

TIMBER INDUSTRY CONSOLIDATION AND THE NEED FOR SCALE
APPROPRIATE HARVESTING MECHANISMS
IN ALABAMA'S BLACK BELT

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TIMBER INDUSTRY CONSOLIDATION AND THE NEED FOR SCALE
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THESIS ABSTRACT

TIMBER INDUSTRY CONSOLIDATION AND THE NEED FOR SCALE

APPROPRIATE HARVESTING MECHANISMS

IN ALABAMA'S BLACK BELT

Arnold M. Brodbeck IV

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The consolidation and technological development of the forest industry in west Alabama's Black Belt has lead to a growing disjunction between the needs of small forestland owners and the capabilities of logging operations harvesting timber. Small timberland owners with limited timber volume are increasingly finding management and economic returns difficult as high production logging operations, geared towards larger timberland owners, are unable to harvest on their land. This thesis begins by

characterizing the current logging systems operating in a four county research region of Alabama's Black Belt. The thesis then identifies the challenges that are faced by small-scale loggers that have limited their ability to operate in west Alabama. The thesis then identifies the specific logging equipment and operations that are available and adaptable to the needs of small timberland owners in Alabama's Black Belt.

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CHAPTER 1

INTRODUCTION

INTRODUCTION

The fragmentation of private property and the growing size and production constraints of logging crews and sawmills have left an increasing number of small timberland owners without a timber market. Additionally, forest product mills nationwide and in Alabama have experienced a decrease in the number of mills through corporate consolidation while maintaining constant output production, which has further narrowed the market for small timberland owners.

Consolidation has reduced employment in mills and has reduced the number of small scale harvesting systems once common in Alabama. Conventional logging crews have conformed to the needs of large sawmills and pulp and paper mills, which require tree length systems and effectively ending shortwood harvesting operations. The net result has greatly reduced the timber management options available to small timberland owners (i.e. under 20 acres).

The introduction of these new technologies (i.e., high production logging and processing systems) has industrialized the process of timber production to the point of excluding and eliminating many small logging operations unable to compete and conform

to the limitations set by modern sawmills. Small logging operations, using older equipment, are generally not as cost efficient as the larger operations using modern, fully mechanized systems. In today's market only the loggers with the lowest cost per ton are able to remain in business as mill reduce delivery prices to provide competitive stumpage rates. The consequence is a need for scale appropriate (i.e., small) logging operations along with a viable market to provide small timberland owners an opportunity for timber management.

The need for management options for landowners, especially small landowners, is growing. As the timber industry continues to grow and the economic constraints of not only sawmills but of loggers increase, landowners are forced into clearcuts while selective harvesting is increasingly rare (Greene et al. 1997). Additionally, small landowners are often forced to accept lower prices for their products due to the high costs associated with conventional logging crews operating on small acreage (Greene et al. 1997). The issue of sustainability gains importance as landowners, especially smaller ones, find clearcuts to be the only management tool available under the current market. The lack of a forestry market with applicable scale-appropriate systems is gaining significance as land fragmentation becomes more prevalent (DeCoster 1998). Lester DeCoster writes "We may be most comfortable and effective dealing with big pieces of land, but since the large sizes in our markets are static, the middle is shrinking, and the bottom is growing, a decision not to invest in marketing to small sizes is a decision to be less and less relevant to more and more people, and to a significant quantity of land" (DeCoster 1998: 28).

Small land ownerships are increasing while the technology used for harvesting timber is increasingly becoming too costly to operate on tracts less than 50 acres and increasingly difficult on tracts under 20 acres (Greene et al. 1997). The options available to small land owners have largely disappeared with the loss of shortwooders, animal loggers, and the small more manual labor oriented operations needed to make these smaller tracts profitable (Greene et al. 1997; Toms et al. 2001).

This thesis will not only document sawmill consolidation in Alabama but work to identify scale appropriate logging operations needed to meet the needs of the growing number of small timberland owners not only in the Blackbelt, but nationwide. Additionally, the identification and implementation of small scale logging operations will potentially provide a source of employment and community revitalization.

The Black Belt counties of Alabama will be the focus of this thesis (i.e., Greene, Sumter, Marengo, and Hale) (Figure 1). These counties are some of the poorest counties in the United States and have some of the highest unemployment rates in the country. These counties have been classified as timber-dependent on the basis of employment and income derived from the forest industry (Norton et al. 2003). The lack of jobs and economic opportunities is adding to the high rates of out-migration that plague community stability and progress in the Black Belt region of Alabama (Norton and Bailey, unpublished). The consolidation of not only the pulp and paper industry, but of the sawmilling industry, has decreased employment opportunities and, thus left many rural residents in the Black Belt without jobs or alternative industries. Additionally, the shift of logging operations to high production tree-length systems requiring high capital investments (i.e. \$250,000 to \$750,000) has not allowed for easy entry or transition from

the previous low capital truck and chainsaw shortwood crews (Bliss and Flick 1994; Toms et al. 2001; Bailey et al. 1996). According to Bailey et al. (1996), this increased mechanization has reduced manual labor traditionally performed by poor rural African Americans, adding to the need for employment in rapidly declining timber dependent communities.

THE GROWING IMPORTANCE OF FORESTRY IN THE SOUTH

Timber production across the United States between 1991 and 1996 has declined by 8%, but in the South timber production has increased by 11%, establishing the South as a forest industry powerhouse (Johnson 2001). The national decline in timber has been most evident in the Pacific Coast Region where production declined by 37% between 1991 and 1996 (Johnson 2001). The increasing environmental restrictions on old growth forests and endangered species in the Pacific West has led to a shift in production to the South (Prestemon and Abt 2002). In 1996 the South accounted for 58% of all roundwood production and had 7 of the top 10 timber producing states in the country (Johnson 2001). Additionally, the South accounted for 40% of the nation's total timberland. Non-industrial private forests owners in the South produced 6.3 billion cubic feet of the total 16.4 billion cubic feet of timber produced in the United States in 1996 (Johnson 2001). Of the 9.8 billion cubic feet produced by private non-industrial forest owners in the United States, the South produced 6.5 billion cubic feet of this total or 66% (Johnson 2001). The importance of private forest land in the South and the income derived from timber production by private timberland owners is substantial. The nation as a whole depends on timber produced by private non-industrial forest owners in the South.

IMPORTANCE OF FORESTRY IN ALABAMA TODAY

The importance of the timber industry as an agricultural commodity in Alabama is second only to the broiler industry (Alabama Forestry Commission 2002). The timber industry is second in cash receipts and accounts for 15% of all commodities (Alabama Forestry Commission 2002). Over the past 25 years the timber industry has increased by 600% in Alabama (AL Forestry Commission 2002).

In 2000 timber manufacturing in Alabama accounted for 18% of the total manufacturing employment in the State (Alabama Forestry Commission 2002). It directly employs 64,500 people and contributes a payroll of over 2 billion dollars to Alabama's economy from 1,900 establishments (Alabama Forestry Commission 2002). (This total number of employees and establishments include not only lumber related industries but also pulp and paper and furniture related industries as well.) Additionally, timber manufacturing by some accounts is the leading manufacturing industry in Alabama, contributing \$5.3 billion in value added in 2002, and \$12.2 billion in value of shipments in 2002 (Alabama Forestry Commission 2002).

The industry has been growing in Alabama for the past 60 years after an initial decline following the cut-out-and-get-out logging operations ending in the early 1920s (Williams 1989; Prestemon and Abt 2002). Alabama's forestland has grown by one million acres between 1990 and 2002 to reach 22.9 million acres or 71% of the entire State's land cover in 2002 (Alabama Forestry Commission 2002). Forest ownership in Alabama is primarily in the hands of private landowners accounting for 70% of commercial forestland (Alabama Forestry Commission 2002). Non-industrial private forest owners own 70% of the forestland while industry owns 25% (Alabama Forestry

Commission 2002). The production of timber is primarily in the hands of private non-industrial individuals in Alabama, providing them with an important source of income and the nation with a natural resource.

IMPORTANCE OF FORESTRY IN THE BLACK BELT OF ALABAMA

The Black Belt region of Alabama has been characterized as timber dependent (Howze et al. 2003). Timber dependent counties are counties with 25% or more of manufacturing jobs in forest-based industries (Bliss and Bailey 2005). Cotton at one time dominated the Black Belt, but today the region is best known for persistent poverty, poor education, and high out-migration rates (Bliss and Bailey 2005). The decline of cotton allowed for the introduction of the timber industry, which in 1988 accounted for 17% of total employment and 38 percent of manufacturing employment in the Black Belt (Bliss and Howze 1993). This is in contrast to 20% of the manufacturing employment in non-timber dependent counties (Bliss and Howze 1993).

The Black Belt region has a large portion of Alabama's forest products manufacturing facilities (Bliss and Howze 1993). The region is home to "five of 13 pulp or paper mills, six of 13 particle board or plywood mills, five wood treatment plants, eight chip mills, 45 sawmills, 20 specialty mills, and 5 veneer mills" (Bliss and Howze 1993: 66). This high concentration of forestry manufacturing plants contributes to the importance and dependency of the Black Belt region to the timber industry.

The communities in the Black Belt are tied to forest resources, from forest landowners and loggers to manufactures. Employment for many rural residents in the forest industry has increasingly declined as capital replaces labor in the dominant forest

industry. Additionally, technology is increasingly geared towards large timberland holdings where profit maximizing is easiest. Nonetheless, there are many thousands of Alabamians who own small timber parcels, and many of these want to harvest timber. There is a strong need to reintroduce small-scale operations to allow for community revitalization and survival in a region characterized by large-scale, technologically dependent forest operations.

OBJECTIVES

This thesis begins by working to understand the current situation in the research area by characterizing and identifying the current types of logging systems operating in the Black Belt region of Alabama. To understand why small-scale logging operations have declined and for the most part disappeared, the thesis then takes a historical look at the history of sawmill consolidation and other factors that led to the decline of small-scale operations. Close attention will be paid to the limitations and difficulties faced by small operators to understand how best to reintroduce these systems. In understanding the current situation in logging operations, the need of small timberland owners and the history of small-scale operations, this thesis seeks to identify small-scale operations that are both economical and adaptable to the Black Belt.

Objective 1: Characterize and document the logging systems currently operating in the four county area of Alabama's Black Belt region.

Objective 2: Identify the factors and limitations that led to the decline of small-scale loggers in the Black Belt.

2.A. History - Document sawmill consolidation and the changes in employment between 1880 and 2000.

2.B. Technology - Examine the impact of capitalization in logging and the ability of small-scale loggers to compete with high production long-wood systems.

2.C. Socio-economic – Describe the socioeconomic factors that affect the ability of small-scale loggers to operate

Objective 3: Identify current small-scale harvesting operations working in the black belt or that have operated in the black belt that are locally adaptable to perform harvests economically on small (i.e., under 20 acres) timberland parcels.

CHAPTER 2

LITERATURE REVIEW

INTRODUCTION

The importance of NIPF owners in the United States, the South, Alabama, and in the Black Belt specifically, is substantial and growing. National markets depend on local privately managed timberland for the production of timber products consumed daily by Americans. The issues of timberland fragmentation and industry consolidation are well documented phenomena, and are current and future challenges that could not only impact communities dependent on timber production but the market as a whole as the dysfunction between scale and profitability diverge. Shrinking tract sizes or timberland fragmentation leave a growing number of timberland owners outside the current timber market geared toward large producers. In addition, the forest industry has continuously consolidated its operations replacing labor with capital increasing unemployment rates and decreasing community growth.

Conventional logging operations today are finding it increasingly difficult to log on small tracts as the cost of logging increases while timber prices remain low. The capital intensive equipment is expensive to insure, maintain, and transport (especially on small tracts where loggers will have to move more because of limited volume per tract)

thus, requiring high levels of production to make these systems profitable. The need for scale-appropriate logging continues to grow as the industry moves away from the management of small timberland tracts.

PERSISTENCE OF POVERTY IN THE BLACK BELT

Black Belt counties of Alabama have ranked in the top 100 poorest counties in the United States (Bliss and Bailey 2005). According to Bliss and Bailey, the average rate of poverty in 16 rural non-metropolitan Black Belt counties in Alabama was 28 percent in 1997 (Bliss and Bailey 2005). The replacement of labor with capital has been evident not only in the primary manufacturing industries of sawmills and pulp and paper mills, but in the secondary supporting industries of logging and transportation (Bliss and Bailey 2005; Bliss and Flick 1994). Alabama forest products industry's employment between 1990 and 1999 declined by 25 percent from 55,600 to 41,500 employees (US Census Bureau 1990, 1999; Bliss and Bailey 2005). Despite the economic boom for industry, this resulted in a loss of jobs for many rural Alabamians, especially those in the timber dependent counties of the Black Belt. The need for labor is declining in an industry where human capital is increasingly replaced with technology (Bliss and Bailey 2005).

Additionally, the consolidation of pulp and paper mills (16 to 14 mills in the last ten years) (Bliss and Bailey 2005) and the consolidation of sawmills (from an all time high of 1,926 in 1920 to 138 in 1997) (U.S. Census Bureau 1920, 1997) has left many forest manufacturing employees without work. Sawmill consolidation is a growing problem in rural Alabama due to an additional 17 sawmills closing between 1997 and 1999 (U.S. Census Bureau 1997, 1999). Persistent poverty in the Black Belt is a way of

life and is increasing as employment becomes scarcer and the replacement of human labor with capital is not only a problem in mills but in the supporting industries, such as logging (Bliss and Flick 1994).

The origins of poverty in the Black Belt region can be traced to the slavery-plantation era (Howze et al. 2003; Bliss and Howze 1993). African-Americans make up 55 percent of the population in the 17 county area of the Black Belt (Perez et al. in Preparation). Historically, and up until the 1970s, African Americans were excluded from many mill jobs, which were primarily held by the white population (Perez et al.; Bliss and Bailey 2005). The decline of cotton in the 1930s led to fewer jobs for the African American population, who historically derived much of their employment from farm labor (Howze et al. 2003; Perez et al. in prep.). Apart from the lack of jobs and the segregation still present in the forest industry today, the African American population has suffered a decline in landownership and tract size (Bliss and Howze 1993). Timberland owners in timber dependent counties are the segment of the population who profit most from the timber industry, by selling timber to the numerous mills in the Black Belt (Bliss and Howze 1993). However, this population is predominantly white. The African American population makes up only 4 percent of the private non-industrial forestland owners in the Black Belt (Bliss and Howze 1993).

CONSOLIDATION OF THE TIMBER INDUSTRY

Lessons can be learned from the decline in employment in the lumber industry in the Pacific Northwest in the 1970s, which had devastating impacts on local timber producing communities (Weeks 1990). Oregon, like the Black Belt of Alabama, was

easily classified as timber dependent (Weeks 1990). Ten percent of Oregon's employment and 42 percent of manufacturing employment was in the lumber and wood products industry (Weeks 1990). The closing and consolidation of sawmills in the Pacific Northwest caused major social and economic upheavals in the communities (Brunelle 1990). Employment declined as more efficient sawmills replaced older more labor intensive mills while boosting production (Brunelle 1990). The process in the South and in the Black Belt of Alabama specifically has begun to follow similar trends, of larger companies, with fewer employees, utilizing highly mechanized processing and extraction systems, and shrinking opportunities for communities.

The timber industry in the United States as a whole, and in Alabama specifically, has experienced a process of consolidation (U.S. Census Bureau 1920, 1997). Research concerning the effects on pulpwooders and small scale loggers in the Black Belt has been documented by Bliss and Flick (1994), who identified the process of connecting the woods to the mill as a major source of employment and income for many rural Americans. The loss of jobs due to increasing technological advances (and the subsequent consolidation) in logging and pulp and paper mills has been substantial and devastating to timber dependent communities (Bliss and Flick 1994). Pulp mills in earlier years favored the small producers who could handle the products using manual labor. Shortwooders (or small-scale loggers who harvest pulpwood in 4 foot bolts, often utilizing a specialized bobtail truck or a small 10 wheel truck) thrived and the capital investments were few, a "saw and truck" was all that was needed (Bliss and Flick 1994). The introduction of whole tree logging and mill utilization pushed for larger machinery with substantially higher production costs and outputs thus requiring fewer loggers

(Toms et. al. 2001; Bliss and Flick 1994). Small-outdated saw mills closed and small loggers were no longer needed (Toms et al. 2001; Bliss and Flick 1994).

The pulp and paper industry like the logging industry has experienced a process of corporate consolidation (Sinclair et al. 2003). Sinclair explains the process of consolidation in the pulpwood industry as a system of making decisions to increase profits in the capitalist market place, most often accomplished through a series of mergers and acquisitions producing a few corporate giants. The results today in Alabama are that 11 companies own 14 major paper mills, and this means declining jobs for rural Americans as older mills close (Sinclair et al. 2003). Sinclair et al. (2003) illustrates this drop in employment by writing, "...in 1998 Alabama's pulp, paper and board mills employed 13,873 compared to 14,788 in 1997".

The same study by Sinclair et al. also concluded that corporate consolidation would economically affect rural communities by replacing employment with capital (Sinclair et al. 2003). Consolidation places pressure on loggers by dropping per unit prices and forcing higher production from loggers. This has caused an increase in mechanization and shrinking opportunities for small timberland owners with insufficient acres or timber to satisfy economic requirements of the harvesting equipment.

Nationally, the sawmilling industry has undergone a process of corporate consolidation much like the pulp and paper industry. The outcome has been a decline in employment and in the number of sawmilling establishments, while production has remained relatively steady. Employment in sawmills for wage earners has decreased nationally from 292,720 employees in 1920 to 102,395 in 1997 (U.S. Census Bureau 1920, 1997). Corresponding with the decline in sawmill employment, sawmills have

decreased nationally from 29,534 in 1920 to 4,403 in 1997 (U.S. Census Bureau 1920, 1997).

Similarly in Alabama, employment and the number of sawmills have decreased, while boasting unchanged timber production output. Employment in Alabama has decreased in sawmills from 16,034 in 1920 to only 5,055 in 1997 (Figure 2) (U.S. Census Bureau 1920, 1997). The number of sawmills has decreased in Alabama from an all time high in 1920 of 1,926 sawmills to 138 in 1997 (Figure 3) (U.S. Census Bureau 1920, 1997). Output has not followed the declining trend, but has remained roughly constant from its estimated output in 1920 of 1.8 billion board feet to roughly 1.9 billion board feet in 2002 (U.S. Census Bureau 1920; Alabama Forestry Commission 2002). However, it must be noted that when researching census data between 1920 and 1997 there were changes in the measures used for describing mill outputs. Prior to 1960 outputs were measured in Board Feet, but in later years it was measured in terms of value added, which was of little use in this setting. The 1.9 billion figure is actually a measure of mill inputs and is thus not completely accurate. However, after discussing current mill outputs with experts in the Auburn School of Forestry and Wildlife Sciences it was concluded that outputs had more than likely remained fairly consistent.

These significant changes in the structure of the forest industry and timber production are replicated across the timber producing regions of the Nation, lending significance across timber dependent regions of rural America. Jobs are decreasing for many rural Americans as well as the opportunities for small timberland owners, as small logging operations and local mills succumb to larger market demands. Thus, landowners, and especially small timberland owners, are left with fewer management alternatives and

opportunities for timber management and needed income (Bailey and Dubois 2003; Sinclair et al. 2003).

NATIONAL LAND FRAGMENTATION AND ALABAMA'S LAND CONSOLIDATION; A CONCERN FOR SMALL TIMBERLAND OWNERS

Nationwide the tendency of private forestland has been towards fragmentation or parcelization (DeCoster 1998; Mehmood and Zhang 2001). "The percentage of the Nation's private forestland held by the largest 1% of private forest owners fell from about 48% in 1978 to about 45% in 1993" (Bliss et al. 1998: 404). Mehmood and Zhang (2001) have suggested that "timber supply has a positive relationship with holding size" and DeCoster estimates that by the year 2010, 95% of private forests will be in parcels less than 100 acres in the United States (Mehmood and Zhang 2001). According to research conducted in Georgia by Greene et al. (1997), today's logging operations require tracts of at least 50 acres to be economically viable, and are discouraged from tracts smaller than 20. The lack of opportunities in the forest industry for smaller timberland owners outside the current economically viable criteria may cause the conversion of land to other uses, and therefore result in a loss in timberland (DeCoster 1998; Mehmood and Zhang 2001). Donald Dennis (1992) writes that landowner surveys have revealed that many small forest owners have changed management objectives away from timber production in the Northeast. Decreasing tract size and management options for small timberland owners would limit options available for sustainable management of both timber and wildlife (Dennis 1992).

In Alabama, and especially in the timber dependent counties of the Black Belt, the national trend towards fragmentation is quite the opposite. According to Bliss et al. (1998) the counties in the Black Belt have experienced a process of forestland consolidation. “The share of Alabama’s private forestland held by the largest 1% of owners grew from 51% in 1978 to 58% in 1993” (Bliss et al. 1998: 404). However, most forest owners in Alabama own less than 10 acres each. While most of the timberland is in tracts greater than 100 acres, most of the owners are not (Bliss et al. 1998). In timber dependent counties, where this consolidation trend is most evident, this leaves a large portion of small woodland owners without a market. The 8% of forest owners who own 80% of forestland are the representative population that profit in timber dependent counties in Alabama, while the vast majority or 92%, do not (Bliss et al. 1998). This is the population the project is hoping to make the market available to. The significance is applicable to both the larger national population who own small parcels and to the majority of landowners with small tracts in Alabama’s Black Belt.

INCREASING LOGGING COSTS

The continued increases in the costs of running logging operations have impacted the ability of loggers to harvest small tracts. The average cost of logging is rising while the prices paid for logging services are continuing to decline, creating a widening gap between logging services and payments (Stuart et al. 2003)). Stuart (2003) found that labor, insurance, contracted services (most commonly trucking), administrative costs and equipment costs are increasing, making logging increasingly more difficult in the southern United States.

The cost of harvesting equipment has increased substantially, as was indicated in a study conducted at Auburn University in 2002 (Brinker et al. 2002). The increasing logging costs and the high capital investment needed for conventional logging equipment have caused many loggers in the South to keep equipment five years or more (Stuart et al. 2003). However, as Stuart et al. (2003) explain, the life of some of this equipment is about three years and after five it has lost all its depreciation as defined by the IRS, thus most equipment in logging firms today is “approaching or past the end of its economic life” (Stuart et al 2003: 21).

Research conducted by Sun and Zhang (2003: 15) explains:

When the market is oligopsonistic or more concentrated, industrial firms are in a better position to bargain with loggers for a lower price for delivered wood. As the paper industry is more concentrated than the wood products industry and has become increasingly so in the South over last two decades, paper mills are able to reduce the harvesting margins for pulpwood.

Thus, while logging costs are increasing timber prices are being lowered, pushing many loggers and especially small loggers out of the market.

Additionally, a study conducted by Kittredge in Massachusetts indicated that the most important factor to loggers is the relative value of the wood, which in recent years has been in decline (Kittredge et al. 1996). The combination of forest industry consolidation, lower timber prices, and rising logging costs is straining many conventional loggers and forcing small loggers out of the market or to operate on the fringes and often illegally. These combinations of factors have reduced the opportunities that small timberland owners have to manage their timber. Small tracts with limited

volume are unlikely to be harvested under the current conditions where loggers are being pushed to the breaking point and small-scale loggers are likely in decline.

DECLINING TIMBER PRICES

The average stumpage rate of wood throughout the South has suffered drastic declines, which have impacted timberland owner's ability to manage and sell timber. "From 4th Quarter 1997 to 4th Quarter 2002, all pine prices have dropped: sawtimber 13%, chip-n-saw 24%, and pulpwood 41%. Hardwood sawtimber has risen 10%, while pulpwood has dropped 17%" (Vardaman 2003). These declines according to Timber Mart-South (2003) in some cases were so sharp that they did not allow mills to operate profitably and pushed many loggers to the "breaking point".

In Alabama an over supply of timber and especially pulpwood in part due to the Conservation Reserve Program (CRP) initiated by the United States government to instigate farmers to retire highly erodible or environmentally sensitive cropland in return for an annual-per-acre rent, in addition to drought, and a general economic downturn have impacted the ability of timberland owners to harvest pulpwood (Springer 2003). In 2001 and 2002 timber prices in pine pulpwood dropped to a ten-year low of 16 dollars per cord or roughly 5 dollars a ton (Timber Mart-South 2001, 2003). Prices for pine pulpwood in 2003 have increased moderately in some regions to as high as 20 dollars per cord, but the market for pine pulpwood is expected to remain weak and possibly decline (Springer 2003). Hardwood pulpwood prices have remained slightly higher than pine pulpwood at 21 dollars a cord after an initial decline, and thus remain weak (Springer 2003). Pine sawtimber remained strong in 2003 after initial losses between 1997 and

2002 (Springer 2003) and continued to increase moderately into 2004 (Timber Mart-South 2004).

The drastic declines in timber prices and especially in pulpwood have impacted the ability of timberland owners to manage their forests. This is especially true for small timberland owners who already experience suppressed timber prices due to the economic limitations of conventional, capital intensive logging operations. Loggers may have been able to harvest smaller tracts when timber prices were higher but today they are increasingly striving to increase production and efficiency to remain in business. Today, loggers seek to harvest large tracts composed of sufficient timber volumes to merit their moving, equipment, insurance and labor costs, which has become increasingly difficult with depressed timber prices.

THE NEED FOR MANAGEMENT OPTIONS

The fragmentation of forestland and shrinking available management tools to small landowners could lead to a shift away from forestry production. Many studies have illustrated the trend for landowners to value timber production lower than other uses (i.e. recreation, wildlife, aesthetics) (Argow 1996; Birch 1996). In a study conducted by Birch in 1995 he illustrated that only 3 percent of non industrial private forest landowners listed timber production as their primary objective (Birch 1996). Thus, the lack of opportunities under the current system could cause the conversion of land to other uses, and therefore result in a loss in timberland (DeCoster 1998; Mehmood and Zhang 2001). Donald Dennis (1992) writes that landowners' surveys have revealed that many small forest owners have changed management objectives away from timber production in the

Northeast. With the growing number of small timberland owners and the dependence of the timber industry on private land for lumber, it is only logical that scale-appropriate systems be developed to suit the needs of the growing number of small landowners.

