

FEDERAL TIMBER INCOME TAXES AND PRIVATE FOREST LANDOWNERS IN THE U.S.

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ABSTRACT

Recent concern has risen among forestry professionals that forest landowners are unaware of federal income tax provisions available to them that make forest management more cost effective. This concern specifically focuses on nine provisions. These nine provisions are: the treatment of timber income as capital gain, the deduction of annual management costs, depreciation of tangible property, the section 179 deduction, recovery of investment through depletion, the reforestation tax credit, amortization of reforestation costs over eight years, the exclusion of cost-share payments from gross income and deductions for casualty losses.

The publication is divided into three major parts. In Part I the specifics of the nine provisions are covered in detail according to the current Internal Revenue Code. Current income tax rates are examined. The Passive Activity Loss Rules (PALS) are reviewed in terms of how they affect landowner eligibility to use the nine provisions for current loss deductions. PALS limitations incurred by holding forestland as a passive trade or business, or active trade or business are examined. Advantages and disadvantages to holding forestland as an investment are also examined.

In Part II, the effects of timber income taxes on forestland investments are explored. Examples of taxes incurred (including the alternative minimum tax) when timber is sold are given. Tax calculations are based on a typical southern landowner

involved with the management of a loblolly pine plantation. In Chapter 6, effects of using the nine income tax provisions on the land expectation value (LEV) of a typical forestland tract are examined for a high-income forest landowner and a low-income forest landowner engaged in both intensive and non-intensive loblolly pine management in the South. Cumulative effects of using or not using the nine income tax provisions in each regime are shown to dramatically influence LEV, and the importance of tax provision awareness is emphasized. In Chapter 7, the complexity of complying with timber tax law is examined. This chapter's purpose is to provide an example of the detail involved in taking advantage of the tax laws. A demonstration of tax complexity is made with income tax calculations for the medium-income landowner in Chapter 6. The landowner first thins his 120-acre plantation in tax year 2003, and forms required by the IRS to use the tax provisions are identified and discussed. Although use of the provisions is essential for maximum economic returns, their complexity can discourage landowners from electing to use them.

Part III presents the results and discussion of a mail survey sent to members of the American Tree Farm System (ATFS). In the survey questionnaire, landowners were asked if they were aware of the nine tax provisions, and if they used them where applicable. They were also asked why they failed to use certain provisions when they know about them. Various hypotheses are tested in Chapter 13. The demographics of ATFS members are compared with the demographics of the general U.S. forest landowner population as described by Birch (1996). The ATFS population was more timber production as well as more land investment oriented. ATFS members have significantly more harvesting experience than the general landowner. Tree Farmers

typically own larger parcel sizes than the average landowner. ATFS members belong to a forestry organization, and ATFS members are more motivated in terms of forest management than the typical landowner. The results show that ATFS awareness and use of the tax provisions are low. Thus, increased efforts by natural resource professionals to inform landowners of their tax options are indicated. Caution should be used when interpreting survey results, because over 70% of ATFS members use tax professionals to file their income taxes. Consequently, actual use of tax provisions could be higher than predicted if the tax professionals are well versed in dealing with timber income.

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Chapter 1

Introduction

Congress is empowered by the Sixteenth Amendment of the Constitution to levy income taxes, and it first exercised this power by passing the Revenue Act of 1913. The U.S. government uses a progressive tax rate structure (Sieg and Johnson 2003). In addition, the current system requires individuals to file their returns and pay their taxes within certain deadlines. Failure to comply with the tax law typically results in fees and penalties and can lead to criminal prosecution in extreme cases (Sieg and Johnson 2003). Taxpayers are therefore motivated to understand tax law enough to comply with regulations.

A bigger motivation to understand tax law, however, is the tax savings opportunities presented to those who follow current legislation changes and that seek professional advice with tax matters. Sometimes tax law changes are easy to interpret and apply directly to a particular situation. Often, however, understanding the complexity of tax laws and how minor changes can have major impacts on individuals and businesses is difficult. Yet the reward for becoming familiar with tax law can be substantial. James Madison addressed the rewards associated with tracking legal changes and understanding complexity in *The Federalist* #62 , February 1788:

“It will be of little avail to the people that the laws are made by men of their own choice, if the laws be so voluminous that they cannot be read, or so incoherent that they cannot be understood; if they be repealed or revised before they are promulgated, or undergo such incessant changes that no man who knows what the law is today can guess what it will be tomorrow.....Every new regulation concerning commerce or revenue or in any manner affecting the value of the different species of property, presents a new harvest to those who watch the change, and can trace its consequences” (Madison in Jennings et al. 1989).

Since 1913, tax law and policy has continued to evolve and change. Major revisions have been made to federal tax regulations in the past several years. Legislation resulting in these changes includes the Taxpayer Relief Act of 1997, the IRS Restructuring and Reform Act of 1998, the Economic Growth and Tax Relief and Reconciliation Act of 2001, the Job Creation and Worker Assistance Act of 2002 and the Job and Growth Tax Relief Reconciliation Act of 2003. Since 1997, Congress has shown a trend of favoring decreases in tax rates for ordinary income as well as decreases in the capital gains tax rates. The Economic Growth and Tax Relief and Reconciliation Act of 2001 created several changes in tax law. These changes were to be phased in over the next several years. One of the most significant changes for individuals by the 2001 Tax Act is the reduction in the top marginal tax bracket from 39.6 percent to 33 percent. For example, in 2003 the top individual tax bracket had already dropped to 35%. In addition, the act makes provisions for the repeal of the estate, gift, and generation skipping taxes but calls for the reinstatement of these taxes in 2011 unless Congress takes further action (U.S. Treasury Department 2004). Increases in standard deductions and personal exemptions were provided for as well. Another noteworthy provision is the reduction of the top capital gains tax rate to 15 percent. The Job Creation and Worker Assistance Act of 2002 has created several tax-saving options for businesses. Accelerated depreciation is one example of how businesses are helped by the bill.

Revenues generated from forest management activities are subject to federal income tax laws. Several provisions in the Internal Revenue Code (IRC), however, offer tax relief to forest landowners who elect to take advantage of them. Unfortunately, many landowners are not aware of the tax-saving options available to them.

Objectives

Since the impact of taxation on forest management decisions is significant in many cases, forest landowner awareness of federal tax-saving provisions available to them is crucial for sound financial planning. The purpose of this study is to examine levels of forest landowner awareness and use of federal income tax provisions that reduce the cost of forest management. Examination of the use of federal income tax provisions and why landowners decide to use or not use them is made. The specific objectives of the study are as follows:

- 1). Estimate the proportion (nation-wide) of landowners who are aware of and use nine federal income tax provisions that benefit investment in forest management.

These provisions include:

- 1). Capital gains treatment of timber income.
 - 2). Deduction of annual forest management costs.
 - 3). Depreciation deductions.
 - 4). Election of the section 179 deduction.
 - 5). Recovery of investment capital through depletion.
 - 6). Use of the reforestation tax credit.
 - 7). Election to amortize reforestation costs over 8 years.
 - 8). Exclusion of cost-share payments from gross income.
 - 9). Election to take loss deductions for damaged or destroyed timber.
- 2). Describe briefly, the major changes in federal income tax law that affect the applicability of the tax provisions.
 - 3). Describe the importance of income tax provisions and why forest landowners should be aware of them. This is accomplished by using current forest management cost data, landowner demographics, timber prices and growth and yield simulators to create a hypothetical landowner. Using different scenarios,

LEV analysis is used to show the importance of the individual income tax provisions in terms of their effect on LEV.

PART I. INTRODUCTION TO TAX

Chapter 2 Justification of the Study

The results of a study that addressed landowner awareness of federal tax law concerning forestry operations in South Carolina were recently published (Greene et al. 2002). In the study the awareness and use of seven federal income tax provisions among South Carolina nonindustrial private forest landowners were estimated. The data collected for the survey were gathered by mail surveys using the Dillman (1978) mail survey method. The study was implemented due to concern that many landowners actually knew little about or used the provisions available to them for the purposes of reducing the cost of forest management.

The seven tax provisions that landowners were asked about are as follows:

- 1). Treatment of qualifying income as a long-term capital gain
- 2). Annual deduction of management expenses
- 3). Depreciation and Section 179 deduction for income-producing property
- 4). Deductions for casualty losses or other involuntary conversions
- 5). The reforestation tax credit
- 6). Amortization of reforestation expenses
- 7). The ability to exclude qualifying reforestation cost-share payments from gross income

In addition, demographic data were gathered about the number of acres owned by each landowner, the primary reason for owning the land, whether the landowners were members of a forest owner organization, whether the landowners had written management plans, landowner occupation, age and total household income.

Results of the study indicate that landowners surveyed were more financially motivated and more active in management than the average landowner in the United States when compared to Birch's (1996) demographic work concerning forest landowners in the United States. As a result, Greene et al. (2001) estimated that levels of awareness and use of the tax provisions, though low, were probably overly optimistic (Table 2-1).

A large percentage of landowners were not aware of several of the provisions available to them (Table 2-1). Of particular concern was a lack of awareness about depreciation and the section 179 deduction, the reforestation tax credit, reforestation amortization provision and exclusion of cost-share payments from gross income (Table 2-1).

Even though overall awareness of some of the provisions was low, results of the study show that large percentages of landowners that were aware of certain provisions tended to use them. Therefore, the authors concluded that if their results were representative, they were a call to forestry professionals to increase efforts to inform landowners of their tax options for reducing the cost of forest management.

Importance of Understanding the Impact of Taxes on Forest Landowners

Two major determinants of future U.S. timber production and non-timber forest outputs are 1) the proportion of land that remains covered in forests, and 2) the

level of management and care given to those forests (Alig and Wear 1992). Forestlands in the United States are divided between public lands, industrial lands and non-industrial lands. The amount of timber produced by America's forests depends significantly on the quality of management given to NIPF lands. A gap has existed in the past between

Table 2-1. Results of the South Carolina tax survey

Tax Provision	Long-Term capital gain (%)	Deduct management expenses (%)	Depreciation / section 179 (%)	Loss deductions (%)	Reforestation tax credit (%)	Reforestation amortization (%)	Exclude cost-shares (%)
Aware of the provision	77	77	50	59	54	56	42
<i>Had used the provision</i>	86	85	67	24	78	80	70
<i>Had not used the provision</i>	14	15	33	76	22	20	30
Not aware of the provision	23	23	50	41	46	44	58

Source: Green et al. (2002)

the investment potential and the level of management on these private lands. Alig and Wear noted that the gap has been explained by: “1) lack of available investment capital, 2) perception of forestry as a relatively risky enterprise, 3) relative lack of liquidity of the assets in young forests, 4) uncertainty about future prices of forest products and 5) important returns to forest ownerships that are not captured in a financial analysis of timber investments.” They noted that these issues would have to be addressed by forest policy in order to increase timber production.

Effects of Taxes on Markets and Individual Firms

At the market level, basic economic theory shows that taxes on producers usually shifts the supply curve to the left (Figure 2-1). When the shift occurs, the market equilibrium point shifts to the left as well, and the price of the product increases. The result is higher prices and lower production (Figure 2-1).

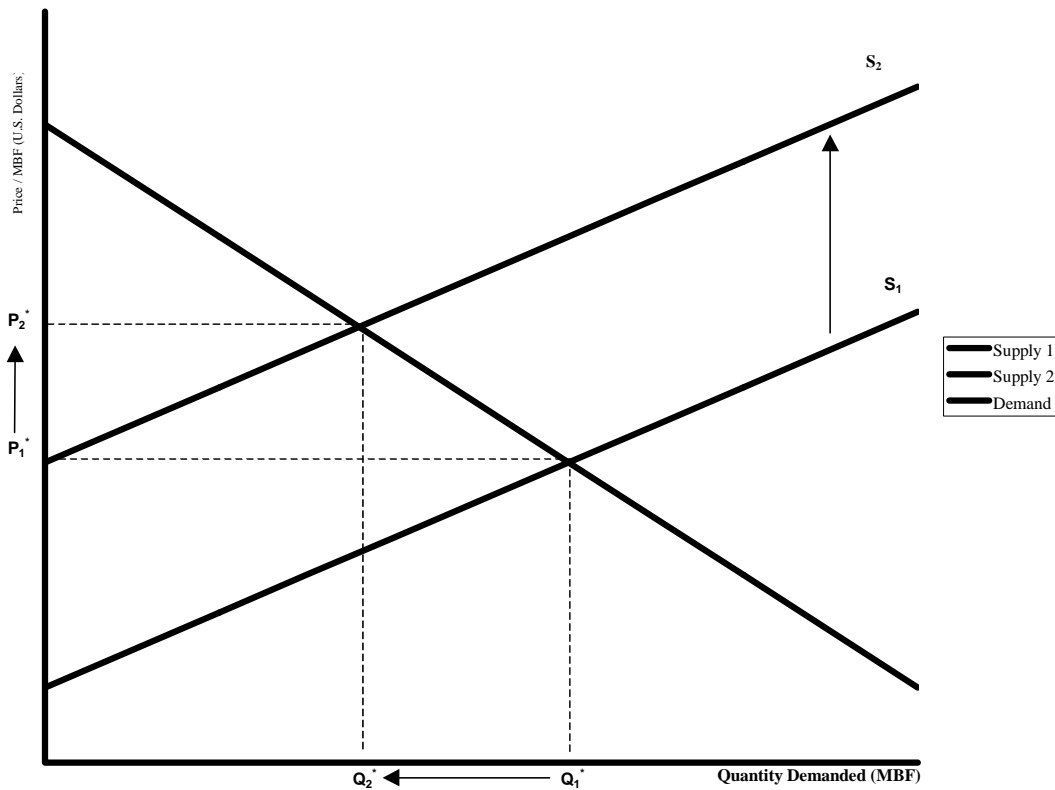


Figure 2-1. Effects of a tax at the market level.

Under economic theory, firms are price takers when 1) firms in a specific market sector are producing identical products, 2) many firms exist in that market sector, 3) each

firm produces a small amount of the total supply and 4) no barriers of entry exist (Gwartney et al. 2000). When a firm is a price taker, it will expand output in the short run until its marginal revenue is equal to its marginal cost (Figure 2-2) in order to maximize profit (Taylor 2002). Income taxes serve to reduce marginal revenue or price (Gregory 1987). Therefore, the imposition of an income tax causes the price the firm receives to decrease. This is seen in the price change in Figure 2-2. As a result, optimum production in terms of profit decreases.

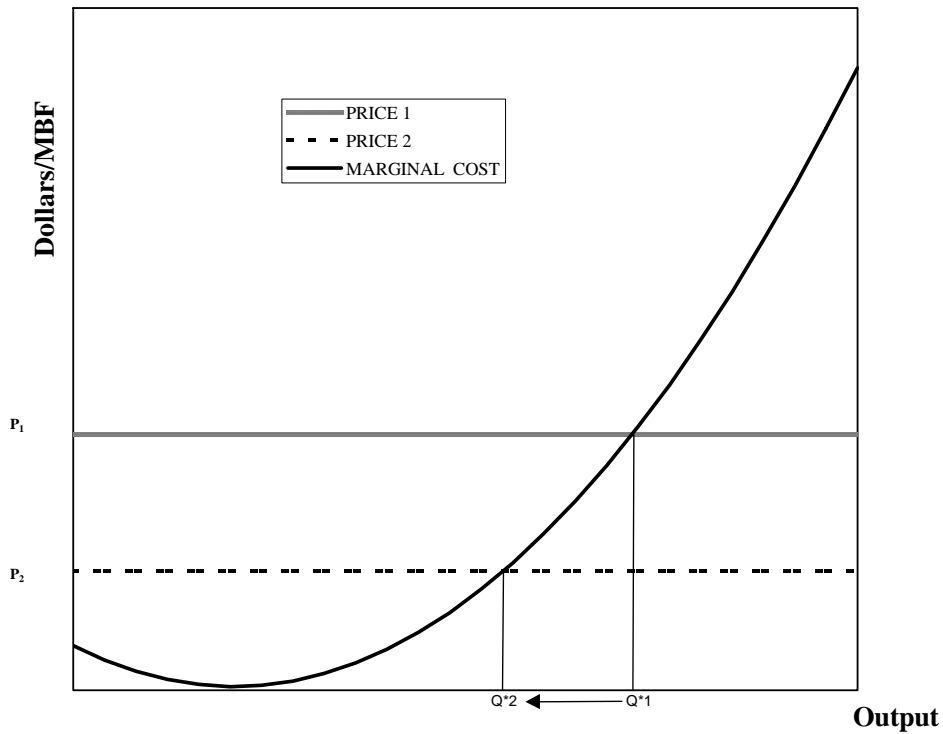


Figure 2-2 . Effects of income taxes on an individual firm.

Private Landowners

Under the above definition, forest landowners are price takers when they sell timber. For example, a forest landowner growing and managing pine will grow a product similar to other landowners growing and managing pine. His timber output will supply only a small portion of the total timber production. Thousands of landowners exist who grow and manage pine, and individuals are free to sell and purchase forest property. If landowners behave as a firm, the effects of tax would be similar to those described for firms above.

Most landowners who produce timber, however, do not produce as a business or a firm. Landowners are a very diverse group of people who hold timberland for a variety of reasons, but a large portion of landowners have sold timber in the past (Birch 1996). Newman and Wear (1993) found that “NIPF behavior is consistent with profit maximization” when comparing NIPF behavior to the behavior of industrial landowners. However, they also found the production function of NIPF’s to be different than that of industrial landowners and suggested that the difference was due to “significant nonmarket benefits” received by NIPF landowners from their forests.

Birch (1996) found that 34 percent of U.S. private forest landowners said they never intended to harvest. However, this proportion of landowners only controlled 23 percent of the private forestland. Interestingly, Birch also reported that 46 percent of private landowners had harvested timber on their lands, and that this 46 percent controlled 78 percent of the private forest land in the U.S. Because landowners are profit motivated to some degree, the assumption is made that taxes serve as impediments to managing their forests. Thus, taxation significantly influences forest management practices, and landowners view taxation as an obstacle to meeting management goals.

Taxation

Forest landowners must deal with several kinds of taxes: income tax, property tax, transfer taxes and, in some cases, sales and use taxes. Taxation serves as an impediment to forest management in several ways. First, any tax paid on stumpage reduces the landowner's revenue and has the tendency to reduce the owner's interest in investing in timber production (Gregory 1987). Hibbard and others (2003) noted that the ability of the U.S. private forest to continually produce "economic and ecological outputs and services" was a function of the amount of investment made in terms of protection, use and management. A substantial proportion of income earned by firms and households is never available for consumption or investment. Instead, it is distributed to governmental units as tax revenue (Clutter et al. 1983). Second, tax law is complex, and professional help is often required in order to comply with the law. Most individuals who manage substantial forest land find assistance from professional tax specialists essential when doing their tax planning and return preparation (Clutter et al. 1983). Learning the relevant tax implications on management decisions and becoming familiar with incentives and how to use them is time consuming and costly (Bailey 1999). He noted the consequences of not taking advantage of existing incentives and policy can be even more expensive. Bailey (1999) found that taking advantages of tax incentives significantly increases the land expectation value of forestland. Third, focus on tax avoidance sometimes influences forest landowners to place the family forest in a legal or business structure that is less than optimal in terms of efficient management. However, although taxes do tend to serve as impediments to forest management, the nine federal

income tax provisions addressed in this study offer several advantages and benefits to forest landowners that many taxpayers do not have. The purpose of the discussion involving taxes above is not to say that taxes are bad or that the tax burden on forest landowners should be further reduced. Rather the purpose is to demonstrate how federal taxation can affect forest management. Because the nine provisions do significantly reduce the forestlandowner's tax burden, knowledge about the provisions is critical.

Income Taxes

Income taxes are a tax on earnings (productivity). Fortunately, profit from timber management can be treated as capital gain (if held for longer than one year and disposed of correctly). Profit from hunting fees and recreation is taxed as ordinary income. Tax policy concerning timber may favor timber management as an investment compared to other alternatives, which produce ordinary income. Capital gains rates are currently 15 percent. Bailey (1999) found ensuring capital gains treatment of timber sales to be crucial in obtaining the highest return on timber management investments. Bailey used discounted cash flow methodology as the decision criterion to examine the effects of income taxes on forest management profitability of various scenarios. He created a hypothetical scenario in which a landowner in the western U.S. who made \$70,000 per year at his job and had an 11 percent discount rate engaged in an even-age forest management regime on his property. Bailey found that a landowner that failed to treat timber as a capital gain reduced LEV by 30 percent.

Capital gains taxes on timber earnings reduce capital available for expenditure on forest management activities. Thus, the tax in itself is an impediment. On the other

hand, the tax policy treats forest management favorably compared to many activities that produce earnings subject to ordinary income tax rates. Therefore, tax policy currently “encourages” capital intensive activities such as forest management by taxing profits at capital gains rates. Such activities also include investment in stock and other investments that produce capital gains.

Awareness of Provisions Allows Forest Landowners to More Accurately Assess the Costs and Benefits of Forest Management

In one of the cases examined, Bailey (1999) demonstrated how failure to take advantage of federal income tax provisions reduces a landowner’s LEV. In his analysis, he described a hypothetical Oregon landowner that was married, age 60 and earned \$70,000 per year in wages. Therefore, the landowner was in the 28 percent federal income tax bracket. The landowner invested in the establishment of a Douglas-fir plantation which was to be pre-commercially thinned at age 15, commercially thinned at year 35 and 45, and harvested in year 65. Bailey created 6 scenarios in which the landowner’s participation in the available federal tax provisions varied. In scenario 1, the landowner took advantage of the reforestation tax credit, amortization of reforestation costs, established the operation as an active business and so was able to deduct management costs and treat the earnings as long-term capital gains. Each of the other 5 scenarios deviated from scenario 1 in terms of tax treatment of costs and revenues. Depending on the discount rate used and the state income tax rate, Bailey found LEV per acre decreased from 7 percent to 172 percent in value from that calculated in scenario 1. Landowners who are unaware of the timber tax provisions available to them can easily turn a profitable operation into a losing proposition.

Chapter 3

Literature Review

This review is presented in three parts. First, the nine tax provisions affecting forestry are summarized. Second, the passive activity loss rules (PALS) effects on landowner eligibility to use the provisions is described. Third, published forest taxation research is briefly summarized.

Timber Tax Provisions

Nine federal income tax provisions were identified in this study as serving to promote forest management in the U.S. Some of the provisions were designed with general applicability although forest landowners benefit from them if used. Other provisions were created specifically to promote forest management.

Capital Gains

Profit from timber sales is often eligible for capital gain treatment. On May 6, 2003, the long-term capital gains tax rate for taxpayers in the 10 percent and 15 percent tax brackets, dropped to 5 percent from the previous rate of 10 percent. On the same date, the long-term capital gains tax rate for taxpayers in the 25 percent and higher brackets dropped to 15 percent from the previous rate of 20 percent (Sieg and Johnson 2003). These capital gains tax rates also apply to the 2004 tax year and after.

Several advantages exist for the taxpayer when income or losses are eligible to be treated as capital gains or losses. Most obvious are the lower tax rates that are applied to capital earnings versus those applied to ordinary income. Another advantage however is

that no limit exists in terms of offsetting capital losses with capital gains. On the other hand, only \$3,000 of capital losses can be offset against ordinary income in a year. In years when timber is sold, landowners can offset other capital losses against timber income (Haney et al. 2001). Finally, capital gain income is not subject to the self-employment tax (Haney et. al. 2001). Rules for treating timber income as a capital gain are contained in Section 631 of the Internal Revenue Code.