There are indications that large forest landowners have more management options available and manage their forests more intensively than small landowners (Straka et al. 1984). This conclusion is logical considering that the key determinants in investment in private non-industrial forests have been commonly understood to be tract size and the amount of merchantable timber present (Straka et al. 1984). Under the conventional system small landowners are disadvantaged; they have fewer management options available to them, and are either excluded from the market or are forced to sell their timber at a lower price (Greene et al. 1997). A study conducted by Greene et al. (1997) argued that small timber tracts had economic disadvantages, the cost to loggers was too high and the equipment used was not well suited for such small land ownerships.

THE NEED FOR SCALE APPROPRIATE LOGGING

The shift of logging operations from a more basic system requiring limited capital investments and requiring hand labor has changed into an operation requiring large capital investments and high output technology. The effects of a shift like this affect many aspects of the logging industry. First, mechanization increased competition by reducing the number of loggers needed to provide the necessary wood. Those with available capital succeeded and mechanized while smaller loggers faded away (Bliss and Flick 1994). Second, the new mechanized loggers were under economic constraints to produce sufficient wood per week to pay the high costs of machinery; this eliminated the

possibility of loggers working on small land holdings (Bliss and Flick 1994; Greene et al. 1997). This additionally limited the types of cuts loggers could perform. Production had to be met, and logging job quality suffered. Third, and finally, the introduction of mechanization, while increasing wood supply, decreased the required employment thus causing available jobs to rural Americans to decline.

Various types of research have been conducted identifying alternative forms of small scale logging for small landowners. Christopher Toms worked on a project identifying animal loggers in Alabama (Toms et al. 2001). The project looked at the techniques used and the market niches in which these low-impact harvesting techniques occupy (Toms et al. 2001). Toms emphasized the importance and desirability of animal logging, but also examined its dim future (Toms et al. 2001). There were 50 active animal loggers in Alabama in 1998 (Toms et al. 2001), and while their numbers are shrinking their desirability may be growing. Apart from the need for such systems by small landowners a “survey of natural resources managers in the northeast U.S. found that 58% agreed with the statement: “If there were loggers who used animals in my area, I would use animal logging over conventional methods in some situations”” (Bailey and Dubois 2003; Egan 1998). The desirability of animal loggers is growing. An additional survey by Toms in 1999 illustrates this by showing 82% of animal loggers reported having no down time in the previous year (Toms et. al. 2001).

Research conducted at Virginia Polytechnic Institute by Robert Shaffer has suggested the use of farm tractors for timber extraction (Shaffer 1998). Small farm tractors would be able to operate on small land holdings performing selective cuts with minimal damage in the way of soil compaction and site damage (Shaffer 1998). The

relatively low costs of this equipment in contrast to conventional equipment could allow for selective cuts on small areas to be a successful enterprise (Shaffer 1998). The tractor can be adapted to perform much like a skidder or forwarder (Shaffer 1998). The research was mainly aimed at farmers seeking alternative income; however this research can be adapted and utilized in areas where farming equipment may be available due to declining agriculture, much like the Black Belt.

McCallum in 1993 published a manual in Canada on equipping tractors for forest operations (McCallum 1993). The research, much like Shaffer's, identified mechanisms that could be attached to tractors to incorporate them into logging (McCallum 1993). Additionally he identified advantages (i.e., lower purchase cost, maintenance and overall versatility) of the farm tractor over conventional forestry equipment (McCallum, 1993).

Wilhoit et al. (1999) in researching ways to economically thin the vast pine plantations of the South identified harvesting systems combining small conventional harvesting equipment (i.e., hydraulic shear harvester) and farm tractors. The capital requirements, while being higher than animal logging and farm tractor logging (i.e., \$75,000 to \$150,000), could provide smaller landowners with an intermediate type logging crew (Wilhoit et al. 1999). The overhead costs to loggers would be far less than the \$500,000 commonly present in conventional crews (Bliss and Bailey 2005). The reduction in overhead would enable loggers to operate on smaller tracts and possibly open the market for more loggers.

The market niches for these small operations are growing, as land fragmentation nation wide increases. In the United States 94% of forest landowners own 1 to 99 acres and this number is expected to increase (Toms et al. 2001; Birch 1996). Additionally, an

estimated 12.6 million acres of commercial timber or 250,000 timberland owners in Alabama, Georgia, North Carolina, and Tennessee own holdings of 50 acres or less (Brown 2004; Hartsell and Brown 2002; Schweitzer 2000; Thompson 1998). Greene et al. (1997) documented the economic limitations for conventional systems and estimated that harvesting would be difficult if not impossible on tracts of 20 acres or less. This gains significance when the national ownership size is headed towards 17 acres (DeCoster 1998). DeCoster emphasized the need for scale-appropriate systems by writing “we need new approaches and technologies designed for small parcels” (Decoster, 1998: 28).

OPPORTUNITIES FOR SMALL-SCALE SAWMILLING

The limited existence and the growing need for these small-scale harvesting operations provides both an opportunity and challenge to communities in the Black Belt. The opportunities arise from the introduction of micro-enterprise, allowing local people to provide small-scale services to timberland owners. However, the challenges begin with the limitations small-scale loggers have with delivering wood to mills. Many mills often require insurance (often in excess of 1 million dollars), logger certification, and tree length products (most small-scale logger buck trees into 16 foot logs to make handling and transportation easier), which are beyond the financial capabilities of small-scale loggers.

Thus, there arises a need for small-scale consumers of raw products, such as portable sawmills, which can process logs and produce lumber that can be sold or used locally. Extensive research and application of small-scale sawmill has been conducted in

the third-world setting and in remote areas of Australia, where limited markets and poverty are common, much like in west Alabama. Research conducted by Martin with the Zuni Pueblo, New Mexico used portable sawmills to facilitate home building in an impoverished reservation (Martin 1998). He encountered various difficulties from identifying harvest areas, federal restrictions, and profitability thus experiencing limited success.

Tyron Venn conducted research on using small-scale sawmills in Queensland Australia to understand the benefits and costs of the operations to timberland owners. He saw the sawmill as a way of harvesting limited timber volumes by bringing the mills to the landowner, eliminating transport costs, increasing sawtimber recovery from logs, limited labor, low setup costs, and low cost of entry into the market (Venn et al. 2004). His finding, however, for Queensland found that the milling costs were excessively high due to inexperience of sawmillers and difficulty of sawing small irregular logs and thus a need arose for “low-volume, high-value niches, where buyers are willing to pay a premium for unique properties of these timbers” (Venn et al. 2004: 22). David Smorfitt conducted research on small-scale portable sawmills working in a niche market providing wood for exotic cabinetry in north Queensland, Australia (Smorfitt 2003). The success experienced by these sawmillers was varied due to the increased competition from foreign and softwood markets and the use of non-timber products such as plastics (Smorfitt 2003). He found that small sawmillers were unwilling to update or make additional investments to their equipment due to the belief that the market was failing (Smorfitt 2003).

The limited successes of these enterprises are a cause for concern for those looking at ways to implement these systems in west Alabama. The realization that these enterprises operate in very specialized markets and on the edge of profitability, especially when attempts are made to move beyond local markets and compete with outside or international markets. The hope in the Black Belt is that community members can acquire portable sawmills and work in conjunction with small-scale loggers and timberland owners to provide locally produced timber products that can in turn be used in the community to improve dilapidated housing. Additionally, the products produced by portable sawmills could be used in secondary manufacturing (i.e. wood for furniture, paneling, flooring, molding etc.), which as John Bliss (1994) emphasizes are limited in this region and could be sources of additional employment and local business.

CHAPTER 3

METHODOLOGY

GENERAL APPROACH

The general approach taken on this thesis was using a semi-structured interview process involving face-to-face semi-structured interviews (LeCompte and Schensul 1999). Convenience, opportunistic, and snowball sampling methods (Ritchie et. al 2003) were used in identifying and sampling the desired community members. The interview script used was written so as to understand the functionality of currently operating logging systems, the reasons for the decline in small-scale systems, and the social and physical dimensions of applying small-scale logging operations to small timberland owners in West Alabama.

RESEARCH SITE

This project has chosen Hale, Greene, Sumter, and Marengo counties as the study site for the thesis (figure 1). These four contiguous counties are located in the heart of the Black Belt region in Alabama and have been classified as timber-dependent counties suffering from persistent poverty (Norton 2001; Howze et al. 2005). These Black Belt counties are

a unique region in Alabama that combines a high production capital intensive timber industry with high poverty levels, ranging from 26% to 39% in the research area, when compared to 16% under the poverty level for the rest of the state (U.S. Census Bureau 1999, 2000). The four county of the Black Belt also has a large African American population (ranging 52% to 80% in the research area), which is substantially higher than the 26% in Alabama as a whole (U.S. Census Bureau 2000). Even with the largest concentration of forest manufacturing facilities in the State (13 pulp and paper mills, 45 sawmills, and 8 chip mills), the Black Belt manages to have been ranked in the top 100 poorest counties in the country (Bliss and Bailey 2005).

The presence of the forest industry is unmistakable in west Alabama. Travel on roads is shared with innumerable log trucks hauling pulpwood, chip-n-saw, and sawtimber forest products to the numerous mills strewn across the four county region. Loblolly pine planted in support of the forest industry mills dominate much of the rural scenery with only small segmented hardwood forests and pastures breaking the monotony. Logging crews in matching uniforms are common scenery in local diners and gas stations.

However, the irony of west Alabama is more reminiscent to developing “third World” culture, economy, and community than it is to developed “first World” America. Across from state-of-the-art forest manufacturing facilities producing building materials it is not uncommon to find dilapidated housing and appalling poverty. Segregation and racial distrust stemming from the slavery and Civil Rights era are still prevalent and remain a strong part of west Alabama culture. The combinations of abundant forest

resources, a dominant forest industry, unemployment, and poverty create the uniqueness that is west Alabama's Black Belt.

Researchers are drawn to this unique setting and its unmistakable needs. Research in community forestry has been conducted in West Alabama for the past 15 years. Drawing researchers such as Conner Bailey, Mark Dubois, and John Bliss and graduate students such as Sarah Crim and Joni Fisher Norton who have recently completed research in the Black Belt and have provided a good base for continued research in this impoverished region (Crim 2003; Norton 2001).

Joni Fisher Norton conducted research in 2001 looking at timber dependency, economic diversity, social capital, and community development in Hale, Greene, Sumter, and Perry counties (Bailey and Dubois 2003). Sara Crim conducted research with female minority landowners in the Hale County (Bailey and Dubois 2003). This research provides a foundation for continuing research and identifies community needs for small minority land owners (Crim 2003).

Hale County was specifically chosen because it is the home base for Auburn University's School of Architecture's Rural Studio, which has been working in the Black Belt since 1993 (Bailey and Dubois 2003). They have succeeded in providing poor rural Americans with homes using materials often found within the community, and they have expressed interest in working with this project (Bailey and Dubois 2003). The Rural Studio has succeeded in gaining community support and has been identified as a possible home base for researchers trying to become established and known within the community (Bailey and Dubois 2003).

The study area is home to HERO or Hale Empowerment and Revitalization Organization and The Federation of Southern Cooperatives, who are both interested in assisting researchers wherever necessary (Bailey and Dubois 2003). These organizations are working in west Alabama to help revitalize the community through education, job placement services, micro enterprises (i.e., small scale farming) and various other services. HERO and The Federation of Southern Cooperatives are valuable sources of information to help researchers become familiar and gain access to the region.

GROUPS INTERVIEWED

In addressing my research objectives (characterizing the logging industry, understand why small-scale loggers have declined, and identify logging systems capable of harvesting on small timberland holding), I focused on three groups of people working in the timber industry in the four county area of west Alabama. The three groups I identified are key to not only understanding how the forest industry works but to understand the different components that are impacting small timberland owners. The ultimate goal in this research is to find ways of integrating small timberland owners into a forestry market that has not responded to their needs and create opportunities for micro-enterprise for small-scale loggers and sawmillers.

This project identified loggers as one of the key groups with the knowledge and expertise to identify the challenges, limitations, and types of equipment needed for providing small timberland owners with management options. Loggers have on-the-ground knowledge and face decisions daily as to the types of tracts they are willing and capable of harvesting and have a unique understanding of the timber business. I

interviewed 24 loggers operating in the research area to understand 1) the types of equipment they are using, 2) the tracts they were harvesting, 3) their limitations in harvesting small tracts, 4) and the equipment they viewed as capable of small-scale harvesting. I interviewed a variety of loggers ranging from large (i.e., incapable of harvesting small tracts and generally uninterested in small-scale logging) to small loggers (i.e., cutting the smaller tracts and possessing unique knowledge as to the challenges in their trade). During my time in west Alabama I interviewed 12 larger loggers and 12 small-scale loggers.

A second key group involved in identifying what tracts of timber are harvested are timber buyers. Timber buyers often hire loggers and buy the timber which loggers are then expected to harvest. Timber buyers in West Alabama often own several logging crews to cut the timber they purchase. For this reason I interviewed several timber buyers ranging from small independent buyers to timber buyers buying timber for the large mills located in the research area. I interviewed seven timber buyers in the region and five timber buyers who were also loggers to understand the possibilities and limitations of harvesting small tracts. The subject matter of the interviews ranged from understanding what type of tracts they generally purchase to understanding the types of loggers they employ.

In this research there is also some interest in linking small-scale harvesting to small-scale processing to enable materials to be produced, processed and consumed locally. For this reason I tracked down and interviewed five small-scale sawmillers operating in the research area. I focused on understanding how their business worked

and the possibilities of linking their type of operation with small-scale logging and small timberland owners.

In total I interviewed 40 loggers, timber buyers and small-scale sawmillers. I spent two and half months in the four county area of west Alabama. I generally spent Tuesdays through Thursdays in the field interviewing the different groups. Following each stay in west Alabama I took the time to transfer my handwritten interview notes to my personal laptop to insure a minimal loss of richness of information. This often gave me time to identify the next group of people I intended to interview and set up meetings or make initial contact. The following section outlines in more detail the techniques I used to interview people, the challenges, and a justification of the methods I utilized.

SAMPLING TECHNIQUES

Making Contact

Many of the smaller loggers could not be found in phone books or on the Professional Logger Manager (PLM) website (this is a state logger certification program common in Alabama to educate loggers in safety, timber management and quality logging), because many do not have the required certifications or insurances and do not want to draw unwanted attention. These loggers are thus difficult to identify and locate in west Alabama. To offset the difficulties of meeting and identifying both conventional loggers and especially small-scale loggers in west Alabama I first attempted to find these people by interviewing and talking to County Extension agents, County Foresters and professional foresters in the region. I hoped that these individuals could identify loggers in the region and provide me with an introduction. Having worked in the forest industry

as a consultant forester I know that loggers are often distrustful. They can be quite cantankerous and unwilling to sacrifice their valuable time to someone whom they don't know and who is asking personal and often uncomfortable questions.

My first interview was with a county extension agent who was very receptive and willing to help me. He called several loggers whom he knew in the region and set up two interviews for me and notified several others that I would be calling within the week. This initial contact went a long way in kicking off my research. It not only gave me confidence but also set up three to four interviews where people were expecting my call and were more than willing to talk to me because I essentially had the "blessing" from the county extension agent. These first few interviews also initiated my snowball sampling technique.

On my first interview I got the names and contact information for three loggers and one of these was a small-scale logger. Thus, my second interview was with a small-scale logger and following that interview I identified one other small-scale logger in the region. By my second week I found that the initial success I had with the county extension agent would not be a common case. I tried other county extension agents, county foresters and some professional foresters and found that people were often unwilling to provide introductions for me to the logging community in their region. They would, however, provide me with names, but, due to the fact that they did not know me personally and were unfamiliar with my intent, they were unwilling to ask loggers to talk to me. This was understandable because for them this was a professional leap of faith in asking a logger in their county who, in some cases, were often prominent people in their community to talk to someone they had only met a few minutes before. Researchers

driving state vehicles and asking confidential information about people's businesses are initially met with suspicion.

These introductions to loggers for the most part did not continue throughout the summer. I was thus forced to call loggers on the telephone without prior introduction or warnings or what is termed a "cold call" to make contact and ask for interviews. This made my job as a researcher far more difficult because I now had to sell myself over the telephone and convince people to meet with me. This technique had varying levels of success, but it was all I had. I often risked sounding like a telemarketer, which is something I was often confused for. However, I was able to convince several loggers to meet with me and I found it especially useful to use another logger's name (who had provided me with their names) as a means to break the ice and give me some credibility. Most of my interviews were set up using this technique and following most interviews I asked the logger if I could use their name as a means of introduction to loggers they recommended.

Snowball Sampling

My most common sampling technique was snowball sampling and basically involved getting loggers to identify other loggers in the region. This often provided me with names, contact information and locations, and allowed me to move throughout the logging population. Most people were willing to give me the names of loggers or sawmiller in the area but were often unwilling to call these people up and let them know I was going to be calling. Some contacts even went as far as asking me not to tell the

loggers they had recommended where I had gotten their name and contact information. Contacts such as these were especially difficult.

Opportunistic Sampling

In addition to Snowball sampling I also used opportunistic sampling at times during my summer in west Alabama. This was a technique of getting interviews when an opportunity presented itself. The best example that comes to mind was an interview I got by following a log truck belonging to a logger whom I had been attempting to contact for some time. I had been interviewing a logger and told him I had been trying to get a hold of this individual. He then mentioned this logger was operating some miles up the road and I should follow one of his trucks up the road, and so I did.

This technique can prove to be difficult but I had success especially with this case due to the logger being friendly and having heard that I was working in the region. I can see how this technique could fail miserably but it does have some merit because it does not allow the logger to avoid you as they often will on the telephone.

Semi-Structured Interviews

A questionnaire or script was written before entering the field. The questions were designed to answer the three primary research objectives I hoped to answer in this research thesis. The three objectives this thesis addressed were 1) characterizing the logging systems operating in Alabama's Black Belt, 2) identifying factors and limitations leading to the decline in small-scale logging, and 3) identifying current small-scale harvesting operations suitable for harvesting on small tracts. My script was thus

comprised of several sections aimed at answering these research objectives. The following are the titles to each of the sections in my interview script.

General Sections for Logging business characterization

1. *Personal Information*
2. *Equipment*
3. *Trucking*
4. *Logging Site*
5. *Labor and Crew*
6. *Production*
7. *Timber Buyer or Broker*
8. *Policy and Regulations*
9. *Small scale loggers*
10. *Technology and Consolidation*

In section 1, I hoped to gain some personal information such as age, years in the business and base of operations. In section 2, I got information about the type of equipment the logger was running and the ages of each piece of equipment. In section 3, I collected information of the trucking side of the logging business including information on whether they used their own trucks or contract trucks and the type of trucks. Section 4, focused on getting information about the types of tracts they were operating on. Information such as typical tract size, smallest tract cut, and site limitations limiting their crews. Section 5, was included to gain basic labor information such as the number of men in the crew, general pay, experience of the labor, and training requirements. Section 6, focused on production to gain an understanding of the number of loads hauled per day/week and hauling distance. Section 7 provided information on where loggers delivered wood and who they went through to purchase the tracts they cut. Section 8 attempted to acquire information about current or past policies that have changed logging and possibly caused some of the consolidation seen in the forest industry today. (This

section was later skipped in most interviews due to poor response from interviewees.) Section 9 was a section directed only toward small scale loggers and asked questions about the challenges they faced in the business. The last section was another section that was deleted or skipped in most interviews due to poor response.

METHODOLOGY JUSTIFICATION

Sample Method

The population of loggers, timber buyers, and small-scale sawmillers were difficult to identify prior to arriving to the field. Logger lists existed only for Professional Logger Managers (PLM) or certified loggers and as well as in some of the county plat books; however, these lists did not often include many of the smaller loggers who are the focus of this research project. For this reason I opted to use snowball and opportunistic sampling methods. This technique allowed me to seek out small-scale loggers often working in conjunction with large loggers, timber buyers, or for themselves and often slipping in under the forestry network radar.

Snowball, opportunistic and convenience sampling allowed me to begin my interview process with the more easily identified larger loggers. Following interviews with these people (who were often well known in the community and easily found) I was then able to ask them to identify other loggers in the region. Using this process I was able to gain access and in some cases a degree of trust when contacting the smaller loggers who proved to be elusive and difficult to contact.

Small loggers often found business not through advertising or holding the proper credentials but rather by reputation or word of mouth. Thus it was only by talking to

loggers, timber buyers, woodyard managers, and mill scalers that I was able to identify who these loggers were and how to locate or contact them. The same was true for small sawmillers who often used their portable sawmills as a means for additional income and were often only known within a fairly limited radius.

Careful attention had to be paid to the biases that exist in this sampling technique. It is easy to fall into the pitfall of only staying within a certain population of loggers, due to the people certain types of loggers are likely to recommend. This bias was something I constantly had to work with, because many of the loggers would tell me that they knew “good loggers” (in their opinion I might add) who would be “willing to talk to me.” I had to time and time again tell them I needed to talk to good and bad loggers and if they could please recommend both. Many times I had to ask if they could identify some minority loggers because often white loggers recommended other white loggers and vice versa for the black loggers. Using these simple techniques I was able to jump into other types of logging systems and using snowball sampling explore the different types of loggers these different logging populations could identify.

This technique, while limiting my statistical options and my ability to build a strong statistical case, was the only plausible way to gain access to this population. Additionally, the numbers of samples collected were likely to be limiting in their ability to be used in a statistical manner. The use of semi-structured interviews limited my ability to collect a large sample, however, anything but semi-structured interviews would not have provided the richness, depth, or accuracy of information found in this study.

CODING

The field research took approximately two and half months during which time 40 interviews were conducted. As the researcher I felt that after two and half months and 40 interviews I had collected sufficient information and found responses had become redundant. I thus felt confident that I had answered my research questions completely and that additional time in the field would not produce significant new information. I thus concluded my time in the field and proceeded to classify my data into varying categories to insure accurate data driven responses to my research questions.

I categorized or coded the data according to the research question that was being addressed. I then created sub-categories within each objective and placed (using cut and paste) exact pieces of text under each category. With this system in place I was able to insure that each research question was closely correlated to the data. This also facilitated the transfer of data into a clear system for answering the key questions sought the research.

CHAPTER 4

LOGGERS IN THE WOODS TODAY; CHARACTERIZATION OF WEST

ALABAMA LOGGERS

INTRODUCTION

The West Alabama counties of Hale, Green, Sumter, and Marengo have long been characterized by poverty, poor housing, and unemployment. These counties, while by most measures poverty stricken are, however, rich in natural resources and full of potential solutions to economic hardships. This region of Alabama is at the heart of the timber industry and has the largest concentration of timber processing facilities in the state. However, in the midst of this thriving industry there has been a growing disjunction between the industry and the large number of small timberland owners who are increasingly finding it difficult to manage their timber.

Timberland owners, loggers, timber buyers and sawmillers can remember a time when small-scale loggers thrived and no tract was too small to cut. However, recent interviews with loggers, timber buyers, and mills proved that the industry was no longer small in scale, but had grown in many ways beyond the reach of small timberland owners. Loggers were faced with the option of modernizing and increasing production or

being forced out of business. This effectively forced many loggers out of business and re-structured an industry that poor rural Americans could easily participate in with relatively limited capital. Small timberland owners found that their tracts were too small to harvest and effectively lost a source of income.

This modernization, which occurred over the past half a century, has not been all negative. While the “small man” has lost his place in today’s forest industry, the industry has become one of the leading industries in Alabama. It provides a large percentage of the jobs in the state and wood production has moved from a local market to national and international markets. The South has assumed a leading role in timber production following the declines in forest production in the once dominate West. Technology was implemented to match expanding timber demand and international competition in the forest products industry. Logging equipment capable of higher production and automated modern mills became common as the industry grew with the demand. The result today is that Alabama is a leading forest products producer in the country.

Additionally, as technology increased production and met the increasing timber demands, it also improved the quality of life for laborers in the forest industry. Mills adopted technology that improved working conditions and increased worker safety. The logging industry, like mills, have also been revolutionized by technology and labor found their jobs more agreeable. Safety drastically improved as mechanization placed workers inside protected cabs. Today, loggers rarely leave the safety of climate controlled logging machinery and accidents are becoming less frequent.

The first stage of this research project was designed to understand the types of logging systems operating in the four county research area of west Alabama. This

characterization provides some of the groundwork needed to understand the types of systems available to timberland owners and the capabilities and limitations of these systems. The first key objective of my interviews was to document the demographic characteristics of loggers, such as age, years in the business, and education. Secondly, I looked at the equipment loggers were using, collecting data on types of equipment, age of equipment, and the number of pieces. Data was also collected on production to understand the amount of wood moved, types and sizes of tract cut, working radius, and suitability for small timber volume tracts. Finally, information was collected on the logging site, timber buyers, and labor to have a comprehensive view of the logging industry today in west Alabama.

LOGGERS CLASSIFICATION

My first method of classification was according to equipment type (i.e., skidder, cutter, chainsaw etc.). However, after conducting a few interviews I found that this method in many ways was inaccurate. Crews operating several pieces of equipment often had limited production and often were out-produced by smaller crews due to a variety of factors such as dealer relations, equipment age, and types of timber harvested. A logger with no quota running newer equipment and only one skidder, loader and harvester was able to haul ten loads a day while a larger logger with older equipment running two skidders, a loader, and a harvester was only able to haul eight loads per day.

I thus developed a method based on production, more specifically on the number of loads loggers hauled on a daily basis. This method was easily operationalized; every

logger knows exactly how many loads he is “moving” per day. This classification goes as follows:

- Large loggers deliver more than 15 18-wheel truck loads per day
- Medium loggers deliver between eight and 15 18-wheel truck loads per day
- Small loggers deliver less than eight 18-wheel truck loads per day

These loads if necessary can be easily translated to a ton or cord basis by estimating the average load on a truck. For 18 wheeler tandem trucks it is estimated at about 26 tons/load and for smaller 10-wheel or bobtail truck it’s about 10 tons/load (these figures were found by asking different loggers and mill weight stations about the average load/truck). However, in following sections data at times will be presented in tons to distinguish the differences in production between loggers operating bobtail trucks, with smaller hauling capacities and loggers operating 18-wheel trucks.

A second and broader classification that I will use is the terms “conventional” versus “non-conventional” logging. Conventional logging is considered to be relatively high production, capital intensive system made up of at least one skidder, a mechanical cutter, and a loader. Non-conventional logging systems are usually missing one of the above pieces of equipment, generally the cutter. The term conventional is used because these are the types of loggers most commonly found operating in Alabama today.

CHARACTERIZATION OF LOGGERS

Logger Characteristics

During the 24 interviews I conducted with small, medium, and large scale loggers I collected data relating to ethnicity, years in the business, age, education and reasons for entering the logging profession (Table 1). I felt this information could provide me with a valuable base for understanding the social profiles of who are the people working in the logging industry in west Alabama. This information can also serve to help understand who the successful loggers in the communities of west Alabama are and why small loggers are fading from the forest industry today.

Age: The average age of loggers of all 24 loggers interviewed is 49 with a range of 29 to 76 years of age (Table 1). The average and median age for medium and large scale loggers was 47 years and 49 years, and for small loggers it was 49 years and 43 years of age respectively (Table 1). Small loggers had a wider range of ages spanning from 29 to 76 while medium and large loggers ranged from 33 to 60 (Table 1).

Small loggers, contrary to what was expected, had a wide age distribution when considering Chris Toms et al. (2001) research findings on mule loggers. His research indicated that mule logging in Alabama was not a progressive or growing profession and that mule loggers were aging out of the business (Toms et al. 2001). Small-scale logging in West Alabama, however, included several small-scale loggers under 40 and one less than 30 years of age who were actively participating in small-scale logging. This finding presents small timberland owners with hope for a new generation of small-scale loggers able to harvest tracts with limited timber.

Ethnicity: Sixteen of the 24 loggers interviewed were caucasian while the remaining eight were African American (Table 1). Of the 11 medium and large scale loggers nine were Caucasian and two were African American, while six of the 13 small-scale loggers were African American (Table 1). Many of the smaller loggers interviewed tended to be African American, while the larger more capital intensive crews were predominantly white. Logging follows similar (as seen in sawmilling and other industries) trends of the larger more successful crews being owned by the white population who historically have had better access to capital in the Black Belt (Bliss and Flick 1994). Additionally, of the 11 medium and large loggers, six owned more than one crew and as many as five separate logging crews. These loggers or logging companies were exclusively owned by white loggers, while the small-scale loggers owning only one crew were more diverse, being split fairly evenly between white and black loggers. This illustrates some trends that the limited capital outlay for small-scale logging allows for the entry of people with limited access to capital.

Education: A sensitive subject to approach many loggers during interviews was related to level of education. Thirty-three percent of loggers did not respond to this question as a result. Many loggers with limited education often avoided this question, due to what I gathered as a sense of unease when talking to an educated individual and compounded when the individual's success was limited. Of those who responded, 17% did not finish high school, 29% finished high school and 21% graduated from college (Table 1). When looking at the small-scale loggers independently, 46% did not respond to this question, 23% did not finish high school, 23% finished high school and only eight percent

graduated from college (Figure 4 and Table 1). Of the large-scale loggers interviewed, 18% did not respond to this question. The level of education for these loggers was varied, however most had achieved high school or college degrees. Only nine percent did not finish high school, while 36% finished high school, and 36% had graduated from either a two year college or four year institution (Figure 4; Table 1).

In comparing the number of crews owned with the loggers, race, and education it becomes evident that the more educated, white loggers own larger businesses than those with less education and of African American descent. Of the six loggers who owned more than one crew, four had graduated with some type of college degree varying from business to forestry and none were African American. It becomes evident that loggers with higher education and generally white have larger businesses owning more than one crew and often timber buying as well.

The one large and medium logger with less than a high school education was the smallest logger of the medium and large-scale logger group and worked exclusively as a logger and did no timber buying. Not surprisingly the level of education for small-scale loggers was considerable lower, with one respondent claiming to have made it as far as third grade and another as far as eighth grade.

Generations in Logging and Future Logging Generations: Most of the loggers interviewed were either second or third generation loggers, having learned to log from family members from an early age, often before finishing high school. Loggers ranged from first to fourth generation loggers, with most loggers being at least second generation loggers. Thirty-eight percent of the small-scale loggers were first generation loggers

while 62% were either second or third generation loggers (Table 1). Sixty-four percent of the medium and large-scale loggers ranged from second to fourth generation loggers and expressed pride in their profession and family heritage (Table 1). However, 36% were first generation loggers and had only begun logging to support their timber buying businesses (Table 1). Their interests were not in logging, but rather in purchasing and selling timber and using logging as a means to harvest tracts they bought. Their perspective could in many ways be expressed as pessimistic towards the logging industry and often indicated that it was almost impossible to make a living off of logging alone.

Half the loggers with more than one crew said logging was not their primary source of employment, and explained that timber buying was far more lucrative and logging was a necessity. The other half explained that logging was their primary source of employment, however, emphasized that timber buying was still an important part of their business. These latter loggers, however, began logging and expanded into timber buying unlike the previous loggers who initially were timber buyers and bought logging equipment to harvest tracts they purchased. Only two of the small-scale loggers did not consider logging to be their primary source of employment because one logged in his spare time while working at a paper-mill. The other primarily bought timber and logged in his spare time.

In addition, most loggers answered “no” when asked whether they would suggest their sons enter the logging business. Most expressed concern about the difficulty of the business and the recent drop in timber prices and did not want to wish their lives on their sons. One logger said that logging was “too hard of a financial struggle” and another explained that logging was getting too expensive and you “couldn’t find good help these

days.” Of the 17 loggers who answered this question 18% already had their sons logging with them, only 12% said they would recommend their sons go into logging, and 71% said they would not recommend logging to their sons. One timber buyer expressed concern about the decline in interest in logging by saying “their kids are not getting into it, logging is no longer glamorous”.

Years in the Logging Business: The average number of years loggers had been operating in the four county area of west Alabama was 20 years with a median of 17 years. The range, however, spanned from one logger who had only been logging for four years to a veteran logger on the cusp of retirement who had logged for 50 years. The medium and large scale loggers had an average and median time in the business of 21 and 18.5 years (Table 1). The range of years for these loggers ranged from 12 to 30 years. These loggers broadly fit into two categories. Those who had began logging with small-scale equipment and worked their way into larger more capital intensive systems, and timber buyers/loggers who started logging with large systems to support their timber buying businesses. Many of the medium and large loggers grew into larger logging systems while many of the small-scale loggers remained small for a variety of reasons, from personal choice to limited access to capital.

The small-scale loggers in the Black Belt have been logging for themselves on average for 19 years with a median of 15 years (Table 1). The range of years for small-scale loggers is far greater than what was found for the larger loggers. Small-scale loggers ranged from a logger who had only been logging four years to one logger who

had logged for 50 years. Many small-scale loggers when asked if they had ever tried expanding their businesses answered by saying loans were often difficult to secure.

Professional Logging Manager Certification (PLM): It has become necessary and in many cases mandatory for loggers to attend courses to get their Professional Logger Managers certification. Many mills have made it mandatory for loggers delivering to mills or harvesting on industry timberland to have this PLM certification. This certification requires loggers to attend courses on safety, first aid, harvesting systems, forest management and silviculture, and logging business management. Loggers must also attend continuing education courses to keep their certifications up to date.

When interviewing loggers and timber buyers it became evident that this certification has become very important for loggers to manage their business in Alabama. Of the 24 loggers interviewed 19, or 79%, had their PLM certification. Most loggers, when asked if they had this license, commented that it has become almost impossible to log without it. All 11 of the medium and large-scale loggers had their PLM certification while 38% of small-scale loggers had not yet acquired their license.

Most explained they were in the process of getting it, due to the difficulties of operating without it. Small-scale loggers operating without this certification did not work with timber buyers, deliver to the larger mills, or log on industry land. They generally worked in a narrow niche market and delivered wood to small woodyards or mills where they were known and allowed to slip by. One mill operator explained to me that soon they would be requiring all loggers to show proof of certification and would no longer allow non-certified loggers to deliver.

Production

An important component of understanding logging is understanding production as it pertains to logging. Ask any logger about his daily production and he will know the figures exactly. In this study I was interested in gaining a basic understanding of production to better understand economic constraints pertaining to minimum tract volume and size (Table 2). Production in logging is a very complex formula taking into account such variables as hauling distance, equipment costs, and tract volume/acre. In my research I was not interested in delving into these complex systems, but rather to gain a basic understanding of the production to better understand their limitations as to where they could operate profitably. To understand this I relied on interviews with loggers and asked them questions pertaining to their daily production and minimum volume needed per tract to understand where the crews operated comfortably and most often.

Daily Production: Production for 24 loggers interviewed in the four county area of West Alabama ranged from 20 to 1040 tons/day . The extreme variation is due to the differences in the logging equipment and the scale of operations with outliers on both extremes of the production spectrum. The average and median production of all loggers was 210 tons/day and 169 tons/day respectively (Table 2).

The range for small-scale loggers (less than eight loads/day) was 20 to 182 tons/day with an average and median of 72 and 52 tons/day (Table 2). Large and medium loggers (greater than eight loads/day) interviewed ranged from crews producing on average 208 tons/day to one twenty-four hour crew averaging 1040 tons/day. The average daily production is 373 tons/day with a median of 286 tons/day (Table 2).

Medium and large loggers on average are getting three times the production of the small loggers. However, the capital investment in these medium and large operations (as will be discussed in the next section) are roughly eight times that of the smaller loggers on average, and therefore are often limited to large tracts with more timber volume to meet higher operation costs.

Minimum Tract Volume: The best way to quantify the smallest tract loggers were willing to harvest I found to be by using not tract size or volume by way of tons, but rather in loads/tract. This is common terminology used by loggers to express production, where the term loads means truck loads. I thus asked loggers during interviews to figure how many loads they needed on a tract before they were willing to move onto the tract and harvest it. However, this data had to be converted to tons to identify the differences between the smaller bobtail loads (understood as being roughly 10 tons/load) and the larger 18-wheel loads (understood as being roughly 26 tons/load). The average number of tons/tract collected from 17 loggers (while 24 were interviewed not all responded to this question) was 520 tons/tract with a median of 195 tons/tract (Table 2). Responses ranged from 10 to 1456 tons/tract due to the extremes in the types of logging operations interviewed and thus I once again separated small-scale loggers from medium and large-scale loggers to better understand the different operational requirements.

Responses from large and medium loggers when asked how many tons they needed on a tract before they would consider moving on to the tracts and harvesting it ranged from 650 to 1456 tons/tract with an average and median of 1044 tons/tract (Table 2). The general understanding in the logging business, understood by both timber buyers

and loggers, is that a tract must have at least one week's worth of work before a logger is willing to justify the cost of moving onto a tract. When looking at these numbers and multiplying the median daily production by a five day work week the result is 1430 tons, which is higher than the 1040 loads/tract median loggers expressed during interviews. The differences in these figures may be accounted for by the fact that loggers may not always get a median of 286 tons/day due to a variety of factors such as quota, weather, and breakdowns. Difficulty in estimating production was something that many loggers expressed during interviews when exact figures were required of them for questions pertaining to production.

By contrast, small loggers indicated that they only needed on average 214 tons/tract. However, this data set has two outliers so in looking at the median, which is more representative, the figure drops to 89 tons/tract. Small loggers, due to using smaller, less capital intensive and fewer pieces of equipment, are able to get around some of the rules of thumb commonly followed in larger logging operations. Most small-scale loggers indicated that they were able to harvest small tracts with as little as 10 tons/tract because of their lower moving costs. One small logger claimed that he sometimes moved five times a week and preferred the small tracts because of the lack of competition from timber buyers and large and medium loggers on the open market. By contrast, one medium scale logger explained that he didn't like moving because every time he moved it cost him \$1000.

Small-scale loggers generally ran older equipment that was often outdated, smaller, and bought used. Medium and especially large-scale loggers generally used newer equipment and often purchased equipment new. I was interested in finding any

correlation between older equipment and minimum loads per tract needed by loggers. I thus averaged the age of all equipment found on each logging crew and plotted it against the minimum loads requirements each of the loggers found (Figure 5). The general trend as was expected was an increase in loads/tract needed by the loggers as the equipment used was of a later date.

Working Radius and Maximum Haul: The working radius or distance a logger is willing to travel to harvest a tract of timber for all 24 loggers' interviews ranged from 10 to 110 miles. The average and median working radius was 61 and 60 miles respectively (Table 2). The variation of 100 miles is due to some of the smaller loggers with very limited working radiuses and having only a single outlet for their timber in contrast to the high production loggers covering large areas with a variety of mills to deliver wood to. "Maximum haul," as the term implies, is the furthest the logger is willing (or is economical able) to haul their timber to the various mills. The average and median maximum haul for all logger interviewed 66 and 67 miles respectively. The maximum hauling distance ranged from 20 to 110 miles.

The working radius for medium and large-scale crews ranged from 50-110 miles with an average of 75 miles (Table 2). Similarly the maximum hauling distance for the same group of loggers ranged from 50-110 miles, with an average of 81 miles. The logger willing to travel 110 miles also happens to be one of the largest loggers in the region that combines timber buying and logging, thus he is able to make a profit not only on logging but off of selling the timber as well. This logger owns five logging crews

while the logger with the smaller working radius is a small one crew logger who primarily does contract work for timber buyers in the region.

Although the variation in hauling distance is significant, it is understandable when other factors are taken into consideration such as production, timber buyers, and quota or delivery restrictions (i.e., limits on number of loads allowed for delivery by a particular mill). Quota is used by mills when there is an over supply of timber on the market and mill wood yards are full and thus mills cannot store the oversupply. Loggers are then subject to production cuts and are forced to deliver to other mills to maintain necessary production. This often results in increased hauling distances.

Small-scale loggers by contrast have an average and median working radius of 45 and 50 miles or about 10 to 15 miles less than the larger loggers (Table 2). The working radius ranges from 10 to 100 miles with only one logger working above the 70 mile mark at 100 miles. This outlier is due to this logger primarily logging cedar, which is not as abundant and thus tracts are often limited. The maximum haul distance ranged from 25 to 100 miles with an average of 51 miles and a median of 60 miles. The smaller loggers on average have a smaller working radius and haul shorter distances because of the limited number of mills taking their products and distances the bobtail trucks some of the small-scale logger use are able to haul economically.

Down Time: Another important factor in production is downtime or the time a logger is not operating. Downtime generally is due to breakdowns and inability to find tracts to harvest (excluding weather). Downtime in logging is something loggers attempt to avoid at all costs, it often means they are getting no production while still making payments on

equipment, insurance and sometimes labor. During interviews I asked the question if loggers experienced any down time due to not having timber to harvest. Of the 11 large and medium loggers none experienced down time because of not having tracts to harvest.

The small-scale loggers, however, are not often as well organized, connected to mills and timber-buyers, and able to compete for timber. Small-scale loggers are more likely to have times when they have no timber to cut. Thirty-one percent of small-scale loggers admitted that they had some down time due to having no timber to cut. The down time ranged from one to two days to 3.5 months per year. Down time is something that small-scale loggers have to be prepared for to survive in an industry geared toward larger loggers. Generally, the first loggers to be placed on quota are the smaller producers. Also, small loggers often cannot pay as much for timber and are thus outbid on larger tracts and must seek out the smaller timberland owners.

Equipment

Medium and large scale loggers in the research area are all considered to be conventional loggers. The equipment make up for these crews consisted of at least one grapple skidder, cutter (most often a fellerbuncher), and at least one loader. These pieces of equipment are now considered to be part of a conventional successful crew in west Alabama. Small-scale loggers in west Alabama ranged from small conventional systems using older equipment to systems generally operating without any one particular piece of equipment or with outdated models. Loggers interviewed were asked about the types of equipment they operated and data was collected on logging equipment, equipment costs, loans, and equipment maintenance costs (Table 2). The data helps to characterize the

equipment loggers use and prefer and the costs associated with the equipment to better understand not only the logging industry but to understand the avenues available to small timberland owners.

Skidder: Skidders ranged in make and size but were almost exclusively grapple skidders, which are now the more common and functional skidders on the market, unlike the older cable skidders found in many small-scale logging crews. All of the medium and large-scale loggers interviewed used grapple skidders with an average of two skidders per logger and a range of one to three skidders per crew (Table 2). Eighty-five percent of the small-scale loggers used grapple skidders with only 15% using cable skidders (table 2). Additionally, 92% of the small-scale loggers utilized only one skidder in the operations unlike the larger logger who generally use two.

Loader: The Loader is another key piece of equipment found in all small, medium and large scale logging crews. While there are a variety of loaders on the market the most common type found in west Alabama is termed the “knuckleboom loader”. Ninety-two percent of loggers in west Alabama used a knuckleboom loading system on their crews (Table 2). This piece of equipment is essential to conventional or tree length operations due to its ability to load large tree length logs (preferred by most mills today) on trucks. Ninety-one percent of the medium and large-scale logger’s interviewed used knuckleboom loaders with only one crew using a front-end loader (Table 2). Eighty-five percent of the small-scale loggers used knuckleboom loaders, the remaining 15% used smaller loaders attached to the rear of bobtail trucks (Table 2). These loaders, while

being much smaller, do not need to be pulled by an eighteen wheel truck like the knuckleboom systems. These systems are generally used to load shortwood or random-length wood and are generally unable to load tree length wood.

Feller: The cutter or feller is generally the most costly piece of equipment on a conventional logging operation and by most measures the most sophisticated and largest. Unlike the two previous pieces of equipment, the felling machine is less prominent in West Alabama due to its high cost. Sixty-three percent of loggers in west Alabama used the fellerbuncher, which is an innovative piece of equipment capable of not only felling the tree but bunching several felled trees in an arm like device that then allows for directionally felling (Table 2). This equipment boosts production and allows loggers to harvest in a variety of settings including thinnings and clearcuts. The remaining 37% of loggers used smaller three-wheel mechanized cutters or chainsaws.

All medium and large scale loggers interviewed used a fellerbuncher varying in only make, size and quantity (Table 2). The average number of cutters per logger was 1.5 with a median of one. Most logging crews only operated with one fellerbuncher primarily due to their high cost; however, some kept a second older machine as a backup and in some cases because they ran enough skidders and loaders to necessitate a second fellerbuncher. Small-scale loggers were more variable in the type of harvesting mechanism used. Thirty-one percent of small loggers used the fellerbuncher, 23% used the Bell three-wheel cutter, 38% used chainsaws and one logger contracted out his cutting (Table 2).

Secondary Equipment: Apart from these primary pieces of logging equipment many of the larger crews also owned secondary pieces of equipment necessary for performing quality logging jobs. Many of the loggers interviewed owned bulldozers necessary for building roads into tracts with limited access and repairing private roads damaged by the harvesting operation. All of the large and medium scale loggers interviewed owned at least one dozer that they kept either with each of their loggers or between crews in the case of the loggers who owned more than one operation. Motorgraders were another piece of equipment used for similar purposes, but was not as common in these logging operations. Fifty-five percent of the loggers owned motorgraders; however, 85% of these loggers owned more than one crew and used this machine between all the crews as needed. The smaller, one crew operations, did not have this piece of equipment and made do with bulldozers.

Surprisingly 31% of the small-scale loggers owned and operated bulldozers on their operations. It must be noted that in the case of two of the loggers they at one time were larger loggers and while they operated in a smaller capacity owned enough equipment to be considered medium size loggers. None of the small-scale loggers owned motorgraders, which are generally rare in logging due to added capital investment and limited versatility. Most loggers make due with bulldozer or skidders for road repair.

Trucking: Loggers in West Alabama either owned their own trucks, contracted out their trucking or performed a combination of the two. In the four county area, 46% of the loggers only used their own trucks to haul wood to mills, while only eight percent used contract trucking services to deliver their wood (Figure 6). Another 46%, however, used

a combination of contract trucks and personal trucks with varying degrees of reliance on one or the other (Figure 6). Seventy-three percent of the medium and large-scale loggers used a combination of contract and personal trucking to deliver their wood products (Figure 6). In contrast 69% of small-scale loggers relied on personally owned trucks to deliver their wood (Figure 6).

The types of trucks loggers used are broken down into two basic categories, 18-wheel tractor trailers and 10-wheel bobtail trucks. Seventy-five percent of all loggers interviewed in the research area used 18-wheel tractor trailer with only 25% of interviewees using 10-wheel bobtail trucks (Table 2). The medium to large-scale loggers exclusively used 18-wheel trucks while 46% or roughly half of the small-scale loggers interviewed used 10-wheel bobtail trucks (Table 2).

Equipment Cost: Equipment costs have steadily increased and some loggers stated they had tripled in price in the last 15 years while timber prices had remained relatively unchanged. The capital necessary for large operations are substantial and to illustrate this point I asked loggers during interviews to figure the current value of their operations. The average value of logging operations for nine medium and large loggers was an estimated \$456,000 with a median of \$350,000 (these values are based on the idea of reselling their used equipment) (Table 2). The value of this equipment when purchased new, as is the case with the majority of the medium and large scale loggers interviewed, is substantially higher than the depreciated values above.

These values are substantially higher than the value of small logging operation which ranged from \$8,500 to \$133,000 with an average of \$50,786 and a median of

\$40,000 (Table 2). In the small-scale logging category there was substantial difference in operation value due to the age, number and types of equipment used. The average age of the equipment for the operation valued at \$133,000 was 1996, or nine years old, and they were running a skidder, loader, cutter and three trucks. The operation while still producing under eight loads/day (thus small) was still much larger than the operation valued at \$8,500, which runs one cable skidder, loader, bobtail truck and harvests with a chainsaw and has an average equipment age of 1990 or 15 years old.

Equipment Age: Equipment age was figured by averaging the age of the essential pieces of equipment in the operation (i.e., skidder, harvester, and loader) and then displaying the average year purchased. The average and median equipment age for 24 loggers interviewed in the four county area of west Alabama was 1995 (Table 2). There are distinct differences between the age of equipment used by medium and large-scale loggers and of that used by small-scale loggers. Medium and large-scale logger's average and median equipment age (defined as the model year) was 2000 and 2001 respectively (Table 2). Small-scale loggers by contrast operated equipment that was 10 years older on average. Their average and median equipment age was 1991 (Table 2). Small-scale loggers generally purchased used equipment and kept equipment far longer than the large and medium-scale loggers as will be discussed further under the section on "Trade in Time and Maintenance Costs."

Equipment Loans: Twenty of the 24 loggers interviewed had some type of equipment loan ranging from on all pieces of equipment to a loan on only one used piece of

equipment. All eleven of the medium and large scale loggers had loans from banks or equipment suppliers, which is not the case with most of the small loggers working in west Alabama (Table 2). Four of the 13 small-scale loggers had no loans, two only had loans on one piece of equipment and five had some loans on some of their equipment and two refused to respond (Table 2). Of the 13 small loggers, most bought used equipment unlike the medium and large loggers who almost exclusively bought new equipment for their operations. Access to capital is a challenge for many poor West Alabama residents and, as Bliss and Flick (1994) noted, it often distinguished between those able to mechanize and expand their operations and those who simply faded away.

The high capital expenditures, however, limited the types of tracts loggers are able to harvest, often limiting large loggers to large tracts with more volume. These larger operations (as will be discussed in the next section on “production” and “logging sites”) are not well suited for small timberland owners (Greene et al. 1997). The smaller loggers with a smaller capital investment, no loans, and smaller equipment are able to harvest smaller tracts with limited volume, which as Greene et al. (1997) note is becoming a necessity. Access to capital is a difficulty shared by many small-scale loggers and as one small-scale logger commented, “a man has to own something to get three million dollars in equipment.” This is a common problem with many small-scale loggers and especially African American small-scale loggers (Bliss and Bailey 2005). “Whether through simple discrimination or because they had little business experience or collateral, few African-Americans could qualify for loans of the size necessary to be competitive with highly productive logging outfits in the current industry” (Bliss and Bailey 2005).

Trade in Time and Maintenance Costs: Loggers were asked how long they kept equipment before it was traded in for a newer model. As discussed above, loggers operating larger crews with higher production and better access to capital generally operated updated equipment that not only increased production but required minimal maintenance and costs associated with breakdowns common in older equipment. Responses from 24 loggers interviewed ranged from “as long as it will go” to trading equipment in every three years when the warranties wore off and equipment was paid off. As can be expected, the large and medium scale loggers traded their equipment more often than the small-scale loggers. On average the large and medium loggers traded in their equipment every 4.3 years ranging from three to 6.5 years. Only two of the loggers in this category waited longer, trading in their equipment either when it became problematic or it would not longer run.

Small-scale loggers by contrast ran their equipment as long as they could keep it running. Only two small-scale loggers traded in their equipment sooner, at five year intervals. Responses for this question were fairly consistent with loggers responding by saying “till it wears out” or “just run it till not worth anything” or “as long as it keep runnin’.” Most small-scale loggers buy used equipment and try to minimize costs by paying off used equipment and keeping it as long as possible. When asking small, medium and large scale loggers and timber buyers what small-scale loggers attempting to make a living off of harvesting small tracts needed to do, respondents unanimously answered by saying reducing overhead and not getting into debt.