Three factors determine if timber income is eligible for capital gain treatment: 1) purpose for holding the timber 2) timber disposal method 3) holding period (Haney et al. 2001). Timber sold that is held as part of a business, passive activity, or investment can qualify for capital gains treatment but the standards established for the three legal factors above must be met in order to qualify. In addition, the manner in which timber can be sold in order to qualify for capital gains differs between timber held as an investment and timber held as part of a passive or active concern. Interestingly, timber used in a trade or business is not really a capital asset although a gain from its disposal can qualify for capital gain treatment under Section 1231 of the Internal Revenue Code (Haney et. al. 2001). Finally, in order to qualify as a long-term capital gain, timber must have been held for more than one year unless the seller has a carry-over basis.

Depletion

Capital gains taxes are only levied against profit. Taxpayers are allowed to recover their investment (basis) in property tax free when the property is sold [IRC § 1001(a)]. Capital gains taxes are applied to revenue minus transaction costs and basis (Haney et al. 2001). Several methods of basis recovery exist. Basis recovery methods

include depreciation, amortization, depletion, and deduction of the basis from the sale price when the property is sold (Haney et al. 2001).

Cost depletion is the method used to recover basis when timber is sold. If timber contained in any depletion block is disposed of over time through a series of sales, basis must be recovered through depletion on a systematic basis (Haney et al. 2001). That is, all basis cannot be deducted immediately up front. Rather, a fixed portion of basis is deducted for every unit of timber harvested [Reg. § 1.611-3(b)(2)]. This method of capital recovery is called depletion, and the fixed portion of basis deducted for every unit of timber harvested is known as the depletion unit. In order to deplete a timber resource, the basis in the timber must be established. The best time to establish basis in timber is at the time of acquisition or when timber is established on land that is already owned. When forestland is purchased, basis is established by finding the fair market value of all the individual assets that comprise the property value and then allocating the correct proportion of the purchase price to the timber asset [Reg. § 1.61-6(a)]. Proper basis allocation is quite detailed and beyond the scope of this project. For a more detailed discussion see USDA Agriculture Handbook No. 718 (Haney et al 2001).

Deduction of Annual Forest Management Expenses

Under current IRC regulations, valid investment and business expenses are deductible against all sources of income. A business expense is deductible if it is ordinary and necessary and reasonable [IRC § 162 (a)]. Investors can deduct ordinary and necessary expenses incurred for “the production or collection of income” and “for management, conservation, or maintenance of property held for the production of

income” [IRC § 212(1), (2)] . Business expenses are considered ordinary if they are in the customary line of the taxpayer’s business and are considered necessary if they aid in advancement of the business. When expenses are incurred from forestry operations that are defined as a business, these expenses are deductible against any source of income as long as they are ordinary, necessary, and reasonable. Examples of deductible forest management expenses for businesses and investments are shown in Table 3-1. Other examples of deductible expenditures are: bank service charges, maintenance and repairs, office supplies, telephone and utilities (Sieg and Johnson 2003).

Table 3-1. Examples of deductible forest management expenses.

Consulting forester fees	Costs for tools with short useful lives
Travel expenses	Hired labor
Prescribed burning	Road and fire break maintenance
Precommercial thinning	Professional fees
Fire, insect, and disease control	Property taxes
Forest protection	Insurance
Interest	

Source: Haney et al. (2001).

When management expenses are incurred in an investment activity they can also be deducted against any source of income although additional limitations apply. For example investment management expenses incurred by an investment can only be deducted to the extent that they exceed 2% of the landowner’s adjusted gross income (Haney et al. 2001). Deduction of interest incurred by an investment activity is not

deductible against any source of income as with a business. Rather, interest is deductible only against net investment income (Haney et al. 2001). On the other hand, property taxes incurred by an investment are not subject to the 2% AGI rule and may be deducted against any source of income.

Section 179 Deduction

Section 179 of the Internal Revenue Code provides a way for businesses to accelerate cost recovery of purchased assets. Section 179 allows active businesses an up-front deduction for qualifying personal property in the year it is placed in service (Sieg and Johnson 2003). For the 2004 tax year, the maximum deduction allowed under Section 179 is \$100,000. Property that is acquired by means other than a purchase does not qualify. According to the Tax Act of 2003, the \$100,000 deduction applies only in the 2003-2005 time period and then reverts back to its previous limit of \$25,000. The Section 179 expense deduction only applies to active trades or businesses [IRC §179(d)(1)(C)]. Section 179 property is tangible, depreciable property purchased and used in an active trade or business [IRC §179(d)(1)(A)(i)]. This provision can be particularly helpful to small businesses with limited cash flows since the purchase price of an asset can be immediately deducted rather than expensed over several years (Murphy and Higgins 2003). Estates and trusts do not qualify for the 179 deduction because they are not viewed as active businesses (Murphy and Higgins 2003).

Depreciation Deductions

Depreciation is the cost recovery method applied to assets that are used and worn in a businesses or for the purpose of producing income (investment). Annual depreciation deductions are allowed for wear and tear of assets used by businesses and investments [IRC § 167(a)]. Income produced through the use of assets with a finite useful life is taxed only after the value of the portion of the asset useful life is deducted (depreciated). Equipment and buildings used in a business or investment with a useful life of more than one year must be capitalized and depreciated. Assets must be depreciated according to the rules of the Modified Accelerated Cost Recovery System (MACRS). Congress created MACRS in 1986. Congress also allows taxpayers to elect to use the Alternative Depreciation System (ADS) which recovers costs more slowly than MACRS. An ADS election is made when large depreciation deductions are not needed. MACRS establishes the useful lives, number of annual depreciation periods, and the rates at which assets can be depreciated. Depreciation is deducted from income and therefore reduces the federal income tax liability.

Assets can only be depreciated when they are used in investment activities or business or trade activities. Depreciable property is classified as either real property or tangible personal property. Real property is depreciated much more slowly than tangible personal property. Examples of real property would be buildings, plants, and warehouses while examples of personal tangible property include machinery, vehicles, and equipment (Sieg and Johnson 2003).

Most property used in a forestry operation can be depreciated if the woodland is held as a business or as an investment (Haney et. al. 2001). Some examples of

depreciable property which may be found in a woodland setting include “fences, bridges, culverts, buildings, temporary roads, and surfaces of permanent roads” (Haney et al. 2001).

Reforestation Tax Credit

Tax credits are reductions made directly to a person’s tax liability. A credit is a dollar for dollar reduction in the tax burden. Many reforestation expenditures are eligible for the reforestation tax credit [IRC § 48(b)(1)]. An investment tax credit of 10 percent is offered on qualified reforestation expenditures. This incentive is known as the reforestation tax credit. The 10 percent tax credit applies to valid expenditures up to a total of \$10,000 for one year. Therefore, the maximum reforestation tax credit is \$1,000 for any one year.

Amortization of Reforestation Costs

Amortization is the systematic method of cost recovery examined in this study. Amortization is the systematic annual deduction of an asset’s basis. Although similar to depreciation, amortization is typically applied to intangible assets such as patents and copyrights (Murphy and Higgins 2003). Amortization is also applied in this special case to reforestation expenditures. Section 194 of the IRC allows forest landowners to amortize up to \$10,000 of reforestation costs over an 8-year period. Reforestation costs in excess of \$10,000 during a year must be capitalized and recovered at the time of timber disposal.

Election to amortize reforestation cost must be made in writing (Haney et al. 2001). Under the established amortization schedule for reforestation costs, one fourteenth of the costs is deducted in year 1, one-seventh is deducted for years 2-7, and one fourteenth is deducted in year 8. If both the reforestation tax credit and reforestation amortization elections are made, the “amortizable basis of reforestation costs must be reduced by 50 percent of the investment tax credit taken” (Haney 2001). Therefore, a maximum of \$9,500 may be amortized if the reforestation tax credit is elected.

In terms of saving landowner’s money, amortization of reforestation costs is much more efficient than capitalizing them and recovering them through depletion. However, if reforestation costs are above \$10,000, the portion above \$10,000 must be capitalized and recovered through depletion.

Exclusion of Cost Share Payments From Gross Income

Under Section 126 of the Internal Revenue Code, a landowner can exclude from gross income a calculated part of qualifying government cost-share payments made for certain conservation or environmental improvements. For example, a portion of cost-share payments to establish or reestablish trees, protect watersheds, create wildlife habitat, and reclaim disturbed mine areas is often excludable from gross income. Exclusion of money from gross income is known as a deduction *for* AGI and saves a taxpayer more money than a deduction *from* AGI (Murphy and Higgins 2003).

Landowners also have the right to include cost-share payments as part of their gross income [IRC § 126(c)(1)]. If cost-share payments are included in gross income and are used for reforestation purposes, landowners may still take the reforestation tax credit

of 10% of up to \$10,000 in reforestation costs. Amortization of reforestation costs made with cost-share payments included in gross income is also allowable provided the \$10,000 limit is applied. If the reforestation tax credit is elected, only \$9,500 of the cost-share payment may be amortized.

Loss Deductions

When timber is damaged or destroyed through a sudden act of nature, stolen, or condemned, landowners are often able to take a tax deduction for the loss [IRC § 165 (a)]. Examples of a sudden act of nature include fire, windstorms, and hail storms (Haney et al. 2001). The maximum tax deduction allowable is equal to the adjusted basis of the timber at the time of the loss [IRC § 165(b)]. For example, if timber is damaged so badly that a salvage operation is not possible, the entire loss is deductible up to the amount of the adjusted basis.

If a salvage operation is made, however, the amount received for the timber must be subtracted from the basis before a deduction is made. With a salvage operation, revenue is handled like a regular sale. The taxable gain of the sale is equal to the gross revenue minus depletion and cost of the sale. If the income from the salvage operation exceeds the basis of the timber, a gain results, and no deduction is possible (Haney et. al. 2001). In addition, insurance received for damages must also be subtracted from basis before taking a deduction. If a salvage operation results in a taxable gain, but because it is an involuntary conversion, a landowner may be able to defer the gain [IRC § 1033].

Passive Activity Loss Rules (PALS)

The use of investments to shelter income from taxation has been abused in the past by many taxpayers. By the early 1980's many high-income taxpayers had become adept at paying very little income tax due to their sheltering activities (Jennings et al. 1989). Because losses from tax shelters (if properly set up) could be offset against ordinary income, individuals who had the means tended to invest in activities regardless if these activities were economically viable. The motivation was to reduce their tax burden, not to earn a profit. As a result, tax shelters often consisted of poor investments, offered little to society, and reduced tax revenue. Congress became concerned that such intense tax sheltering was causing the American public to lose faith in the federal income tax system. This concern led to the creation of the passive loss rules (Jennings et al. 1989). Prior to the 1986 Tax Reform Act, two primary elements of the tax system tended to encourage tax sheltering. The first was high marginal rates which made deductions very valuable. The second element was a code filled with special tax preferences (Jennings et al. 1989).

The passive loss rules were passed as part of the 1986 Tax Reform Act. The 1986 Tax Reform Act lowered the high marginal tax rates. It did not, however, rid the code of special tax preferences because Congress felt that these were socially beneficial. *"The passive loss rules do not disallow deductions"* (Jennings et al. 1989). They simply alter the timing of the deductions. The objective of the passive activity rules is to prevent *"current loss deductions for tax sheltering activities"* (Murphy and Higgins 2003). Losses can, however, be carried forward and deducted against passive income in future years.

The passive activity loss rules divide all income into 3 groups: portfolio income, passive income, and active income (Sieg and Johnson 2003). This approach forces taxpayers to place all passive income and losses in the passive category. Under the passive loss rules, passive losses can only be used to offset passive income. Passive losses cannot be used to lower income from the active basket or the portfolio basket except at the time of disposition (Jennings et al. 1989). Prior to 1986, losses from passive activities could be mixed in with other kinds of income to reduce taxes. This could be done even if the passive activity resulted in losses. “Congress isolated the activities most likely to create tax shelter losses by defining a passive activity as a trade or business in which the taxpayer does not materially participate” (Jennings et al. 1989).

Portfolio income is the most passive kind of income. It typically represents income from dividends, interest and annuities (Schell and Keiser 1988). Income from salaries or a trade or business in which a taxpayer materially participates defines active income (Schell and Keiser 1988). How a taxpayer’s income is classified is important because the classification dictates the extent to which losses can be currently deducted. For example, business losses from an active business can be deducted against any source of income (portfolio, passive, or active). Investment losses and expenses are also deductible but are subject to much more stringent guidelines. For example, interest on an investment is deductible in the current year but only to the extent of net investment income. Investment expenses such as travel and other administrative or maintenance costs are deductible but only as miscellaneous itemized deductions. Only the portion of miscellaneous itemized deductions that exceed 2 percent of gross income are deductible. Finally, property taxes from investments are deductible in full but only as an itemized

deduction. Deductible expenses from a passive activity are deductible just like expenses from an active activity. However, these expenses can only be deducted to the extent of passive income and cannot be used to offset investment income or active income (Haney et al. 2001).

The passive loss rules are important to forest landowners because timber income must also be classified as portfolio, passive, or active income. Although the nine federal income tax provisions apply to forestry income, the passive loss rules dictate to what extent expenses can be currently deducted. Forest landowners will have the most flexibility in terms of deducting management expenses and costs if their forest holdings qualify as an active business. In order to qualify an active business owner, landowners must pass one of the six material participation tests established by the IRS. These six tests are outlined and described in detail in the *Forest Landowners Guide to the Federal Income Tax* (Haney et al. 2001).

Past Timber Tax Research

Most forest taxation research has centered around legal issues, economic and social issues, and application of existing laws to case studies and scenario analyses. The first category involves the study of tax laws and regulations. Much research has simply consisted of examining the Internal Revenue Code and compiling information about existing tax regulations conducive to forest management. The tax code changes regularly, and frequent updates are required in order to stay within the law.

In the second category, studies typically examine the effect of income taxes on optimal rotation age, timber supply and capital expenditures. Other studies in this

category investigate whether current tax policies encourage or discourage forestry investments. Mostly these studies use comparative statics, econometrics and economic theory to examine policy implications for landowners.

Category three is often the easiest to apply, but it tends to be narrow in scope. It includes published case studies and scenario analyses that show the effects federal income tax provisions have on land expectation value (LEV) when applied. Research in this category is typically practical. In addition, the results are often very useful. Due to the complexity of tax law, however, scenario analysis and case studies can only be applied directly to the situations created. Because they can rarely be applied to a particular landowner's situation, they tend to be created for the purposes of demonstrating the importance of the current tax provisions. These studies are useful in ranking the relative importance of tax laws. For example, scenario analyses shows that LEV is affected more by the proper use of capital gain provisions than reforestation amortization (Bailey 1999). The majority of forestry tax research falls within the second category. A detailed literature survey of these three categories is included in the following sections.

Legal

Siegel (1986) cautioned that many landowners do not use federal income tax provisions because they are complex and hard to understand. He explained that landowners tend to lose substantial savings because of a lack of knowledge about federal tax law. Other reasons for failing to take advantage of provisions included the lack of awareness by tax professionals of timber tax law and that standard IRS publications fail

to address timber tax issues. Failure to take advantage of depletion deductions and the deduction of timber sales expenses were identified as two common mistakes made by landowners. Siegel emphasized the importance of establishing a timber basis in order to take depletion deductions. He gave instructions on how to claim capital gain treatment of timber sales. In terms of casualty losses, Siegel demonstrated that deductions could be significant or miniscule depending on the adjusted basis at the time of the loss. Finally, he discussed timber installment sales and noted that some timber income in the absence or appropriate interest on future payments could be recalculated as interest by the IRS and treated as ordinary income. Landowners who made an occasional timber sale were encouraged to take advantage of income averaging in order to save on timber taxes. Siegel encouraged good record keeping regardless of the tax provisions used. Although timber tax topics can be difficult to understand, he explained that failing to take the time to understand and implement the provisions along with proper timing of expenses and sales would result in substantial financial losses. Siegel's findings supports the findings by Bailey as well as the findings in this thesis that knowing about federal tax provisions is critical for making sound timber management decisions.

Siegel (1986) sought to clarify the changes made by the TRA of 1986 and how they affected forest landowners. Siegel reported that although the TRA of 1986 changes reduced opportunities for landowners to save on taxes, several opportunities still existed for the prudent landowner. He reviewed the history of legislative precedent of giving forest landowners preferential tax treatment. In terms of such policy justification, he noted that no empirical evidence existed that could prove that such tax incentives had a positive effect on forest management. He did note, however, that "...the federal income

tax treatment extended thus far to timber owners *did* parallel significant and distinctly improved trends in forestry investments, productivity and application of scientific forestry practices” (Siegel 1986). It was from this context that he argued that such treatment does have a positive effect on forest stewardship whether it had been proven or not (Siegel 1986). In terms of actual TRA changes, Siegel pointed out that the expensing of forest management costs, property taxes and interest remained intact. However, he demonstrated how deducting these costs would become increasingly difficult for many landowners because of the new passive loss rules. Siegel pointed out that no changes had been made to the reforestation amortization and reforestation tax credit provisions. Siegel predicted that the passive loss rules would be the biggest obstacle for forest landowners. Finally, he emphasized that advanced planning and good record keeping would be more important than ever.

Siegel (1989) gave a brief explanation of the passive loss rules and explained that the extent of operating expense and carrying charge expense deductibility depended on landowner classification as an active trade or business, a passive activity or an investment under the rules of the TRA of 1986. He also gave a brief explanation of the material participation tests. Passing any one of the six material participation tests would allow for deduction of ordinary and necessary operating expenses and carrying charges. Landowner timber operating costs were defined as costs incurred in day-to-day management of woodland. Such costs were said to include: “...fees paid to consulting foresters and other professionals; travel expenses directly related to the income potential of the property; silvicultural operations such as prescribed burning and precommercial thinning; fire, insect, and disease protection; short-lived tools; and salaries for hired

labor.” Siegel noted that the arbitrary hourly requirements of the material-participation rules were already proving to be problematic for landowners. That is, the time specifications “generally bear no relationship to the ownership and efficient management of forest property.” He noted that this was because some years required little or no management activities to continue good forest management. Another problem attributed to the passive loss rules was that many landowners that had typically relied on consultants would find justifying the use of a consultant more difficult since doing so could “easily jeopardize their eligibility to deduct forestry expenditures.” Siegel predicted that many landowners that failed to qualify as material participants would curtail forestland expenditures such as those for silvicultural treatments and protection. He feared that millions of landowners would change from stewards to non-managing forest owners. Material participation was encouraged, and some other benefits of material participation were described as possibly avoiding the alternative minimum tax and saving on estate taxes. He also identified one drawback of material participation as possibly incurring difficulty qualifying for capital gains treatment.

Hoover (2000) wrote a manual called *Timber Tax Management for Tree Farmers*. His publication was designed to explain tax law and the “financial aspects of owning and managing forest land”. The publication was directed primarily toward nonindustrial forest landowners and the common situations they face. Issues addressed in the manual include selection of tax structures for timberland ownership, the passive loss rules, and an introduction to federal income tax provisions landowners can use in order to reduce timber income taxes. Hoover explained that proper tax treatment of timberland operations is vital to making the operation profitable and that the timber income tax

provisions afforded landowners play a large role in defining the benefits from investing in timber. He also cautioned that an awareness of the tax law is crucial for knowing how to qualify for federal income tax provisions that promote management and that qualifying for these tax treatments “is critical to achieving acceptable returns from the timber investments of many individuals”. Hoover contributed the suspicion among analysts that landowners do not use provisions currently available to them to ignorance about the benefits timber can add to an investment portfolio and to complexity of tax laws. He also encouraged landowners with complex tax situations to seek out professional assistance.

The U.S. Forest Service, as well as many state forestry agencies, has published extension materials designed to help forest landowners properly file their timber taxes. For example, Haney, Siegel, and Bishop (2001) wrote a short USDA Forest Service publication called *Federal Income Tax on Timber – A Key to Your Most Frequently Asked Questions*. The main purpose of the publication was to serve as a “quick reference to the Internal Revenue Service (IRS) forms necessary when filing Federal income tax returns for forestry-related activities” (Haney et al. 2001). The booklet was designed to provide tax assistance for situations that nonindustrial private forest landowners commonly face. This publication helps landowners define the kind of activity in which they are involved, learn how to qualify for the best tax treatment, and know which IRS forms to complete when filing a return.

Perhaps the most comprehensive tax manual for forest landowners is *Forest Landowners’ Guide to the Federal Income Tax* (Haney et. al 2001). The primary purpose of this U.S. Forest Service publication is to “foster good forest management by combining, in one source, relevant information for analyzing investments in forest

management and an explanation of the Federal income tax law associated with those investments” (Haney et al. 2001). *Forest Landowners’ Guide to the Federal Income Tax* explains in detail the federal income tax provisions available to forest landowners, how to qualify for them and how to complete the relevant IRS forms when filing a return. In addition, the passive loss rules are addressed in great detail. Tax planning strategies are reviewed, record keeping procedures are recommended and ownership structures are examined. In addition certain revenue rulings are included as well as suggested sources of tax assistance (Haney et al. 2001). An updated version of this manual is produced periodically.

Economic and Social

Chang (1983) explored the effects of capital gains treatment of timber income on reforestation efforts from 1944 until 1980 in the South. His interest was stimulated by the debate between the GAO and timber capital gains proponents over whether capital gains treatment actually encourages reforestation efforts. In the Revenue Act of 1943 Congress extended capital gains treatment from landowners selling on a lump sum basis, to practically all timber income. This provision was originally established in the IRC as Section 117(k) that later became the well-known Section 631b of today (Bailey 1999). Chang stated that the Forest Industries Committee on Timber Valuation and Taxation (which represented industry interests) had “claimed that the capital gains tax is a major stimulant of reforestation investment, citing the dramatic increase in reforestation since 1944 as their major evidence” (Chang 1983). Chang used causality tests to determine if

the capital gains treatment of timber had an effect on the number of acres regenerated on either nonindustrial forestland or industrial forestland from 1946 until 1980. His null hypothesis was that "...the top capital gains tax rate causes neither the industrial nor the nonindustrial private reforestation" (Chang 1983). He chose the South as his testing ground since this region had seen the biggest increase in reforestation in the country since 1944. Between 1944 and 1980, the top capital gains rate varied. Until 1969, the top rate was 25 percent. Afterwards, 50 percent of capital gains was exempted from income tax through 1978. In 1979, the capital gains rate changed again to exempt 60 percent of capital gains from taxation. Chang's conclusion was that the top capital gains tax rate did not have a causal effect on either industrial or nonindustrial reforestation during this time period. In terms of nonindustrial private landowners, Chang concluded that many owners do not pay taxes at the top bracket and that more work needed to be done before any definite conclusions should be drawn about capital gains treatment effect on their reforestation efforts. Nevertheless, he felt it was safe to conclude that capital gains treatment did not encourage industrial reforestation (Chang 1983).

Dennis (1985) evaluated the capital gains treatment of timber income from the viewpoints of economic efficiency, equity, operability and revenue adequacy. In terms of efficiency, he argued that capital gains affect the optimal rotation length when management costs are incurred. His reasoning was that the imposition of a tax influenced how much a landowner was willing to spend in terms of management costs which ultimately affected rotation age. Dennis found that an ordinary income tax on timber profits was neutral only as long as non-timber benefits were not considered. While Dennis found the capital gains treatment to reduce optimal management efficiency, he

found that “because capital gains preference, as compared to an ordinary income tax, lessens the gap between the social and market price of timber, it will influence decisions toward the social optimum”. He also noted that the U.S. progressive income tax structure was biased against forestry and other investments that produced sporadic and large lumps of income and stated that capital gains treatment reduced this inequity. In terms of supply, Dennis felt that while capital gains taxes reduced timber supply, it reduced it less than ordinary income taxes would. Dennis (1985) concluded: 1) removal of capital gains treatment of timber would reduce soil rents and cause some forestland to shift into other uses; 2) this soil-rent reduction would consist of a “lump-sum” loss to timberland owners; 3) this loss would be inequitable if capital gains treatment was not removed from other long-term investments; 4) this inequity was, in itself, justification for maintaining capital gains treatment; 5) an increase in taxes caused by the removal of capital gains treatment would reduce the timber output on lands that did remain in timber production; 6) timber supply would be reduced.