Thus, it is easier to understand why small-scale loggers keep equipment as long as they do. However, as many small-scale respondents commented, the problem with old

used equipment are breakdowns and high maintenance and upkeep costs. To better understand maintenance costs in logging, I asked loggers what maintenance and upkeep on their equipment averaged on a monthly basis. Such data proved difficult to collect because many loggers did not know these figures because, their wives took care of the accounting. Additionally, different loggers figured this information differently, some figure it on per ton basis others on a weekly or monthly basis, additionally some included fuel costs and other didn't. For these reasons these data is fairly rough and inconsistent.

Of the 24 loggers interviewed, maintenance and fuel costs ranged from \$600 to \$30,000 per month. Nine of the loggers were unable to provide any information. The general understanding from the data was that half of maintenance costs were in fuel and the other half was consumed in regular maintenance operations, such as in oil, hydraulics fluids and parts. Breakdowns were highly variable and loggers were generally unable to account for this highly variable cost. Estimates ranged from one logger whose last breakdown cost \$4,400 to a few hundred dollars. A rough average maintenance cost per month for the loggers interviewed was an estimated four to six thousand dollars with extremes on both sides.

The medium and large scale loggers generally had higher maintenance and upkeep costs, especially when fuel was considered. Small-scale loggers, however, often experienced more breakdowns, which was a common complaint expressed by most small-scale loggers. One small-scale logger commented "When little man gets equipment its already worn out." Another logger explained that his biggest challenge was breakdowns and that it once took him two months to get his skidder fixed. Old equipment breaks down and becomes problematic the older it gets and small loggers are

often faced with the difficult decision of either buying newer equipment or continue fixing old equipment. For this reason medium and large-scale loggers generally trade in equipment regularly because they cannot afford to lose production when pieces of equipment fail.

Labor

Number of Employees per Crew: The number of employees on a logging operation depends on the size and number of pieces of equipment being run on the operation. Operations generally have one man per piece of equipment such as the loader, harvester, skidder and trucks. Additionally, many operations still have a deck hand that delimits and bucks trees before loading. However, many of the more modern operations are attempting to modernize equipment to reduce labor in the way of the deck hand. The number of employees per logging crew for the 24 operations interviewed ranged from 1 to 12 employees. The average number of employees was 5.3 employees per operation with a median of four (Table 2). When separating medium and large-scale loggers from small-scale loggers it becomes evident that the larger loggers have more employees than the small-scale loggers. The medium and large-scale logger on average had 7.2 employees with a median of seven employees per operation (Table 2). This finding is consistent with Green et al. (1998), in a study conducted in Georgia, where they found an average crew size of eight. The range of 3 to 12 employees is due to one of the loggers operating 24 hours and thus running two separate shifts. Small-scale loggers by contrast on average had 3.7 employees per operation with a median of four (Table 2).

Small-scale operations on average were smaller than the larger operations and generally hired fewer employees. The range for small-scale loggers was one to six employees. Two of the small logging operations ran a six-man crew, which could be considered excessive when considering production and the pieces of equipment being operated. This perceived excess in labor is due to the fact that both were family operations hiring mainly family members and thus there was a sense of family well being that may overcome logging labor norms.

Labor Compensation: Eighteen of the 24 loggers interviewed were willing to provide data on what their labor was being paid. Different employees on each logging operation were paid differently based on their position and occupation on the crew. Generally, harvester operators were the highest paid with the exception of crew bosses, who often doubled as harvester or loader operators. The second highest paid position was the loader operator, then the skidder operator and the deck hand generally was paid the least due to their lack of specialized experience and training. This data does not include what loggers, often working one of the pieces of equipment, paid themselves but rather is strictly base on labor wages. The average daily wage for 18 of the 24 loggers interviewed was \$101.5/day with a median of \$110/day (Table 2). There were distinct differences between what labor was being paid on the medium and large-scale crews when compared to the small-scale loggers. The average daily pay for 11 medium and large scale loggers was \$115/day with a median of \$110/day (Table 2).

Small-scale loggers, however, were substantially lower with an average daily pay of \$81/day with a median of \$76/day (Table 2). It was generally understood in the

logging business that the larger operations paid far better than the smaller loggers. Many of the larger loggers and timber buyers explained that labor generally tried to work in the larger crews and those with limited skill or tainted reputations often ended up working on the smaller operations. This point, while having some merit, cannot be applied to all laborers working for small-scale loggers because there were skilled individuals manually felling trees on many of the small logging operations where different skills are required. However, in conventional terms the most experienced and trained labor generally worked in the larger high production crews capable of paying higher wages.

Labor Profiles: The majority of labor working on logging crews is African American; more specifically ninety-one percent of the labor was African American (excluding the owners). Crews owned by African American loggers were exclusively made up of African American labor. The majority of the labor on white owned crews was African American (excluding the owner) with the exception of one small-scale logger who had white labor and another logger who employed one white man. Labor for many of the logging crews were recruited from as close as five miles to within the county the operation was based. Many loggers provided transportation for their labor and thus insured that labor was within a close radius. Loggers also generally did not hire part time help. Of the 22 loggers who responded, only six or 27% hired part time help on their operations. Most loggers were not comfortable hiring part time help because of the dangers of the profession and the lack of experience part time help often possessed.

Loggers were asked during the interviews if they had ever used or heard of any logger using migrant labor. Of the 24 loggers interviewed, only two loggers had ever

used migrant labor. None were using any during the time of the interviews. Many of the loggers interviewed expressed interest in hiring migrant labor due to their reputation as hard, dependable workers. One of the leading challenges expressed by loggers was labor and the difficulties of finding hard working dependable labor.

Loggers, when asked what they looked for in their labor, almost unanimously answered by saying, they sought experienced labor with a good reputation. They explained that logging was a dangerous occupation with expensive equipment and they thus sought experienced individuals who could meet high production standards while operating safely and running and maintaining equipment carefully. Several of the loggers interviewed commented that most of their labor had grown up in logging and had been around it all their lives and in many cases was all they had ever known. Experience was thus not always a problem; however, reputation was closely scrutinized. Many loggers relied on their crews to provide information on the reputation for people being considered for a position. In the logging profession reputation is one of the key components to a successful operation. Loggers with a good reputation for being honest, dependable, and doing quality logging were often sought by timber buyers and seldom had trouble finding tracts to harvest.

Logging Site

Average Tract Size: One of the key reasons for characterizing the different logging operations in west Alabama was to understand not only the current logging systems but to also find small-scale systems capable of harvesting small land holdings. I asked a variety of questions pertaining to tract size and volume to understand where the different size

loggers operated. The average and median tract size in acres that loggers harvested was 62 and 70 respectively (Table 2). The average tract size for large and medium-scale loggers was 85 acres with a median of 80 acres (Table 2). Additionally, as expected small-scale loggers generally harvest smaller tracts on average. The average tract size for small-scale loggers was 37 acres with a median of 25 acres (Table 2).

The range for small-scale loggers however, was considerable when compared to the smaller range exhibited by the large and medium-scale loggers. Small-scale logger's average tract size ranged from seven acres (this was a small-scale logger who specialized in small tracts) to 100 acres. The logger averaging 100 acres was the largest of the small-scale loggers interviewed in that category and by some measures could be considered medium sized. By contrast, the large and medium-scale loggers were more consistent and average tract sizes ranged from 65 to 100 acres.

Medium and large-scale loggers are generally more limited on tracts they can operate for a variety of reasons ranging from tracts generally provided by timber buyers to higher operational costs common in larger operations. Small-scale loggers by contrast are able to harvest a wider range of tracts due to lower operating costs and independence from timber buyers. However, they often are unable to harvest larger tracts due to steep competition in the timber market established by timber buyers and larger loggers, often providing more competitive timber prices. Small-scale loggers generally are unable to provide competitive timber prices due to low production with high operating costs such as insurance, labor and workman's compensation, which change little between large and small-scale loggers.

Smallest Tract Harvested and Minimum Volume Needed: To better understand the limitations, as they pertain to tract size, I asked loggers what the smallest tract they would generally or had ever harvested. The average response from 24 loggers was 13 acres with a median of six acres. The 11 large and medium-scale loggers generally required larger acreage; the average for the smallest tract harvested was 21 acres with a median of 17. The average small tract size for the small-scale logger was five acres with a median of two acres. The large loggers were generally unable to operate on tracts less than 17 acres.

However, following a number of interviews I noticed a problem associated with this question. This question provided data that was in some ways inaccurate because loggers generally named small tracts that were exceptions. Exceptions ranged from harvesting small tracts for friends and family or because of close proximity to larger tracts or due to unusually high timber quality and volume on a small tract. For these reasons I added a new question to my interview script that would help identify the minimum operation size for the different loggers interviewed. The new question focused on logger production by asking loggers what was the minimum number of loads they would need before considering moving onto a tract and harvesting the timber. (This data was presented and discussed above under the section on “Production”.)

Timber Preferences and Site Limitations for Loggers: In the interview script, I used two questions to determine what types of wood loggers generally preferred and site limitations they avoided or prevented them from harvesting a tract. Responses for the most part were fairly redundant often prompted by the type of logging loggers performed,

either clear-cut or thinning. Most of the thinning loggers preferred a good stand of planted pine to thin while the clear-cut loggers depending on their specialty (either hardwood or pine) preferred quality hardwood sawtimber or pine sawtimber. Large and medium-scale loggers were fairly consistent in the types of wood they were able to harvest or did harvest. Six of the 11 loggers said they would harvest anything as long as it was merchantable and there was enough volume, varying only in the silvicultural cut that was their specialty. Two loggers specified that they preferred pine thinning; another preferred pine pulpwood clear-cuts while the remaining two were only pine loggers and usually avoided hardwoods.

Small-scale loggers were highly variable in what they harvested and generally commented on only being limited by what the mill was taking that week. All but one of the small-scale loggers avoided pine pulpwood thinning and all preferred quality sawtimber whether hardwood or pine. Pulpwood often has a lower value and is generally limited in its acceptance at mills with the exception of hardwood pulpwood, which is more widely accepted. Sawtimber is far more valuable and provides a larger profit per load and is generally easier and less labor intensive to load. Loggers are able to make a larger profit per load which is often necessary due to the low production exhibited by most of the small-scale loggers interviewed.

Several questions were asked during interviews to establish if there were any site limitations that loggers generally avoided or that might limit small-scale loggers with limited equipment. For the most part responses were fairly consistent. Loggers generally found, within reason or legal limits, they had no problems harvesting wet or swampy tracts, steep tracts and limited access tracts. Some loggers indicated that they did have

problems with any of these limitations if the incidence was excessive such as mountainous tracts or tracts with no access (which I might add was something loggers always check before moving in). Many loggers, however, indicated that they would often avoid any tract that was extreme in any one of the categories due to limited production associated with these site limitations slowing production.

There was one point relating to site limitations that became apparent as interviews progressed. Several large and medium loggers indicated that they would not operate within city limits, around homes, or in urban areas while many small-scale loggers indicated that this was a niche market they had identified. Many small-scale loggers explained that they often worked around homes and within urban neighborhood where conventional systems feared legal repercussions (such as mud on roads, asphalt damage, or home damage) and or could not access wood due to equipment and truck size. Three small-scale loggers in particular were interviewed while harvesting urban areas that many of the largest loggers “run the other way” (paraphrased) from.

Timber Buyer

Timber buyers in west Alabama in many ways control the logging industry. They often control access to wood products, mills, and hire or contract loggers to harvest timber they purchase and deliver to mills. They are the gatekeepers and control what tracts loggers harvest, the timber price loggers receive, and where they deliver their products. Most wood products mills in west Alabama generally will not deal with independent loggers, rather they deal with timber buyers. For these reasons I included a section in my questionnaire to understand the relationship loggers had with timber

buyers. I also sought out timber buyers to understand the logging business from their perspective as well as trying to understand the possibilities and limitations faced by small-scale loggers.

There are three basic types of timber buyers or methods by which loggers acquire the timber they harvest. First there is the “independent timber buyer” who is generally a forester working independently or for a larger timber buying company that buys timber and supplies mills with the raw materials. These timber buyers generally contract loggers to harvest the timber they purchase and have negotiated timber prices and quota with the surrounding forest products mills. Second there are “mill timber buyers” who work directly for one of the larger mills (i.e. Gulf States, Weyerhaeuser, or International Paper) in the area and buy timber exclusively for their mill. Loggers working for mill timber buyers either harvest tracts these timber buyers purchase or harvest on company land. Finally, there are the independent loggers who buy their own timber. These logger/timber buyers can favor one or the other of the two occupations using the lesser to support their primary business.

Where Loggers Get their Tracts: Of the 24 loggers interviewed in west Alabama, five harvested timber for independent timber buyers. An additional two loggers worked for independent timber buyers on a part time basis while either harvesting for a mill buyer or for themselves the rest of the time. Only two loggers interviewed logged full time for a mill buyer while an additional three loggers harvested for the mill buyers on a part time as needed basis. Twelve of the 24 loggers bought and harvested their own timber or what I term independent loggers. These loggers worked independently buying or negotiating

tracts for harvest and then harvesting these tracts. These independent loggers ranged from loggers owning one small crew to a company system depending more on timber buying than logging and owning as many as five separate logging crews.

To further analyze this information I separated small-scale loggers from large and medium loggers to distinguish the differences between the two logging categories. Of the 11 large and medium loggers interviewed, two worked for independent timber buyers, two harvested for mill buyers, five were independent loggers and three worked for a combination of mill buyers, independent timber buyers and for themselves. Three small-scale loggers, of 13 interviewed, harvested for independent timber buyers while nine harvested timber they purchased themselves. One logger both bought timber for himself and worked for an independent timber buyer. None of the 13 loggers harvested timber for mill timber buyers.

The Dealer System: In addition to asking loggers where they procured the wood they harvested, I also interviewed timber buyers to understand the types of loggers they seek, the types of loggers they employed and the possibilities open to small loggers. During the summer of 2004 I interviewed a combination of 12 mill buyers, independent timber buyers, and independent logger/timber buyers. I visited several of the sawtimber and pulpwood mills in the region to learn about the dealer system and how mills decide who can deliver timber and what the requirements loggers are expected to meet were.

The larger mills in west Alabama work exclusively through the dealer systems, while many of the smaller mills and wood-yards were more open to a variety of loggers and do not require loggers to work with dealers. Two of the largest mills in the region

worked exclusively on the dealer system. Under this system dealers contacted the mill timber buyers and negotiated timber prices for a particular tract a dealer was in the process of buying. Using the timber prices given by the mill timber buyer, the dealer competed with other timber buyers to buy the tract. If the tract was purchased the dealer harvested the tract using a contract logger who in turn delivered the timber to the mill for the negotiated price.

Loggers are generally outside this system and contract under the dealer to harvest the timber he has negotiated or bought. These large mills thus only deal with a certain number of dealers in the region and at certain time of the year even dealers may not be allowed to deliver wood because the mill has put them on quota. One timber buyer at a large mill explained that when the mill gets full they cut everyone off except for their most faithful timber buyers. Wood delivered through the dealer systems is termed “gate wood”; in contrast wood harvested off of company land or bought by the mill’s own dealers or timber buyers does not follow this process but is viewed as an “in-house” operation.

The dealer system has in many ways limited the opportunities to small-scale loggers. As one large mill buyer explained, they do not like taking the time to make a deal with one small logger on 5 to 10 acres. Instead, they look to the dealers or large logger/timber buyers who have higher production and supply the mill on a more regular basis. Additionally mills are able to place a degree of separation between themselves and the loggers often associated with a high degree of liability by working through timber buyers or dealers who take on this responsibility.

Mill and Timber Buyer Logger Expectations: Industry or mill loggers are generally the best loggers in the business. Loggers contracting for industry or mills are by far the most regulated and meet the highest standards and possess all possible certifications available in the logging industry. During two interviews with timber buyers working for two of the largest mills in West Alabama I asked what types of loggers they sought. One of these companies preferred loggers operating one skidder, loader and harvester, while the other preferred loggers who moved at least 12-14 loads/day. Their philosophy at the latter company was to have as few loggers as possible and as big as possible while still meeting production requirements. This company replaced 4 loggers with one 40 loads/day crew, which the timber buyer admitted harvested the majority of their timber with the help of a second 40 load/day operation.

The requirements for industry loggers are far more stringent than they are for loggers contracting for timber buyers in the region. The list of requirements was extensive and included Sustainable Forestry Initiative training (i.e., industry based standards for timber certification that requires loggers to take courses to meet certification requirements), environmental training, Professional Logger Manager Certification, Defensive truck driving courses, insurance, and workman's compensation. Company loggers as they were commonly termed were subject to extensive audits to ensure quality logging and were required to number trucks to help mill timber buyers ensure loads were delivered to the right places. Industries worked to ensure the contract loggers performed quality jobs as well as adhering to the highest safety standards and penalizing loggers for deviations. One of the mill buyers commented on this by saying "you can't make contractors be safe but you can do something if they are not".

Small-scale loggers in the case of both mill buyers were not considered due to their low production and higher operating costs. The mill buyer explained that large loggers, because they had higher production and were more efficient, were generally able to operate for a lower cut and haul rate. They pay their logger on average 13-14 dollars/ton (rate subject to mileage); while small-scale loggers he explained generally need 17-18 dollars/ton to operate profitably. (In interviews with loggers during the summer I ran across a particular situation where a logger was untrusting due to having been audited by a timber buyer who, upon learning of his profit margin, cut his cut and haul rate by 1 to 2 dollars per ton.) Most of the small-scale loggers interviewed operated on cut and haul rates ranging from \$16-20 per ton, much like the mill buyer explained. Small-scale loggers for this reason often have a hard time competing for timber on the open market and are often forced to harvest tracts most loggers are unwilling to cut. Thus small-scale loggers generally operate in niche markets where they can charge higher rates (i.e., urban areas, deadwood, storm wood, and yard trees).

CHAPTER 5

SMALL-SCALE LOGGERS IN DECLINE; FACTORS, LIMITATIONS AND DIFFICULTIES OF RUNNING SMALL-SCALE LOGGING OPERATIONS IN WEST ALABAMA'S BLACK BELT

INTRODUCTION

The intent of this research was to identify small-scale logging systems capable of providing limited resource timberland owners opportunities for timber management. Interviews were conducted with a range of loggers, timber buyers, and mills to identify, first what types of systems are currently operating in west Alabama, second what are the challenges and limitations faced by small-scale loggers, and finally what systems are adaptable to small timberland owners. During interviews I found that the challenges and limitations faced by small loggers are numerous and in many ways growing as the forest industry consolidates and the logging industry becomes increasingly capital intensive and regulated. Small-scale loggers are finding it difficult to operate in west Alabama as mills consolidate and the distance to mills increases. Insurance, workman's compensation, and logger certifications become mandatory; and access to capital, timber, and quality labor becomes a real challenge.

Logging in general is a strenuous profession where loggers with often limited educations operate businesses with high capital investments, highly variable operating hours (weather, breakdowns and quota) and with small profit margins. Small-scale loggers today are operating on the margins of the forest industry. They are no longer mainstream, as they once were, but rather operate in a gray area often not meeting all legal requirements and working tracts that generally do not interest larger loggers. Many of these smaller loggers have identified niches, allowing them to cut out a living from an industry that has systematically marginalized them.

In an attempt to reduce capital investments small-scale loggers use older and often undependable equipment, and rely on strenuous manual labor to reduce costs and harvest tracts at the margins of profitability. Additionally, they are far more susceptible to changes in the forest industry that may upset the delicate balances under which they operate today. However, with this being said, it must also be noted that small-scale loggers today are survivors in an industry increasingly geared towards high production operations.

It is no secret that small-scale logging is in a state of decline. Research conducted by Bliss and Flick (1994) alluded to the fact that shortwooders and small-scale loggers were declining. Chris Toms et al. (2001) reached similar conclusions for small-scale mule loggers who were aging out of the business. In this chapter I identify what factors have led to the decline of small-scale loggers, commonly understood as having provided small timberland owners with management options and timber dependent communities with employment. Interviews, while providing data for characterizing the logging

industry, was also used to help me understand what the difficulties small-scale loggers faced in today's timber industry in west Alabama.

DECLINING TIMBER OUTLETS

One of leading challenges facing small-scale loggers today has been the continuous consolidation of the forest industry. Sawmills, pulp and paper mills, and wood-yards have continuously been declining in numbers and have consolidated into larger high production mills. Sawmills in Alabama for example have declined from an all time high in 1920 of 1,926 mills to only 138 in 1997. The national and state trends were reflected by most of the loggers interviewed, often commented that declining mills and woodyards were one of the primary reasons for the decline in small-scale logging. One logger explained that in the west Alabama community of Linden alone there used to be five sawmills, but today only two mills remaining. Another logger, when asked about declining mills, explained that the surrounding communities of Demopolis, Moundsville, Greensborough, and Marion used to have several mills; today these communities have lost most of their mills.

Prior to the more consolidated forest industry that is common in the Black Belt today there were a number of smaller mills and woodyards located in most of the West Alabama communities. Woodyards, generally operated by timber buyers or dealers, provided small local outlets for loggers operating in the region. Bliss and Flick (1994; pp. 81) conducted research on the "dealer system", as it is termed, and explained that the "dealer is a middleman who operates among mills, landowners, and wood producers." Dealers owning woodyards provided additional delivery locations for loggers operating

in the region and provided a connection between large mills and the loggers in the local communities (Bliss and Flick 1994). However, as mills became more established in the region and as loggers began operating 18-wheel trucks capable of longer hauls, dealers and loggers alike found it more profitable to deliver directly to mills. Dealers changed their operations and today generally do not own woodyards, reducing their investments and risks by not maintaining large timber inventories. Dealers today hold timber on the stump and deliver it directly to mills as it is harvested. Woodyards have thus declined, and so have many of the local outlets for many small-scale loggers.

The decline in local wood-yards is one of the key reasons for the decline in small-scale logging. When wood-yards went out so did a lot of the local loggers who delivered to these yards. Most could not afford or were not willing to make the longer hauls. One small logger shook his head and explained “wood yards about played out” while another small logger commented that the logging industry had...“let the big man have it, just like it happened to cotton.”

More specifically the increasing distances to mills, have negatively impacted small loggers by rendering their hauling equipment outdated and ill-suited for a new logging industry requiring longer hauls. Many small-scale loggers, unlike large and medium loggers, use the bobtail truck, a piece of equipment common several decades ago. The bobtail truck is smaller and only capable of carrying 10 to 14 tons, unlike 18-wheel trucks capable of 22 to 26 tons. Small loggers commented that the bobtail truck was not well suited to travel greater distances, to the large mills, due to equivalent operating cost to the 18-wheel truck and the reluctance of mills to unload small trucks.

Most of the small-scale loggers interviewed owned only one truck and as the distance to mills increased it became increasingly difficult to deliver enough loads to cover their operating costs. One logger in Greensborough explained that most of the mills were a 60 to 70 mile haul, which is difficult for a small logger running an old outdated bobtail truck. These distances, when compared to the average maximum haul of 50 miles for small-scale loggers interviewed and an average working radius of 45 miles, are considerably higher. Small loggers indicated that it was becoming difficult to operate with a single bobtail truck and continue their current production without expanding their operations to accommodate the greater distances to mills. One small-scale logger complained that when the local mill put him on quota (which was often) the next mill was a 100 mile haul, and that, he explained made production real tough.

Additionally, while most of the small-scale loggers would not admit it, their old trucks, as one timber buyer explained, would generally not pass Department of Transportation (DOT) inspections. One small logger, however, did comment that he avoided traveling down any of the larger highways, while keeping his hauls as short as possible to minimize the risk of DOT inspections. The bobtail trucks observed during the interviews in west Alabama were generally in poor condition and not likely to pass DOT safety inspections. Additionally, the forestry tags small-scale loggers operating bobtail trucks were likely buying (i.e., they would likely buy this tag over the commercial tag because of the lower cost and because it does not require the driver to have a Commercial Drivers License (CDL)) only allowed for a maximum load weight of 42 thousand pounds. However, small loggers on average load 26 thousand pounds of timber and when added to an estimated truck weight of 26 thousand pounds, these loggers are overloaded.

For these reasons eight of the 13 small-scale loggers interviewed had switched to 18 wheel trucks. One logger in particular explained that when the local wood-yard he used to delivered to shut down, he switched to the 18-wheel truck, allowing him to make the longer hauls. However, not all small-scale loggers were able to make this transition. Eighteen-wheel trucks and their trailers are far more costly than the old bobtail trucks and the commercial tags for these trucks are substantially higher, adding a degree of difficulty to some small-scale loggers and increasing operation costs. Additionally, many of the loggers operating bobtail trucks are not required to have Commercial Drivers License (CDL) and it is suspected that most did not have them. This adds another barrier that small loggers must overcome to expand their operations.

WOOD DEALERS AND BUYING TIMBER

Small loggers in west Alabama run into two major problems when operating under the current system in the forest products industry. The first is finding dealers willing to act as middle men between small loggers and the large mills. The second is buying timber and finding tracts to harvest in a system that is highly competitive. The timber dealer, as was previously discussed, has for the most part adopted a system of moving timber directly from the stump to the mill, eliminating woodyards. Additionally, the timber dealer acts as a middle man for large mills assuming the liability associated with harvesting and transporting timber. As one timber buyer explained, the mills “pass the buck to the middleman,” placing the liability of loggers on timber buyers. This system has created several challenges for small-scale loggers with limited production, old equipment, and minimal insurance coverage.

Small-Scale Loggers without Dealers

Dealers receive wood orders from mills and act as the connection between landowners and the mills (Bliss and Flick 1994). Dealers contact landowners, buy their timber, and deliver the timber to mills on a per-tract-purchase price, agreed upon before the sale was negotiated. Wood delivered by dealers is generally termed “gatewood” by the mills. The mill buyers who work with the dealers explained that they do not work with loggers directly, but rather through dealers who have working relationships with the mills. Dealers, in turn, contract loggers to harvest tracts they purchase and pay them generally on a harvested per ton basis. The loggers then harvest the tracts and deliver the timber to the mill under the dealer’s agreement.