Boyd and Daniels (1985) used a general price equilibrium model to explore the incidence and welfare implications of giving timber income capital gains treatment. Model input variables consisted of capital and labor. Their study was made prior to 1986 when industrial forest corporations were still receiving capital gains treatment for timber income. The authors reported IRS revenue losses of \$1.6 billion from 1976-1980 and stated that 75 percent of the savings went to corporations while 25 percent went to private landowners. Based on the results of their model, the authors concluded that timber capital gains proponents’ argument that such treatment improved employment had little validity. This was the case because tax incidence examination showed that capital

received the entire subsidy. Welfare losses due to capital gains treatment were reported as substantial, and the authors found the overall cost of capital gains treatment difficult to justify in terms of reforestation benefits. The authors noted, however, that if other resource-based industries were given capital gains treatment that forest industry should be given the same treatment or that capital gains treatment for all resource-based industries should be taken away.

Leuschner and Haney (1985) explored the effects of some of the 1984 tax proposals made by Congress and the President pertaining to timber income and expenses. According to the authors, proposals at the time included an elimination of the reforestation income tax credit, elimination of reforestation amortization, capitalization of all timber management costs except interest, indexing basis to inflation and elimination of capital gains treatment as well as a change in income tax rates. The authors used loblolly pine growth projections to develop southern pine management scenarios for which LEV analysis could be made. Many of the scenarios in the model were (based on the assumptions) found to no longer be profitable. Based on their analysis, the authors concluded that passage of the proposals would result in lower returns to forestry as well as lower investments in reforestation. They also concluded that timber supply would be affected negatively since forestry returns would become less attractive and investors would shift to more financially attractive alternatives. In addition, basis indexing and capitalization of costs were projected to complicate record keeping and worsen tax compliance.

Guertin and Rideout (1987) investigated the effects of the 1986 TRA on corporate forestry. Specifically, they investigated the effect of the new tax law changes on

“planting density, rotation age, and removal of marginal lands from production”.

According to the authors the tax law changes having effects on corporate forestry were the loss of capital gains treatment for timber and the reduction of the maximum corporate income tax rate from 46 percent to 34 percent. The authors calculated the LEV values for loblolly pine and Douglas-fir on several site indices under the old and new tax laws. Under the new tax laws any loblolly lands having a site index below 57, base age 25, produced a negative LEV while lands having a site index as low 50 produced a positive LEV under the old tax laws. Likewise, marginal lands for Douglas-fir increased in minimal site index requirements from 104 to 108 (base age 50). The authors found minimal changes to optimal planting densities and rotation ages for the two species. Overall, the authors concluded that lower-site lands would become economically unproductive while the optimal management decisions for productive lands would remain basically unchanged (Guertin and Rideout 1987).

Gregory (1987) explained the effects of property, severance and income taxes on production decisions. According to Gregory, the ‘production’ decisions are “those involving how much to produce from a given forest property through changing the inputs or the intensity of management.” In terms of income taxes, Gregory reported that incomes taxes should always be seen as a percent reduction in net revenue ($\text{Total Revenue} - \text{Total Cost} = \text{Net Revenue}$). He concluded that the optimum output for maximizing profit in timber management is exactly the same before and after an income tax so long as the income tax is less than 100 percent. Although Gregory said that income taxes do not affect management decisions, they do affect the overall investment decision (Gregory 1987). When deciding between two alternative investments, the

manager will pick the one with a higher after-tax NPV. Therefore, unequal tax treatment of an investment alternative in terms of tax legislation will move that alternative up or down the capital budget queue. Gregory explained that while an imposition of an ordinary income tax on timber income makes no difference in terms of management decisions, special tax treatment (e.g. capital gains) makes timber investments move up a notch on the capital budgeting list. Gregory showed this by stating that “there is no doubt that Sections 631(a) and (b) provided a decided encouragement to invest in timber-growing enterprises, especially for larger firms” (Gregory 1987).

Klemperer explored the effects of income taxes on the liquidity of immature forests in terms of landowners selling them for future harvests (1989). He noted that the income tax system acts as a wedge to widen the difference between bid and ask timber prices for immature forests. Klemperer built on the work of Kovenock and Rothschild (1983) to show not only that asking price of timber will exceed bid prices during times between initial investment and harvest, but he attempted to quantify the bid/ask difference over different periods between establishment and harvesting. Klemplerer’s conclusion was that “...income tax as currently administered on realized income can introduce market inefficiency by hampering mid-rotation sales of timber when bid and ask prices are based upon discounted cash flow”. He showed that indexing timber basis to inflation would increase market efficiencies and eliminate the “...inflation term in the bid and ask equations and reduce the ask/bid ratio to that found under zero inflation”. Klemperer said that such indexing would reduce the bid/ask difference for immature forests and make the buying and selling of immature forests more feasible.

Amacher et al. (1991) studied the effects of taxes on rotation length and management intensity for individual firms. The authors developed loblolly pine and Douglas-fir management scenarios to simulate the effects of different taxation regimes on management intensity and rotation length. In their study the authors qualified income taxes as a kind of productivity tax and conclude that the “qualitative effects of the harvest income tax on initial stand investment and rotation length cannot be determined *a priori*.” The determination of whether stand establishment investment and rotation age increases or decreases was found to depend on whether initial stand investment and rotation length are complementary or competitive inputs (Amacher et. al. 1991). The authors concluded that firms act differently in response to the same forestry tax regime. That is “directions and magnitudes of distortional effects from forest taxes on firms depend on how firms model forest production.” Based on a comparative statics analysis of simulated loblolly pine and Douglas-fir management scenarios, the conclusion was drawn that the distortional effects of forestry taxes “vary dramatically for different volume functions for the same species” (Amacher et. al. 1991). However, the authors did conclude that harvest income taxes lower optimal harvest age and initial stand investment when these two inputs are complementary and interest rates are low.

Decoster (1995) noted that the current federal tax system is encouraging fragmentation of private forests. He explained that the tax code forces small and mid-sized forest landowners to treat their holdings like a business if these forests are expected to justify themselves economically. He stated that small and mid-sized forest landowners are not able to act like businesses and so are unable to take advantage of many income tax provisions that larger landowners are able to use. Decoster stated that 230 million

acres of private forestland qualified as mid-size to small holdings and that all were at risk of being further fragmented because of the tax system. One of the major concerns of this fragmentation was that smaller forests would not be able to provide the environmental benefits that larger ones would. A large tax trap that Decoster recognized for medium-sized to small forest landowners was having to invest non-timber income into forestlands in years when no timber income was provided. He stated that such investments forced small and medium-sized landowners into the passive loss rules arena. He also stated that "...there are tax-policy biases against the mid-size and small forest owners who have to invest nonforest income in lumps, then wait for years for returns to maintain their forests". Decoster claimed that the overall incentive of the federal, state and local tax structures was for forest landowners to convert forests and forestland into cash and invest the cash into short-term investments. Decoster feared that further fragmentation would continue without easing federal income tax regulations on the smaller landowners.

Application of existing laws via case studies and scenario analyses

Dangerfield and Gunter (1986) examined the short-term effects of the 1986 TRA for forest landowners. They attempted to identify optimal timing of timber sales in order to save on tax costs as the TRA was phased in from 1986 to 1988. They concluded that because of the tax reform, it did matter in what year the timber was sold. Based on their hypothetical scenarios for 1986, '87 and '88 they concluded that people with lower AGI's would fare worse than those with higher incomes. As a general rule, owners with small tracts would do better to sale timber in 1986 than in 1987 or 1988. Although, timing was identified as important in terms of saving on taxes for the next three years, the authors

cautioned that planning had to be done on an individual basis. They showed how fluctuations in timber prices could alter the optimal year for selling (in terms of tax savings).

Bettinger et al. (1989) examined the impact of federal and state income taxes following the Tax Reform Act of 1986 (TRA) and discussed the importance of the passive activity loss rules as well. The authors developed landowner scenarios for both medium and high-income forest landowners in the South in which a timber sale was made. The authors demonstrated the importance of including the combined effect of federal and state income taxes on profit when doing financial analyses of timber investments. They encouraged landowners to become active participants in order to be able to deduct management expenses as well as to take advantage of federal and state income tax provisions available to them. Some important provisions listed as available to landowners were: depletion, capital gains treatment, installment sales, deduction of management expenses, reforestation amortization and the reforestation tax credit. The authors gave an example of how installment sales significantly reduced taxes, especially for lower income forest landowners, and suggested that good record keeping is essential for taking advantage of federal and state income tax provisions that make forest management more affordable.

Bailey (1999) investigated the impacts of federal and state income taxes on forest earnings. He used LEV analysis and created hypothetical landowner scenarios in which a timber sale was made. He investigated the differences in LEV for the same scenario when income tax provisions were taken advantage of and when they were not. He showed that federal and state income taxes affect LEV significantly and that taking

advantage of income tax provisions available to landowners can make timberland investment alternatives much more attractive. See previous discussion concerning Bailey's work in Chapter 2.

Chapter 4

Current Tax Laws

The tax calculations in this study are made in accordance with 2003 federal income tax laws. A review of 2003 tax rates and changes in pertinent tax law provisions from 2002 to 2003 is provided. The current rates for 2004 as well as some of the important changes from 2003 to 2004 are given.

Importance of understanding year-to-year changes in tax law

A knowledge of current tax laws and rates is crucial when performing after-tax calculations involving investment decisions, which are made at the margin. Such calculations include the net present value (NPV) and land expectation value (LEV). Tax rates affect the after-tax NPV and LEV calculations in two ways:

- 1). After tax cash flows are reduced (if taxed) or increased (if deducted) based on the current tax rate. These after-tax cash flows form the basis of the calculations.
- 2). Discount rates in an after-tax analysis are adjusted to match after-tax cash flows (Haney and Gunter 1984).

The IRC contains numerous preferences and special tax treatment for certain economic endeavors. Such preferences reflect the intention of Congress to encourage certain activities. For example, the reforestation tax credit is a special treatment provided to forestry investments. This advantage would never be seen in a before-tax analysis.

Because of the advantageous treatments given to forest landowners, before-tax LEV analyses make certain forestry investments appear less profitable than they really are. For example, Haney and Gunter (1984) compared a before-tax and after-tax LEV calculation for a hypothetical scenario in which a landowner planted and harvested a hybrid poplar stand. The before-tax LEV was negative. Therefore, the landowner would have rejected the poplar plantation as an investment since his alternative rate of return (ARR) was better. However, the after-tax LEV of the same scenario was positive, and was more profitable than his best alternative as expressed by the ARR. The change in unprofitability was due to special tax treatments (reforestation amortization and credit) afforded the poplar plantation investment which were unavailable to the alternative investment.

Understanding the current tax law is crucial to predicting the tax consequences of forest management decisions. For example, a landowner who sells a large amount of timber in a single tax year may lose his personal exemptions simply because his income is too high to qualify for them in the year of the sale due to the phase-down of exemptions in the IRC. Large timber sales in a single tax year may trigger the alternative minimum tax (AMT). As discussed above, the AMT was created by Congress to ensure that individuals with relatively high incomes and who take advantage of special tax provisions in the IRC pay at least a minimum income tax. Individuals who qualify their timber income as capital gain are taking advantage of just such a provision and may be faced with paying an AMT when the timber income is substantial.

The Job and Growth Tax Relief Reconciliation Act of 2003

The Tax Act of 2003 is the most recent broad-sweeping tax legislation passed by Congress. Tax rate reductions included in the Economic Growth and Tax Relief Reconciliation Act of 2001 that were not scheduled to go into effect until 2006 are accelerated to 2003 by the Tax Act of 2003 (CCH 2004). As a result, the 27 percent tax bracket has been lowered to 25 percent, the 35 percent bracket to 33 percent and the 38.6 percent bracket to 35 percent for 2003. These rate reductions [¶205] are in effect through 2010 (CCH 2004).

The Act increases standard deduction amounts for joint filers [¶220] and increases the AMT exemption amount from \$35,750 to \$40,250 for single filers and from \$49,000 to \$58,000 for married tax payers filing jointly [¶225] for the 2003 and 2004 tax years (CCH 2004). The dollar exemption amount for the Section 179 deduction is also increased [Code Sec. 179 (b)(1) and 5] (CCH 2004). Changes to the Section 179 deduction are addressed in greater detail below.

Capital gain tax rates [¶305 & ¶ 320] are reduced from a maximum of 20% to a maximum of 15% through 2008 (CCH 2004). Tax on dividend income from domestic companies and qualified foreign companies received by individuals is reduced by the act to 15% through 2008 [¶325]. Dividend income is tax free for 2008 (CCH 2004). Bonus depreciation is increased and extended [¶350]. Bonus depreciation is addressed in more detail below.

Depreciation

The Job Creation and Worker Assistance Act [Public Law 107-147] was passed by Congress in 2002 to stimulate the struggling economy. Several business tax incentives are included in the act. One of these incentives is a special depreciation allowance known as “bonus depreciation” (CCH 2004). Under the bonus depreciation provision, much larger percentages of the costs of “purchases of new personal property acquired after September 10, 2001, and placed in service by December 31, 2004” can be recovered in the first year (CCH 2003). For purchases made before May 6, 2003, the bonus depreciation amount is 30%. The Tax Act of 2003 increases the amount to 50% [¶350] for purchases made after this date and placed in service before January 1, 2005 (CCH 2004). In forest investment decisions that involve purchases of large amounts of depreciable assets, bonus depreciation can make a substantial impact on investment decisions. Because bonus depreciation is a temporary measure, it was omitted in the LEV analyses of the landowner scenarios in the next chapter. Rather, depreciation was calculated according to standard MACRS rates using the mid-year convention. In a real-life situation, however, a forest landowner depreciating equipment would be required to take the bonus depreciation unless he explicitly elected not to take the depreciation in writing (CCH 2003).

Finally, depreciation is sometimes subject to recapture. Business property held long-term is designated as Section 1231 property. Sometimes disposal of such business property can actually result in a capital gain due to the depreciation method used. When this happens, part or all of the gain may be recaptured as ordinary income. Depreciation recapture was omitted as an issue in the landowner scenarios in the next chapter.

Landowners must realize, however, that depreciating property has limitations established by law.

Section 179 Deduction

The 2003 Tax Act increased the Section 179 deduction from \$25,000 to \$100,000 for tax years between 2002 and 2006 [Code Sec. 179(b)(1) and (5)], and this increase will be adjusted for inflation (CCH 2004). The \$100,000 deduction returns to the original value of \$25,000 in 2006. A tree farmer who maintains some level of knowledge about tax law changes might have waited until 2003 to purchase heavy equipment instead of doing so in 2002 because of the favorable increase in the 2003 Section 179 deduction allowance. Section 179 deductions may not exceed business income. Disallowed deductions may be carried forward to other tax years however (CCH 2003). The Section 179 deduction is reduced dollar for dollar when more than \$400,000 of Section 179 property is placed in service in a single year (Sieg and Johnson 2003). This \$400,000 phase-out limit is reduced to \$200,000 in 2006 (CCH 2004).

Federal income tax rates for 2003 and 2004

Ordinary income tax rates for individuals for 2003 ranged from 10 percent to 35 percent for various categories of taxpayers as amended by the 2003 Tax Act (Tables 4-1 – 4-4). The thresholds for taxable income are indexed for inflation and change annually.

Table 4-1. Federal income tax rates for 2003, for single taxpayers.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$7,000	...10%	\$0
7,000	28,400	\$700.00+15%	7,000
28,400	68,800	3,910.00+25%	28,400
68,800	143,500	14,010.00+28%	68,800
143,500	311,950	34,926.00+33%	143,500
311,950	....	90,514.50+35%	311,950

Source: Sieg and Johnson (2003).

Table 4-2. Federal income tax rates for 2003, married filing separately.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$7,000	...10%	\$0
7,000	28,400	\$700.00+15%	7,000
28,400	57,325	3,910.00+25%	28,400
57,325	87,350	11,141.25+28%	57,325
87,350	155,975	19,548.25+33%	87,350
155,975	.....	42,194.50+35%	155,975

Source: Sieg and Johnson (2003).

Table 4-3. Federal income tax rates for 2003, for filing as head of household.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$10,000	...10%	\$0
10,000	38,050	\$1,000.00+15%	10,000
38,050	98,250	5,207.50+25%	38,050
98,250	159,100	20,257.50+28%	98,250
159,100	311,950	37,295.50+33%	159,100
311,950		87,736.00+35%	311,950

Source: Sieg and Johnson (2003).

Table 4-4. Federal income tax rates for 2003, for married filing jointly or qualifying widower.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$14,000	...10%	\$0
14,000	56,800	\$1,400.00+15%	14,000
56,800	114,650	7,820.00+25%	56,800
114,650	174,700	22,282.50+28%	114,650
174,700	311,950	39,096.50+33%	174,700
311,950		84,389.00+35%	311,950

Source: Sieg and Johnson (2003).

Income tax rates for 2004 are shown in Tables 4-5 through 4-8. The differences are due to inflationary adjustment. Standard deduction and exemptions have also changed.

Standard deductions for 2003 and 2004 are listed in Table 4-9. Personal exemption amounts for 2003 and 2004 are \$3,050 and \$3,100 respectively.

Table 4-5. Federal income tax rates for 2004, for single filing.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$7,150	...10%	\$0
7,150	29,050	\$715.00+15%	7,150
29,050	70,350	4,000.00+25%	29,050
70,350	146,750	14,325.00+28%	70,350
146,750	319,100	35,717.00+33%	146,750
319,100	....	92,592.50+35%	319,100

Source: CCH (2004).

Table 4-6. Federal income tax rate for 2004, married filing separately.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$7,150	...10%	\$0
7,150	29,050	\$715.00+15%	7,150
29,050	58,625	4,000.00+25%	29,050
58,625	89,325	11,393.75+28%	58,625
89,325	159,550	19,989.75+33%	89,325
159,550	.....	43,164.00+35%	159,550

Source: CCH (2004).

Table 4-7. Federal income tax rates for 2004, filing as head of household.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$10,000	...10%	\$0
10,200	38,900	\$1,020.00+15%	10,200
38,900	100,500	5,325.50+25%	38,900
100,500	162,700	20,725.00+28%	100,500
162,700	319,100	38,141.00+33%	162,700
319,100	....	89,753.00+35%	319,100

Source: CCH (2004).

Table 4-8. Federal income tax rates for 2004, for married filing jointly.

If taxable income is over	But not over-	Tax is:	of the amount over-
\$0	\$14,300	...10%	\$0
14,300	58,100	\$1,430.00+15%	14,300
58,100	117,250	8,000.00+25%	58,100
117,250	178,650	22,787.50+28%	117,250
178,650	319,100	39,979.50+33%	178,650
319,100		86,328.00+35%	319,100

Source: CCH (2004).

Table 4-9. Federal standard deduction amounts for 2003 and 2004.

Filing status	Basic Standard Deduction		Increase
	2003	2004	
Married, filing jointly	\$9,500	\$9,700	\$200
Surviving Spouse	9,500	9,700	200
Head of household	7,000	7,150	150
Single	4,750	4,850	100
Married, filing separately	4,750	4,850	100

Source: Sieg and Johnson (2003).

PART II. TAX CALCULATIONS AND LEV ANALYSIS

Chapter 5 Examples of Timber Sale Costs Including the Alternative Minimum Tax

The survey of forest landowners' awareness and use of federal income tax provisions that make forest management more affordable was conducted on the national level. The scenario analysis is limited to a hypothetical southern forest landowner; however, the concepts of how taxation affects profitability in terms of forest management are applicable to landowners throughout the United States. Results of scenario analysis on a region-wide basis are available as demonstrated by Bailey (1999).

The purpose of part two of this thesis is to show the importance of understanding federal income tax law through scenario analysis. Chapter 5 has three purposes. First, a hypothetical, yet realistic tract of forestland is created. This parcel of forestland serves as the basis for the scenario analyses in this section. Second, the cost of a timber sale (in terms of taxes) is created. Third, the importance of understanding the alternative minimum tax and how it affects forest landowners as well as LEV analysis is emphasized. Although the alternative minimum tax is not the focus of this publication, it is inseparably bound to ordinary income taxes when income from timber sales is substantial and is treated as a capital gain.

In chapter 6, discounted cash flow methodology is used to examine the effects of federal income taxes on the profitability of two hypothetical, yet typical, forest management scenarios. Analysis is performed under the assumption that a landowner in

the 25% tax bracket and a landowner in the 33% tax bracket participate in both scenarios. An example of the detail involved in a forest landowner taking advantage of federal timber income tax provisions in a single tax year is provided in chapter 7.

A Typical Southern Tract

In 1993, a landowner purchased a 135-acre parcel of forested land. A loblolly pine plantation covered 120 acres. This pine plantation was 19 years old and was thinned for the first time at age 16. Residual basal area was estimated to be 80 ft². Fifteen acres of the tract composed a stream-side-management zone (SMZ). These fifteen acres supported a sixteen-year old hardwood pulpwood forest. A 1/8 mile long forest road existed on the tract at the time of purchase. Immediately following the first thin at age 16, the previous owner had resurfaced the road with gravel and installed two 18" culverts. The road served as access for harvesting and for hunters. In addition, the road was contained within the pine plantation. It was unnecessary to cross the 15-acre SMZ since it composed the southeast portion of the tract. That is, the plantation was contiguous and undivided by the SMZ.

The tract was estimated to be a site index of 60, base age 25 for woods-run seedlings. At the time of plantation establishment in 1974, the previous landowner had chopped and burned the site and planted 600 trees per acre of woods-run stock. Two-year herbaceous weed control was applied at the time of establishment. No other silvicultural treatments were made to the tract prior to the first thin at age 16.

The tract purchaser decided to grow the loblolly pine stand to financial maturity and estimated that maturity would occur at age 30. In addition, he decided on custodial

management of the SMZ. Although some management and harvesting would be possible without violating BMP guidelines, the landowner elected to neither actively manage nor harvest because he enjoyed the aesthetics of the area. Since the remaining 120 acres of the tract would be managed more intensively, he enjoyed knowing that this area would be left undisturbed by his timber management practices as much as possible. In addition, it served as a favorite spot for hunters who leased the tract annually.

At the time of purchase, the purchaser’s consulting forester appraised the property. The purpose of the appraisal was to allow accurate and cost-effective basis allocation and to provide cruise data for developing a forest management plan. A description of the purchase, appraisal values and basis allocation are contained in Tables 5-1 and 5-2.

Table 5-1. Description of purchase fees.

Purchase date:	1993
Purchase price:	\$ 162,760
Legal expenses:	\$ 2,700
Cruising expenses:	<u>\$ 900</u>
Total purchase price:	<u>\$ 166,360</u>

In 2003, the landowner sold the timber composing the pine plantation. The harvest produced a harvest of both pine sawtimber and chip-n-saw (Table 5-3). Income and costs of the sale are reported in Table 5-3. The landowner treated the timber income as a capital gain under a pay-as-cut contract (Section 631 (b)). His consulting forester

charged a 6 percent commission for administering the sale. At the time of the harvest, the landowner was 60 years old. He and his wife earned a combined income of \$80,000 dollars per year at their jobs, and they filed a joint income tax return.

Table 5-2. Basis allocation. Year of purchase – 1993.*

Pine stand:

Volume: 2,520 cords

Basis: \$107,763

Hardwood stand:

Volume: 225 cords

Basis: \$2,511

Land:

Acres: 135

Basis: \$55,246

Depreciable property

Assets: 2 culverts and road surface

Basis: \$840

Total basis: \$166,360

*Part I of Form T (Timber) is designed for basis allocation of acquisitions.

The landowner treats his forestland holding as a business activity. He leases the tract annually to hunters for \$4.00 per acre. He depreciates the road base and culverts on an annual basis. Road surfaces and culverts are 15-year recovery property under MACRS and are depreciated using the mid-year convention (Haney et al. 2001). Property taxes and management costs are deducted annually. Finally, the landowner decides to resurface the road and install new culverts at the beginning of the next rotation. As a result, the logger removes the culverts for him at the end of the harvest. Because the culverts are not fully depreciated at the time of disposal and because they are depreciable business assets, the unrecovered basis is written off as a capital loss and deducted from the timber revenue. This loss is netted with timber sale income on Form 4797 (Sales of Business Property). Carrying charges and other cash flows related to holding the property are reported in Table 5-4.

Federal income taxes for a medium income landowner (25% tax bracket) and a high-income landowner (33% tax bracket) are shown in Table 5-5. The table shows the income tax that would be incurred if the landowner earned \$80,000 (low income) and made the timber sale at the end of 2003. The right hand column of Table 5-5 shows the federal income tax burden that would be incurred if the landowner and his spouse made \$200,000 (high income) and made the same identical timber sale.

Close examination of the tax calculation allows the calculation of the total cost of making such a timber sale in 2003. This cost includes capital gains taxes, an alternative minimum tax, and consulting forester fees. Table 5-6 shows the total after-tax cost of making a timber sale for both income levels.

Table 5-3. Timber sale income and costs.

Product	Per acre volumes	Product prices	Per acre income
Pine sawtimber	8.0 MBF (Scribner)	\$287 / MBF	\$2,296.00
Pine chip-n-saw	18.9 (Cords)	\$70.40 / Cord	<u>\$1,329.50</u>
Total income per acre:			\$3,625.50
Total income from 120-acre timber sale:		\$435,046	
Depletable basis:		(\$107,763)	
Consulting forester fee:		<u>(\$26,103)</u>	
Net timber sale income:		\$301,180	

Table 5-4. Carrying charges and other cash flows related to property.

Hunting Lease Revenue	\$540
Management Costs	675
Property Taxes	513
Road and Culvert Depreciation	25
Culvert and Gravel Disposal	248

Table 5-5. Income tax calculation during year of final harvest.

INCOME:		
Personal income	\$80,000	\$200,000
Business income or loss		
Revenue		
Hunting lease revenue	\$540	
Less costs		
Management costs	\$675	
Property taxes	\$513	
Depreciation	\$25	
Business loss	(\$673)	(673)
Revenue from timber sale	\$435,046	\$435,046
Less deductions		
Expenses of sale	\$26,103	\$26,103
Depletion	\$107,763	\$107,763
Culvert disposal	\$248	\$248
Taxable long-term capital gain on sale	\$300,932	\$300,932
Total income	\$380,259	\$500,259
Adjusted gross income	\$380,259	\$500,259
Standard deduction	\$9,500	\$9,500
Personal exemption (phased out)	\$0	\$0
Taxable Income	\$370,759	\$490,759
TAXES:		
Taxable income	\$370,759	\$490,759
Less taxable capital gain on sale	\$300,932	\$300,932
Ordinary income	\$69,827	\$189,827
Ordinary income tax	\$11,076	\$44,088
Taxable long-term capital gain on sale	\$300,932	\$300,932
Capital gains tax	\$45,140	\$45,140
Alternative minimum tax	\$9,436	\$8,224
Total federal income tax	\$65,652	\$97,452

Table 5-6. Cost of a timber sale for both levels of income.

Specific Cost	Low annual income (\$)	High annual income (\$)
Capital gains tax	45,140.00	45,140.00
Consulting forester fee*	22,188.00	22,188.00
Alternative minimum tax	<u>9,436.00</u>	<u>8,224.00</u>
Total sale cost	76,764.00	75,552.00

*Because consulting fees can be deducted from the timber revenue received. The true after-tax cost is 15% less than the before tax cost.

When timber sale income is substantial, the costs of selling timber are almost identical between medium income and high-income landowners (Table 5-6). Because of the nature of capital gains taxes and the alternative minimum tax, timber investments can be particularly favorable for high-income landowners. For example, if the timber sold in this example were treated as ordinary income, the landowner in the 33% tax bracket would pay much more in taxes than if he were in the 25% bracket. Treating timber income as ordinary income would force both taxpayers into higher tax brackets, but because of the progressive income tax structure, the low income taxpayer would pay a much lower income tax than the high income taxpayer. Treating timber income as ordinary income would cause both landowners to lose the favorable capital gains tax rate of 15% and to be taxed at higher rates.

Alternative minimum tax

The alternative minimum tax is treated as a cost of the timber sale (Table 5-6). This conclusion is made because neither level of income generates an AMT without the timber sale income. As a result, the AMT is considered in timberland LEV analysis when large timber sales generate sufficient income to trigger the alternative minimum tax. Since the AMT is a cash flow, should be included in LEV and NPV discounted cash flow models.

Chapter 6

Effect of Federal Income Taxes

- LEV Analysis of Case Studies -

The effects of federal income taxes on the profitability of forest management in a typical forestry setting are examined in this chapter. The analysis consists of two different management scenarios. The first scenario reflects the increasing intensity of forest management in the south. The management regime was selected because it offers a relatively high LEV compared to other alternative scenarios. Dynamic programming was used to optimize the LEV of a loblolly pine plantation in the South. The actual methodology used to select the management regime used in this intensive management scenario is explained in detail in Appendix A. The land is the same property described in Chapter 4, consisting of 135 acres. Fifteen acres fall into a streamside management zone in which no management takes place. The remaining 120 acres are operable, have recently been harvested and the landowner plans to reforest immediately. Costs and fees as well as silvicultural regime and road maintenance schedule are listed in Tables 6-1 and 6-2.

The second scenario is evaluated on the same tract of land; however, it is much less intense. It represents a regime that not only requires less capital, but also yields a lower return. It represents the more classical approach to forest management and may represent a more realistic management regime for a landowner who is restricted by budget constraints and unable to allocate higher amounts of capital to silvicultural treatments.

Table 6-1. Cash flows for the intensive forest management regime in Scenario 1 with costs reported on a per acre basis in 2003 dollars.

Costs and fees	
Reforestation ^a	
	(\$)
Chop and burn	166.28
Planting	48.92
Herbicide	70.18
Fertilizer	56.04
Seedlings	20.03
Total	361.45
Mid-rotation fertilizer ^b	56.04
Annual management costs	5.00
Property taxes ^c	3.80
Road costs (gravel, labor, and culverts) ^d	9.79
Annual revenues	
Hunting lease revenue	4.00
Stumpage prices ^e	
Pulpwood (cord)	24.20
Chip and Saw (cord)	70.40
Sawtimber (Scribner MBF)	287.00
Forester commissions for timber sale	6%

a. Reforestation costs are southwide estimates for 2002 (Dubois et al. 2003).

b. Mid-rotation fertilizer costs are southwide estimates for 2002 (Dubois et al. 2003).

c. Property tax estimates based on interviews with tax assessors in 4 counties of the South. These counties include: Montgomery County, VA; Louis County TN; Polk County, TX; and Bulloch County, GA.

d. Road costs source: Aust 2004

e. Stumpage prices are in 2003 dollars. They are ten-year averages (1993-2003) for the South. Inflation was removed from the years by deflating current prices with the Producer Price Index for each year. The annual PPI numbers were indexed to 2003. As a result, stumpage prices were deflated, reported in 2003 dollars, and then averaged.

Table 6-2. Forest management regime and road maintenance schedule for Scenario 1.

Forest management regime^a

Year 0:	Chop and burn the site.	
	Reforest the site with 500 trees per acre (genetically improved stock).	
	Fertilize at time of establishment with NPK mix.	
	Apply herbaceous weed control.	
Year 19:	Commercial thinning (80 residual basal area) ^b	
	.....10.5 cords of pulpwood	
	..... 6.1 cords of c-n-s	
	..... 0.0 MBF sawtimber	
	Mid-Rotation fertilization ^c	
	.....200 lbs Nitrogen	
	.....25 lbs Phosphorous	
Year 30:	Final harvest ^d	
	.....11.9 cords of c-n-s	
	.....14.79 MBF Scribner	
Site:	Site index ^e	
	..... 67 base age 25	

Forest road maintenance schedule^f

Year 0:	Resurface road	.....82.5 tons of 357 gravel aggregate	
		.....Install two 18” steel culverts ^e	
		.....4 hours of labor	
Year 19:	Resurface road	.....82.5 tons of 356 gravel aggregate	
		.....Install two 18” steel culverts	
		.....4 hours of labor	

-
- a. This management regime was selected because it yielded the highest LEV in the dynamic programming process shown in Appendix A.
 - b. Timber volumes from the thinning were generated with PTAEDA 3.
 - c. The 25 pounds of phosphorous applied at mid-rotation is the default value in the PTAEDA software. The 200 pounds of nitrogen applied at mid-rotation was recommended by Amateis (2004) during a phone interview.
 - d. Final harvest volumes were generated with PTAEDA 3.
 - e. A site index of 67 was chosen because genetically improved stock was used. The assumption in the forest management regime financial analysis was that the land was average in terms of productivity for the South. The site index typically quoted as average for the South by foresters is 60 base age 25. However, when genetically improved stock is used, the site index of average land increases. PTAEDA 3 growth and yield volumes are based on woods-run seedlings. When genetically improved stock is used on site index 60 land, it is appropriate to use a site index of 65-67 in the PTAEDA simulations (Burkhart et al. 2003).
 - f. Road gravel amounts and labor amounts were estimated by Aust (2004) during a phone interview.

Allocation of costs in the LEV analysis

In the LEV model, all carrying charges and costs related to the 15-acre SMZ are allocated proportionally to the plantation as a cost. That is, the SMZ is treated as a cost that must be borne by the plantation. Very few forested tracts of land with no riparian zone exist in the South. It is common for large portions of tracts to be covered by roads and streamside management zones. However, landowners must deal with the costs and revenues of a tract of land as a whole. For example, landowners benefit from clean water, habitat diversity and less erosion due to SMZ's.

On the other hand, timber production will be reduced in the SMZ, and the landowner may decide to forego harvests in these zones. The landowner will continue to pay property taxes, boundary line maintenance, general protection costs and other management costs on these acres. The purpose of the model is to demonstrate that SMZ's provide a host of benefits both to the landowner and society in general in spite of the costs. Many of the benefits are difficult to express monetarily; however, protecting these lands reduces short-term cash flow simply because they incur costs. Such costs may be viewed differently by landowners. For example, a landowner who never intends to harvest timber and who owns the tract for recreational enjoyment has accepted annual carrying costs for the entire tract as the price of enjoying the land and forest. There is no difference in the carrying charges of either the SMZ or the rest of the tract. At the other extreme, landowners holding the timberland for profit may view the SMZ as a necessary cost relative to the more productive acres.

After-tax discounted cash flow model

An after-tax discounted cash flow model with current discount rates (inflation included) was used. The Faustmann (1849) formula was used to calculate the impacts of tax provisions on the financial returns of each scenario. The Faustmann formula is also called the land expectation value or simply LEV. The LEV is the net present value of bare ground used to grow an infinite series of identical even-aged rotations. It is often viewed as an estimation of a maximum bid price that an investor can afford to pay for bare piece of ground and still earn a rate of return equal to the alternative rate of return (Gunter and Haney 1984). In its simple form, the LEV formula is as follows (Gregory 1987):

$$Lev = \frac{\sum_{t=0}^r R_t (1+i)^{r-t} - \sum_{t=0}^r C_t (1+i)^{r-t}}{(1+i)^r - 1}$$

Where:

- Lev = Land expectation value.
- R_t = Revenue received at time t .
- C_t = Cost incurred at time t .
- r = Rotation age.
- i = Interest rate.

An after-tax investment analysis using the LEV formula is the same as a before-tax analysis with two exceptions (Haney and Gunter 1984). First, all before-tax cash flows must be converted to after-tax cash flows. Second, the discount rate used for

compounding and discounting must be net of income tax effects (Gunter and Haney 1984). After-tax LEV analysis becomes complicated because of the different tax provisions. For example, the after-tax cash flows of management costs are adjusted by the ordinary income tax rate since costs are a deduction against ordinary income for an active business. The discount rate for after-tax income is adjusted for the capital gains tax rate since timber income is treated as capital income. Adjustments for amortization, depletion and depreciation also complicate matters. For this reason, all analyses were made with a spreadsheet discounted cash-flow model that used the LEV formula and that converted before-tax cash flows to after-tax cash flows. The model used a discount rate net of income tax effects. However inflation was still included. The effects of inflation are discussed later. The format for the spreadsheet DCF models is modeled after templates demonstrated by Gunter and Haney (1984).

Intensive Forest Management Regime – Scenario one

The landowner site prepares the harvested area by chopping and burning and reforests with 500 trees per acre of genetically improved stock. The site is also fertilized with an NPK mix at the time of establishment. Finally, a herbaceous weed control with a two-year effective life is applied at the time of reforestation. The 1/8 mile long forest road on the tract is resurfaced, and the old culverts are replaced at the end of reforestation efforts. The cost for road maintenance and culvert replacement is \$1,179 (2003 dollars).

The stand is thinned to a residual basal area of 80 ft² at 19 years of age. The thinning consists of a row thinning. Every fourth row is removed, while the residual rows are thinned from below. At the time of the first thinning, a mid-rotation fertilizer is

also applied. Fertilizer application consists of 200 pounds of nitrogen and 25 pounds of phosphorous per acre. After the logging is completed, the woods road is resurfaced with a 357 gravel aggregate, and the two old culverts are replaced with new ones.

The final harvest occurs at age 30. Volumes harvested in both the first thins and the final harvest are reported in Table 6-2. Volumes were generated with PTAEDA 3, a loblolly pine growth and yield simulator (Burkhart et al. 2003). The landowner pays his consulting forester 6 percent of gross timber sale revenue for administering the sale and overseeing the harvest. The landowner markets three products from the pine plantation: pulpwood, c-n-s and pine sawtimber. Product specifications are listed in Appendix A.

Less intensive forest management regime – Scenario 2

Costs and revenues, cash flows, harvested volumes, road maintenance schedule and the forest management regime are reported in the Tables 6-3 and 6-4. In this scenario, the landowner site prepares by chopping and burning, and he reforests with a higher density of 600 trees per acre. Herbaceous weed control with a two-year effective life is applied, but fertilization at the time of reforestation is omitted.

The plantation is thinned to a residual basal area of 60 ft² in year 16, and mid-rotation fertilization is omitted. The thinning method is a combination of a row and low thinning where every fourth row is removed. Once the stand is thinned, the road is resurfaced, and the culverts are replaced. The final harvest occurs at year 30 with consulting forester fees, management costs, property taxes and road maintenance costs levied the same as in the intensive scenario.

Other forest activities

The tract is leased annually to hunters. The purpose of the lease is to build positive relationships with neighboring landowners and to cover the cost of annual property taxes. The landowner receives \$4 per acre for annual hunting lease fees and pays \$3.80 per acre for local property taxes. In addition, the landowner also pays an annual management fee of \$5 per acre to his consulting forester.

Landowner Scenarios

The after-tax LEV analyses of the management scenarios are made for a landowner who earns \$80,000 per year (middle income landowner) and for a landowner who earns \$200,000 per year (high-income landowner). Under current tax law, the middle-income landowner is in the 25 percent tax bracket, and the high-income tax landowner is in the 33 percent tax bracket. In the analyses, both the high and middle-income landowner take the standard deduction. Each landowner is 60, married, has no children living at home and files a joint income tax return with the spouse. Both landowners hold the forestland as an active trade or business.

Inflation

Taxes are always levied on current income (inflation included). Levying taxes on current income ensures that taxes revenue is adjusted for inflation. For example, if tax laws are held constant and a taxpayer pays a 25 percent tax on \$20,000 in wages in 2003 and then again in 2004, the tax paid in 2004 is worth less than that paid in 2003 because of inflation. Wage rates, however, generally increase over time due to inflation (cost of

living adjustments). As a result the taxpayer who made \$20,000 in wages in 2003 may earn \$20,600 in wages in 2004 (given a 3% increase in pay). Because taxes are levied on current income, the taxpayer in 2004 would pay 25 percent on \$20,600. Although the tax rate remains constant, the federal government will see an increase in tax revenue due to higher wages. Therefore, tax revenue is automatically adjusted for inflation.

Depending on the situation, LEV analysis is sometime done in real terms (effects of inflation removed) and sometimes in current terms (effects of inflation included). Because, taxes are levied on current income rather than real income, LEV analysis in current terms is the appropriate method. As a result, labor costs, timber prices, land taxes, lease revenues, and all other cash flows must be projected into the future (incorporating effects of inflation), because the general price level rises over time. Annual consumer price index values from 1983 to 2003 were averaged to give an estimate of average annual inflation of 3.1 percent (Bureau of Labor Statistics 2004). Therefore, all cash flows were compounded forward at a rate of 3.1 percent. Effects of real price increases were ignored. This increase in cash flow amounts allowed the analysis to be in current terms (inflation included), and the discount rate was adjusted to reflect the 3.1 percent inflation expectation. Also, the cash flows and discount rate were adjusted for the effects of the federal income tax. Therefore, with cash flows and the discount rate adjusted, land expectations values can be interpreted as after-tax and in current terms.

Table 6-3. Cash flows related to the less intensive forest management regime. Costs are on a per acre basis and are reported in 2003 dollars. – Scenario 2.

Costs and Fees

Reforestation ^a		(\$)
Chop and burn		166.28
Planting		48.92
Herbicide		70.18
Seedlings		<u>24.04</u>
Total		309.42
Annual management costs		5.00
Property taxes ^b		3.80
Road costs (gravel, labor, and culverts) ^c		9.79
Annual revenues		
Hunting lease revenue		4.00
Stumpage prices ^d		
Pulpwood (cord)		24.20
Chip and Saw (cord)		70.40
Sawtimber (Scribner MBF)		287.00
Forester commissions for timber sale		6%

a. Reforestation costs are southwide estimates for 2002 (Dubois et al. 2003).

b. Mid-rotation fertilizer costs are southwide estimates for 2002 (Dubois et al. 2003).

c. Property tax estimates based on interviews with tax assessors in 4 counties of the South. These counties include: Montgomery County, VA; Louis County, TN; Polk County, TX; and Bulloch County, GA.

d. Stumpage prices are in 2003 dollars. They are ten-year averages (1993-2003) for the South. Inflation was removed from the years by deflating current prices with the Producer Price Index for each year. The annual PPI numbers were indexed to 2003. As a result, stumpage prices were deflated, reported in 2003 dollars, and then averaged.

Table 6-4. Forest management regime and road maintenance schedule for Scenario 2.

Forest management regime

Year 0:	Chop and burn the site.	
	Reforest the site with 600 trees per acre (woods-run stock).	
	Apply herbaceous weed control.	
Year 16:	Commercial thinning (60 residual basal area) ^b	
		.....10.0 cords of pulpwood
		..... 1.5 cords of c-n-s
		..... 0.0 MBF sawtimber
Year 30:	Final harvest ^c	
		.....18.9 cords of c-n-s
		.....7.93 MBF Scribner
Site:	Site index	
		..... 60 base age 25

Forest road maintenance schedule^d

Year 0:	Resurface road	.....82.5 tons of 356 gravel aggregate
		.....Install two 18” steel culverts ^e
		.....4 hours of labor
Year 19:	Resurface road	.....82.5 tons of 356 gravel aggregate
		.....Install two 18” steel culverts
		.....4 hours of labor

-
- a. This scenario represents a less intensive scenario that may typify the actions of a landowner constrained by a budget.
 - b. Timber volumes from the thinning were generated with PTAEDA 3.
 - c. Final harvest volumes were generated with PTAEDA 3.
 - d. Road gravel amounts and labor amounts were estimated by Aust (2004) during a phone interview.

Alternative Minimum Tax

Because the alternative minimum tax is incurred due to the sale of timber, it is a relevant cash flow that should be included in the LEV analyses. Alternative minimum taxes were calculated for each scenario as if each first thin and harvest were to be made

in the 2003 tax year. They were calculated based on the assumption that the property was held as a business to take advantage of all available tax provisions. Alternative minimum taxes for the alternative scenarios are reported in Table 6-7. Because the AMT will be highest when favorable tax provisions are used, the AMT will decrease as landowners fail to use existing income tax provisions. For example, if a landowner fails to treat a timber sale as a capital gain, he may avoid the AMT. However, his overall tax burden will be higher since his timber sale income will be taxed at ordinary income tax rates, including the applicable Social Security levies. The LEV analysis begins by calculating the LEV for the intense and non-intense scenarios when all income tax provisions are used. In each successive scenario, a favorable tax provision is omitted. This results in the LEV of the same forest management scenario becoming lower and lower. The purpose is to show how much LEV is affected by the failure to take advantage of tax provisions available to landowners. While the AMT is important, it also has a small effect on the LEV per acre in both the intense and non-intense scenarios for both high and medium-income landowners. For example, LEV of the high intensity scenario when all provisions are used by an individual in the 33 percent tax bracket is only reduced by \$21.51 per acre (from \$1880.80 to \$1,867.28) when the AMT is included in the LEV calculation. Because the AMT changes each time a provision is omitted, calculating the AMT for each scenario is a complex task. While the inclusion of the AMT is necessary, effects on LEV tend to be minimal in the particular scenarios that are examined here. As a result, the AMT was omitted in LEV analysis. Estimates of alternative minimum taxes are included in Tables 6-5; however, these taxes are omitted from the LEV analysis.

Financial Analysis

The impacts of the federal income tax provisions on the LEV per acre are reported for four possible cases in Table 6-6. The first two analyses deal with the landowner who earns \$80,000 per year at his job and is in the 25 percent tax bracket. He has a choice of investing in either the intensive or non-intensive management regime. The second two analyses deal with the landowner who makes \$200,000 per year and who is in the 33 percent federal income tax bracket. He also has a choice of selecting the intense or non-intensive scenario. Both landowners hold the property as a business.

Table 6-5. Alternative minimum taxes for hypothetical high and low management scenarios.

	Tax bracket at 25% (\$)	Tax bracket at 33% (\$)
First thin high intensity	0	1,501
Final harvest high intensity	9,550	8,223
First thin low intensity	0	0
Final harvest low intensity	9,552	8,223

Table 6-6. Four scenarios on which LEV analysis was performed.

25% Tax bracket – Annual income of \$80,000.

Two possible scenarios for:

- High intensity management regime (case one)
- Low intensity management regime (case three)

33% Tax bracket – Annual income of \$200,000

Two possible scenarios for:

- High intensity management regime (case two)
- Low intensity management regime (case four)

The LEV analysis of each case begins with calculation of an LEV per acre when all of the income tax provisions are used. Under the initial LEV calculation for each case, the assumption is made that all favorable provisions are not only used, but also used in an optimal fashion. For example, reforestation costs are split over 2 years. This allows the forest landowner to take a reforestation tax credit for each year as well as elect to amortize \$9,500 in reforestation costs for each year. Tax savings decisions made by the forest landowners are displayed in Table 6-7.

Table 6-7. Tax-saving decisions made by each forest landowner during the LEV analyses.^a

Take the reforestation tax credit (Split reforestation costs over two years so credit can be taken twice).

Elect to amortize \$9,500 of reforestation costs over eight years (Spread reforestation costs over two years so election can be made twice).

Deplete remaining timber bases during first thin and final harvest.

Treat timber sale profits as capital gains.

Deduct the cost of timber sales (Consulting forester fees) from timber income

Deduct management costs and property taxes.

Depreciate road surface and culverts using the 150% declining balance method (MACRS mid-year convention).

Amortize mid-rotation fertilizer over 5 years^b

-
- a. Assumption is made that no cost-share payments are received and that no losses occur, making election of the loss deduction provision unnecessary. The section 179 deduction election also was not elected.
- b. As of June 2004, fertilizer can be expensed (Rev. Rul. 2004-62, 2004). The ruling came too late to incorporate in the analysis.