The challenges for small-scale loggers in this system are many. Many of the dealers interviewed sought loggers with a high consistent production level, modern equipment, and under a desired insurance coverage. Small-scale loggers that move only 15 to 20 loads/week, and run old undependable equipment are generally turned down by many dealers. Dealers, as a norm, generally charge loggers about one to two dollars per ton and one dealer explained it was simply not worth the liability making two dollars/ton on 200 to 300 tons/week.

Another timber buyer explained that many small-scale loggers are undependable and do not run consistently. They may shut down for a week for a breakdown and “are more aggravation than they are worth financially.” Timber buyers often have production requirements and generally require loggers to run consistently to keep a constant flow of timber delivery. Additionally, when mill yards run low on timber, dealers are expected to meet timber demands immediately by increasing production. Small-scale loggers with

low production rates and often few incentives to produce beyond their daily rates are not dependable.

Additionally, timber buyers felt that they were susceptible to liability associated with timber theft. One timber buyer explained “you don’t know where he is and what he is paying the landowner and if they are buying and hauling straight to the mill you are wide open for liability. Some of these guys may haul a few loads and not pay the landowner.” Many of the dealers interviewed were skeptical of the reputations of many of the small-scale loggers and feared tainting their hard earned reputations. The forest industry in West Alabama is a small, close knit community, where reputations are critical for surviving in the business.

In addition, logging is a profession with numerous opportunities for law suits, ranging from timber theft and property damage to improper logging and highway accidents. Dealers contracting loggers without proper insurance often have the deeper pockets and often suffer the consequences of lawsuits. One logger commented that people today were “sue crazy”, and in the past year he had four lawsuits. Many small loggers have identified urban areas as niches and often harvest trees in residential neighborhoods around homes, power lines, and under public scrutiny, all of which are situations dealers avoid. Areas such as these are labeled by dealers as high risk, and most dealers are unwilling to take the risks many small loggers operate under.

Working in these high risk areas and the lack of required insurances make small loggers a liability risk to dealers. Most small-scale loggers interviewed claimed to have all the required insurance with the exception of one small logger who admitted to not being able to afford covering one truck. Several small-scale loggers admitted to cutting

corners to make their businesses work and the cost of insurance is one place where this may occur. Many timber buyers explained that small loggers were often unable to pay for insurance and listed the increasing insurance costs as another primary reason for the decline in small-scale loggers. Small-scale loggers without insurance, acceptable production, and dependable equipment are generally turned down by dealers.

The Challenge of Timber Buying for Small-Scale Loggers

Many of the small loggers interviewed complained about the difficulties they experienced in finding tracts to harvest. Interviews with small loggers indicated that they generally were unable to pay market value for timber and did not have the capital to buy tracts on a lump sum basis, making competition with dealers and high production loggers difficult. Small loggers, often only able to purchase tracts on a unit basis and unable to pay market values (see Chapter 6), are often outbid or turned down by landowners looking to maximize profits. The competition created by timber buyers and large loggers leaves small loggers on the fringes of the timber industry.

Small loggers have found niches in small tracts, urban areas, or limited access tracts that are generally unfavorable to large loggers. However, while these niches exist they are often difficult to identify and require small loggers to maintain community, dealer, and logger connections. Small loggers with extensive time in the business and good reputations often hear about small tracts. Two of the best connected loggers interviewed had at one time been high production loggers. These loggers had good working relationships with the larger forest industry and experienced few difficulties finding tracts to harvest.

Reputations are crucial in finding tracts to harvest. Small loggers, however, are not viewed by the forest industry as having good reputations. Many of the timber buyers interviewed were skeptical of the reputations of small loggers and their labor. They viewed them as cutting corners and operating on the fringes of the legal system. Reputations such as these, possibly earned by some, have made finding timber and dealers a problem for many small loggers, often forcing many of them out of the business when local connections disappear.

Loggers and timber buyers indicated that there were relatively few available small tracts to harvest in West Alabama. While research indicates that there are 60 million acres in Alabama, Georgia, North Carolina, and Tennessee that are in holding sizes of less than 50 acres (Brown 2004; Hartsell and Brown 2002; Schweitzer 2000; Thompson 1998), the long exclusion of these parcels from the market have possibly changed timberland owner perceptions. This would coincide with Dennis's (1992) findings in the Northeast that many small timberland owner no longer placed timber production as a primary management objective. The long exclusion from the market may keep small timberland owners from looking for opportunities for timber harvest, and thus these tracts are as the timber buyers found, rarely on the market. Small loggers were also beginning to experience competition from larger loggers who offered their services to small timberland owners in the vicinity of larger tracts. The problem one small logger explained was that if a small timberland owner was willing to wait long enough he would eventually get a large logger to harvest his timber.

One timber buyer noted that small loggers charged "half again the logging rates" of larger loggers. Larger high production crews are able to harvest tracts at a logging rate

of \$15 to \$16 per ton while small loggers generally need \$20 per ton to cover expenses. High production loggers moving numerous loads per day, and with better mill prices, are able to harvest tracts cheaper and offer timberland owners a larger profit.

In addition to experiencing competition on even small tracts, small loggers are also limited by their ability to only pay timberland owners on a per unit basis. In other words, small loggers pay timberland owner for each load of timber delivered to the mill. Many timber buyers purchasing wood on the open market often pay lump sum, or an advanced payment on the wood they estimate is on the tract. On a per unit basis timberland owners, not utilizing the services of a forest consultant, are at the logger's mercy. Timber value is allocated by the timber products and how they are merchandized or separated into different products of varying value. Loggers not merchandizing correctly can limit the value of the timber.

Generally landowners do not know how many loads were delivered and it is relatively simple for a logger to deliver more loads than he pays for. Timber theft is a factor many of the timber buyers associated with small-scale loggers. Consultants, as a general rule, prefer lump sum sales for a variety of reasons. They force competition between timber buyers, resulting in higher timber prices. They also eliminate the risk of timber theft affecting the landowner, and place the burden of timber merchandizing on the buyer. Small loggers explained during interviews that they do not have the capital to pay up front for these types of sales. They also do not have the capital necessary to pay "performance bonds" collected by timberland owners or consultants to insure a quality logging job is performed. Their higher logging rates (the cost per ton in small-scale logging is higher and small loggers often keep a larger percentage of the profits)

generally limit their ability to buy tracts sold on the open market. Small loggers are forced to use other avenues and niches for purchasing.

CHANGES IN FOREST PRODCUTS

While the forest industry was consolidating and the distance to mills began to increase, the types of wood products accepted at mills began to change and impacted a large fraction of small-scale loggers in west Alabama. Prior to the treelength operations common today there was an array of opportunities for small-scale loggers in west Alabama. In talking to loggers and timber buyers in the region it became apparent that many of the timber products driving small-scale loggers had mostly disappeared from west Alabama. At one time shortwooders dominated the pulpwood market as well as opportunities in “bugwood” harvesting and random length logging. The nature of the business was small-scale and the opportunities for small loggers were numerous and required limited capital investments. However, changes in the forest industry and the modernization of mills shutdown many of these small-scale logging industries and forced loggers to adapt to the new systems.

Mills Stop taking Shortwood and Bugwood

Research conducted by Bliss and Flick (1994) examined the shortwood industry and its decline in west Alabama and the opportunities it provided poor rural Americans. During the interviews in the summer of 2004, ten years after the research conducted by Bliss and Flick, loggers and timber buyers still explained that the decline in shortwood mills and woodyards had shutdown the small-scale logging industry. Prior to treelength

operations, pulpwood was commonly hauled in the form of shortwood. Shortwood or pine pulpwood bolts that are roughly four feet long could easily be loaded and unloaded by hand, unlike the treelength operations today where whole trees are loaded onto 18-wheel trucks.. Trucks used for hauling shortwood were the bobtail 10-wheel truck, ideal for accessing small tracts and hand loading.

Small-scale logging thrived during this era; loggers could harvest pulpwood with a minimal investment of a saw and bobtail truck (Bliss and Flick 1994). Many of the small, medium and large loggers interviewed could remember logging shortwood, some during high school and others made it a full time business. Shortwooding provided many rural Alabamians with an opportunity for earning extra income, and, as one timber buyer commented, there was no tract too small for a shortwooder. Some remembered following larger logging operations with their shortwood trucks harvesting or merchandizing timber left behind.

Shortwood logging, however, has been phased out over the past two decades with no mills or woodyards taking shortwood in the four county area of western Alabama. Without shortwood, many of the loggers were faced with the option of converting to treelength or random length logging or shutting down their logging business. Many small-scale loggers with limited access to capital were unable to modernize their operations.

This change in timber product accepted at mills was another key reason identified by many timber buyers and loggers as the reason for the decline in small-scale logging. One small random length logger explained this by saying “when they took shortwood out they took the littleman out, who just needed a saw and a truck.” Without shortwood the

scale of operations increased, random length logging became common for many of the old shortwooders. They converted bobtail trucks to haul random length wood and were forced to buy loaders, due to the larger size of the timber. Some with available capital expanded their operations while many parked their old trucks.

Declining Trends for Random Length Loggers

Today small loggers complained that many of the mills were beginning to frown upon their random length operations. One timber buyer explained that the large mechanized cranes that unloaded trucks at mills had difficulties unloading bobtail trucks. While most of the mills still accepted random length wood, these loggers were usually the first to be placed on quota.

Additionally, while some small loggers deliver quality wood, one small logger harvesting storm damaged trees, explained that the crooked branches he hauled as pulpwood were causing problems, he did not know how much longer the mill would take his wood. Many small scale loggers working in unconventional niches are delivering timber that is raising questions at many of the mills. Recently loggers hauling “deadwood” or “bugwood” (bugwood are dead trees prior to harvest) have lost this niche when mills concerned about product quality discovered that decayed wood impacted paper quality.

This change according to one small logger impacted many small loggers harvesting “bugwood” for consultants; however, the overall impacts were minimal. Many of the small-random length loggers have working relationships with many of the smaller mills or with the few remaining woodyards. These small mills are often less

stringent on certifications, are able to unload small trucks, do not operate on the dealer system and are often able to buy a variety of timber types and grades. These mills provide opportunities for many small loggers that are generally denied access to the larger specialized mills.

INSURANCE AND WORKMAN'S COMPENSATION

A major component associated with the decline in small-scale logging, and one of the major factors impacting the relationship small loggers have with dealers and mills, is insurance. During interviews, loggers, timber buyers, and mills repeatedly emphasized that the high costs of insurance and workman's compensation in combination with limited production, has caused many small loggers to struggle and go out of business. Laws today in Alabama require loggers to have insured vehicles and many mills have mandated that loggers have at least 1 million dollars in general liability before loggers are allowed on mill grounds.

Vehicle, General Liability and Equipment Insurance

Most dealers today in west Alabama require loggers to show proof of general liability and vehicle insurance. Mills, contrary to what was expected, do not generally ask to see proof of insurance, but rather feel that the responsibility lies with the timber buyer contracting the loggers and buying the timber from the timberland owner. Contract mill loggers, however, are required to have all pertinent insurances and an array of additional certifications.

General liability is required for most loggers to operate. This insurance covers loggers, timber buyer, and timberland owners in the case of property damage in the way of forest fires, over-cuts, damaged property, and personal injury. Vehicle insurance required by Alabama law insures loggers and protects other drivers in the case of an accident on Alabama's highways. Equipment insurance, often required if loggers purchase new equipment or have outstanding loans, insures the equipment in the case of damage during logging or transportation. Loggers interviewed had varying types of insurances depending on the size of operations and with whom the operations contracted.

Loggers with good safety records, consistent high production, and mechanized operations, minimizing the use of chainsaws, generally have few problems acquiring insurance and agreeable rates. However, as insurance companies explained, if loggers are small, with inconsistent production and do not have mechanized harvesting equipment, then companies are often reluctant to provide liability insurance. These findings were reflected by small loggers not completely mechanized (i.e., harvest using chainsaws) who claimed that insurance was a major challenge they faced today in west Alabama. Many of the small loggers complained about high rates and in some cases explained that insurance was difficult to acquire. One small logger in particular admitted to not having general liability insurance, "I just tries to be safe" he explained.

However, without insurance most loggers find operating in west Alabama near impossible due to mill regulations, state laws, and dealer expectations. People are "sue crazy" one logger explained, while a timber buyer complained of already having had 4 law suites that year. As Darren McAvoy wrote "Logging is among the most difficult and dangerous occupations in the United States. Loggers work with falling trees, rolling logs,

heavy equipment, and chainsaws, often on steep slopes and in snow, rain, mud, wind and extreme temperatures-good reasons for them to carry a package of insurance policies that protect themselves and the owners of the land they are logging” (McAvoy 2002). The dangers in logging have pushed mills, timberland owners, dealers and loggers to protect themselves with insurance, something that small-scale loggers with minimal production and without mechanized operations find hard to accommodate.

Small loggers indicated during interviews that the costs of operating a logging operation were steadily increasing and the benefits were declining. One logger emphasized this in saying “you use to not get much for your wood but you did not have all the expenses you have now and so you use to do pretty good in small logging. But now you need all these things and it increased the cost of logging”. Small loggers are finding increased operating cost due to factors like insurance, that in the past were not part of a small logging operation.

Workman’s Compensation

Workman’s compensation as explained by dealers, loggers and insurance companies is one of the hardest insurance types for small loggers to secure. Workman’s compensation, which provides compensation to logger’s employees in the case of accidents, is closely linked to logger safety and equipment. Insurance companies explained that small loggers running chainsaws are far more susceptible to injury than loggers harvesting trees inside a mechanized machine. For this reason many small loggers often pay substantially higher rates or are turned down for workman’s compensation. One small logger interviewed claimed to be paying \$1.50/ton for

workman's compensation while one insurance agent explained that the average rate paid by loggers insured through his company was about 50 to 75 cents per ton.

Additionally, small loggers are also challenged by minimum production rates that some insurance companies require of loggers paying rates on a per ton basis. One logger in particular was turned down for not producing at least 15 thousand tons per year, which was a minimum for the insurance company he bought insurance through. Loggers, however, are also allowed to pay workman's compensation by the payroll. Under this system they pay a percentage of their monthly payroll to workman's compensation. One large logger claimed he paid 18-22 percent (which seemed to be an average rate) of his monthly payroll while one small logger according to one insurance agent paid 36 percent. "Small man catches the devil out here" said one small logger after discussing what he paid in insurance and workman's compensation.

Small loggers struggling to make a living in west Alabama are faced with the challenges of securing insurance to gain access to the market. Without many of these insurances loggers are unable to operate in the timber industry. "It's a must thing in logging" said one logger when asked if he had insurance. For medium and large loggers insurance is hardly a consideration, they all have it. Small loggers, however, had varying degrees of coverage. Small loggers often only insured what they absolutely need.

The logging industry of the past, where small loggers thrived and all logger's needed was a "saw and truck" have long since past. Small loggers today, like their large and medium counterparts, must insure their operations to access the timber market. This fact has forced many small loggers to stop logging, especially those small part-time loggers who used logging to supplement their income. Small loggers without the

financial means, reputation, or proper equipment are unable to secure insurance and are forced to park their trucks. Loggers today are encouraged to increase the size of their operations to fit into the guidelines set by laws, industry, dealers, and insurance companies, thus diminishing the management options available to small timberland owners as small loggers retire from the industry.

ACCESS TO CAPITAL

Access to capital challenges many small-scale loggers operating on the fringes of the forest industry today. Small loggers interviewed explained that acquiring loans was a major challenge for poor rural west Alabamians trying to get into logging or attempting to expand their operations. Poor rural loggers with a limited credit history, collateral (i.e. houses or land), and generally only working part time, have difficulties accessing capital necessary for starting even a relatively small logging operation (Bliss and Bailey 2005). As one small African American logger noted about the capital necessary for a conventional logging crew, “a man has to own something to get 3 million dollars in equipment.”

Small loggers with limited or poor credit histories were generally unable to secure loans and often pursued outside signatures from recognized community members with more credibility and positive credit histories. One small African American logger interviewed had a woodyard owner to whom he delivered timber co-sign his loan while another small logger had a larger logger he contracted with co-sign his loan. One logger commented that banks just didn't give out loans like in the past to loggers and money was hard to acquire. In part this can be explained by loans to loggers having proven to be

very volatile due to the number of loggers claiming bankruptcy. This is not surprising when one considers the difficulties of operating a logging business, where investments are high, operating hours highly variable, profit margins narrow, and all managed by loggers with often limited educations.

Small loggers interviewed in west Alabama generally had minimal loans and tried to minimize the size of their loans. All of the 11 large and medium loggers interviewed had loans while only seven of the 13 small loggers had loans. Small loggers generally commented that they had loans on used equipment and avoided expanding their operations because of the difficulties of accessing capital and the undependable production they experience. Additionally, interest rates for small loggers were perceived as being higher. The average interest rate for nine large and medium loggers willing to respond was 6.5% ranging from zero percent to one medium sized African American loggers claiming 10%. Small loggers were reluctant to answer this question and explained that interest rates on used equipment were generally higher. Only two small loggers responded and the corresponding interest rates were seven percent and 7.5%, higher than the large logger category.

The undependable nature of the small-scale logging business due to generally old dilapidated equipment, poor industry connections, and difficulties in finding tracts makes access to capital especially difficult for small loggers. As one timber buyer commented “small loggers should be able to shut down for a couple of weeks because limited wood or break downs” (paraphrase), something which banks are generally unwilling to risk, thus charging high interest rates or limiting access to capital.

WORN OUT EQUIPMENT AND MAINTANCE COSTS

Small-scale loggers with limited access to capital, timber, and mills generally buy old used equipment purchased for a fraction of its initial value allowing for the introduction of small entrepreneurs into the logging industry. However, used equipment purchased by small loggers is generally in marginal condition due to the equipment often having exceeded a normal operational life and thus entering a gray area of declining machine productivity. As a harvesting professor at Auburn commented “small-scale loggers by using old depreciated equipment exceeding its utilization rate have made their logging operations variable cost businesses.”

Small loggers by using older equipment suffer declining productivity and increasing variable costs, however, the alternative is incorporating the fixed cost of machine payments, which many are either unable or unwilling to incur. As one timber buyer pointed out “many of these big operations need one million dollars to start up and small producers don’t have that kind of money.” While newer equipment would increase productivity and decrease operational costs, many small loggers with limited access to capital, timber, and mills are unwilling to incur these fixed costs. By keeping their operations free of debt they are able to shutdown their businesses when the needs arise, something common in small-scale logging.

Operating with used, outdated, and often more manually intensive equipment has presented small loggers with both opportunities and challenges. Loggers are able to take initiative and start small logging operations with relatively small capital investments. However, the challenge of managing these businesses takes determination, patience, and planning. As one small logger commented “the greatest challenge is just keeping this old

equipment working and keepen it together.” Many small loggers complained breakdowns were costing as much as four thousand dollars and taking as long as two months to repair in some cases. Dealers interviewed complained that small loggers did not understand production and would forfeit two to three working days to find used parts rather than taking a few hours and using new parts. Unlike in conventional logging, where down time is unthinkable, small loggers accept it as a part of their operations.

However, many of the small loggers interviewed operated under business loans incurred from equipment purchase and often expanded when paying for sizeable breakdowns. Small loggers in these situations have more consistent production, however, even a loan of \$40,000 incurred by one logger threatened to put him out of business due to the constant struggle with his equipment. The logger explained that he was unable to pay off the loan and thus at the age of 76 was unable to retire. This small logger commented “small man can’t stand breakdowns” but with this loan he said the “only way of surviving is to keep going.” Fixed cost, such as bank loans are a major challenge to small loggers who operate on the fringes of the forest industry where production, timber, and quota are highly variable and flexibility is essential.

Additionally, small loggers using old equipment are also unable to compete with modern crews offering higher timber prices and capable of harvesting timber in a more conventional manner. Small loggers while able to provide timberland owners with specialized management options, are unable to perform conventional harvests as efficiently as the large and medium loggers. Small loggers are generally unable to perform first thinning or sizeable quality clearcuts. A desired clearcut is free of any standing timber, which has either been cut or crushed by the harvester during the

operation. Small loggers often harvesting with chainsaws do not have this capability and will often leave larger residual stumps which many timberland owner dislike. These limitations reduce the small logger's competitiveness and have forced all but the most determined and savvy loggers from the business.

LABOR

In their attempts to reduce capital investments small-scale loggers have incorporated manually intensive older equipment, while the trend today in conventional logging is highly mechanized, and geared towards increasing productivity and reducing labor. Most of the conventional logging crews visited attempted to minimize labor by utilizing technological replacements for occupations previously filled by manual labor. Modern crews have sought to keep all men inside the protective cabs of forestry equipment to increase safety and lower insurance and workman's compensation rates. The outcome for many of these crews has been reduced labor costs due to fewer employees, superior working conditions, and higher wages for the remaining labor.

In contrast small-scale loggers generally have more employees, poor working conditions, and on average lower wages. This presents a challenge to small-scale loggers seeking to find labor willing to perform more manual intensive work that is not only dangerous but also pays less than conventional logging. One logger explained that in today's age it was difficult to find people still willing to 'run a chainsaw' or 'pick up a stick of wood'. "We're in a new generation" one small logger explained and "people don't want to work as hard and prefer sitting inside an air-conditioned machine rather than runnin a chainsaw." Additionally, loggers explained that most of labor willing to

work was already logging, one logger in particular commented that he tried starting a small logging crew but could not find willing labor.

Quality labor ensures quality logging and as one dealer explained most of the experienced quality labor worked on the larger crews where they could not only earn higher wages but made an easier living. Small-scale logging requires skilled labor able to safely fell trees with chainsaws, skid timber with faulty equipment, and understand the business to ensure proper timber merchandizing, timber buying, and successful logging plans. For these reasons many of the smaller loggers were either older experienced loggers from a past generation or sons of these logging veterans. Many of the small loggers interviewed had well established labor that were either family or had been with them ten or more years. Labor, many small loggers explained, is essential to successful logging and today in west Alabama that is becoming increasingly hard to find, endangering the future of small-scale logging.

CHAPTER 6

FINDING SOLUTIONS: SMALL-SCALE LOGGING SYSTEMS ADAPTABLE TO SMALL TIMBERLAND OWNERS IN ALABAMA'S BLACK BELT

INTRODUCTION

During my summer in west Alabama I came to understand many aspects of the logging industry and the challenges faced by small-scale loggers still operating in the four county research area today. To my surprise the complexity of the logging industry, to which I had some exposure during my time as a forestry consultant, raised more questions than solutions. The intent of my research, of matching small adaptable logging systems to the needs of small timberland owners, became a far more monumental task as the list of limitations and challenges faced by small loggers grew. Small-scale loggers today were found to have been working on the fringes of the timber industry and often not possessing many of the necessary components (including legal requirements) to satisfy industry. My original sense was that many small loggers were operating in a gray area and their eventual demise was unavoidable.

The changes in the forest industry in the past fifty years have driven the logging industry from a positive small-scale environment to a more hostile environment for small loggers. Many of the small loggers found in the four county region of west Alabama

have survived by developing a distinct and different attitude from the rest of the forest industry. They have, for the most part, abandoned the faster paced, high production, cost minimizing, profit maximizing struggle for more leisurely paced operations. As one small logger commented “it’s not about the money, just been doing it all my life.” Small loggers in west Alabama lived a humble lifestyle knowing they would never make much money but were satisfied in their small, often family based operations.

Many of the small loggers identified in west Alabama were remnants from a logging era long since gone. Their equipment, trucks, and approaches were outdated and formed a historical link to the past. Many were elderly and had begun logging as children and had progressed through the industry from laborers until owning their own small crews. These crews, which were often family businesses, were in some cases now operated by sons or nephews who were continuing family traditions and often doing the only thing they knew how to do in timber dependent west Alabama.

During my time in west Alabama I interviewed and observed a variety of loggers ranging from large high production 24-hour crews to small one man logging operations, as well as timber buyers, to understand and provide information on suitable systems for small timberland owners. The results of my findings are the combined use of interview data on small-scale systems successfully operating today and recommendations from small loggers and timber buyers as to solutions to challenges faced by small-scale loggers. This chapter will identify suitable equipment for harvesting small tracts of limited volume and potential solutions to barriers faced by small loggers in West Alabama today.

DATA VARIABILITY AND RESEARCH ASSUMPTIONS

The use of semi-structured interviews presents several challenges in interpreting and presenting the data in this chapter. The answers to interview questions were often presented in a variety of ways making interpretation difficult and forcing the researcher to format data into a single unit for interpretation. Loggers asked about insurance, operational, and variable costs often presented the information in a variety of formats from on a per ton basis to a daily or monthly basis, requiring conversion to a single unit. Data regarding production also had to be converted to tons from loads which were highly variable between bobtail and 18-wheel truck operations. Additionally, some respondents refused to answer particular questions thus limiting the data in various categories.

Data collected for the use in understanding the costs of different forest operations was collected using online sources, secondary phone interviews with insurance companies, and discussions with knowledgeable individuals in the field of forest operations. Many of the exact dollar figures presented are rough estimations and are subject to variability due to the complexity of the forest market and the difficulty of accessing data from insurance companies, equipment dealerships, and loggers themselves. The financial data presented in this chapter provides rough estimations and serves to illustrate the differences between various logging operations proposed. Additionally, data collected on existing logging operations is used to estimate variables in proposed systems that were similar in size and equipment composition.

SUITABLE EQUIPMENT FOR SMALL-SCALE MANAGEMENT

Small-scale loggers in west Alabama use an array of equipment combining factors such as equipment size, function and cost. While there were similarities in the equipment makeup of the crews visited, there were, I found no two identical crews. Small loggers are very opportunistic and often operate using equipment that is readily available; however, there were several patterns that emerged from the research that provides the data supporting the solutions for suitable equipment.

There were four basic types of small-scale loggers operating in west Alabama currently harvesting on small tracts and providing small timberland owners with management options. These operations were broken down into four categories based on their equipment types (Table 3). These four operations varied primarily in the systems used for harvesting and in the type of trucks used for hauling. Systems one and two both used bobtail trucks capable of a limited hauling capacity when compared to systems three and four, which were using 18-wheel trucks. Additionally, systems one and three used chainsaws for harvesting while systems two and four used mechanized harvesting systems, allowing for increased production, safety, and favorable labor relations. In the following sections I combine the data from these existing logging systems with qualitative data provided by loggers, timber buyers and mill operators interviewed to identify specific equipment suitable for small-scale logging and to create new logging systems capable of matching the needs of small timberland owners.

Trucking

There are two truck types available to small loggers operating in west Alabama: the bobtail ten-wheel truck, which is a piece of equipment commonly used during the shortwood logging era, and the 18-wheel tandem trailer common in most conventional logging crews today. These two pieces of equipment present both opportunities and challenges to small-scale loggers. The bobtail truck is smaller, generally less costly to operate (including taxes, tags and no need for Commercial Drivers License (CDL)).

Bobtail trucks are not well suited for the longer hauls becoming increasingly common as the woodyards and small mills disappear. This is so due largely to their limited hauling capacity and the generally poor condition of the trucks. Most of the bobtail trucks observed in west Alabama were older trucks converted to forestry use and were generally in poor condition and on average hauled half of what an 18-wheel tandem truck is capable of carrying. The advantage to bobtail truck, as one logger exploiting the urban interface niche explained, is that they are able to access small tracts and areas within urban neighborhoods or commercial centers. However, as the forest industry consolidates, small loggers running bobtail trucks are generally limited to one or two mills in order to not exceed their desired working radius. Most small loggers operating bobtails generally preferred not to travel more than 25 miles.

For these reasons about half of the small loggers interviewed had switched to the 18-wheel tandem trailer, which increased their working radii and allowed them to access more mills in the region. However, the capital costs for these trucks are higher, ranging from \$18,000 to \$36,000 for used trucks, depending on their age. Additionally 18-wheel tandem trucks require loggers to purchase logging trailers which range from \$8,000 to

\$15,000. By contrast bobtail trucks are less costly ranging from \$8,000 to \$19,000, and do not require the additional costs of trailers. Another challenge associated with the 18-wheel truck is that they are not as well suited for small neighborhood tracts sensitive to large trucks traveling their streets.

Trucking has proven to be a complex factor and limitation to small loggers with limited capital. However, many loggers today in west Alabama employ the services of contract truckers who specialize in hauling timber for loggers. Many of the loggers said they were only able to start operating by using contract trucking. Some loggers interviewed expressed concern about whether small loggers, with limited production, could keep a contract trucker busy enough to employ his services full time. Most of the small loggers interviewed hauled three loads per day on average, which would be borderline for employing a contract trucker full time. Additionally, contract truckers are perceived as being undependable, often moving from crew to crew when improved opportunities present themselves, making them a risky option.

After gathering the information I have concluded that there are three options available to small loggers, and these are dependent on the logger's access to capital, mills, wood and the niche the loggers is operating in. The first and primary option is purchasing an older used 18 wheel truck and one trailer. While access to neighborhoods may be restricted it will allow loggers to access more mills and will limit complications with unloading problems common with bobtail trucks in many of the larger mills. Additionally, the use of an 18-wheel truck allows small loggers the ability to transport their skidders and loaders, something loggers owning bobtail trucks are generally forced

to contract out to truckers. Additionally, loggers using these trucks will access more of the mills in the region opening new opportunities for timber harvest on small rural tracts.

The second option of using a bobtail truck is reserved for loggers operating near smaller mills, woodyards or where special agreements with larger mills or timber buyers are reached. The bobtail truck still has a place in west Alabama, but it is quickly becoming obsolete as the distance to mills increases. However, a strong niche still remains for bobtail trucks in small-scale logging where urban interfaces are creating new opportunities. These bobtail trucks however, should be modernized to reduce problems associated with Department of Transportation (DOT) inspections. Small loggers can easily convert trucks built for other hauling uses to bobtail trucks. Bobtail trucks generally are no smaller than a Ford 550 and most bobtails range from Ford 650s to 850s. Additionally, bobtail operators will likely be required to acquire Commercial Drivers License (CDL) due to the fact that most small loggers were hauling 12 to 16 tons, which exceeds the legal limit without a CDL in Alabama.

The use of contract trucking is available in west Alabama, to loggers with limited capital. Contract truckers' rates in West Alabama ranged from two to three dollars per loaded mile and when factored with the average haul for small loggers of 51 miles, the cost per delivered load is \$127.50. Small loggers could conceivably acquire the services of a contract trucker on a part time basis, either hauling on a daily basis or only a few times a week. This option, while being available, would present risks associated with the difficulties in finding dependable services, however, with the right connections this was a common practice for a few of the small loggers interviewed.

Logging Equipment

A key factor for successful small-scale logging is keeping overhead and operational costs as low as possible. During the summer, loggers and timber buyers emphasized the importance of small loggers purchasing used equipment to reduce overhead. Additionally, the types of equipment used and the number of pieces operating are critical in logging and are especially important in small-scale logging. Smaller and fewer pieces of equipment also mean lower moving costs as indicated by a study conducted by Green et al. (1988). In this study they indicated that larger operations cost as much as \$890 per move and that for smaller operations the costs ranged from negligible to \$244 (Green et al. 1988). Equipment maintenance to reduce breakdowns are another critical part of small-scale logging necessary for successful operations.

Most of the small-scale loggers interviewed purchased their logging equipment used to reduce their capital investment and operating overhead. Small loggers sought to reduce this fixed cost, which would force higher production and logging on larger tracts. Small loggers with limited capital generally operated small outdated equipment purchased at a fraction of its original value. Both small and large loggers emphasized the importance of small loggers purchasing only used equipment.

Feller: Conventional logging crews in west Alabama today operate using at least one skidder, one feller, and one loader. Many of the small-scale logging crews interviewed, generally operated using the same equipment but without the harvester. The harvester is generally the most expensive piece of equipment in a logging operation and small-scale

loggers often unable or unwilling to produce the necessary capital replace the harvester with unconventional equipment.

Most of the loggers interviewed agreed that for successful small-scale logging these crews must implement harvesting systems other than the conventional fellerbuncher harvester. The two most common systems found that are suitable for small-scale logging in both versatility and capital investment are the chainsaw and a small three-wheeled harvesting machine called a Bell. While five of the 13 small-scale loggers interviewed used the fellerbuncher it must be noted that two contracted the services from an independent party and the others either were borderline conventional loggers or owned the equipment from previously owned conventional operations.

The chainsaw was recommended by most small and large loggers as an ideal tool for harvesting for small-scale loggers entering the business. The investment cost is low and it allows for harvesting on small tracts. A logger operating chainsaws can selectively harvest timber without damaging the residual stand or damaging the terrain. Thus small loggers with limited capital are able to enter the logging business with low investments and provide quality logging to timberland owners. However, the chainsaw gives rise to a series of challenges, which prove to be exceedingly difficult for many small-scale loggers, especially any looking to start up new crews.

The chainsaw while reducing capital investments, in the way of equipment, also raises several challenges for small-scale loggers. One of the primary challenges identified by loggers was the difficulty in finding suitable labor willing to operate chainsaws fulltime. Many loggers explained that labor today was unwilling to work as hard as loggers in previous generations who depended on hard manual labor.

Additionally, the use of the chainsaw increases general liability insurance and workman's compensation rates and in some cases makes such insurance difficult to obtain due to safety concerns. Additionally, chainsaw harvesting as indicated by Wilhoit et al. (1999) has very low productivity especially in harvesting small diameter trees, limiting chainsaw crews to larger diameter harvests. Nevertheless four of the small-scale crews interviewed harvested timber with the chainsaw. However, the labor in these crews was generally older and several loggers commented that the younger generations were unwilling to perform strenuous manual labor for relatively limited compensation when compared to conventional logging.

The other alternative identified and currently in operation is the three-wheeled Bell harvester. This is a small harvester about half the size of a fellerbuncher and thus easier to transport and more maneuverable on small tracts. The Bell like the fellerbuncher has a felling head that can use a variety of attachments from a bar saw to a shear (Wilhoit et al 1999). This machine, as one small logger operating it commented, increases production even on small tracts of 10 acres (when interviewed he was harvesting a 12 acre neighborhood tract) and increases safety by placing the operator inside a protected cab. Three of the thirteen small loggers interviewed operated the Bell harvester and explained that it increased production, safety and also made it easier to find labor. The Bell is also small enough that it can be loaded on smaller trailers and pulled behind a bobtail truck as one small logger did.

The challenge of operating a Bell harvester is the larger capital investment when compared to the chainsaw. A search on Machine Trade and Equipment Trader Online produced four results for used Bell harvesters in the South and the prices ranged from

\$18,500 for a 1988 model to \$32,500 for a 1996 model machine. However, the Bell would allow for loggers to access labor, have higher production, and perform a variety of silvicultural harvests generally not possible with the chainsaw.

Small loggers entering the business have two primary options available with regard to a harvester. The chainsaw is available for small loggers able to find suitable labor and with limited capital. The Bell harvester is available for small loggers with better access to capital and provides loggers with a higher level of versatility due to higher production and thus allows small loggers to harvest larger tracts if so desired. These two harvesting systems were the two most adaptable systems found for small timberland owners with limited timber. These two systems provide a combination of opportunities and challenges to small loggers and are options that each individual logger should apply to their own circumstances.

Skidder: Skidding systems used by small-scale loggers observed in west Alabama were exclusively forest skidders built specifically for logging. The only variation in skidders arose in age, make, and the means by which the skidder connected to the trees intended for skidding. The two systems encountered were the grapple and cable skidders. The grapple skidder, which is the more modern and common system found among small loggers (11 of 13 small loggers used it), allows for higher production and is far less manual intensive. The grapple is operated within the cab and allows loggers to backup to a pile of trees collect them in the grapple and pull them through the woods. The cable skidder by contrast uses a cable and winch system, which required the operator to leave his cab and manually connect the cable to the trees intended for hauling.

For the purposes of small-scale logging both systems are adequate, small loggers can operate either systems successfully, however, the grapple skidder is easier to operate, less manual intensive (a plus when considering labor), and more accessible. Cable skidders by contrast are more difficult to operate and are becoming increasingly rare as the older machines are retired from logging and newer cable skidders are not common in West Alabama.

Loggers and timber buyers interviewed in west Alabama explained that small loggers should look for small used skidders that would be easy to transport and reduce capital investments. There are a variety of skidder makes and models on the market available to small loggers, however, the most common skidder make and model found in the region, and used by small loggers was John Deere. The John Deere 548 and the older cable skidder John Deere 540 models proved to be popular among many of the small loggers as well as the small Timber Jack 440 and 450s.

The cost of these skidders, depending on their age, ranged from \$5,500 for a 1974 Timber Jack 440 to \$40,000 for a 1993 John Deere 548 (Machine Trader 2005; Equipment Trader Online 2005). However, while these skidders were common, it must be noted, that small loggers are very opportunistic and operated a variety of skidder makes and models that are readily available and can be found at agreeable prices. Most loggers commented that small skidders were desirable because they were easier to transport and more adaptable to small tracts with limited timber.

The use of farm tractors and other unconventional equipment was not found during the summer; however, there were at least two loggers rumored to be in the region who operated this equipment. Farm equipment converted for logging use could be

suitable for small-scale logging, however, it would be easier for small loggers to purchase used equipment built for their occupation. Converting farming equipment, that may not be suited for some of the rough terrain found on many logging sites, could be difficult and small loggers are more likely to find a sizeable used skidder market available in west Alabama.

Loader: The loader is the last key piece of equipment needed in logging regardless of the scale of operations. Loaders allow loggers to move timber from the logging deck to the truck. Logger's both large and small conventionally use the knuckleboom loader today in west Alabama. The loader is usually attached to trailer hauled by an 18-wheel truck was used in 12 of the 13 small-scale logging operations visited. The primary difference between the loader used in larger conventional crews and small-scale crews was the age of the equipment. Small-scale loggers seeking to reduce overhead used older loaders.

The only exception to the knuckleboom loader was one logger using an old model loader attached to a bobtail truck. There are a variety of bobtail mounted loaders models on the market, such as the Barko 3300 and 160B and the Husky 125B and range in price from \$7,000 for a 1980 Husky 125B to \$38,000 for a 1996 Barko 160B (Machine Trader 2005; Equipment Trader Online 2005). These systems are ideal for loggers operating the smaller bobtail trucks because it eliminates the need for an 18-wheel truck or contract trucker to haul the knuckleboom loader from tract to tract. However, this system would not be suited for loading treelength wood on 18-wheel trucks because the loaders are generally too small.

Due to the difficulty of locating bobtail loaders, loggers generally operate knuckleboom loaders. Loggers explained that small loggers should operate small, used and inexpensive knuckleboom loaders. There are a variety of makes and models on the market available to small loggers seeking to enter the logging profession, however, the most common loader found among small loggers are the Prentice 210 and the Barko 160. Both these models are the smallest loaders made by either company and there should be a sizeable used market for both machines.

A challenge associated with the knuckleboom loader for many loggers and especially those operating bobtail trucks was moving the loader. The loader is generally too large for any truck to pull except for an 18-wheel truck, so many small loggers operating bobtail trucks had to hire contract truckers to move the loader. However, with this being said, this is still the best option available to small-scale loggers operating 18-wheel trucks, small Bell harvesters or chainsaws and small skidders.

OPERATIONS COSTS AND EQUIPMENT COMBINATIONS; RESEARCHER RECOMMENDATIONS

Developing equipment combinations for small-scale loggers that are adaptable to small timberland holdings is a difficult process when one considers the number of variables under which every small-scale logger operates. Nevertheless the goal of my research was to identify equipment currently in operation in west Alabama or available in west Alabama that would be adaptable to small timberland holdings. Thus, using data collected from small-scale logging crews interviewed and observed (Table 3), I have recommended equipment currently used, available, and adaptable for harvest on small

timberland holdings by small loggers. This equipment, however, is highly variable in cost due to the age and condition of the machines purchased. Additionally, there are a series of combinations that can be created to provide varying operational costs, production capabilities, and benefits to loggers and timberland owners.

There are four equipment categories that are deemed as essential to logging in general. These are the harvesting, skidding, loading, and hauling equipment. In the previous section I recommended equipment for each of the equipment categories, however, in this section my intent is to understand the cost and capabilities of the three basic operations composed of the recommended equipment reviewed in the previous section (Table 3).

For illustrative purposes I have provided three separate options that are distinct in equipment type, make up, age, and cost (Table 4). There are three age categories. The first is equipment that is older than 1990. The second is equipment put into service between 1991 and 1995, and the third category is equipment dating between the ages of 1996 and 2000. The idea behind this classification is that as the equipment becomes newer the cost increases with the dependability of the equipment.

In Table 4, while I identified three basic operations based on equipment type and age, I have also included data to allow the reader to imagine the various alternative opportunities loggers are likely to exploit. Capital investment figures are provided for all the equipment types in the three age categories to emphasize the idea that loggers are not limited to the three operations I have suggested, but rather are likely to create their own combinations depending on their individual situations. The three operations I suggested

are based on operations found in the field and are created to provide three distinct operations that will provide different results and opportunities.

To fully understand the capabilities and challenges associated with these operations, I used interview data (production, interest rates, labor, maintenance costs, and required insurance) in combination with secondary data (insurance costs, equipment costs, payment schedules, and equity) collected from insurance companies, online equipment dealerships and discussions with logging experts to derive rough estimates of fixed and variable costs for the three proposed logging systems (Tables 5 and 6). Using this information I was able to get an understanding of the cost per ton and economic capabilities of each operation.

Operation 1

Equipment: The equipment combinations presented in “operation one” and illustrated in Tables 4 and 7 are for loggers with limited access to capital, seeking to operate on small tracts in urban areas, and with access to local mills, to limit hauling distances.

“Operation one” is composed of two chainsaws for harvesting and delimiting, one 1990 or older cable skidder, one 1990 or older loader attached to a bobtail truck, and one bobtail truck for hauling (Table 4, delineated in yellow).

Chainsaws used in logging are generally either a Husqvarna or Stihl. The use of the chainsaw substantially reduces the equipment cost of the operation, however, it also reduces production and safety, and increases the amount of manual labor required. The cable skidder was chosen for this operation due to its lower cost when compared to the newer grapple skidders. The most common skidder make found in west Alabama is a

John Deere and the smallest John Deere available is the 440C. This skidder can be hauled on a small trailer behind a bobtail truck, as one small logger proved. The bobtail loaders were chosen because they would allow loggers to not have to use the services of a contract trucker to move this piece of equipment. Additionally, while these systems are not well suited for treelength loading they are designed for random length logging, which is perfect when combined with the bobtail truck for hauling. One such crew was encountered in west Alabama, and the logger specialized in small tracts less than 20 acres that were in urban interface regions.

Capable Production: I averaged the production from similar operations interviewed in the region to acquire an estimate of the production this type of logging operation is capable of generating. The average production for this type of operation is estimated at 30 tons per day (Table 7). The range for this type of operation was from 20 to 50 tons per day. The operation producing only 20 tons per day operated with two laborers while the operation producing 50 tons per day operated employed six. This estimate of production is rough because no two crews in west Alabama are identical and production is often based on the logger's perception. Some produced enough logs to cover expenses and shut down for the day while other sought to make additional money.

Capital Investment: The cost of the used equipment was derived from two online websites selling used equipment throughout the South. The cost of this operation was estimated at \$52,505 with a range of \$17,700 to \$68,500 depending on the age and condition of the equipment (Table 4). The average figure is more than likely higher than

what a small logger with local connections would likely be able to start up an operation of this type. However, these prices give a rough idea of the capital investment needed to start this kind of logging crew.

Assuming the loggers has 25% equity and is taking out a loan for 36 months with an interest rate of 7.25% (interest based on the average rate for small-scale loggers) his monthly payment is estimated at \$1,187 (Table 5). This payment, while being the lowest of the three operations presented, is coupled with the operation with the lowest production and thus causing this operation to have the highest cost per ton at \$18.11 (Table 7).

Labor and Variable costs: An operation of this size could employ anywhere from 2 to 4 individuals and would ideally be run by 3 loggers (Table 6). One would manually fell trees, the second would operate the skidder and the last would load the truck. The individual hauling the timber could be any of the three loggers, depending on which facet of the operation is in surplus or ahead. Labor cost for this type of operation, using the small-scale compensation average for loggers interviewed, would be \$82 per day per person (Table 6).

Liability insurance and workman's compensation for this type of operation (no exact figures are available due to insurance providers being unwilling to divulge confidential information) would be substantially higher than a more mechanized operation, due to increased risk of injury. Workman's compensation is estimated at being roughly \$1.50 per ton delivered compared to 30 to 75 cents for a conventional operations (Table 6). Insurance for this operation would also be high due to the increased liability

risks, however, exact figures were not available, so figures based on conventional operations were used. Insurance is estimated to be about \$410 per month. This figure includes only general liability and truck insurance, unlike the larger conventional operations, which also pay equipment insurance (Table 6). Insurance companies suggested that, like workman's compensation, insurance and especially general liability would be difficult for small loggers to acquire due to the lack of mechanization.

Maintenance costs for this type of operation are likely to be higher, due to the age of the equipment. Small loggers using this type of operation have to be prepared to spend a high percentage of time repairing breakdowns. Small loggers recommended that any individual starting this type of operation needed to set aside a certain percentage of their monthly earnings into a breakdown and maintenance account. The combined maintenance and fuel cost (this is because loggers often combined the figures when asked during interviews) for "Operation One" is an estimated \$3,452 with an \$800 breakdown emergency fund, totaling \$4,252 per month. Additionally, small-scale loggers have to be prepared to repair their equipment themselves. Interviews with loggers suggested that this was essential due to the numerous breakdowns in these operations and the high costs of professional mechanics.

Benefits and Challenges: The system laid out in "Operation One" would be ideal for loggers seeking to work on small tracts in urban areas where access with an 18-wheel truck would not be possible. Using data collected during interviews from crews of similar make up, I estimated the average tract size for this crew to be about 25 acres and with a minimum tract size of 2.3 acres and a minimum volume per tract of 30 tons. These

loggers would be able to move all their equipment relatively quickly and without the use of a contract trucker. Set up time would be fairly quick due to the small equipment; however, operations of this type need relatively easy access. Without a bulldozer, common in larger crews, they are unable to build extensive road networks and thus need tracts that are accessible from roads in drivable condition.

Additionally, as was previously mentioned, because of the level of manual labor the logger will have difficulties acquiring insurance, workman's compensation and labor willing to perform this type of strenuous work. Labor was considered to be a major challenge to small loggers in west Alabama due to the strain of manual logging, the relatively low compensation, and the lack of benefits. Loggers generally do not provide any kind of health insurance, retirement, guaranteed working hours, or paid vacations. The work is hard and the pay, while being better than minimum wage, is lower than the average pay for loggers working on larger mechanized operations.

Additionally, this operation has a high cost per ton of \$18.11 per ton (Table 7). These figures are based on the assumption of a logger opening a new business and purchasing 75% of his equipment at one time and having 25% equity. The low production, in combination with the costs (even though substantially lower than capital intensive crews), leads to high cost per ton making this operation difficult to operate under conventional terms. This gives rise to a series of questions relating to how these loggers initiate their operations. Many of the small-scale loggers interviewed had few, if any, fixed costs and ran what Dr. Mathew Smidt, a professor at Auburn University, called "variable cost logging operations."

Many of these small loggers only had loans on one piece of equipment so in many ways it is unrealistic and near impossible for loggers to operate today if one assumes, they purchase all their equipment at one time, even if the capital investment is far less than capital intensive crews. This makes entry into this type of logging exceedingly difficult, and requires loggers to have little if any fixed costs by purchasing equipment outright. Once a logger eliminates his fixed costs the opportunities for small-scale logging become more plausible.

Interviews, however, indicated that small-scale loggers were generally unable to pay the same stumpage rates as conventional logging crews. Loggers and timber buyers explained that small timberland owners or any timberland owners using the services of small loggers could not expect the same stumpage rates of a timberland owner using a conventional system. “Today small loggers make it by paying low stumpage prices” explained one timber buyer and small loggers need “half again the logging rates.” If a conventional logger is getting \$15 to \$16 per ton then a small loggers needs \$22.5 to \$24 per ton. Small loggers were unclear about what they paid, however, most agreed that they were unable to pay what conventional loggers did.

This consideration helps offset the high cost per ton for this operation and illustrates how small-scale loggers are able to run their businesses. For this reason loggers using this system are likely to work in niche markets where low stumpage rates are acceptable or not required at all, such as in some of the urban interface regions. Additionally, loggers using these systems are likely to find alternative avenues for avoiding some of the high variable costs, especially insurance.

Operation 2

Equipment: “Operation two” (Table 7) is designed for loggers with more available capital and looking to harvest on small tracts in both rural and in some urban settings. This operation is a little larger and is using newer equipment (1991-1995) capable of higher production and requiring potentially less maintenance costs. Additionally, my intent in this operation was to identify a combination of equipment that would provide a higher level of mechanization to reduce insurance and workman’s compensation costs and make the labor more desirable to workers. This crew uses a Bell Super T three-wheel harvester, one grapple skidder, one small conventional knuckleboom loader, one chainsaw for delimiting and one 18-wheel tandem truck and trailer (table 5, delineated in green).

In “Operation Two” I recommend the use of the John Deere 548, which like the John Deere 440C is the smallest grapple skidder produced by one of the most prominent equipment companies in west Alabama, John Deere (Table 4). The most common loader used by small-scale loggers in west Alabama is the Prentice 210, which like the John Deere 548, is the smallest knuckleboom, trailer mounted skidder on the market in west Alabama. However, several crews were also using the Barko 160, which is comparable in size to the Prentice 210 and was also common among small loggers. This smaller equipment was chosen because of its lower cost, more compact size and versatility in a small tract setting.

Capable Production: This type of operation will allow loggers to increase their production, while increasing the safety and ability to find willing labor in west Alabama.

This operation design was not found exactly as I have proposed it, however, there were similar operations varying only in the use of the bobtail instead of the 18-wheel truck or using a fellerbuncher rather than the Bell harvester. I have thus combined production estimates from these two operations to provide a rough idea of what this operation is capable of producing. This operation on average is capable of producing 65 tons per day and ranging from 26 to 78 tons per day (Table 7).

Capital Investment: The cost of this operation is higher than “Operation One” and thus is reserved for loggers with better access to capital. The equipment recommended for this operation dates from the years 1991 to 1995 and thus increases the cost of the operation when contrasted to the 1990 and older equipment in “Operation One.”

Additionally, the Bell harvester and the 18-wheel truck raise the cost of this operation significantly. However, the Bell increases safety and the logger’s ability to find willing labor, and the 18-wheeler allows access to more tracts and mills in the region.

“Operation Two” costs an estimated \$129,900, and the cost ranges from \$79,500 to \$174,500 (Table 4). However, like in the previous suggested operation, these figures are likely to be higher due to the listings found on the internet likely being negotiable.

Loggers with connections in the local forest industry are likely to find used equipment at a far more agreeable rate.

Using the assumption of a logger having 25% equity and taking out a loan with an interest rate of 7.25% (interest based on the average for small-scale loggers interviewed) for the remaining sum and assuming a 36 month payment schedule, the monthly payments for this operation are \$2,916 per month (Table 5). While this operation has a

higher fixed cost it also is capable of increased production and thus lowering the cost per ton for this operation to \$10.60 (Table 7).