Once the initial LEV is calculated, several scenarios (9 for the intensive regime and 8 for the nonintensive regime) of each case are created in which the landowner omits the use of one additional federal income tax provision each time. Then, the resulting change in LEV (in percent) is calculated. The results of the four cases are reported in Tables 6-8 through 6-11. Some concern has been expressed by users of PTAEDA 3 that volumes generated by the program tend to be overly optimistic due to its use of the Weibull distribution and that financial analyses based on these simulated volumes result in unrealistically high LEV's. This argument is neither supported nor refuted. The intent of this chapter is to demonstrate the effects taxes have on forest management profitability. The chapter should be read for educational purpose in terms of federal

taxation rather than used as a benchmark for current market land prices or making decisions on whether to invest in forestland.

The order in which use of specific tax provisions are omitted is not represented in a necessarily logical manner. For example, a landowner that fails to amortize reforestation costs might also fail to take the reforestation tax credit if the landowner is unfamiliar with dealing with reforestation costs. Nevertheless, the analyses performed below show the landowner choosing to omit amortization of reforestation costs while choosing to use the reforestation tax credit. The nine provisions are simply listed, and then each successive scenario LEV is calculated using one less provision. The *cumulative* effect on LEV is examined. In addition, the rotation length and management regime does not change when specific tax provisions are not used. The management regime chosen for the intensive cases is based on dynamic programming results that yielded an optimum LEV before tax under limited management options and rotation lengths (See appendix A). The management regime used in the less intensive scenarios was never selected due to optimization techniques. Rather, it was simply chosen based on observation of past management decisions made by managing foresters. Both the intensive and non-intensive management regimes were selected to represent reasonable management scenarios. However, as a landowner chooses not to use tax provisions, the true optimal management regime and rotation length will change everytime a provisions is not used. Therefore, the changes in LEV due to omitting the use of certain tax provisions do not represent the true costs of not using certain provisions. Rather, they represent the costs of failing to use the provisions given that rotation age and

management regimes are held constant. The purpose of the LEV analyses is to show that choosing to omit the use of income tax provisions has significant impacts on LEV.

Table 6-8. Results of LEV analysis for case one – Landowner in the 25% tax bracket and adopting the intensive management regime.*

Scen. #.	Capital gains treatment	Depletion	Deduct cost of sale	Reforestation amortization	Deduct mgt. costs and property taxes	Depreciate road assets	Amortize mid-rotation fertilizer	Reforestation tax credit	LEV (\$)	Change from scenario one(%)
1	X	X	X	X	X	X	X	X	1366.70	
2		X	X	X	X	X	X	X	1153.85	-15.6
3			X	X	X	X	X	X	1142.81	-16.4
4				X	X	X	X	X	1108.13	-18.9
5					X	X	X	X	1074.38	-21.4
6						X	X	X	1023.79	-25.1
7							X	X	1021.12	-25.3
8								X	1014.35	-25.8
9									997.01	-27.0

* After-tax current alternative rate of return is 7%.

Table 6-9. Results of LEV analysis for case two – Landowner in the 33% tax bracket and adopting the intensive management regime.*

Scen. #	Capital gains treatment	Depletion	Deduct cost of sale	Reforestation amortization	Deduct mgt costs and property taxes	Depreciate road assets	Amortize mid-rotation fertilizer	Reforestation tax credit	LEV (\$)	Change from scenario one (%)
1	X	X	X	X	X	X	X	X	1888.80	
2		X	X	X	X	X	X	X	1396.04	-26.1
3			X	X	X	X	X	X	1377.99	-27.0
4				X	X	X	X	X	1319.17	-30.2
5					X	X	X	X	1271.15	-32.7
6						X	X	X	1194.58	-36.8
7							X	X	1190.54	-37.0
8								X	1179.65	-37.5
9									1161.42	-38.5

* After-tax current alternative rate of return is 7%.

Table 6-10. Results of LEV analysis for case three – Landowner in the 25% tax bracket and adopting the non-intensive management regime.

Scen. #	Capital gains treatment	Depletion	Deduct cost of sale	Reforestation amortization	Deduct mgt. costs and property taxes	Depreciate road assets	Reforestation tax credit	LEV (\$)	Change from scenario one (%)
1	X	X	X	X	X	X	X	867.28	
2		X	X	X	X	X	X	722.54	-16.7
3			X	X	X	X	X	712.65	-17.8
4				X	X	X	X	688.91	-20.6
5					X	X	X	655.17	-24.5
6						X	X	604.57	-30.3
7							X	601.81	-30.6
8								584.47	-32.6

Table 6-11. Results of LEV analysis for case four. –Landowner in the 33% tax bracket and adopting the non-intensive management regime.

Scen. #.	Capital gains treatment	Depletion	Deduct cost of sale	Reforestation amortization	Deduct mgt. costs and property taxes	Depreciate road assets	Reforestation tax credit	LEV (\$)	Change from scenario one (%)
1	X	X	X	X	X	X	X	887.80	
2		X	X	X	X	X	X	722.11	-18.7
3			X	X	X	X	X	614.20	-30.8
4				X	X	X	X	582.87	-34.3
5					X	X	X	538.33	-39.4
6						X	X	471.55	-46.9
7							X	467.92	-47.3
8								450.58	-49.2

The purpose is not to calculate the true cost of omitting the use of specific tax provisions. As a result, LEV analyses results should be interpreted from this context.

Results of LEV analyses on intensive cases

Case One

In case one, the LEV of nine scenarios are reported in Table 6-8. In the base case (scenario 1), the landowner uses all of the favorable tax provisions listed in Table 6-7, and he uses them in an optimal fashion. When the landowner is in the 25 percent tax bracket, chooses to engage in the intensive management regime, and uses all of the income tax provisions, the LEV per acre is \$1,366.70. Remember that this LEV includes the proportional costs per acre of “carrying” the 15-acre SMZ. Therefore, using the LEV

as an estimate of the bid price for bare land, a landowner willing to accept a current rate of return of 7 percent after taxes could afford to pay \$164,004 (120 acres x \$1,366.70 per acre) for the 135-acre tract. If purchase price is allocated across all 135 acres rather than just the plantation then the per acre bid price becomes \$1,215 per acre.

In the second scenario of case one, the landowner fails to treat timber income as a capital gain. This causes the LEV to drop to \$1,153.85 per acre, a 15.6 percent decrease in LEV. Failure to treat timber as a capital gain could result due to ignorance of the availability of the capital gains provision or by a marketing mistake such as selling the timber lump-sum while holding it as a business rather than on a pay-as-cut basis and using the provisions of IRC Section 631(b).

In the third scenario, the landowner fails to treat the timber income as capital gains and fails to deduct the basis of the timber through depletion. As a result, the LEV drops to \$1,142.81 (a 16.4 percent decrease from scenario one). Such a mistake could occur because no basis was established at the time of purchase, inheritance or reforestation, or the landowner may be unaware that reforestation costs can be capitalized for recovery through depletion. Under scenario three, a failure to claim a depletion deduction causes only a minor decrease in LEV. This is because the landowner recovered much of his cost through reforestation amortization because the tract is relatively small. However, when reforestation costs are significantly larger than the amortizable allowances or when amortization is unavailable, the failure to deplete the basis has a greater impact on LEV. For owners who have recently purchased or inherited well stocked timberland, proper depletion of basis can result in substantial reductions in taxable income.

In the fourth scenario, the landowner makes the same mistakes as those in scenario three. In addition, he fails to deduct the “cost of the sale” from the timber revenue. When timber is sold, a landowner has the right to recover his basis and the cost of sale from the timber income received to arrive at the portion of income that is taxable. In this scenario, the landowner fails to deduct the 6 percent consulting forester fees charged in the first thin and the final harvest. LEV is reduced 18.9 percent from scenario one to a value of \$1,108.13.

In Scenario five, the landowner makes all of the same mistakes as in scenario four and also fails to make an amortization for reforestation costs. LEV is reduced 21.4 percent from the scenario one base case to a value of \$1,074.38. Reason for failure to amortize reforestation costs could result from ignorance about tax law, the hassle of record keeping or from situations where the property is held as a passive activity and no passive income is produced against which the reforestation costs can be amortized. The amortization provision is proportionately more important for a small landowners than large due to the \$10,000 limit of the treatment of annual reforestation costs.

In Scenario six, the landowner makes all of the same mistakes as in scenario five and also fails to deduct annual management costs and property taxes. Such mistakes can be made due to unfamiliarity with tax law. In addition, landowners holding timber as an investment can only deduct management costs as miscellaneous itemized deductions. Only the portion of these expenses exceeding 2 percent of AGI may be deducted. Note that in such cases, that property taxes and interest are deductible and are not subject to the 2 percent AGI limit. If a landowner takes the standard deduction, no such limited

deduction is even possible. As a result of failure to deduct management costs and property taxes, LEV is reduced 25.1 percent from Scenario one to a value of \$1,023.79.

In Scenario Seven, the landowner makes all of the same mistakes as in Scenario Six and also fails to depreciate the road surface and culverts under MACRS over the 15 years recovery period . The LEV is reduced 25.3 percent to \$1,021.12. In this particular case, failure to depreciate has a small impact on LEV. This is because the depreciable property (the road surface and culverts) represents a very small portion of overall capital invested in the forest venture. However in situations where large capital investments are made, depreciation becomes relatively more important. For example, if the landowner had invested in a new fence on the perimeter of the property, resurfaced a road one mile long instead of 1/8 mile long and purchased eight culverts rather than two, the impact of failing to depreciate would have had a greater negative impact. Generally, the more capital that is invested in depreciable property, the more important depreciation becomes to the bottom line.

In Scenario Eight, the landowner makes all of the same mistakes as in Scenario Seven and fails to capitalize the mid-rotation fertilizer costs and to amortize them over five years. As a result, the LEV is reduced 25.8 percent from Scenario One to a value of \$1,014.35.

In Scenario Nine, no tax provisions are used by the landowner. Such behavior is probably rare, but the resulting LEV helps demonstrate the impact that good tax management has on forestry investments. In Scenario Nine, the LEV is reduced 27.0 percent from that in Scenario One to a low of \$977.01 (Table 6-8).

Case Two

The LEV analysis for Case Two was performed in the same manner as in Case One. However, tax impacts were examined for a landowner in the 33 percent tax bracket that elected to engage in the intensive scenario. Results of the LEV analysis of Case Two are reported in Table 6-9. Some interesting observations can be made from this table.

First, the LEV of Scenario One is \$1,888.80 as compared \$1,366.70 in Case One. This difference of \$522.10 is due solely to the difference in the income tax brackets in which each landowner is placed. The greater value of Scenario One, Case Two shows that the election of the federal income tax provisions by a landowner in a high income tax bracket results in more tax savings than for a landowner in a lower income tax bracket making the exact same elections. As a result (and holding all other factors constant) the landowner in the high income tax bracket who uses the income tax provisions available and who desires to earn a current, after-tax rate of 7 percent on the forested land can pay more per acre than the landowner in the lower tax bracket desiring to make the same rate of return using the same federal income tax provisions.

Second, choosing not to take advantages of federal income tax provisions are more expensive for landowners in a higher income tax bracket than those in a lower income tax bracket. For example, in Case One, the decision to not treat timber profits as capital gains resulted in a 15.6 percent decrease in LEV. The same decision by a landowner in Case Two results in a 26.1 percent decrease in LEV. Also, the choice by a landowner in Case One to use any of the provisions available results in a total LEV decrease of 27 percent while the same decision by a landowner in Case Two results in a total LEV decrease of 38.5 percent.

Results of LEV analyses on non-intensive cases

The LEV analyses of Case Three and Case Four are the same as Case One and Case Two, respectively, except that the landowners engage in the non-intensive forest management regime. Also, eight scenarios rather than nine are addressed because no mid-rotation fertilization occurs in the non-intensive management regime and thus, no amortization of fertilization costs.

Case Three

In the Scenario One base case, the landowner uses all of the tax provisions listed in Table 6-7 in an optimal fashion. When the landowner is in the 25 percent tax bracket, chooses to engage in the non-intensive management regime, and uses all of the income tax provisions, the LEV per acre is \$867.28. Remember that this LEV also includes the proportional per acre costs of “carrying” the 15-acre SMZ. Therefore, if LEV serves as an estimate of bid price for bare land, a landowner wanting to make a current rate of return of 7 percent after taxes could afford to pay \$104,074 (120 acres x \$867.28) for the 135-acre tract. If purchase price is allocated across all 135 acres, rather than just the plantation, the maximum acceptable bid price per acre becomes \$771.

In Scenario Two, the decision to not treat timber income as a capital gain reduces LEV 16.7 percent from Scenario One to a value of \$722.54 per acre. In this example, the decision by the landowner to not treat timber income as a capital gain when engaged in the non-intensive scenario reduces LEV by a higher percentage than the same landowner engaged in the intensive management scenario.

In Scenario Three, failure to treat timber income as a capital gain and to deplete timber basis during the timber sales causes LEV to drop 17.8 percent from the Scenario One to a value of \$712.65 per acre. In Scenario Four, the landowner chooses not to treat timber as a capital gain, recover basis through depletion and deduct the cost of the timber sale (consulting forester fees). LEV of Scenario Four is \$688.91 and is 20.6 percent lower than the LEV in Scenario One. In Scenario Five, the landowner makes the same decisions as in Scenario Four and also decides not to amortize reforestation costs. The resulting LEV is 24.5 percent less than the LEV in Scenario One and has a value of \$655.17 per acre.

In Scenario Six, the landowner makes the same mistakes as in Scenario Five and also fails to deduct management costs and property taxes resulting in a LEV of \$604.57 which is 30.3 percent lower than the Scenario One LEV. Such mistakes can be made due to unfamiliarity with tax law. In addition, landowners holding timber as an investment can only deduct management costs as miscellaneous itemized deductions. Only the portion of these expenses exceeding 2 percent of AGI may be deducted. Note that in such cases, that property taxes and interest are deductible and are not subject to the 2 percent AGI limit. If a landowner takes the standard deduction, no such limited deduction is even possible.

Scenario Seven is identical to Scenario Six except that the landowner does not depreciate the road surfaces and culverts placed in service during the rotation. As a result, LEV falls to \$601.81 and is 30.6 percent lower than the Scenario One LEV. Scenario Eight is identical to Scenario Seven except that the reforestation tax credit goes unused. As a result, the landowner is taking advantage of none of the income tax provisions listed

in Table 6-7. The LEV reaches a low of \$584.47 per acre, which is 32.6 percent lower than the LEV in Scenario One.

Case Four

LEV analysis is the same as in Case Three except it is for a landowner in the 33 percent tax bracket (\$200,000 annual salary). The LEV values range from \$887.80 per acre when all of the tax provisions are used to \$450.58 when none of the tax provisions are used. LEV is 49.2 percent lower when none of the income tax provisions are used. This percentage drop is the highest of the four cases.

Summary of the four cases

The LEV analysis shows that failing to take advantage of income tax provisions available to forest landowners has a significant negative impact on LEV regardless of income levels or management intensities examined. In addition, the following trends were noticed:

- 1). As intensity increases, LEV increases, and more can be paid for bare land.

Although this is the case in this particular study, this statement cannot be applied to all forest management situations. Due to the law of diminishing returns LEV will not always increase with increased intensity. In addition, extremely poor ground may not merit large capital investments. However, this statement does tend to be true when managers are dealing with relatively high site indexes and comparing intensive silviculture versus non-intensive silviculture.

- 2). The rewards from using the favorable tax provisions are more beneficial for high income landowners (those in higher tax brackets). Conversely, failure to use income tax provisions is also more costly for higher income landowners.

- 3). Due to the nature of the tax provisions, a landowner in a higher tax bracket engaging in a plantation investment and using all of the provisions can pay more for the same timberland than a landowner in the lower income tax bracket contemplating the exact management regime and who uses all of the same income tax provisions. This statement is based on the assumption that real estate markets are imperfect. That is, taxes are not capitalized into land prices on the open market. It is also based on the assumption that the high income landowner and the middle-income landowner have the same investment alternatives. This may not realistically be the case since the higher income landowner may have more investment options. Therefore, this statement is conditional.

- 4). In terms of percent, the LEV is effected more by the failure of a high income landowner holding a non-intensively managed plantation to use the income tax provisions than a high income landowner holding a intensively managed plantation.

The preceding discounted cash flow analyses demonstrate the importance of keeping abreast of federal income tax provisions. For example, a potential investor

knowledgeable about tax law who is bidding on a tract of bare land for timber production has a significant advantage over an investor who is unfamiliar with the federal income tax laws.

Chapter 7

Complexity of Tax Law Compliance

The importance of taking advantages of tax provisions that make forest management more affordable is one of the major focal points of this paper. The second is estimating the level of awareness and use of these tax provisions among landowners. One of the suspected reasons for landowners failing to use favorable tax provisions even when they are aware of them is the amount of effort and understanding required to actually use the provisions and fill out the correct IRS forms. The purpose of this chapter is to provide an example of the detail involved in taking advantage of the tax law.

The tax scenario consists of the intensive management southern scenario in the previous chapter. The landowner makes \$80,000 per year and takes the standard deduction. He holds the forested property as a business.

Only tax issues that the landowner must deal with during a first thin are shown in Table 7-1. Other tax issues that must be dealt with in other tax years during the rotation remain unaddressed in this chapter. For example, the landowner does not elect amortization of reforestation costs, take the reforestation tax credit, exclude cost-share payments from gross income, take the Section 179 deduction or take a deduction for a casualty loss during the year of the first thin. Only the appropriate forms to use when concerned with matters during the first thin are identified in this chapter. Forms pertaining to these other issues are beyond the scope of this chapter but may be found in *Agriculture Handbook No. 718: Forest Landowner's Guide to the Federal Income Tax* (Haney et al. 2001).

The forms required by the IRS in the tax year of the first thin are shown in Table 7-2. The assumption is made that the landowner takes the standard deduction and that he and his spouse are not involved in other activities such as passive activities or investment activities. In reality, this is probably an oversimplified view; however, the purpose here is to show the time and effort involved in complying with tax law as it pertains to a forestry investment.

Table 7-1. Tax decisions relevant to the landowner in the tax year of the first thin.

Elect to treat timber income as a capital gain.

Depreciate a portion of the road surface and culvert costs.

Amortize fertilization costs.¹

Deplete the appropriate basis amount from the timber account.

Deduct management costs.

Deduct property taxes.

Report timber lease revenue.

Deduct the expense of the timber sale.

Determine if an alternative minimum tax is owed.

1. As of June 2004, fertilizer can be expensed (Rev. Rul. 2004-62, 2004). The ruling came too late to incorporate in this example.

Typically, a taxpayer begins filing a tax return by starting with line 1 of Form 1040. As the landowner begins to complete Form 1040, he will be directed by the instructions to other forms and worksheets necessary for calculating the information

needed to complete Form 1040. Once the form is completed, Form 1040 and the accompanying forms are mailed to the IRS by April 15.

In this particular scenario, the landowner has three different kinds of income: 1) wages salaries and tips, 2) business income or loss, 3) capital gain or loss.

Table 7-2. Forms required for filing a federal income tax return during the tax year of the first thin.

Form 1040	U.S. individual income tax return
Form 1040 – Schedule D	Capital gains and losses
Form 4797	Sales of business property
Form 1040 – Schedule C	Profit or loss from business
Form T (Timber) – Part II ¹	Timber depletion
Form T (Timber) – Part III	Profit or loss from land and timber sales
Form 4562	Depreciation and amortization
Form 6251	Alternative minimum tax – individuals

1. The landowner in the example holds timber as a business, and Form T is required. However, on the latest Form T (2003) the IRS has relaxed the requirement for landowners with occasional timber income.

Wages Salaries and Tips – W-2

The landowner must report his wages on line 7 of Form 1040, his business gain or loss on line 12 and his capital gain or loss on line 13a. Wages are taken from the landowner's W-2 and simply reported. However, reporting the business income or loss

for line 12 requires that the landowner fill out Schedule C “Profit or Loss From Business.”

Business income or loss – Schedule C

Because the landowner holds the forestland as a trade or business, costs and income that are not of a capital gain nature must be netted on Schedule C to determine if the business generated a gain or loss of income for the year. These cash flows include property taxes, lease revenue, management costs and amortization of fertilization costs. Once these costs and income are netted on the Form 1040, Schedule C, the net gain or loss is then transferred to line 12 of Form 1040. Unfortunately, amortization of fertilization costs and depreciation of the road surface and culverts are calculated on Form 4562 rather than directly on Schedule C.

Note that amortization of fertilizer is included in this example. Revenue Ruling 2004-62, which was passed in 2004, now allows fertilizer used in established stands to be expensed rather than amortized. At the time of this analysis, Rev. Ruling 2004-62 had not yet been made, and mid-rotation fertilizer costs were still amortized. Were the same analyses made today, only depreciation of the road surface and culverts would be included on Form 4562.

Depreciation and Amortization – Form 4562

Allowable depreciation and amortization deductions are determined using Form 4562 “Depreciation and Amortization”. Once these amounts are determined, they are

transferred to Schedule C where they are netted with other business income and costs. The net gain or loss is then transferred to line 12 of Form 1040.

Capital Gain or Loss – Schedule D

Typically, a capital gain or loss is determined using Schedule D of Form 1040. Ultimately, the capital gain or loss from a timber sale is reported on Schedule D. This amount is then transferred to line 13a of Form 1040. However, other forms must be filled out before the capital gain or loss can be reported on Schedule D and then onto Form 1040. When timber is held as part of a business and timber is sold as a capital gain [Section 631(a) or 631(b)], then the gain or loss from the sale is reported on line 11 of Schedule D. Line 11 of Schedule D is designated for reporting (among other things) “Gain from Form 4797”. That is, in order to report the gain or loss on line 11, the necessary portions of Form 4797 must first be completed.

Form 4797 – Sales of Business Property

Under IRS regulations, timber held in a business is classified as Section 1231 property rather than being defined as a capital asset. However, the IRS allows the income from the disposal of timber to be treated as a capital gain (or loss). Section 1231 property is assets held for use in a business. When Section 1231 property is disposed of, the disposal must be reported on Form 4797, including timber treated as a capital gain. Interestingly, the road surface and culverts included in the scenarios addressed in the previous chapter are also Section 1231 property. If culverts and the road surface are replaced before they are fully depreciated and are replaced in the same year of the timber

sale (a likely event due to road damage) then the remaining basis of the culverts and road surface are “disposed of” on Form 4797 and netted against the timber gain (also reported on this form) to produce the gain or loss from the sales of business property. This net gain or loss is then reported on line 11 of Schedule D.

When the sale of timber is reported on Form 4797, the form requires the landowner to report the total amount received. Then the cost of the sale as well as the allowable portion of timber depletion are subtracted to generate the capital gain from the sale of this Section 1231 asset. This means that the landowner must know what amount of the timber sale income can be subtracted as depletion. In order to calculate the amount of allowable depletion, part II of Form T (Timber) must be filled out. While the landowner is filling out part II of Form T, he will also find it practical to also complete part III.

Form T (Timber) – Parts II and III

Part II of Form T is called “Timber Depletion” it is specifically designed for calculating the correct depletion unit and, with the volume harvested, for calculating the entire amount of depletion allowed in a particular timber sale. Part III of Form T is called “Profit or loss from land and timber sales”. Part III allows the landowner to calculate the actual gain from the timber sale. It requires that the landowner report the total income received for the timber sale. Next, the depletable basis and cost of the sale (such as consulting forester fees and legal expenses) are subtracted from the income received to produce the actual gain. Once parts II and III of Form T are completed, all of the

information necessary for filling out Form 4797 (in terms of selling timber) is available. The landowner must then simply transfer it to Form 4797.