Labor and Variable Costs: This operation by using the Bell harvester reduces the manual labor necessary when compared to the other operation, and thus will make finding labor less of a challenge. Additionally, this operation is likely able to operate with only 3 loggers, by having one logger to run the Bell harvester, a second to run the skidder, and the third to operate the loader. Like the previous operation the crew can reduce its labor costs by using one of the three laborers to haul the loads. However, if the distance to mills becomes too great, thus increasing the truck's turn around time, it may be necessary to hire a fourth person to haul on a fulltime basis. The labor compensation rate for this operation, like in "Operation One", is based on the average compensation rate for small-scale loggers interviewed, and is estimated at \$82 per day per man.

Insurance and workman's compensation is likely to be less with this type of operation because it places the individual harvesting inside a protective cab reducing his risk of injury. While not exact, figures are available on the declining insurance and workman's compensation rates in this operation (due largely to financial books being kept by logger's wives), I am confident that rates would be lower and access to insurance and workman's compensation easier.

Using interviews with loggers and insurance companies I estimated the workman's compensation rate for this operation to be \$1.00 per ton, which is still high compared to the 30 to 75 cents for conventional crews (Table 6). The insurance cost,

including generally liability and truck insurance, is estimated to be roughly the same as in “Operation One” at \$181 and \$229 respectively and totaling at \$410 per month (Table 6).

The maintenance costs for this operation, while still being high due to the equipment being older, should be lower than “Operation One”. The equipment in this operation is newer, ranging from 1991 to 1995, and less likely to be as problematic. The combined maintenance and fuel costs for this operation are estimated to be roughly the same as “Operation One”. While “Operation One” has less equipment “Operation One” is likely to have more breakdowns (because of older equipment), so I estimated that this operation, like “Operation One” would cost about \$3,452 per month including the \$800 emergency breakdown account (Table 6).

Benefits and Challenges: This operation was put together using interviews and observations from several small-scale loggers in west Alabama. I had visited several crews harvesting with chainsaws and learned of their difficulties associated with insurance and labor. I also visited several crews running Bell harvesters who expressed the usefulness and applicability of this machine in a small-scale setting. The logger using the Bell harvester, however, used bobtail trucks and after learning of the difficulties associated with bobtail trucks and the increasing distance to mills and reduced working radius and thus limited available tracts, I put these two logging operations together to form “Operation Two”.

This operation is ideal for loggers seeking to harvest tracts in both the urban setting and rural settings where tracts may be a little larger. Using data from loggers of similar composition I estimated that the average tract size for this crew is about 26.7

acres with a minimum tract size of 1.8 acres, and a minimum volume per tract requirement of 120 tons. In addition, this operation allows the logger to harvest timber at a faster pace with increased safety. While having some limitations in the urban settings, the 18-wheel truck allows the loggers to access more tracts and mills in the region. This operation is something that a logger with access to capital could successfully run and make a living harvesting only on small tracts.

Operation 3

Equipment: “Operation Three” (Table 7) is the largest and most capital intensive of the three operations. It also closely resembles conventional logging systems found in west Alabama, varying only in the age and size of the equipment. This operation uses all the components of a conventional operation, the fellerbuncher, grapple skidder, knuckleboom loader, and 18-wheel truck (Table 4, delineated in blue). This operation uses newer equipment ranging from the years 1996 to 2000 and thus increasing the cost of the operation. The equipment is similar to that proposed in “Operation Two” using a 548 John Deere skidder, a Prentice 210 or Barko 160 knuckleboom loader, an 18-wheel truck and trailer, and replacing the Bell harvester with the larger 411 or 511 HydroAx fellerbuncher.

This operation was included to illustrate a facet of loggers in west Alabama currently harvesting small tracts and the potential success with this equipment on certain small tracts. This operation, while being less versatile in the types and size of tracts it’s able to harvest, illustrates the capital necessary and the capable production by using newer and more modern equipment. While interviews suggested that many loggers using

this type of operation harvested small tracts, they were also exploiting certain conditions to make their operations possible. These loggers harvested small tracts located near larger tracts, exceptional timber, or performing favors in hope of larger tracts in the future.

Capable Production: This operation is able to out-produce both of the previous operations presented. The modern equipment and the level of mechanization allows this operation to reflect the production common in the large conventional crews. Using data acquired from interviews I estimated that this operation on average should be able to deliver 147 tons per day (Table 7). The primary difference from “Operation Two” is the use of the fellerbuncher which allows these operations to harvest timber at a greater pace and the newer skidder and loader are able to meet a higher level of production.

Capital Investment: The age and type of equipment proposed in this operation raise the capital investment to an estimated \$221,600 (Table 4). Unlike the previous two operations this systems uses newer equipment that borders on the equipment used in medium and large scale conventional operations. The fellerbuncher is the most costly piece of equipment used in this operation, costing an estimated \$64,500 for a 1996 to 2000 model (Table 4). The skidders are estimated to cost an estimated \$48,800 and the loader is priced at \$38,800 (Table 4). This operation requires a substantial capital investment and assuming the same equity, interest and payment schedule of the previous two operations has a monthly payment of \$4,935 (Table 5).

Labor and Variable Costs: A logging operation of this size would require 4 laborers (Table 6). One would operate the fellerbuncher, a second would run the skidder, a third the loader and the last would drive the trucks to mills. In operations of this size it may become necessary to hire contract truckers on some tracts when the distance to mill does not allow for a fast enough turn around, and thus reducing production.

Contract trucking rates would increase the operating cost for this operation substantially. The contract trucking rate is estimated at \$2.50 per loaded mile, and when multiplied by the average haul distance, the cost is \$203 per delivery (Table 6). The cost per ton if using contract trucking to delivery three loads per day and assume the logger's truck will haul the rest, the cost is \$12,180 per month (Table 6). Purchasing a second truck is a second option, however, most loggers in west Alabama owned one or two trucks and contracted out the rest of the hauling. The cost of adding a second truck is almost identical to the cost of using contract trucking.

The labor in this type of operation will be more specialized and interviews with medium and large scale loggers suggested that labor operating mechanized equipment generally are paid \$102 per day (Table 6). This raises the price of the labor when compared to the more manual labor intensive operations where labor is making on average \$82 per day. Maintenance costs will be higher in this operation due to larger and more equipment, thus increasing fuel and upkeep. However, the costs associated with breakdowns should be lower due to the equipment being newer, ranging from 1996 to 2000. I estimated the maintenance and fuel cost for this operation to be \$5,478 per month (Table 6). This figure includes a breakdown emergency fund of \$800 like in the previous two operations, which many loggers explained was necessary for successful logging.

The workman's compensation cost for this operation should be lower than the previous two operations because of the level of mechanization in this operation. In talking to loggers and insurance companies I estimated the cost for this operation to be roughly about 75 cents per ton (Table 6). This figure is on the high side for conventional logging, but because it is still a small operation it is appropriate. The insurance for this operation is likely to be about the same as the previous two operations. Except, for the addition of equipment insurance, likely to be necessary because of the higher equipment value, and possible mandate by the loaning agency. The insurance cost for this operation is estimated at \$999 per month (Table 6).

Benefits and Challenges: This operation, because of the capital investment, is not likely to be implemented by loggers intending to work on only small tracts. The overhead and higher moving cost, due to more and larger equipment, would limit these loggers from logging on small tracts on a full time basis. Using data collected on the average tract size and minimum tract size from similar loggers interviewed, I found that the average tract size could be estimated at 85 acres and the smallest at 14 acres and a minimum volume per tract of 650 tons (Table 7). This operation is thus likely to have difficulties on smaller tracts when considering the ways similar loggers operating in west Alabama operate their business.

Larger operations such as these have difficulties on smaller tracts because they are able to harvest timber faster and, thus would need to move to other tracts more often. Thus their moving cost rises as they make more than one trip in moving equipment, when compared to the smaller crews able to make the move in one trip. Additionally, this

operation has the slightly higher cost per ton at \$11.04 per ton (Table 7). This is because of the operations increased production capabilities, due to the fellerbuncher and modern equipment, and a need for contract truckers to haul what the operation's truck cannot. This raised the cost of the operation over "Operation Two", which would likely only need one truck.

CHAPTER 7

CONCLUSION

INTRODUCTION

The indisputable truth is that there is a need for scale appropriate harvesting mechanisms in west Alabama, Alabama, and the United States as a whole. There is an increasing divergence between the scale of operations and the growing number of small timberland owners in the United States (Decoster 1998). Timber buyers interviewed confirmed the notion that small timberland owners have difficulties managing and harvesting their timber. The reality to the forest industry, however, is the total acreage in timberland, rather than the actual numbers of timberland owners. Research by Bliss et al. (1998) indicated that 8 percent of timberland owners owned 80% of the timberland, suggesting large ownerships. These are the figures driving the forest industry in west Alabama, which contrary to the rest of the country suffers from forestland consolidation rather than fragmentation (Bliss 1998).

Management, however, often goes beyond dollar figures and total acreages. Timberland owners, large and small, are likely to require the services of small loggers capable of specialized harvests. Conventional loggers, due to their production requirements, are often unable or unwilling to perform harvests that do not allow them to

achieve required production (Green et al 1997). There are a variety of harvesting opportunities for small-scale loggers such as storm damage wood recovery, small selective harvests, small clearcuts, bug-wood removals, and a variety of timber management objectives timberland owners find necessary on their land (Decoster 1998).

The initial purpose and primary interest of my research, of characterizing west Alabama loggers and then identifying small-scale logging operations adaptable to small timberland owners, became an increasingly monumental task. My initial intent of finding small-scale loggers successfully harvesting small tracts, and finding a way of extending their operations to the thousands of small timberland owners across the four county research region, became dimmer as I progressed through this thesis. Small loggers, faced with increasingly difficult industry standards, government regulations, and the greater economic capitalist systems are pushed towards the fringes of the forest industry where they operate in a gray legal area. The number of challenges faced by small-scale loggers surpassed potential opportunities as I delved deeper into the world of small-scale logging and the forest industry in west Alabama.

INCREASING CHALLENGES FOR SMALL-SCALE LOGGERS

Interviews with loggers illustrated a dynamic forest industry in west Alabama where the presence of the larger forest industry has changed the balance of logging from small family oriented businesses to a larger industry with high production, capital intensive operations, and small profit margins. The forest industry, in attempts to provide low cost products and competitive stumpage prices to timberland owners, have forced a higher level of efficiency in the process of transporting the timber from stump to mill.

They sought to reduce transaction costs by reducing the number of loggers delivering products and looked for loggers capable of delivering timber at lower costs. Loggers were forced to modernized operations, capable of substantially higher production at a lower cost per ton. Conventional loggers today are caught in a system of increasingly higher operating costs, and due to low profits per ton, have a need for high production to make ever decreasing profits.

Logging costs as indicated by Stuart et al. (2003) are continuing to increase causing an increasing gap between the cost of logging and the payments received. In addition, the implementation of higher safety standards, logger education programs, and liability insurance, have increased logging costs for loggers regardless of size and production. Small loggers, like larger loggers have begun to pay insurance and workman's compensation, and take Professional Logger Manager courses. While these changes have had many positive impacts, such as improving working conditions, safety and logging efficiency, they have effectively pushed logging into a new era. Today loggers operate in a high production era, where profits are slim and success dangles on factors such as, minimal down time, high production, access to mills, suitable tracts, and good safety records.

My hope was to identify small-scale loggers with limited capital investments who could provide management to small timberland owners. I had hypothesized that, because these loggers used older equipment, purchased at a fraction of its original value, they could run businesses comfortably on small parcels of land where production is difficult. However, interviews suggested that factors like labor, insurance, and workman's compensation, as well as increasing distance and access to mills, limited these operations.

These variable logging costs, changing little between small and large operations, became exceedingly difficult to absorb for smaller loggers producing only a fraction of what the conventional operations could. Thus, their cost per ton when operating under the conventional system made profits slim, if not nonexistent.

Small loggers seeking to remain in business sought alternatives to working under this high production system. Loggers having identified specialized niches, allowing for larger profit margins, still found variable costs like insurance and workman's compensation to be a problem. I suspected many of these small loggers found ways to circumvent the system by paying only fractions of the insurance costs or only covering certain parts of their operations. The consensus among timber buyers and mill owners was that most of these loggers were not fully insured. Thus, loggers found a second major challenge in accessing mills that are currently working on a dealer system, requiring loggers to work through timber buyers. Timber buyers, unwilling to incur the liability of uninsured small-scale loggers, would not work with small loggers, and thus, limited their access to local mills.

Labor challenges many small-scale loggers today. Small-scale logging requiring strenuous manual labor, having higher safety risks and poor compensation rates, does not present employees with favorable working environment. Many small loggers complained of difficulties in finding willing labor able to work under the difficult conditions. Labor, generally preferring the comforts and higher pay of larger conventional operations, are generally unwilling to consider employment with small-scale loggers.

Small loggers are assaulted on several fronts. There is not one single challenge they must overcome, but rather a series of challenges. Most of the small loggers

interviewed had identified specialized niches and found small outlets for their timber. Their situations are precarious, and seem to only worsen as industry continues to grow and regulations compatible with a first world nation become mandatory in the small forgotten corners of the west Alabama logging industry. Small-scale logging in west Alabama operates in a different era, where handshakes were contracts, suing was unheard of, and small local mills and woodyards thrived. Today they struggle in the modern industrial era where logging is no longer just cutting and hauling trees and you need more than a “saw and a truck,” but also an array of necessary certifications, safety precautions, and insurance coverages.

RECOMMENDED SMALL-SCALE LOGGING OPERATIONS; A QUESTIONABLE OPPORTUNITY FOR SMALL TIMBERLAND OWNERS

The three proposed logging systems, while having low capital investment costs, are capable of only limited production causing the operations to have a higher cost per ton than large conventional logging operations. This study worked on the assumption that an individual was entering the logging business with limited capital, and thus needed to acquire loans for all the equipment purchased and assume a payment schedule. Equipment was identified for each of the small-scale systems based on equipment commonly used, available, and adaptable to small-scale logging operations in west Alabama.

Three separate operations were designed using logging systems currently operating in west Alabama on small tracts of timber. “Operation One”, common in west Alabama, was difficult to justify financially. The limited production in combination with

the high variable costs, and assuming a 36 month equipment payment schedule, made the operation costly to operate. Small loggers running this type of system likely found alternative ways to buying the equipment to reduced initial investments. They also likely found alternatives to insurance, which would be expensive and difficult to acquire for this operation. “Operation One” is not a likely candidate for future small-scale logging in west Alabama, as regulations, safety concerns, and distance to mills continue to pressure these loggers out of business.

“Operation Two” is the best option identified in this study for small-scale harvesting in west Alabama. The operation addresses many of the identified challenges facing small-scale loggers and works to bridge the gap between scale and production, safety, and operational costs. The operation, while still facing many challenges associated with high insurance, low production, and access to mills, is likely to be a strong candidate for future small-scale loggers modernizing their operations from systems similar to “Operation One”.

“Operation Three” incorporating the highest capital cost and the highest level of mechanization proves to be a poor candidate for most small timberland owners in west Alabama. The operation is likely only able to operate on small tracts of timber periodically and especially if the timber is of high quality or located near larger tracts of timber. However, because of the modern equipment, this operation will have a higher level of production and will need to move more often because of increased production.

The cost of moving “Operation Three” will be more costly than “Operation One” or “Two”, because of the size and number of pieces of equipment causing loggers to make more trips when moving. Additionally, this operation has high variable costs, due

to the need for more trucks and higher level of fuel consumption, and will thus need to produce more than the 147 tons specified in table 7 to remain in business. This operation, with a few more trucks and a mechanized delimeter will likely increase its production and lower its cost per ton, however, the operation will become conventional and unable to work on small tracts of timber.

These operations will require a larger profit margin, which can only be attained by paying timberland owners less for their timber, when compared to conventional systems. The benefits to small timberland owners become questionable as their stumpage value decreases, due to the high operating costs of small loggers. However, this may be the only opportunity for harvesting small timberland owners are likely to receive and will have to adjust to a new stumpage rate, separate from values associated with larger tracts.

IDENTIFIED NICHE AVAILABLE TO SMALL LOGGERS

Small-scale loggers challenged by the reluctance of mills and timber buyers to work with them, and the competition presented by larger, high production, conventional logging operations have shifted their operations to small niches across the research region. Their niches generally comprised of special relationships with timber mills and woodyards or large timberland owners and urban interface regions were exceedingly delicate and seem to lack potential for expanding to the small rural forestland owners of west Alabama.

Local Mill or Woodyard Connections

Small loggers often developed, over multiple years in the logging business and due to local connections and reputations, a relationship with local mills and woodyards. These mills and woodyards, often reluctant about working with small-scale loggers, made exceptions for small loggers with years in the business and personal ties. These connections provided local markets for small loggers working in the region that are often not available to other small loggers in the area. However, these connections are delicate; a change in ownership, management or the closing of these facilities would almost surely force the small loggers out of the market.

Specialized Harvests

Small loggers finding competition from conventional loggers difficult, when competing for tracts on the open market and even on smaller rural tracts, sought different timber markets for harvesting. These two timber markets are broken down into two primary groups. The first are timberland owners, large and small, with needs for specialized timber management. These landowners, as three loggers in this niche explained, ranged from ten to several thousand acres. These owners allowed small loggers to perform small and often specialized harvests on their tracts for a range of outcomes from wildlife thinnings to storm damage, bug-wood, and salvage cuts. These clients, often large, provided small loggers with years of future work by keeping them busy on a variety of tasks on their land.

These relationships are in many ways contrary to what would generally be expected. Intuition would suggest that these harvests would generally be performed by

larger logging operations able to pay more for the timber and deliver the profits to timberland owners in a smaller time frame. However, timberland owners by using small loggers, are likely able to micromanage their forests due to the low production and scale of operation. This provides large timberland owners, not primarily interested in profits, with a variety of silvicultural opportunities.

The second niche small loggers exploited were the urban interface regions. These regions located around many of the towns and larger urban areas are avoided by conventional systems, and thus many small timberland owners did not have outlets for their timber. Small loggers finding competition in rural areas began to find small tracts, where timberland owners would often settle for lower prices to achieve their desired goals. Small loggers with smaller equipment, lower moving costs, and a willingness to risk lawsuits in sensitive urban areas, occupy this niche.

Urban timberland owners, often forced to pay for the removal of trees, find small loggers to be a positive alternative. Several loggers interviewed worked in this niche, and two were interviewed while harvesting within the city of Tuscaloosa. Small loggers thrive in this environment where lower stumpage prices are acceptable, competition is non-existent, and access is seldom a problem.

The Need for Specialized Timber Outlets

The idea of introducing small-scale loggers is functional on some levels, when considering growing niches and the needs of small forestland owners; however, they are limited when trying to place them into the larger forest industry. Many of the challenges facing small loggers are driven by industry standards and the strains of fitting into

mainstream economics and modern society. Alternative timber outlets, designed to support timberland owners and small loggers are needed as well as a market for these products.

The need for small loggers is there, and potentially growing (Decoster 1998), however, the chances of these loggers becoming mainstream or fitting into a capital intensive, production oriented industry are limited. Alternative outlets for their harvested products must be considered to make a functional link between the needs of small timberland owners and the challenges faced by small loggers in finding markets for their products. These markets, however, are few and of limited capacity in west Alabama.

Cedar Mills: Specialized cedar mills were encountered capable of supporting two loggers and providing opportunities for both timberland owners with cedar forests and small loggers harvesting these specialized products. The value of delivered raw cedar was substantially higher at \$70 per ton than conventional hardwood and pine products ranging from \$25 per ton for pine pulpwood to \$62 per ton for pine sawtimber (Timber Mart-South 2004). The opportunities for successful small-scale logging were filled by two small-scale loggers logging almost exclusively for these mills. The larger of the two cedar mills expressed interest in finding other small loggers and could likely only support one other. This market, however, from both a logging and milling perspective, seemed maximized and likely to consolidate into only one supplier.

Portable Sawmills: Other potential outlets found in west Alabama that are largely undeveloped and hold questionable potential are portable sawmills. Portable sawmills,

largely owned by larger timberland owners interested in producing high quality lumber from downed trees on personal property, are also becoming a market for entrepreneurs looking for alternative incomes. Three individual working fulltime in this relatively new enterprise were encountered in west Alabama. They largely worked on an 'as needed basis' moving their operations to the timber supply. These small sawmillers generally worked for timberland owners needing the services of an individual able to produce quality lumber from downed trees. The production capabilities of these systems were very limited, only producing about one to two thousand board feet per day or less than one delivered load per day.

The services of loggers were not used in this market. However, one small sawmiller running an operation from a fixed location, used the services of tree surgeons in one small urban area. This sawmiller on random occasions bought wood from a tree surgeon business in town, when the timber was of high quality. All the sawmillers interviewed however, explained that their business was geared towards a specialized product. This product changed, by means of dimensions and intended use, from client to client. This variability made it difficult for the portable sawmill operators to keep an inventory of lumber for sale. They said that it was difficult for them to sell plain dimensional lumber on the open market and thus they refrained from keeping inventories and only sawed when special orders were placed.

An alternative to this situation, however, was encountered in one small sawmiller, who worked exclusively for a specialty hickory drum stick outlet in Moundville, Alabama. The idea of specialty products, sawed by small mills, is likely to provide some solutions to the needed timber outlets for small loggers. Specialty mills would ideally

pay a premium price, like in cedar mills, allowing loggers a larger profit margin. The primary challenge for loggers in this specialized timber market is the fact that solid hickory stands are rare, and loggers need alternative outlets for the various products found in an average west Alabama forest. Additionally, the market has to be large enough to support at least one logger full time producing at least 30 to 40 tons per day.

The way specialty markets work in west Alabama, apart from the cedar market (cedar stands in west Alabama often occur in dense stands), loggers would have to deliver products to several different locations. The delivery costs may outweigh the benefits of this type of operation. This especially would be the case with small loggers harvesting small tracts where full loads of various products may not be present. In conventional logging, loggers unable to fill a full load of a certain product will lump it in with hardwood pulp, something these small loggers are not likely to do.

Small outlets with limited markets are likely to have difficulties working with the various forest products loggers deliver. If these specialty markets were able to take a few products, use what they need and sell the rest to the larger forest industry mills, there might be an opportunity. However, because loggers generally cannot supply their needs, specialty mills purchase their products from the large mills in west Alabama.

AREAS FOR FURTHER RESEARCH

The areas for continued or further research are many. The goal of my study required me to research and analyzes several factors of west Alabama logging from current operations to potential systems for small timberland owners. In the process of

interviewing individuals in the forest and logging industry, several questions and areas for further research were brought to my attention.

One area in need of further research is a more in-depth look at the needs and willingness of small timberland owners to work with small loggers and their willingness to forgo premium market prices for opportunities for specialized timber harvests. Additionally, a closer look needs to be taken at some of the urban niches and the possibilities and challenges these are likely to present to small loggers. This urban interface region is a growing portion of land that is engulfing forestland and research is needed to understand the dynamics of what is expected from loggers and the potential opportunities and challenges of specialized urban loggers.

This thesis presented a long list of challenges facing loggers and further research is needed to understanding what small loggers are doing to meet these challenges, in a market becoming increasingly hostile. A closer look is needed to understand the economic structure of small logging crews and how small businesses are functioning in today's industry where costs of operating logging crews continue to rise while the benefits remain unchanged. Research on the costs of operating small crews painted a very negative picture, where new loggers entering the business are going to be unlikely. Further research is needed to understand how small loggers remain in business, and how they purchase, finance, and deal with the high variable costs.

CONCLUSION

Small loggers exist in west Alabama, not because there is a market for them, but rather because logging to them is a way of life and the only thing they know how to do in

the timber dependent Black Belt. The challenges facing small loggers are numerous and only seem to continue to increase. Small loggers are declining as small timber outlets continue to disappear and industry consolidation becomes more apparent in every corner of west Alabama. The needs of small timberland owners notwithstanding, the structure of the forest industry and the government regulations provides few opportunities for small loggers.

Small loggers will increasingly find specialized niches, as they find operating in the conventional forest industry increasingly difficult. The urban interface and specialized small-scale harvests are likely to provide small loggers with a market. The larger problem for small loggers, however, is finding suitable timber outlets. Consolidating mills, working on the dealer system, are likely to force many of the small loggers out business and only small loggers with proper insurance, certifications, and connections to timber buyers will get access. Specialized timber outlets are limited and provide a separate set of challenges with regards to accepted volume and timber products. The forests are diverse and loggers need markets for many of their products.

Regardless of the growing challenges facing loggers, I am confident that there will always be small-scale loggers working in a gray murky area, under the conventional radar, and occupying niches throughout west Alabama. Small loggers in west Alabama are survivors from a previous era and will continue to find opportunities for their business. The number of small loggers, however, is likely to decrease as industry changes force loggers without proper insurance, poor safety records and certifications out of the business.

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APPENDIX A

SEMI-STRUCTURED INTERVIEW SCRIPT

The purpose of this interview and my research in general is part of a larger effort to learn what obstacles exist for small timberland owners and to find ways of incorporating these people into the current timber market. My interview specifically hopes to characterize the current types of logging systems operating here in the Black Belt to understand where you operate and your limitations in working with small timberland owners. The outcome I am hoping to derive is to identify types of logging systems that are adaptable and economical for small timberland owners and hopefully creating opportunities for small loggers and timberland owners here in Alabama's Black Belt.

Personal information

(I would like to start this interview with a few questions relating to yourself and how you got into the logging business.)

1. What is your name?
2. How long have you been in the logging business?
3. How did you get into the business?
4. Where is your base of operations?
5. What is your working radius? How far will you go?
6. Would you consider logging to be your main job? (Toms)

Equipment

(I would like to now go into a section talking about the types of equipment you are using on this logging crew to understand the make up of your logging operation.)

7. What kind of operation is this?
8. What kind of equipment are you using?

<i>Type</i>	<i># of pieces</i>	<i>Age</i>
a. Skidder		
b. Harvester		
c. Loader		
d. Crew support vehicle		
e. Bulldozer		
f. Other		
9. How long have you been using this kind of equipment?
10. How do you generally move the equipment?
11. How long do you work a piece of equipment before trading it in?