Alternative minimum tax – form 6251

Once line 7 (wages salaries and tips), line 12 (business income or loss), and line 13a (capital gain or loss) of Form 1040 are completed, continuation of Form 1040 completion is fairly straightforward until line 42. Line 42 is designated for reporting any alternative minimum tax owed (AMT). The existence of the AMT provides a good argument for timber sales techniques that allow income from a sale to be realized in two separate tax years. For example, a landowner may want to realize half of the timber sale income in December and half in January (a new tax year). However, in this particular scenario, the landowner receives substantial income in one tax year. Because of the large amount of income received from the timber sale, the landowner incurs an alternative minimum tax.

The alternative minimum tax is calculated using Form 6251 which is called “Alternative Minimum Tax – Individuals”. Once the AMT tax (if any) is completed, completing Form 1040 becomes much more straightforward and simple (at least in this particular example). A flow chart which provides an understanding of how the network of forms required to complete Form 1040 fit together in a logical manner can be found by examining Figure 7-1.

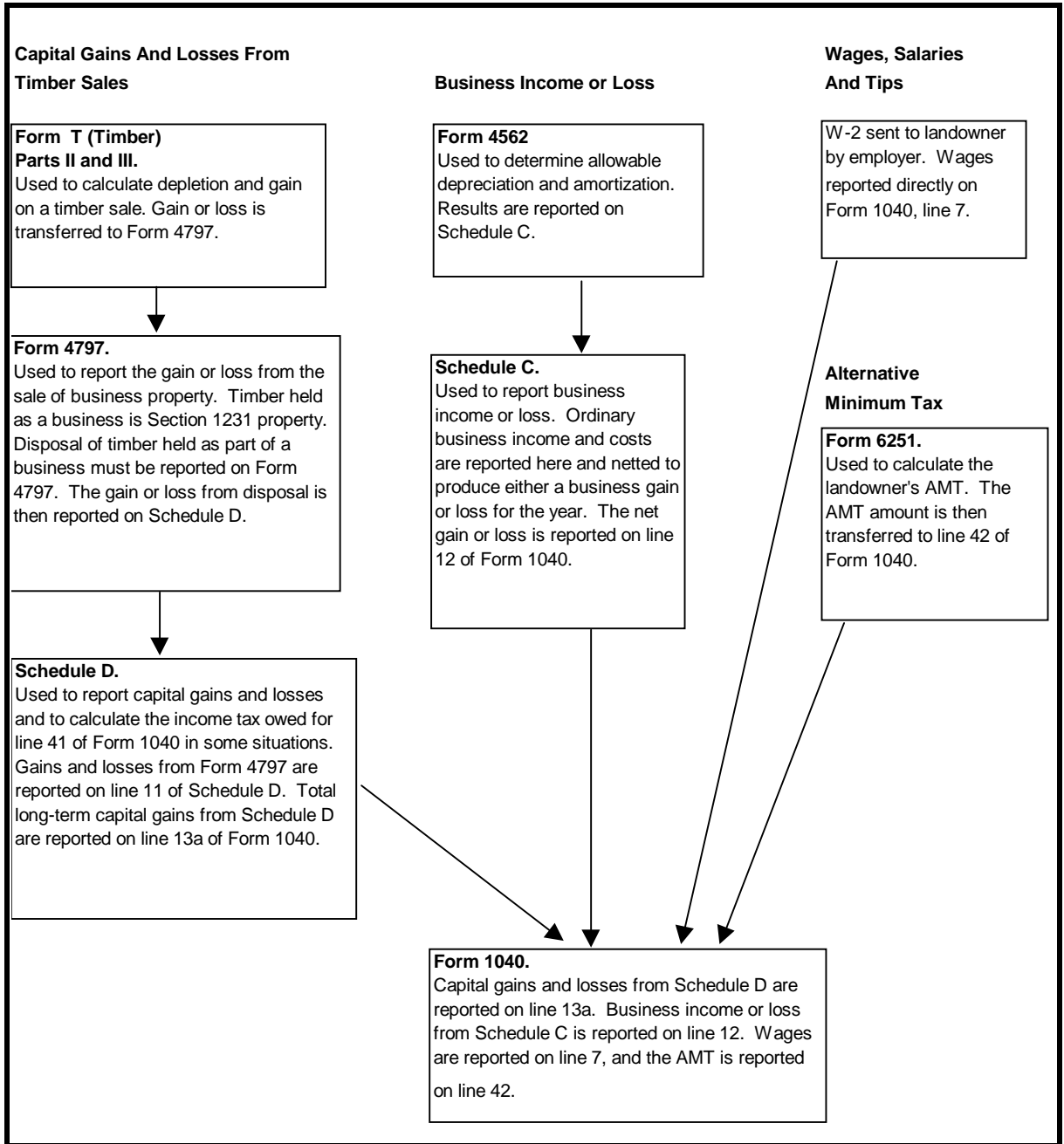


Figure 7-1. Forms needed for the landowner to file a federal income tax return in the year of the first thin.

Conclusion

Compliance with the tax law in terms of timber income is complex, but this is not necessarily bad. Rather, complexity tends to be a side effect of the actions of Congress to influence social behavior through tax incentives. Special tax treatment of any economic activity by nature involves additional regulations and forms. This special treatment also encourages sound forest management by making it more cost effective. Unfortunately, the complexity of the IRC and the steps required to take advantages of such provisions can be discouraging. Taking advantages of the provisions available to landowners tends to be worth the time and effort involved. The purpose of this chapter is to describe the tax situation a typical landowner might face in a harvest year.

This example is fairly simple. Multiple stands are not managed, and the tract is relatively small. As the size of forest holdings increases, the complexity of complying with IRS regulations grows quickly and will most likely be handled efficiently only by a tax professional such as a certified public accountant. In conclusion, an enormous gap exists between knowing about provisions available and actually using them. Awareness of the benefits that these provisions offer should encourage landowners to seek professional tax advice if handling their own timber tax issues becomes overwhelming.

PART III. LANDOWNER SURVEY METHODS AND RESULTS

Chapter 8 Materials and Methods

Ideally the study would survey landowners at random. The purpose of a random sample is to avoid bias such as was incurred in the South Carolina study (Greene et al. 2001). All forest landowners surveyed in the South Carolina study were members of the Forest Landowners Association. Therefore, the respondents in that survey were much better educated about forestry than forest landowners who are unaffiliated with any kind of forestry organization. In order to capture the true levels of awareness among forest landowners in the U.S., a sample needed to be pulled from the population of all forest landowners rather than landowners who are members of a particular organization. Two ways were identified to develop such a sample. The first was to obtain a list from the U.S. Treasury Department of all landowners who had filed Form T with their Form 1040 in the last five years. However, the Treasury Department was unwilling to disclose this information. Such a sample would probably have led to a sample of forest landowners more highly motivated to manage timber than the average landowner in the U.S. since the filing of Form T indicates active timber management and or harvesting activities. The second method would have been to obtain names of forest landowners from county courthouses in each state and to sample these landowners. Such a study may have been

possible on a state or regional level. However, due to budgetary and time constraints, such a study on the national level was simply infeasible.

Thus, the proposal to conduct a national survey of forest owners to determine whether they are aware of and use favorable federal income tax provisions that promote reforestation and forest management was modified to sample landowners who were members of the American Tree Farm System (ATFS).

As a result, the sample was drawn from the American Tree Farm membership list of nonindustrial private forest landowners. The American Tree Farm System is a forest landowner organization, dedicated to sound forest management principles. American Tree Farm members most likely represent highly motivated landowners in terms of timber management, and they are expected to deviate in characteristics from “typical” landowners as described by Birch (1996).

American Tree Farm System

The American Tree Farm System program was established in 1941 and is administered by the American Forest Foundation. Currently, the mission of the ATFS is to “promote the growing of renewable forest resources on private lands while protecting environmental benefits and increasing public understanding of all benefits of productive forestry” (ATFS 2004). Today, the ATFS includes 55,000 certified tree farms that contain 21 million acres of forestland (O’Connor 2004). In order to join the ATFS, tree farmers must pledge to manage their holdings for “clean water and healthy watersheds, abundant wildlife and recreation – as well as wood” (ATFS 2004). In order for landowners to join the ATFS, they must adhere to specific standards and guidelines. One

of the distinguishing characteristics between the “average” U.S. forest landowner and the ATFS member is that the ATFS landowner is required to have a written management plan. Under ATFS guidelines, members must develop forest management plans that adhere to environmental standards. In addition, Tree Farm members must pass inspection every five years by an ATFS volunteer. Inspections are designed to ensure that properties are still being managed according to ATFS guidelines (ATFS 2004). In addition, certification standards are independently reviewed by a standards panel that helps keep ATFS standards current with the “latest benchmarks for sustainability” (ATFS 2004).

In return for becoming a member of ATFS, the American Forest Foundation and American Tree Farm System help tree farmers in many ways. Members of ATFS are provided sources and contacts to help them with quality natural resource planning and advice. ATFS members are also provided with a tree farm sign and given the option to attend a public ceremony in which their certification is recognized (NJTF 2004). They are also given the opportunity to participate in natural resource seminars and tours as well as to compete in “local, state, regional, and national outstanding tree farmer contests” (NJTF 2004). Promotional ATFS tree farm products may also be purchased and displayed by members as long as their properties continue to pass inspections every 5 years. Members receive a newsletter and can subscribe to *Tree Farmer Magazine*. Finally, Tree Farm provides political advocacy for members. The National Public Affairs Committee “organizes educational and lobbying efforts in support of policies that advance sustainable forestry on family-owned forests” (ATFS 2004).

Therefore, ATFS members not only have a management plan, but they are also part of an organization that is dedicated to keeping members current on natural resource management issues and techniques. Compared to the average landowner in the United States, the ATFS member population is probably more highly motivated to manage his or her lands effectively and is probably better educated about forest management techniques and the benefits they provide.

Under the belief that ATFS members serve as a benchmark for better educated forest landowners in terms of management, the assumption was made that the level of awareness and use of the federal income tax provisions would be higher than for the general U.S. forest landowner population. The conclusion was made that if the ATFS members surveyed showed a low level of awareness and use of the provisions that the nation-wide level of awareness and use would be even lower and that the survey results would serve as a call to forestry professionals for increasing the efforts to help landowners become more aware of their timber tax options.

Using 1994 data, Birch (1996) estimated the total private forestland ownerships in the United States to be 9.9 million and estimated that they controlled 393 million acres of forestland. About 94% of these ownerships (or 9,319,000) were considered to be controlled by individuals, and these individuals were estimated to control 59 percent of the private forestland in the United States. Partnerships comprised 2.9 percent (289,000) of the forestland ownerships and controlled 7.5 percent of the private forestland in the United States. Other forms of ownership (such as estates, trusts, and tribal lands) comprised 1.4 percent of the forestland ownerships (136,000) and controlled 6.2 percent

of private forestland in the United States. Finally, corporations accounted for 1.6 percent of forestland ownerships and controlled 27.2 percent of private forestland in the United States (Birch 1996). Excluding corporations, total private forestland ownerships in the United States comprise 9.7 million ownerships that control 286.3 million acres of private forestland. By definition, these 9.7 million owners are considered to be nonindustrial private forestland owners (NIPF's). Currently, the ATFS states that it has 55,000 certified tree farms (O'Connor 2004). Assuming 1 member per certified tree farm, the ATFS comprises only 0.6 percent of all NIPF's. ATFS also states that these tree farms control 21 million acres (O'Connor 2004). Therefore, ATFS tree farms control 7.3 percent of all private forestland in the United States that does not fall into the corporate ownership category. As a result the sample comes from only a small group or NIPF's.

Dillman Method

The mail survey was implemented using the Dillman (1978) method (Figure 8-1) which is intricately detailed. An actual flow chart of the way the data should be collected under the Dillman method is shown below (Figure 8-1). The questionnaire was prepared and pre-tested during the summer of 2003. Special attention was paid to creating questions, which adhered to Dillman's standards. Upon completion, the questionnaire was then pre-tested for possible confusion, bias and error three ways. First it was reviewed by faculty members within the Department of Forestry, Virginia Tech, and it was reviewed by a certified public accountant to make sure descriptions of the provisions were accurate. Next, it was mailed to ten forest landowners in southwest Virginia. These landowners provided feedback on ways to improve the questionnaire and identified

shortcomings in the format. Finally, six forest landowners agreed to meet on the Virginia Tech campus and actually fill out the survey while under observation. Such observation allowed the researcher to identify problems, which were unidentified through the mail survey. These six landowners were also timed to assure that the questionnaire could be completed within a reasonable time frame. The mail survey questionnaire is included in Appendix A.

The original survey, the post card follow up, and the second and third follow-up letters were mailed during the fall of 2003. Certified mail was not used in the final mailing. Dillman’s recommended timing of the mail-outs were followed as closely as possible. After the final mail out, questionnaires were collected for two months before data entry into a database began. The questionnaire, post card and cover letters are included in Appendix B.

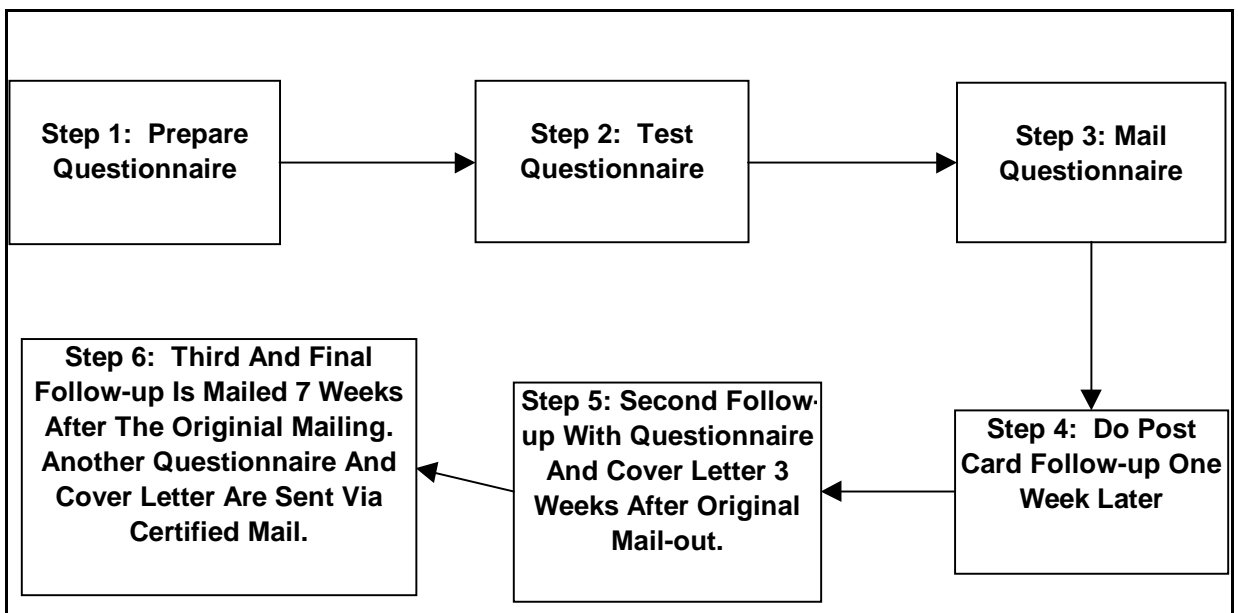


Figure 8-1. Dillman step-wise procedure for a mail survey.

Statistical Analysis

The primary purposes of the statistical analysis with the survey data are listed below:

- 1). Estimate the proportion (nation-wide) of ATFS landowners who aware of each of the 9 income tax provisions listed previously. The sample proportion will be used to estimate the true population percentage, and confidence intervals will be constructed.
- 2). Estimate the proportion (nation-wide) of ATFS members who aware of each of the 9 income tax provisions listed previously but who do not use the provisions. The proportion of the sample will be used to estimate the true population percentage, and confidence intervals will be constructed.
- 3). Give the reasons (by sample percentage) why landowners who are aware of the provisions fail to use them.
- 4). Compare the demographic results of the survey with landowner demographics published by Birch (1996). Hypothesis tests will be developed to determine how ATFS demographics identified by this study are the same or differ significantly from those of the typical landowner described by Birch.

Sample Size Determination

Two thousand members were selected from the ATFS population to participate in the survey. Sample size was decided based on the following reasons. First, the questionnaire developed for data collection contains a total of seventy-seven questions. These questions vary significantly in terms of the kind of information solicited. The major objective of this survey, as stated in the proposal to the USDA Forest Service was to determine the level of awareness and use of current federal income tax provisions available to forest landowners. As a result, the decision was made to prioritize estimating the level of awareness of the tax provisions over other objectives of the study. Therefore, the appropriateness of centering the sample size decision around estimating the true population proportion of landowners aware of the income tax provisions was recognized.

Determining if a landowner is aware that a certain income tax provision exists requires a “yes” or “no” answer. Thus, the answer to this type of question involves binomial data. These are commonly found when estimating a percentage or proportion of a population that exhibits a particular characteristic

Survey participants were asked if they were aware of 9 different income tax provisions available to them; therefore, nine different proportions were estimated. For example, what proportion of landowners were aware of capital gains treatment for timber earnings, and what proportion of landowners were aware that the reforestation tax credit exists? An objective of this study was to make an estimate of the proportions that will be within 10 percent of the true population proportions at the 95 percent confidence levels.

The sample used for the South Carolina study (Greene et al. 2001) of forest landowners was drawn from members of the South Carolina Forest Landowners Association. Therefore, the population sampled probably represented landowners that are more highly motivated and that have more management information at their disposal than the average landowner in the United States. In addition, every member of this population is by default a member of a forestry organization. As a result, it was assumed that these landowners are better informed about tax provisions than the general population of U.S. forest landowners. Although the South Carolina population used is different than the American Tree Farm System population, the assumption was made that these two populations are similar in several respects. First, members of both populations are members of a forestry organization. Second, due to the nature of both organizations, it is assumed that both populations are more highly motivated to actively engage in forest management than the average landowner in the United States. Therefore, the levels of

awareness and use of the income tax provisions among landowners of the two organizations is probably similar. As a result, the proportions of awareness reported for the South Carolina population (Table 2-1) is viewed as a bench mark for determining sample size in the ATFS survey. Notice that the lowest level of awareness concerning the seven income tax provisions asked about in the South Carolina study concerned the exclusion of cost-share payments from gross income provision. The level of awareness for this particular provision was 42 percent (Table 2-1).

The formula for estimating a (1-alpha)100% confidence interval of 2B (TAMU 2004) is:

$$2B = 2z_{\alpha/2} \sqrt{p(1-p)/n}$$

Where:

- B = largest possible distance between any π In the confidence interval and the sample proportion p .
- $z_{\alpha/2}$ = z score for a given level of confidence (Two-tailed)
- p = estimated proportion of successes
- n = number of population units sampled

This formula can easily be rearranged and solved for n (TAMU 2004):

$$n = \frac{z_{\alpha/2}^2 p(1-p)}{B^2}$$

However, this formula requires one to know p . Unfortunately, p was unknown; however, the estimated proportions of the South Carolina landowners served as a substitute. Therefore, 42 percent was used for p . In order to create a 95 percent

confidence interval for the true population mean in which a 10 percent error is tolerated, n is calculated to be:

$$n = \frac{(1.96)^2 \times 0.42(1 - .42)}{.05^2} = 375$$

For simplicity, n was rounded to 400. The South Carolina study achieved a 35 percent response rate. Although a similar response rate was expected in the ATFS survey, the number of questionnaires sent out was based on a conservatively predicted 20 percent response rate as a safety precaution.

$$\mathbf{2,000 \text{ questionnaires} \times 20\% = 400 \text{ respondents} = n.}$$

Therefore, 2,000 ATFS members were selected for the sample.

Chapter 9

Nationwide Results of the American Tree Farm System Mail Survey

The survey results of landowners from the ATFS on the national level are summarized in Chapter 9. Population proportions (all tables) and means (Table 9-10 only) concerning awareness and use of tax provisions were calculated by compiling the results of the Southern, Northern and Western Regions and using stratified sampling estimation techniques. Information concerning survey response rates is reported in Appendix C. The following formulas for population proportion, population means and respective confidence intervals were used to calculate the values in Tables 9-1 through 9-10:

Estimation of a population proportion for stratified random sampling (Sincich 1996)

Point estimator:

$$\hat{\pi} = \bar{p} = \frac{1}{N}(N_1p_1 + N_2p_2 + \dots + N_kp_k)$$

Approximate 95% confidence interval:

$$\bar{p} \pm 1.96 * \sqrt{\frac{1}{N^2} \sum N_i^2 \frac{p_i(1-p_i)}{n_i-1} \left(\frac{N_i - n_i}{N_i} \right)}$$

Estimation of a population mean for stratified random sampling (Sincich 1996)

Point estimator:

$$\hat{\mu} = \bar{\bar{x}} = \frac{1}{N} (N_1 \bar{x}_1 + N_2 \bar{x}_2 + \dots + N_k \bar{x}_k)$$

Approximate 95% confidence interval:

$$\bar{\bar{x}} \pm 1.96 \sqrt{\frac{1}{N^2} \sum N_i^2 \frac{s_i^2}{n_i} \left(\frac{N_i - n_i}{N_i} \right)}$$

Where:

- k = Number of strata
- N_i = Number of sampling units in the i th stratum
- N = Number of sampling units in the population
= $N_1 + N_2 + \dots + N_k$
- n_i = Number of sampling units randomly selected from the i th stratum
- n = Total number of sampling units selected from the population

\bar{x}_i	=	Sample mean of the n_i observations selected from the i th stratum
s_i^2	=	Sample variance computed from the n_i observations selected from the i th stratum
p_i	=	Sample proportion computed from the n_i observations selected from the i th stratum
$\hat{\pi}$	=	Estimate of a population proportion
$\hat{\mu}$	=	Estimate of a population mean.

Nationwide Results

Landowner Awareness of Favorable Tax Provisions

A summary of the awareness and use of the nine income tax provisions is reported in Table 9-1. Estimated levels of awareness range from 60 percent for the deduction of management costs to 25 percent for exclusion of cost-share payments from gross income. Based on this study, the provision to which LEV is most sensitive are capital gains (51 percent), deduction of management costs (60 percent), depletion (42 percent), and amortization of reforestation costs (29 percent) (Table 9-1).

Table 9-1. Nationwide estimated awareness among American Tree Farmers of tax provisions that make forest management more cost effective.

Awareness	Deduction of		Section 179	Depletion (%)	Reforestation tax credit (%)	Amortization		Exclusion of	Loss
	Capital gains (%)	management costs (%)				Depreciation deductions (%)	reforestation costs (%)			cost-Share payments (%)	deductions (%)
<i>Aware of the Provision</i>	51	60	57	32	42	32	29	25	34
<i>95% Confidence Interval</i>	03	03	03	03	03	03	03	03	03

The importance of depreciation as well as the Section 179 deduction varies depending on the amount of capital invested in depreciable assets. The reforestation tax credit has a small effect on LEV but provides substantial income to landowners in the year of reforestation. Exclusion of cost-share payments also has a small effect on LEV and can only be used when cost-share payments are received. Finally, sensitivity of LEV to loss deductions varies depending on the amount and severity of damage incurred (if any) during a rotation. Reasons for low levels of awareness are discussed in the demographics section below and in Chapter 13.

Landowner Use of Favorable Tax Provisions

Although a Tree Farmer may be aware of a favorable tax provision, it does not necessarily presuppose that s/he has used the provision. For example, a landowner who is aware of capital gains treatment, but who has never sold timber will never have used the provision. A summary of the use levels among those that *are* aware of the provisions is included in Table 9-2.

Use of the provisions by those aware of their existence is substantial. Deduction of management costs had the highest use rate (75 percent) while deduction of losses had the lowest (19 percent). However, use of the loss deduction election mandates a casualty loss. As a result, use of such a provision is understandably low since eligibility to elect this provision is sporadic at best. Section 179 had the second lowest use rate of 42 percent, which again is understandable. Use of the Section 179 deduction requires the purchase of depreciable, tangible personal property. Such purchases probably vary dramatically by frequency and value. The results in Table 9-2 seem to indicate that if

more landowners were aware of these nine provisions more would use them. For example, national awareness among Tree Farmers of the reforestation tax credit is 32 percent. However, 55 percent of this proportion have used the reforestation tax credit. Another example of relatively high use compared to awareness would be the election to exclude cost-share payments from gross income. The nationwide awareness among Tree Farmers is 25 percent. However, 55 percent of that number have used the provision. Excluding the loss deductions, all provisions show a high level of use compared to their respective levels of awareness. Such results indicate that more effort could beneficially be made to inform landowners of the tax provisions available to them. Although one could argue that the levels of awareness are low because many landowners are not interested in harvesting their timber or managing their forests for income, it is possible that some landowners may change ownership objectives when informed of the tax benefits available to them.

Table 9-2. Estimated level of use of favorable tax provisions by Tree Farm members that *are* aware of the provisions.

	Capital gains (%)	Deduction of management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	Amortization of reforestation costs (%)	Exclusion of cost-share payments (%)	Loss deductions (%)
<i>Have used the provision</i>	68	75	62	42	52	55	52	52	19
<i>95% Confidence interval</i>	04	04	04	04	05	06	06	07	05

Lack of Use

Specific reasons for knowing about a favorable tax provision but not using it are numerous; however, a list of presumed major reasons is shown in Table 9-3. The estimated proportions of Tree Farmers who are aware of the provisions but who fail to use them are also reported in Table 9-3. The number one reason for failing to use the capital gains provision (40 percent) unfortunately fell into the “other” category, and little can be said about reasons for lack of use without speculation. However, an estimated 39 percent of Tree Farmers in the U.S. failed to use the capital gain provision because it is not applicable to their situation. For example, the landowner may never have sold the timber or may have bought and sold timber before holding it for one year. Landowners who sell timber at a loss also would have a capital loss rather than a capital gain.

In terms of deducting management costs, an estimated 36 percent of Tree Farmers reported that the benefit is too small to bother with. Another 28 percent say that the provision is not applicable to their situation. One suggestion for the reason that the provision is unapplicable to their situation is that these landowners hold their forestry operation for other than active business purposes.

An estimated 40 percent of Tree Farmers do not find depreciating assets to be applicable to their situation. In cases where landowners own land with no depreciable assets, it is not an option. Also if the forest is not held as a business and landowners take the standard deduction on their federal income taxes rather than itemize, taking depreciation deductions disappears as an option. Another 38 percent say the benefit is too small to bother with taking the time to establish a depreciation schedule. Such situations could exist when capital investments in depreciable assets are small or when

landowners hold the property as an investment and are faced with the 2 percent of AGI limitation.

Fifty-two percent find that the section 179 deduction is not applicable to their situation. When landowners fail to make investments in depreciable property that is used in a business, the section 179 deduction is unapplicable to their situation. Therefore, it cannot be used to accelerate the depreciation of property held as an investment. An estimated 18 percent who know about the section 179 deduction but who fail to use it feel the benefit from using the provision is not worth the effort. This could be the case when investment capital in depreciable property is extremely small.

Table 9-3. Estimated proportion of Tree Farm members who are aware of the provisions but fail to use them.

	Deduction of		Depreciation deductions (%)	Section 179		Reforestation tax credit (%)	Amortization of	Exclusion of cost
	Capital gains (%)	management costs (%)		deduction (%)	Depletion (%)		reforestation costs (%)	share payments from gross income (%)
Too complicated to understand	07	07	03	05	13	09	05	05
Benefit too small to bother with	10	36	38	18	24	36	27	27
Not applicable to landowner situation	39	28	40	52	41	37	45	43
Landowner does not want to use it	03	04	01	04	03	02	06	11
Other	40	25	18	21	18	16	17	15

Forty-one percent of ATFS members who know about depletion but fail to use it say that it is unapplicable to their situation. Such could be the case if all reforestation

costs are recovered through amortization of reforestation costs or for landowners who do not sell timber. Finally, landowners may have no basis in timber due to natural regeneration in which no capital was invested. Another 24 percent feel the benefit is too small to bother with. This may or may not be true depending on the amount of basis invested in the timber.

An estimated 37 percent say the reforestation tax credit is not applicable to their situation. In cases where landowners do not invest capital in reforestation efforts, the reforestation tax credit does not apply. In addition, landowners may be holding forests not ready to be harvested and regenerated. In such cases the tax credit does not apply. Another 36 percent say the benefit is too small to bother with.

Forty-five percent of ATFS members who know about the amortization of reforestation costs but who fail to use this provision feel that it is not applicable to their situation. Landowners who have purchased or inherited tracts with timber already growing and who have not harvested and regenerated will not find the amortization of reforestation costs to be applicable. Another 27 percent say the benefit is too small to bother with.

An estimated 43 percent of ATFS members who know about the exclusion of cost-share payments from gross income say the provision is unapplicable to their situation. Landowners who do not receive cost-share payments will not find this provision to be applicable to their situation. Another 27 percent say the provision is too small to bother with.

Fifty-eight percent of ATFS members who know about the loss deduction provision but who fail to use it say it is unapplicable to their situation. This is reasonable,

since a casualty loss must occur in order to use the provision. Another 14 percent find the benefit from the provision too small to bother with. Such could be the case when the landowner incurs very small losses.

Use of a tax preparer

Caution must be used when interpreting numbers concerning awareness, use, and lack of use. Survey results show that 76 percent of Tree Farmers use tax professionals to prepare their tax returns. If the tax professionals are well versed in dealing with timber income, some landowners may have the benefit of favorable tax provisions for which they are unaware.

Demographics

Results of the demographic portion of the survey are reported in Tables 9-4 through 9-10. Demographic data were gathered for several reasons. One of the major reasons was an attempt to find reasons why (or why not) a landowner knows about and uses the favorable tax provisions.

Reasons for Ownership

Tree Farmers participating in the survey were asked to choose their primary reason for forestland ownership. The resulting data were compiled to estimate population-wide proportions of landowners by reason of ownership. Choices given to the landowners in terms of reason for ownership are included in Table 9-4. Thirty-five percent of Tree Farmers are estimated to hold their forestland for timber production (the

most common reason listed). Another estimated 12 percent hold their forestland as a land investment. As a result of these categories, 47 percent of Tree Farmers hold their timberland with some form of profit motive (given that timber production is with a profit motive). Eighteen percent hold their forestland as part of their farm, 11 percent for esthetic enjoyment, 8 percent as part of their residence and 8 percent for recreation purposes. Overall, the survey participants appear to be a profit motivated group.

Table 9-4. Reasons Tree Farmers give for timberland ownership.

Reasons for ownership	Percent (%)
Provide products for home and farm	02
Part of landowner residence	08
Esthetic enjoyment	11
Part of farm	18
Recreation	08
Timber production	35
Land investment	12
Other	06

Harvesting attitudes

Survey participants were asked if they had harvested timber in the past, and if they intended to harvest timber in the future. Responses were used to estimate the general attitudes among Tree Farmers about timber harvesting (Table 9-5). The Tree Farm System predictably has very positive attitudes about timber harvesting. An

estimated 81 percent of Tree Farmers have harvested timber in the past, and another 77 percent plan to harvest in the future while 16 percent remain undecided about future harvests. Only 7 percent plan no timber harvesting in the future (Table 9-5).

Table 9-5. Harvesting behavior of Tree Farmers.

Category	Percent (%)
Have harvested timber in the past	81
Have not harvested timber in the past	19
Plan to harvest timber in the future	77
Do not plan to harvest timber in the future	07
Undecided	16

Parcel size

Survey respondents were asked the size of their forestland parcel or parcels. Respondents were given ranges that they could select in the questionnaire to represent the parcel size they owned. These parcel size categories are listed in Table 9-6. The data were then used to estimate the population distribution of ownership size. Most Tree Farmers own parcels in size from 20 acres to 499 acres (77 percent). Fifty percent own parcels of 100 acres or more. Birch (1996) stated that tracts in size of 100 acres or more facilitate effective forest management. Logically, owners of these larger tracts have a much better chance of qualifying as active business owners in order to apply all nine tax provisions to their forest holding without constraints. An estimated thirty-one percent own 200 or more acres, and 15 percent own more than 500 acres. The distribution of Tree Farmers by parcel size is shown in Figure 9-1.

Table 9-6. Estimated percentage of owners by parcel size.

Parcel size (Acres)	Percent of tree farmers (%)
1-9	01
10-19	08
20-49	20
50-99	22
100-199	19
200-499	16
500-999	07
1,000-4,999	07
5,000+	01
Total	100

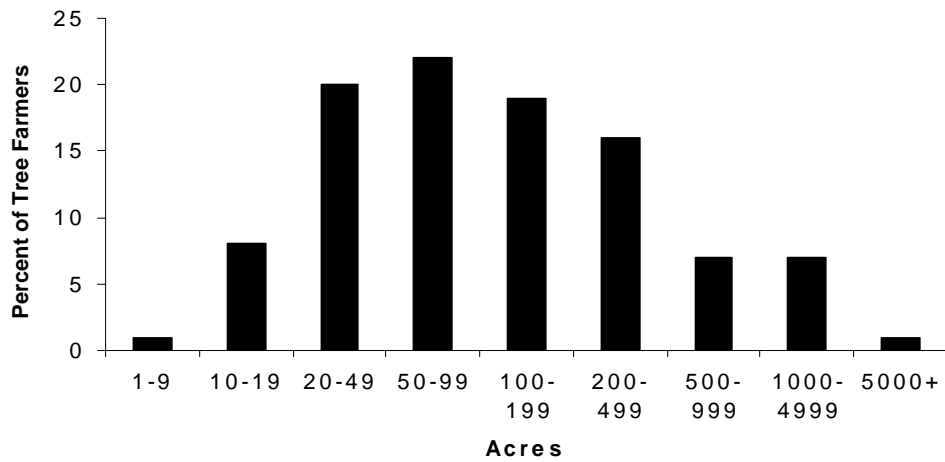


Figure 9-1. Estimated distribution of Tree Farmers by ownership parcel size.

An estimated fifty percent of tree farmers own 99 acres or fewer, and twenty-nine percent own fewer than 50 acres.

Distance of ownership from residence

Forty-four percent of Tree Farmers own forestland as part of their resident. Fifty-nine percent live within five miles of their ownership. Twenty-seven percent live more than twenty-five miles from their ownerships, and 22 percent live fifty or more miles away from their ownerships.

Table 9-7. Estimated proportions of Tree Farm members by distance from residence to nearest forest ownership.

Distance to forest ownership (Miles)	Percent of respondents (%)
Part of residence	44
< 1	07
2-5	08
6-15	10
16-25	04
26-50	05
50 +	22
Total	100

Education

Estimates from survey data show that Tree Farmers are highly educated (Table 9-8). Sixty-four percent have a college degree or higher level of education. Thirty-seven percent either have some graduate education or a graduate degree. Twenty-eight percent have a graduate degree. Only 18 percent are estimated to have a high school diploma or lower level of education. Given the higher levels of education for Tree Farmers, the survey results showing the low awareness among Tree Farmers are surprising.

Table 9-8. Estimated education levels of Tree Farmers.

<u>Level of education</u>	<u>Percent of respondents (%)</u>
Elementary	01
High school or equivalent	17
Some college	18
College degree	27
Some graduate work	09
Graduate degree	28
Total	100

The distribution of Tree Farmers by educational level is shown in Figure 9-2.

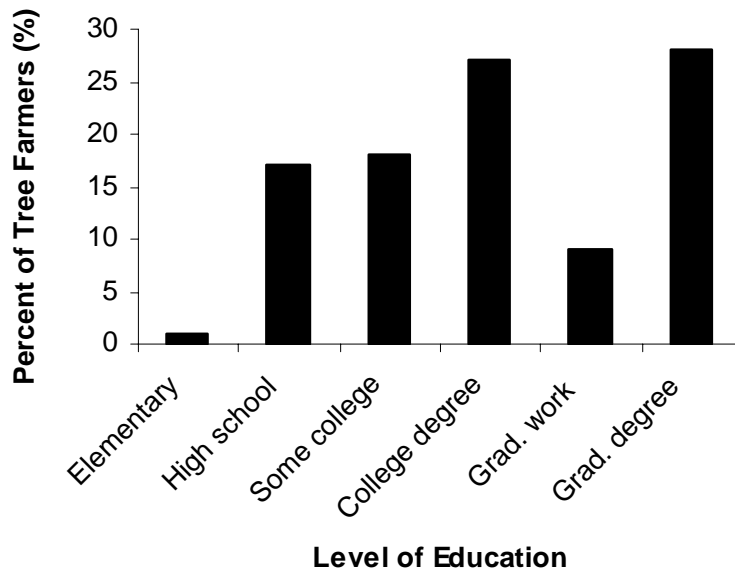


Figure 9-2. Distribution of Tree Farmers by level of education.

Occupation

Survey data were also gathered about participant occupation. Estimates concerning occupation are reported in Table 9-9. Forty-eight percent of Tree Farmers are retired. Another 31 percent consider themselves to be professional white-collar workers, whereas only 6 percent of Tree Farmers consider themselves to be blue-collar workers. Finally, only 9 percent are farmers.

Miscellaneous

Information concerning landowner age and forestland acquisition date are included in Table 9-10. Average Tree Farmer age is 64 years which is very close to that estimated by Birch (1994). The average year of acquisition is 1974, with 44 percent

having acquired their forestland holdings since 1978. This latter estimate is also very close to that of Birch (1994).

Table 9-9. Estimated occupational allocation of Tree Farm members.

Occupation	Percent of Respondents (%)
Blue collar	06
White collar	31
Farmer	09
Homemaker	01
Retired	48
Other	05
Total	100

Table 9-10. Estimated miscellaneous member characteristics.

Category	Value
Average landowner age	64 years
Average year of acquisition	1974
<i>95% Confidence interval</i>	<i>+/- 3 years</i>
Proportion that has acquired land since 1978	44%
<i>95% Confidence interval</i>	<i>+/- 3%</i>

Chapter 10

Results of the American Tree Farm System Mail Survey - Southern Region

The survey results for the Southern Region ATFS member participants are reported in Chapter 10. Information concerning survey response rates is reported in Appendix C. Population proportions (all tables) and means (Table 10-11 only) concerning awareness and use of tax provisions were calculated using data gathered from the restricted random sample of Tree Farmers taken in the Southern Region. The Southern Region is identical to that identified by Birch (1994), and the states comprising this region are listed in Table 10-1.

Table 10-1. States comprising the Southern Region.*

Texas	Oklahoma
Arkansas	Louisiana
Kentucky	Tennessee
Mississippi	Alabama
Florida	Georgia
South Carolina	North Carolina
Virginia	

* Source: Birch 1996

The following formulas for population proportion, population mean and respective confidence intervals were used to calculate the values in Tables 9-1 through 9-10:

Estimation of a population proportion for simple random sampling (Sincich 1996).

Point estimator:

$$\hat{\pi} = p = \frac{x}{n}$$

Approximate 95% confidence interval:

$$p \pm 1.96 \sqrt{\frac{p(1-p)}{n}} \sqrt{\frac{N-n}{N}}$$

Where:

- x = Number of sampling units possessing a specific attribute
- n = Number of sampling units in the sample
- N = Number of sampling units in the population
- $\hat{\pi}$ = Estimate of a population proportion

Estimation of a population mean for simple random sampling (Sincich 1996)

Point estimator:

$$\hat{\mu} = \bar{x} = \frac{\sum x}{n}$$

Approximate 95% confidence interval:

$$\bar{x} \pm 1.96 \frac{s}{\sqrt{n}} \sqrt{\frac{N-n}{N}}$$

Where: $s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$

n = Number of sampling units in the sample

N = Number of sampling units in the population

$\hat{\mu}$ = Estimate of a population mean.

Southern Region results

Landowner Awareness of Favorable Tax Provisions

A summary of the awareness and use of the nine income tax provisions is reported in Table 10-2. Estimated levels of awareness range from 64 percent for the deduction of management costs to 29 percent for exclusion of cost-share payments from gross income. Although no level of awareness among forest landowners is considered high or adequate for the Southern Region, levels of awareness for each of the nine provisions are higher than for national awareness values. Based on this study, the provisions to which LEV is most sensitive are capital gains (60 percent), deduction of management costs (64 percent), depletion (48 percent), and amortization of reforestation costs (38 percent) (Table 10-2).

Table 10-2. South-wide awareness of American Tree Farm members of tax provisions that facilitate forest management.

Awareness	Deduction of					Amortization of		Exclusion of cost-share payments (%)	Loss deductions (%)
	Capital gains (%)	management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	reforestation costs (%)		
<i>Aware of the provision</i>	60	64	59	34	48	42	38	29	40
<i>95% confidence interval</i>	05	05	05	05	05	05	05	05	05

The importance of depreciation as well as the Section 179 deduction varies depending on the amount of capital invested in depreciable assets. The reforestation tax credit has a small effect on LEV but provides substantial income to landowners in the year of reforestation. Exclusion of cost-share payments also has a small effect on LEV and can only be used when cost-share payments are received. Finally, sensitivity of LEV to loss deductions varies depending on the amount and severity of damage incurred (if any) during a rotation. Reasons for low levels of awareness are discussed in the Demographics section of this chapter and in Chapter 13.

Landowner Use of Favorable Tax Provisions

Although a Tree Farmer may be aware of a favorable tax provision, it does not necessarily presuppose that s/he has used the provision. For example, a landowner who is aware of capital gains treatment, but who has never sold timber will never have used the provision. A summary of the use levels among those that *are* aware of the provisions is included in Table 10-3.

Use of the provisions by those aware of their existence is substantial. Deduction of management costs and capital gains both had the highest use rate (78 percent) while deduction of losses had the lowest (26 percent). However, use of the loss deduction provision mandates a casualty loss of some kind on the ground. As a result, use of such a provision is understandably low since eligibility to elect this provision is sporadic at best. Section 179 had the second lowest use rate of 45 percent, which again is understandable. Use of the Section 179 deduction requires the purchase of depreciable, tangible personal property. Such purchases probably vary dramatically by frequency and value. The results in Table 10-3 seem to indicate that if more landowners were aware of these nine provisions more would use them. For example, Southern Region awareness among Tree Farmers of amortization of reforestation costs is 38 percent; however, 77 percent

Table 10-3. Estimated level of use of favorable tax provisions by southern Tree Farm members who are aware of them.

	Deduction of Capital gains (%)	Deduction of management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	Amortization of reforestation costs (%)	Exclusion of cost-share payments (%)	Loss deductions (%)
<i>Have used the provision</i>	78	78	67	45	60	77	77	59	26
<i>95% Confidence interval</i>	06	05	06	09	08	07	07	10	07

of this proportion have amortized reforestation costs in the past. Another example of relatively high use compared to awareness would be the election to exclude cost-share payments from gross income. The South-wide awareness among Tree Farmers is 29 percent; however, 59 percent of that number have used the provision. Excluding the loss

deductions, all provisions show a high level of use compared to their respective levels of awareness. Such results indicate that more effort could beneficially be made to inform landowners of the tax provisions available to them. Although one could argue that the levels of awareness are low because many landowners are not interested in harvesting their timber or managing their forests for income, it is possible that landowners may change ownership objectives when informed of the tax benefits available to them.

Lack of Use

Specific reasons for knowing about a favorable tax provision but not using it are numerous; however, a list of presumed major reasons is shown in Table 10-4.

Table 10-4. Estimated proportion of Tree Farm members who are aware of the provisions but fail to use them.

	Deduction of		Depreciation deductions (%)	Section 179		Reforestation tax credit (%)	Amortization of reforestation costs (%)	Exclusion of cost-share payments (%)	Loss deductions (%)
	Capital gains (%)	management costs (%)		deduction (%)	Depletion (%)				
Too complicated to understand	07	09	03	03	09	14	11	08	08
Benefit too small to bother with	02	36	35	16	19	39	19	30	14
Not applicable to landowner situation	42	27	44	57	53	29	52	46	56
Landowner does not want to use it	05	02	n/a	05	02	n/a	07	11	02
Other	44	27	17	19	17	18	11	05	20

The estimated proportions of Tree Farmers who are aware of the provisions but who fail to use them are reported by reason in Table 10-4. The number one reason for failing to use the capital gains provision (44 percent) unfortunately fell into the “other” category, and little can be said about reasons for lack of use without speculation. However, an estimated 42 percent of Tree Farmers in the South failed to use the capital gain provision because it was not applicable to their situation. For example, the landowner may never have sold the timber or may have bought and sold timber before holding it for one year. Landowners who sell timber at a loss also would have a capital loss rather than a capital gain.

In terms of deducting management costs, an estimated 36 percent of Tree Farmers reported that the benefit is too small to bother with. Another 27 percent say that the provision is not applicable to their situation. One suggestion for the reason that the provision is unapplicable to their situation is that these landowners hold their forestry operation for other than active business purposes.

An estimated 44 percent of Tree Farmers do not find depreciating assets to be applicable to their situation. In cases where landowners own land with no depreciable assets, it is not an option. Also if the forest is not held as a business and landowners take the standard deduction on their federal income taxes rather than itemize, taking depreciation disappears as an option. Another 35 percent say the benefit is too small to bother with taking the time to establish a depreciation schedule. Such situations could exist when capital investment in depreciable assets is small or when landowners hold the property as an investment and are faced with the 2 percent of AGI limitation.

Fifty-seven percent of landowners said that the section 179 deduction is not applicable to their situation. Landowners who fail to invest in depreciable assets will find both the option to depreciate and the section 179 deduction to be of little value. Another 16 percent said the benefit from the provision was too small to bother with.

Fifty-three percent of Tree Farmers in the South said that depletion was not applicable to their situation. The most likely reason for the provision not applying to their situation is that the landowners have never sold timber, have sold timber but never established a basis, or plan to sell timber but are waiting for timber to mature. Thirty-nine percent of the Tree Farmers who knew about the reforestation tax credit but failed to use it said the benefit was too small to bother with. Unless, landowners made extremely small investments in reforestation efforts, it is difficult to believe that use of the benefit is not profitable. This high percentage may indicate that some landowners do not understand the benefit associated with the reforestation tax credit and so do not pursue it. Another, 29 percent said that the provision was not applicable to their situation, and 14 percent said the provision was too complicated to understand.

Fifty-two percent of respondents who knew about the amortization of reforestation costs but failed to use the provisions said that amortization of reforestation costs was not applicable to their situation. Another 19 percent said the benefit was too small to bother with. Eleven percent found using the provision too difficult to understand.

Forty-six percent of respondents who know about the exclusion of cost-share payments but who failed to use them reported that the provision was not applicable to their situation. Landowners who do not receive cost-share payments obviously cannot

exclude them from gross income. Thirty percent said the provision is too small to bother with. Obviously the more the value of the cost-share payment received and the higher the tax bracket of the landowner, the more valuable the benefit of excluding cost-share payments from gross income.

Fifty-six percent of landowners said that the loss deduction provision was unapplicable to their situation. It is possible that these landowners have incurred little damage to their timber. Fourteen percent said the benefit from the provision was too small to bother with. If a loss is small in terms of value, it is possible that the cost of hiring a forester to negotiate a sale and to determine the amount of loss is higher than the tax savings from using the provision in some situations.

Use of a tax preparer

Caution must be used when interpreting numbers concerning awareness, use, and lack of use. Survey results show that 80 percent of southern Tree Farmers use tax professionals to prepare their tax returns. If the tax professionals are well versed in dealing with timber income, some landowners may have the benefit of favorable provisions for which they are unaware.