Trucking

(In this next section I would like to understand what kinds of trucks you use and how the trucking side of your business works.)

12. What kind of trucks do you use to haul wood?
 - a. Ten wheel
 - b. 18 wheel
13. Do you use your own trucking or use contract trucking?
 - a. Contract
 - b. Own
 - c. Both
 - d. How many trucks do you own?
 - e. How does the contract trucker get paid? (per load, per day)

Logging Site (Tract)

(In this next section I would like to learn the types of tracts you generally cut, the things you look at when selecting a tract to cut, and the reasons why you can or can't harvest small acreages (i.e. your limitations) and the types of wood you look for on a tract.)

14. What is the typical size of the tracks you cut?
15. What is the smallest tract you have cut? Both in acreage and timber volume?
16. What would it take for you to cut a tract less the 20 acres? 10 acres?
17. Are you primarily a:
 - a. Clearcut crew?
 - b. Thinning crew
18. What kind of wood do you usually try and cut? Or will not cut?
19. Are there any site limitations you usually stay away from, for example:
 - a. Wet or swampy tracts?
 - b. Steep tracts?
 - c. Tracts with thick undergrowth?
 - d. Limited Access

Labor and Crew

(In this next section on labor and crew I want to get an understanding of the make up of your crew, the things you look for in employees, and where your crew is from. (The characteristics of the crew that this section seeks to identify are for the crew that is currently working, not ideal))

20. How many people do you have in your crew?
21. What do you look for when recruiting labor for your crew?
 - a. Do they need experience?
 - b. Do they have or need any physical requirements?
 - c. Education
 - d. Do the need to know how to run more than 1 piece of equipment?

22. Do you know if it is common to use migrant (Mexican) labor? Have you ever used any?
23. Do you ever use part time help?
 - a. How many people work for you part time, and how often do they work?
24. Where do workers get their training from?

Production

(In this next section I want to understand the production side of your logging business. To find out where you take your wood, how far will you go, how many loads you get and the challenges you face in logging.)

25. What is your average hauling distance for:
 - a. PS?
 - b. HS?
 - c. PP?
 - d. HP?
26. How far will you go on average to deliver wood?
27. On average how many loads do you haul per day? Week?
28. How many loads does it take per week for you to break even?
29. How many weeks a year do you work in the woods? (Toms)
30. In the past year, have you had any down time because you didn't have any timber to cut? (Toms)
31. What do you view as the greatest challenges in operating your logging crew today?
 - a. Is it finding clients or tracts to cut?
 - b. Dealing with the stumpage prices?
 - c. Finding or working with employees?
 - d. Insurance?
 - e. Quota?
 - f. BMP Guidelines?
 - g. PLM Certification?
 - h. Other?
32. What has changed over the years to make you more or less competitive in the logging industry?

Timber Buyer or Broker

(The next section on timber buyers and brokers is to understand who buys the timber you cut and how the relationship between yourself and the timber buyers works.)

33. Who buys the timber that you cut?
 - a. How does that work?
34. Do you always work for the same timber buyer?
35. How did you start working with this timber buyer?
36. Are there times during the year you work on a quota system?
37. How many places do you deliver wood too right now?

Policy and Regulations

(Policy and regulations is the next section in this interview. In this section I am hoping to identify any government regulations, laws or policies which may have made or have made logging more or less difficult. As well as finding out if there have been any changes in last 20 years which impacted your competitiveness)

- 38. Are there any government influences or policies that have impacted your ability to operate or remain in business?
 - a. Recently?
 - b. Historically?
- 39. Has anything changed over the last 20 years that has influenced your ability to compete in logging? For example:
 - i. Timber prices
 - ii. Distance to the mill
 - iii. The types of wood they accept at the mill (tree-length vs. 16 ft logs or shortwood)

Sensitive information

(I would like to finish up this interview with the following questions.)

- 40. How much does it cost to maintain this equipment on a weekly or monthly basis?
- 41. What is the highest level of education you have obtained?
 - a. Less than high school graduate
 - b. High school graduate
 - c. Some college
 - d. Trade/Technical/Vocational training
 - e. College graduate
 - f. Post-graduate work/degree
 - g. Don't know
 - h. refuse
- 42. Are you PLM certified?
- 43. What is the value of your logging operation today?
- 44. What is the common pay for a:
 - a. Harvester operator?
 - b. Skidder operator?
 - c. Loader operator?
 - d. Chainsaw operator?
 - e. Truck driver?
- 45. Did you have to take out a loan for this logging crew?
 - a. What can you tell me about that?
 - i. Interest rates?
 - ii. Terms (length)?

46. Would you recommend your son going into logging? (future of logging)
47. How old are you?
48. Do you know any other loggers in this area that would be willing to talk to me?

Small-scale loggers

(Same questions as above will be asked in addition to the following questions)

49. Have you ever tried expanding and making your crew bigger using larger equipment capable of higher production?
 - a. What challenges would you face in doing something like this?
50. How many acres or trees can you cut per day? Per week?
51. What impacts has new logging equipment had on smaller operations?
 - a. More or less competitive?
 - b. More or less clients?
 - c. Timber prices?
 - d. Have you had to increase the number of loads to maintain economical production?

Technology and Consolidation

52. Have mills (i.e. pulp & paper and sawmills) done anything to affect your productivity or competitiveness?
 - e. Mill acceptance of your products?
 - f. Distance to the mill?
 - g. Product specifications (tree-length vs. logs, top diameter, log size)?
53. How does the existence of high production logging crews impact your work?
54. What changes have you seen over the past 20 years in your logging business?
55. Why do you think there are fewer small logging operations today?
56. Do you know any other small loggers in this area?

APPENDIX B

Figure 1. Alabama and the Four County Study Area (Green, Hale, Marengo and Sumter counties)

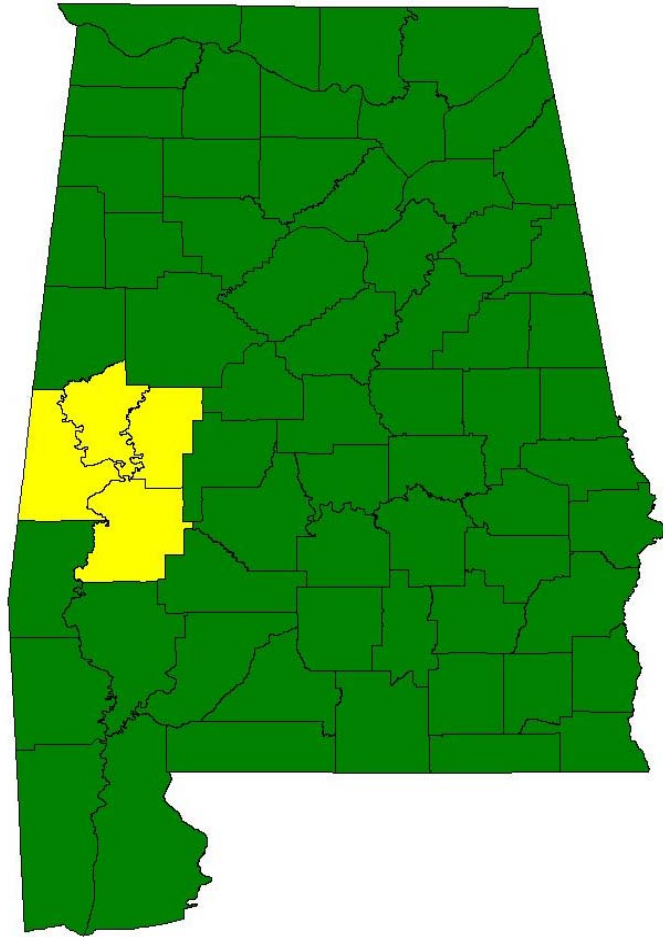
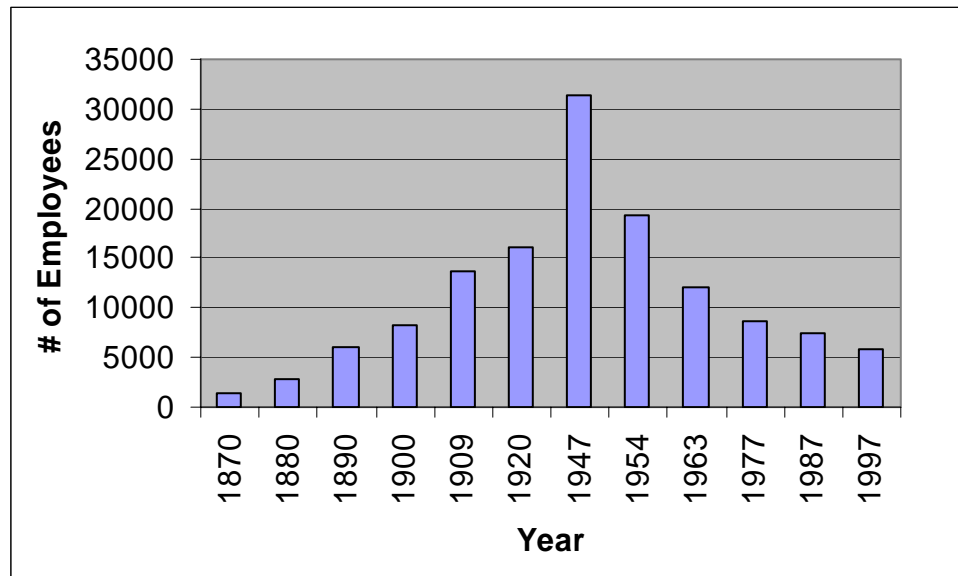
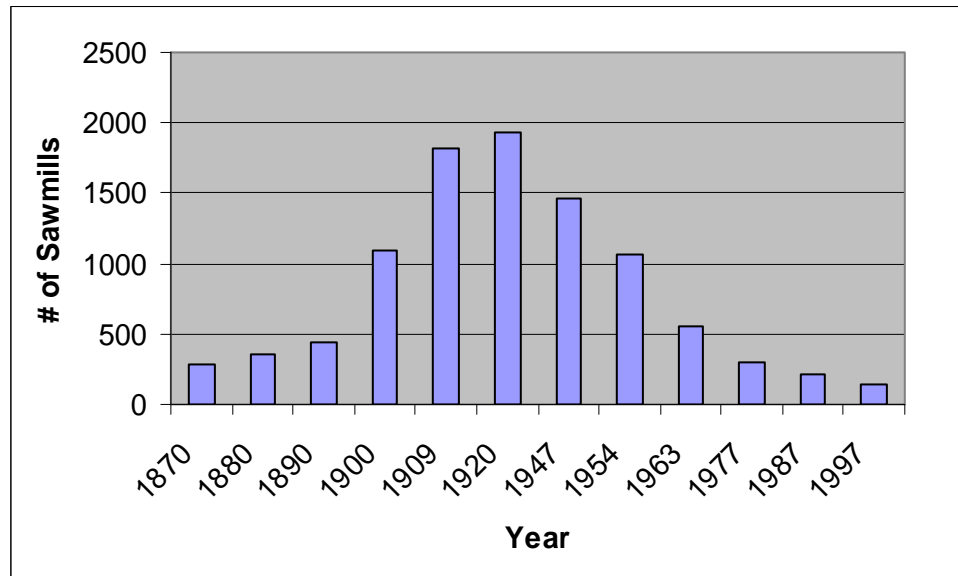


Figure 2. Total Number of Employees in Sawmill in Alabama between 1870 and 1997



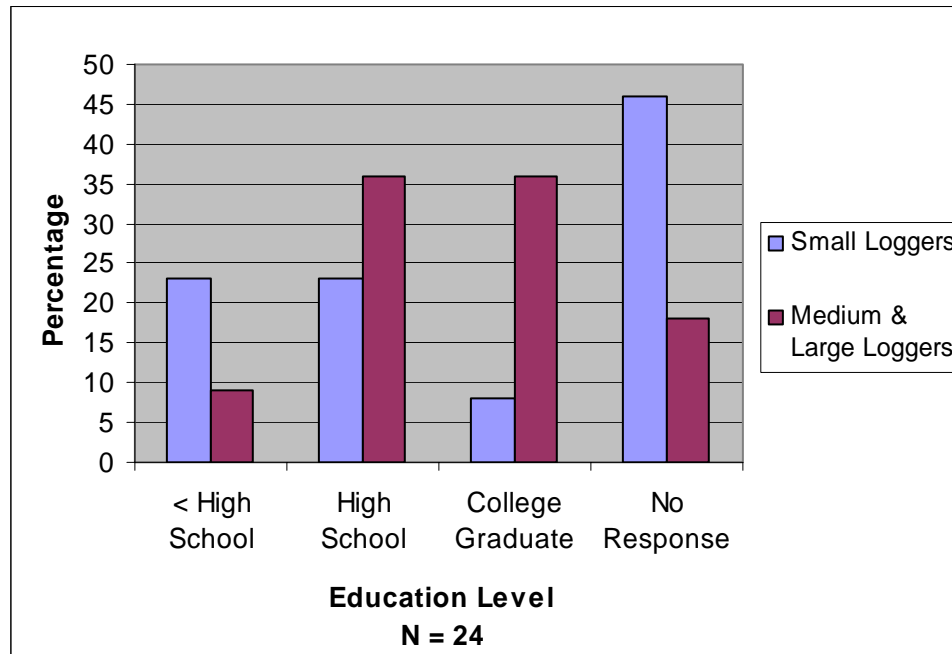
Source: United States Census of Manufacturing (1870, 1880, 1890, 1900, 1909, 1920, 1947, 1954, 1963, 1977, 1987, and 1997)

Figure 3. Total Number of Sawmills In Alabama between 1870 and 1997



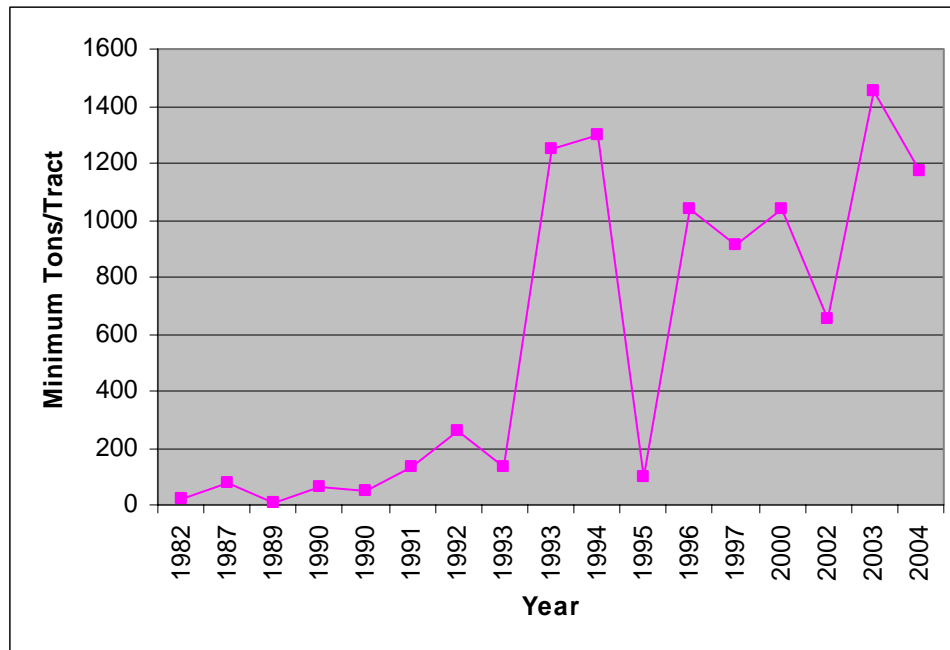
Source: United States Census of Manufacturing (1870, 1880, 1890, 1900, 1909, 1920, 1947, 1954, 1963, 1977, 1987, and 1997)

Figure 4. The Level of Education Attained by Respondents, by Size Class



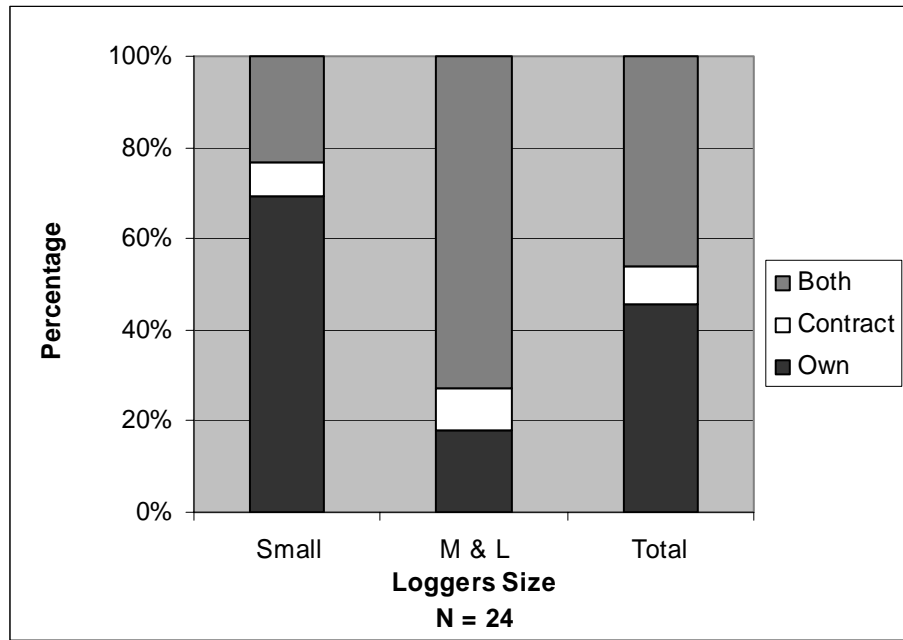
Source: Primary Data

Figure 5. Relationship between Average Age of Equipment (Year of Purchase) and the Minimum Volume Required by Loggers per Tract



Source: Primary Data

Figure 6. Trucking Strategies of Respondent Loggers in West Alabama



Source: Primary Data

APPENDIX C

Table 1. Logger Demographics by Respondent Category

Characteristics	Loggers	
	Large and Medium	Small
Age	<i>n</i> = 11	<i>n</i> = 13
Average	47	49
< 30	0%	8%
31 to 40	27%	38%
41 to 50	27%	23%
> 50	46%	31%
Ethnicity	<i>n</i> = 11	<i>n</i> = 13
<i>Black Owned Crews</i>	18%	46%
<i>White Owned Crews</i>	82%	54%
Education	<i>n</i> = 9	<i>n</i> = 7
<i>Some High School</i>	11%	43%
<i>High School</i>	44%	43%
<i>Some College</i>	11%	14%
<i>4-year College Degree</i>	34%	0%
Years Logging	<i>n</i> = 10	<i>n</i> = 13
Average	21	19
< 10	0%	15%
11 to 20	60%	54%
21 to 30	40%	15%
> 31	0%	16%
Generations in Logging	<i>n</i> = 10	<i>n</i> = 12
<i>1st Generation</i>	40%	42%
<i>2nd Generation</i>	30%	33%
<i>3rd Generation</i>	20%	25%
<i>4th Generation</i>	10%	0%

Source: Primary Data

Table 2. Selected Characteristic of Logging Operations in West Alabama

Characteristic	Small	Medium & Large	Total
Skidder	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
% using Grapple	85%	100%	92%
% using Cable	15%	0%	8%
Loader	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
% using Knuckleboom	92%	91%	92%
% using Front-end Loader	0%	9%	4%
% using Bobtail Loader	8%	0%	4%
Feller	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
% using Fellerbuncher	31%	100%	63%
% using Bell	23%	0%	13%
% using Chainsaw only	38%	0%	24%
Truck	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
% running 18-Wheeler	54%	100%	75%
% running Bobtails	46%	0%	25%
Investment Cost	<i>n</i> = 7	<i>n</i> = 9	<i>n</i> = 16
Current Value (used)	\$50,786	\$456,000	\$297,794
Equipment Age	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
Average Model Year	1991	2000	1995
Equipment Loans	<i>n</i> = 11	<i>n</i> = 11	<i>n</i> = 22
% having Loans	70%	100%	83%
% Not having Loans	30%	0%	17%
Employees/Operation	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
# of Laborers	3.7	7.2	5.3
Labor Compensation	<i>n</i> = 7	<i>n</i> = 11	<i>n</i> = 18
\$/day	\$81	\$115	\$102
Working Radius	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
Radius in Miles	45	75	61
Production	<i>n</i> = 13	<i>n</i> = 11	<i>n</i> = 24
Tons/day	71.5	373.5	209.5
Average Tract Size Harvested	<i>n</i> = 9	<i>n</i> = 9	<i>n</i> = 18
Acres	37	85	62
Min Tons/tract Required per Tract	<i>n</i> = 11	<i>n</i> = 6	<i>n</i> = 17
Tons	214.0	1044.3	520.4

Source: Primary Data

Table 3. West Alabama Small-Scale Loggers Interviewed by Operation Type, Average Value by Type

Operation Type	Low Cost	Moderate Low Cost	Moderate High Cost	High Cost
Sample Size (n)	3	2	3	5
Equipment				
<i>Harvester</i>	Chainsaw	Bell Super T	Chainsaw	Fellerbuncher
<i>Skidder</i>	Old Skidder	Old Skidder	Old Skidder	Old Skidder
<i>Loader</i>	Old Knuckleboom	Old Knucleboom	Old Knucleboom	Old Knucleboom
<i>Truck</i>	Bobtail	Bobtail	18-wheeler	18-wheeler
Production (Tons)	30	30	78	109.2
Minimum tons required/tract	35	60	156	683
Estimated Capital Investment	\$53,105	\$72,880	\$92,575	\$164,600

Source: Primary Data

Table 4. Suggested Small-Scale Logging Equipment Cost by Equipment Type and Age

Feller	Make & Model	# of Pieces	1990 & Older	1991-1995	1996-2000
<i>Chainsaw</i>	Husqv. or Stihl	2	\$1,400	\$1,400	\$1,400
<i>Bell</i>	Bell Super T	1	NA	\$20,000	\$32,500
<i>Fellerbuncher</i>	HydroAx 411, 511, 611; JD	1	\$13,725	\$31,300	\$64,300
Skidder					
<i>Cable</i>	JD 440, 640G	1	\$21,125	\$26,150	\$46,000
<i>Grapple</i>	JD 548, 648; TJ 450, 460	1	\$14,425	\$36,500	\$48,800
Loader					
<i>Bobtail Attached</i>	Barko 80C, 160B; Husky 125B	1	\$18,100	\$26,150	NA
<i>Knuckleboom</i>	Prentice 210 & Barko 160	1	\$9,500	\$22,500	\$38,800
Truck					
<i>Bobtail</i>	Ford 450, 550, 650	1	\$8,480	\$17,350	\$19,750
<i>18-wheel</i>	Kenworth, Mack	1	\$18,175	\$25,500	\$36,900
Trailer					
<i>Logging Trailer</i>	Pitts	2	\$10,000	\$19,600	\$24,000
<i>Lowboy</i>	Pitts	1	\$4,000	\$5,000	\$8,000
Total Operational Cost			\$53,105	\$130,500	\$222,200
<i>Low</i>			\$21,200	\$91,500	\$151,164
<i>High</i>			\$74,500	\$189,500	\$305,000

Source: Primary Data

Table 5. Fixed Costs for Suggested Small-Scale Logging Enterprises

Equipment Payment			
	Operation 1	Operation 2	Operation 3
Total Capital Investment	\$53,105	\$130,500	\$222,200
Equity (25%)	\$13,276	\$32,625	\$55,550
Loan	\$39,829	\$97,875	\$166,650
Interest Rate	0.0725	0.0725	0.0675
Payment Schedule (36 month)	\$1,187	\$2,916	\$4,942

Source: Primary and Secondary Data

Table 6. Variable Costs for Suggested Small-Scale Logging Operation

Variable Costs	Operation Category		
	1	2	3
Labor (\$/day)	\$82	\$82	\$102
<i># of Employees</i>	3	3	4
<i>Total (\$/month)</i>	\$4,920	\$4,920	\$8,160
Maintenance & Fuel	\$3,452	\$3,452	\$4,678
<i>Breakdown (\$/month set aside)</i>	\$800	\$800	\$800
<i>Total Maintenance Cost</i>	\$4,252	\$4,252	\$5,478
Workman's Comp.	\$1.50/ton	\$1/ton	0.75 Cents/ton
<i>production (tons/month)</i>	600	1560	2080
<i>Insurance cost/month</i>	\$900	\$2,080	\$1,560
Insurance (\$/month)			
<i>General Liability</i>	181	181	181
<i>Truck Liability</i>	229	229	229
<i>Equipment Insurance</i>			589
<i>Total Insurance Cost</i>	\$410	\$410	\$999
Contract Trucking \$/loaded Mi	\$2.50	\$2.50	\$2.50
<i>\$/Average Max haul</i>	\$128	\$128	\$203
<i>\$/month</i>			\$12,180
Total (\$/month)	\$9,682	\$10,862	\$27,577

Source: Primary and Secondary Data

Table 7. Operational Overview for Suggested Small-Scale Logging Enterprises

	Operation 1	Operation 2	Operation 3
Capital Investment	\$53,105	\$130,500	\$222,200
<i>Lowest Cost</i>	<i>\$21,200</i>	<i>\$91,500</i>	<i>\$151,164</i>
Fixed Cost (\$/month)	\$1,187	\$2,916	\$4,942
Variable Cost	\$9,682	\$10,862	\$27,577
Production (tons/day)	30	65	147
Cost per ton	18.11	10.60	11.04
Tract Size Average (acres)	25	26.75	85
<i>Smallest Harvested Average</i>	<i>2.3</i>	<i>1.8</i>	<i>14.3</i>
<i>Minimum Required loads/tract</i>	<i>30</i>	<i>120</i>	<i>650</i>
Tract Location	urban & rural	urban & rural	rural

Source: Primary and Secondary Data