Demographics

Results of the demographic portion of the survey are reported in Tables 10-5 through 10-11. Demographic data were gathered for several reasons. One of the major reasons was to attempt to find reasons why (or why not) a landowner knows about and uses the favorable tax provisions.

Reasons for Ownership

Tree Farmers participating in the survey were asked to choose their primary reason for forestland ownership. The resulting data were compiled to estimate South-wide population proportions of landowners by reason of ownership. Choices given to the landowners in terms of reason for ownership are included in Table 10-5. Forty-nine percent of Tree Farmers are estimated to hold their forestland for timber production (the most common reason listed) compared to 16 percent in the North and 40 percent in the West. Another estimated 15 percent hold their forestland as a land investment.

Table 10-5. Reasons Tree Farmers in the South give for timberland ownership.

<u>Category</u>	<u>Percent (%)</u>
Provide products for home and farm	01
Part of landowner residence	05
Esthetic enjoyment	05
Part of farm	16
Recreation	04
Timber production	49
Land investment	15
Other	05

As a result of these two categories, 64 percent of Tree Farmers in the South hold their timberland with some form of profit motive (given that timber production is with a profit motive) compared to 25 percent in the North and 49 percent in the West. Sixteen percent

hold their forestland as part of their farm, 5 percent for esthetic enjoyment, 5 percent as part of their residence, and 4 percent for recreation purposes. Overall, the survey participants appear to be a profit motivated group.

Harvesting attitudes

Survey participants were asked if they had harvested timber in the past, and if they intended to harvest timber in the future. Responses were used to estimate the general attitudes among Tree Farmers about timber harvesting (Table 10-6).

Table 10-6. Harvesting behavior and attitudes in the South.

<u>Category</u>	<u>Percent (%)</u>
Have harvested timber in the past	85
Have not harvested timber in the past	15
Plan to harvest timber in the future	82
Do not plan to harvest timber in the future	06
Undecided	12

Tree Farmers in the South predictably have very positive attitudes about timber harvesting. An estimated 85 percent of Tree Farmers have harvested timber in the past, and another 82 percent plan to harvest in the future while 12 percent remain undecided about future harvests. Only 6 percent plan no future timber harvest (Table 10-6).

Parcel size

Survey respondents were asked the size of their forestland parcel or parcels. Respondents were given ranges that they could select in the questionnaire to represent the parcel size they owned. These parcel size categories are listed in Table 10-7. The data were then used to estimate the population distribution of ownership size. Most Tree Farmers own parcels in size from 20 acres to 499 acres (71 percent). Sixty-one percent own parcels of 100 acres or more compared to 37 percent in the North and 48 percent in the West. Birch (1996) stated that tracts in size of 100 acres or more facilitate effective forest management. Logically, owners of these larger tracts have a much better chance of qualifying as active business owners in order to apply all nine tax provisions to their forest holding without constraints.

Table 10-7. Parcel size allocation in the South.

<u>Parcel size (Acres)</u>	<u>Percent of respondents</u>
1-9	01
10-19	04
20-49	13
50-99	20
100-199	19
200-499	19
500-999	09
1,000-4,999	12
5,000+	<u>02</u>
Total	100

An estimated 42 percent own 200 or more acres compared to 17 percent in the North and 32 percent in the West, and 23 percent own more than 500 acres compared with 6 percent in the North and 14 percent in the West. The distribution of Tree Farmers by parcel size is shown in Figure 10-1. An estimated 38 percent of tree farmers own 99 acres or fewer, and eighteen percent own fewer than 50 acres. Smaller tracts are more likely held as an investment or passive activity due to the smaller amounts of time required managing them. However, this is a general rule of thumb and not always the case.

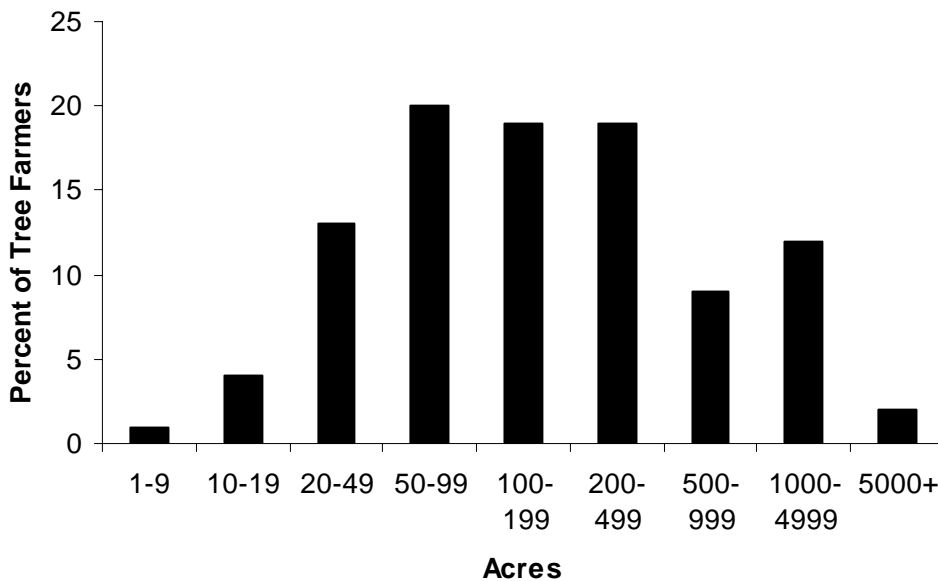


Figure 10-1. Estimated distribution of Tree Farmers by ownership parcel size.

Distance of ownership from residence

Thirty-eight percent of Tree Farmers own forestland as part of their resident (Table 10-8). Fifty-three percent live within five miles of their ownership. Thirty-one percent live more than twenty-five miles from their ownerships, and 25 percent live fifty or more miles away from their ownerships. Results show that significant portions of Southern Tree Farmers are absentee landowners.

Table 10-8. Distance from residence to nearest forestland ownership.

Distance to forest ownership (Miles)	Percent of respondents
Part of residence	38
< 1	08
2-5	07
6-15	12
16-25	04
26-50	06
50 +	25
Total	100

Education

Estimates from survey data show that southern Tree Farmers are highly educated (Table 10-9). The distribution of Tree Farmers by educational level is shown in Figure 10-2.

Sixty-five percent have a college degree or higher level of education compared to 62 percent in the North and 71 percent in the West.

Table 10-9. Estimated education levels of Tree Farmers in the South.

Level of education	Percent of respondents (%)
Elementary	01
High school or equivalent	17
Some college	17
College degree	28
Some graduate work	09
Graduate degree	28
Total	100

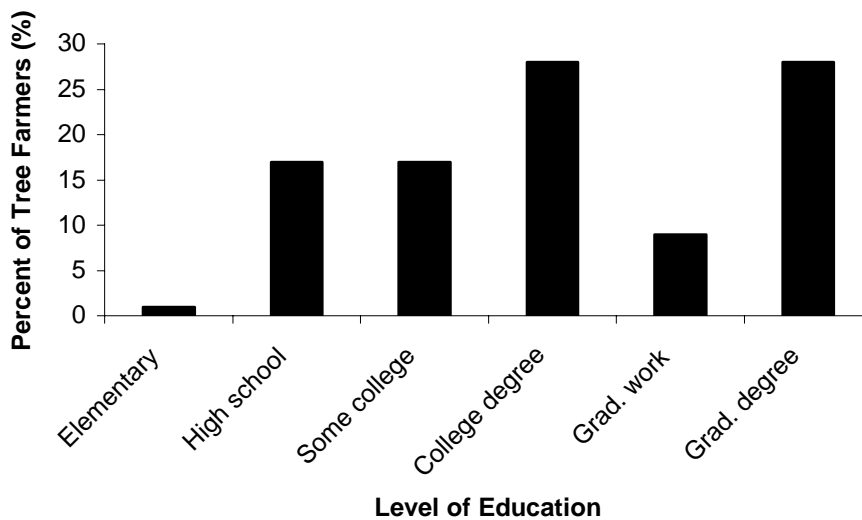


Figure 10-2. Distribution of Tree Farmers by level of education.

Thirty-seven percent either have some graduate education or a graduate degree compared to 35 percent in the North and 47 percent in the West. Twenty-eight percent have a graduate degree compared to 27 percent in the north and 32 percent in the West. Only 18 percent are estimated to have a high school diploma or lower level of education. Given the higher levels of education for Tree Farmers and the high level of forest management in the South, the survey results showing the low awareness among Tree Farmers are surprising.

Occupation

Survey data were also gathered about participant occupation. Estimates concerning occupation are reported in Table 10-10. Fifty percent of southern respondents are retired compared to 47 percent in the North and 45 percent in the West.

Table 10-10. Estimated occupational allocation of Tree Farmers in the South.

Occupation	Percent of respondents (%)
Blue collar	03
White collar	30
Farmer	08
Homemaker	02
Retired	50
Other	06
Total	100

Another 30 percent consider themselves to be professional or white-collar workers, whereas only 3 percent of Tree Farmers consider themselves to be blue-collar workers. Finally, continuing a long time trend, only 8 percent are farmers.

Miscellaneous

Information concerning landowner age and forestland acquisition date is included in Table 10-11. Average Tree Farmer age is 66 years compared to 62 in the North and 64 in the West. This estimate is very close to the estimate of 60 years made by Birch (1996). The average year of acquisition is 1972, with 40 percent having acquired their forestland holdings since 1978. This latter estimate is also very close to the 40 percent estimated by Birch (1994).

Table 10-11. Estimated miscellaneous Tree Farm member characteristics (Southern Region).

Category	Value
Average landowner age	66
<i>95% Confidence interval</i>	1 year
Average year of acquisition	1972
<i>95% Confidence interval</i>	2 years
Proportion that has acquired land since 1978	40%
<i>95% Confidence interval</i>	5%

Chapter 11

Results of the American Tree Farm System Mail Survey - Northern Region

The survey results of the Northern Region ATFS member participants are summarized in Chapter 11. Information concerning survey response rates is reported in Appendix C. Population proportions (all tables) and means (Table 11-11 only) concerning awareness and use of tax provisions were calculated using data gathered from the restricted random sample of Tree Farmers taken in the Northern Region. The Northern Region is identical to that identified by Birch (1996), and the states comprising this region are listed in Table 11-1.

Table 11-1. States comprising the Northern Region.*

Minnesota	Wisconsin	Michigan
Iowa	Missouri	Illinois
Indiana	Ohio	West Virginia
Maryland	Delaware	Pennsylvania
New Jersey	New York	Rhode Island
Massachusetts	Connecticut	Vermont
New Hampshire	Maine	

* Source: Birch (1996)

The following formulas for population proportion, population mean, and respective confidence intervals were used to calculate the values in Tables 11-2 through 11-11:

Estimation of a population proportion for simple random sampling (Sincich 1996).

Point estimator:

$$\hat{\pi} = p = \frac{x}{n}$$

Approximate 95% confidence interval:

$$p \pm 1.96 \sqrt{\frac{p(1-p)}{n}} \sqrt{\frac{N-n}{N}}$$

Where:

- x = Number of sampling units possessing a specific attribute
- n = Number of sampling units in the sample
- N = Number of sampling units in the population
- $\hat{\pi}$ = Estimate of a population proportion

Estimation of a population mean for simple random sampling (Sincich 1996)

Point estimator:

$$\hat{\mu} = \bar{x} = \frac{\sum x}{n}$$

Approximate 95% confidence interval:

$$\bar{x} \pm 1.96 \frac{s}{\sqrt{n}} \sqrt{\frac{N-n}{N}}$$

Where:

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$$

n = Number of sampling units in the sample

N = Number of sampling units in the population

$\hat{\mu}$ = Estimate of a population mean.

Northern Region results

Landowner Awareness of Favorable Tax Provisions

A summary of the awareness and use of the nine income tax provisions is reported in Table 11-2. Estimated levels of awareness range from 55 percent for the deduction of management costs to 17 percent for amortization of reforestation costs.

Table 11-2. North wide estimated awareness of American Tree Farm members of tax provisions available to make forest management more cost effective.

Awareness	Deduction			Amortization					
	Capital gains (%)	Deduction of management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	Amortization of reforestation costs (%)	Exclusion of cost-share payments (%)	Loss deductions (%)
<i>Aware of the provision</i>	39	55	52	26	34	20	17	18	26
<i>95% Confidence interval</i>	05	05	05	04	05	04	04	04	04

Awareness of all nine provisions is considered low in the Northern Region. In addition, the levels of awareness for each provision in the Northern Region are less than the nationwide levels of awareness for each provision. Based on this study, the provisions to which LEV is most sensitive are capital gains (39 percent), deduction of management

costs (55 percent), depletion (34 percent), and amortization of reforestation costs (17 percent) (Table 11-2).

The importance of depreciation as well as the section 179 deduction (26 percent) varies depending on the amount of capital invested in depreciable assets. The reforestation tax credit (20 percent) has a small effect on LEV but provides substantial income to landowners in the year of reforestation. Exclusion of cost-share payments (18 percent) also has a small effect on LEV and can only be used when cost-share payments are received. Finally, sensitivity of LEV to loss deductions (26 percent) varies depending on the amount and severity of damage incurred (if any) during a rotation. Possible reasons for low levels of awareness are discussed in the demographics section below.

Landowner Use of Favorable Tax Provisions

Although a Tree Farmer may be aware of a favorable tax provision, it does not necessarily presuppose that s/he has used the provision. For example, a landowner who is aware of capital gains treatment but who has never sold timber will never have used the provision. A summary of the use levels among those that *are* aware of the provisions is included in Table 11-3.

Use of the provisions by those aware of their existence is substantial, but use levels for all nine provisions are lower than use levels for the same provisions in the South. Deduction of management costs and capital gains had the highest use rates of 69 percent and 58 percent respectively while deduction of losses had the lowest (14 percent). However, use of the loss deduction provision mandates a casualty loss of some kind on the ground. As a result, use of such a provision is understandably low since eligibility to

elect this provision is sporadic at best. Amortization of reforestation costs had the second lowest use rate of 23 percent. The low usage rate of amortization of reforestation costs indicates that landowners may need to be made more aware of the benefits of this provision. The results in Table 11-3 seem to indicate that if more landowners were aware of these nine provisions more would use them. For example, Northern Region awareness among Tree Farmers of the exclusion of cost-share payments from gross income provision is 18 percent. However, 47 percent of this proportion have used it.

Table 11-3. Estimated level of use of favorable tax provisions by Northern Tree Farm members that *are* aware of them.

	Deduction of				Amortization of			Exclusion of	Loss
	Capital gains (%)	management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	reforestation costs (%)	cost-share payments	deductions (%)
<i>Have used the provision</i>	58	69	56	33	40	28	23	47	14
<i>95% Confidence interval</i>	08	06	07	09	08	10	10	12	07

Another example of relatively high use compared to awareness would be the election to treat timber income as a capital gain. North-wide awareness among Tree Farmers is 39 percent. However, 58 percent of that number have used the provision. Excluding the loss deduction provision, all provisions show a high level of use compared to their respective levels of awareness. Such results indicate that more effort could beneficially be made to inform landowners of the tax provisions available to them. Although one could argue that the levels of awareness are low because many landowners are not interested in harvesting their timber or managing their forests for income, it is possible that some

landowners may change ownership objectives when informed of the tax benefits available to them.

Lack of Use

Specific reasons for knowing about a provision but not using it are numerous; however, a list of presumed major reasons is shown in Table 11-4.

Table 11-4. Reasons among northern Tree Farm members for not using the federal income tax provisions.

	Deduction				Amortization				
	Capital	of	Depreciation	Section 179	Depletion	Reforestation	of	Exclusion of	Loss
	gains (%)	management	deductions	deduction (%)	(%)	tax	reforestation	cost-share	deductions (%)
		costs (%)	(%)			credit (%)	costs (%)	payments (%)	
Too complicated to understand	08	06	04	08	17	04	n/a	03	03
Benefit too small to bother with	19	38	43	20	29	35	39	23	15
Not applicable to landowner situation	34	27	28	44	24	38	31	39	60
Landowner does not want to use it	02	03	03	03	05	06	04	13	03
Other	38	26	21	26	24	17	27	23	20

Also reported in this table are the estimated proportions by reason of Tree Farmers in the North who are aware of the provisions but who fail to use them. The number one reason for failing to use the capital gains provision (38 percent) unfortunately fell into the “other” category, and little can be said about reasons for lack of use without speculation.

However, an estimated 34 percent of Tree Farmers in the North failed to use the capital gain provisions because it was unapplicable to their situation. For example, the landowner may never have sold timber or may have bought and sold timberland before holding it for one year. Landowners who sale timber at a loss also would have a capital loss rather than a capital gain.

In terms of deducting management costs, an estimated 38 percent of Tree Farmers reported that the benefit is too small to bother with. Another 27 percent say that the provision is not applicable to their situation. One suggestion for the reason that the provision is unapplicable to their situation is that these landowners hold their forestry operation for other than active business purposes.

Forty-three percent of respondents in the North said the benefit from the depreciation provision is too small to bother with. Such situations could exist when capital investments in depreciable assets are small or when landowners hold the property as an investment and are faced with the 2 percent of AGI limitation. Twenty-eight percent of respondents reported depreciation to be unapplicable to their situation. In cases where landowners own land with no depreciable assets, it is not an option. Also if the forest is not held as a business and landowners take the standard deduction on their federal income taxes rather than itemize, taking depreciation deductions dissappears as an option.

Forty-four percent of landowners said that the section 179 deduction was unapplicable to their situation. Landowners who fail to invest in depreciable assets will find both the option to depreciate and the section 179 deduction to be of little value. Another 20 percent said the benefit from the provision was too small to bother with.

Twenty-nine percent of respondents reported the depletion provision as having a benefit too small to bother with. Unless basis in timber is extremely low, this argument is questionable since every dollar of basis depleted is recovered tax-free. Another 24 percent said that depletion was unapplicable to their situation. The most likely reason for the provision not applying to their situation is that the landowners have never sold timber, have sold timber but never established a basis, or plan to sale timber but are waiting for timber to mature. Another reason could be that the basis is extremely small as may be the case with natural reforestation methods. Another 17 percent said the provision was too complicated to understand.

Thirty-eight percent of respondents said the reforestation tax credit is unapplicable to their situation. This could be possible in cases where landowners may have purchased tracts with standing timber where thinnings or simply growth has taken place but not final harvest and subsequent regeneration has occurred. Another possibility is that landowners final harvested timber and then converted the land to another use. Thirty-five percent of the Tree Farmers who knew about the reforestation tax credit but failed to use it said the benefit was too small to bother with. Unless, landowners made extremely small investments in reforestation efforts, it is difficult to believe that the benefit is too small to bother with. This higher percentage may indicate that some landowners do not understand the benefits associated with the reforestation tax credit and so do not pursue it.

Thirty-nine percent of respondents reported the benefit from amortizing reforestation costs as too small to bother with. Thirty-one percent of respondents who knew about the amortization of reforestation costs but failed to use the provision reported

that amortization of reforestation costs was not applicable to their situation. Thirteen percent said they do not want to use it.

Thirty-nine percent of respondents who know about the exclusion of cost-share payments but who failed to use this provision reported that it was unapplicable to their situation. Landowners who do not receive cost-share payments obviously cannot exclude them from gross income. Twenty-three percent said the provision is too small to bother with. Obviously the more the value of the cost-share payment received and the higher the tax bracket of the landowner, the more valuable the benefit of excluding cost-share payments from gross income.

Sixty percent of landowners who knew about loss deductions but who failed to use them said that the loss deduction provision was unapplicable to their situation. It is possible that these landowners have incurred little damage to their timber. Fifteen percent said the benefit from the provision was too small to bother with. If a loss is small in terms of value, it is possible that the cost of hiring a forester to negotiate a sale and to determine the amount of loss is higher than the tax savings from using the provision in some situations. Another 20 percent gave other reasons for not using the provision (Table 11-4).

Use of a tax preparer

Caution must be used when interpreting numbers concerning awareness, use, and lack of use. Survey results show that 71 percent of northern Tree Farmers use tax professionals to prepare their tax returns. If the tax professionals are well versed in

dealing with timber income, some landowners may have the benefit of favorable provisions for which they are unaware.

Demographics

Results of the demographic portion of the survey are reported in Tables 11-5 through 11-11. Demographic data were gathered for several reasons. One of the major reasons was an attempt to find reasons why (or why not) a landowner knows about and uses the favorable tax provisions.

Reasons for Ownership

Tree Farmers participating in the survey were asked to choose their primary reason for forestland ownership. The resulting data were compiled to estimate North-wide population proportions of landowners by reason of ownership. Choices given to the landowners in terms of reason for ownership are included in Table 11-5. Based on survey results, Tree Farmers in the North are more evenly diversified in terms of reason of ownership than in the South. Whereas 44 percent of Tree Farmers in the South hold their land for timber production, only 16 percent of northern Tree Farmers hold their forestland for timber production purposes. This was also much lower than the 40 percent of western Tree Farmers who hold their land primarily for timber production. Another 9 percent said they held the forestland as a land investment. As a result of these two categories, 25 percent of Tree Farmers in the North hold their timberland with some form of profit motive (given that timber production is with a profit motive).

Table 11-5. Primary reasons northern Tree Farmers give for timberland ownership.

Category	Percent (%)
Provide products for home and farm	04
Part of landowner residence	11
Esthetic enjoyment	17
Part of farm	20
Recreation	16
Timber production	16
Land investment	09
Other	07
Total	100

This is much less than the 64 percent of landowners in the South and 49 percent in the West who hold forestland primarily with a profit motive. The largest proportion of northern Tree Farmers listed the primary reason for owning forestland as that it was simply part of their farm. Seventeen percent hold their forestland for esthetic enjoyment, 16 percent for recreation, and 11 percent as part of their residence. Overall, the survey participants appear to be very diversified in terms of ownership.

Harvesting attitudes

Survey participants were asked if they had harvested timber in the past and if they intended to harvest timber in the future. Responses were used to estimate the general attitudes among northern Tree Farmers about timber harvesting (Table 11-6).

Table 11-6. Harvesting behavior and attitudes in the North.

Category	Percent (%)
Have harvested timber in the past	75
Have not harvested timber in the past	24
Plan to harvest timber in the future	72
Do not plan to harvest timber in the future	07
Undecided	22

Although reasons for ownership are very diverse, Tree Farmers in the North have very positive attitudes about timber harvesting. An estimated 75 percent of Tree Farmers have harvested timber in the past, and another 72 percent plan to harvest in the future while 22 percent remain undecided about future harvests. Only 7 percent plan no future timber harvest (Table 11-6).

Parcel size

Survey respondents were asked the size of their forestland parcel or parcels. Respondents were given ranges they could select in the questionnaire to represent the parcel size they owned. These parcel size categories are listed in Table 11-7. The data were then used to estimate the population distribution of ownership size. Most Tree Farmers own parcels in size from 20 acres to 499 acres (84 percent). Thirty-seven percent own parcels of 100 acres or more. This is a much smaller proportion than

**Table 11-7. Northern Tree Farmers
by parcel size.**

Parcel size (Acres)	Percent of respondents
1-9	01
10-19	09
20-49	27
50-99	26
100-199	20
200-499	11
500-999	04
1,000-4,999	02
5,000+	<u>n/a</u>
Total	100

the 61 percent of Tree Farmers in the South and 48 percent in the West who own 100 are more acres. Birch (1996) stated that tracts in size of 100 acres or more facilitate effective forest management. Logically, owners of these larger tracts have a much better chance of qualifying as active business owners in order to apply all nine tax provisions to their forest holding without constraints. An estimated 17 percent own 200 or more acres compared with 42 percent in the South and 32 percent in the West, and only 6 percent own more than 500 acres compared to 23 percent in the South and 14 percent in the West. The distribution of Tree Farmers by parcel size is shown in Figure 11-1.

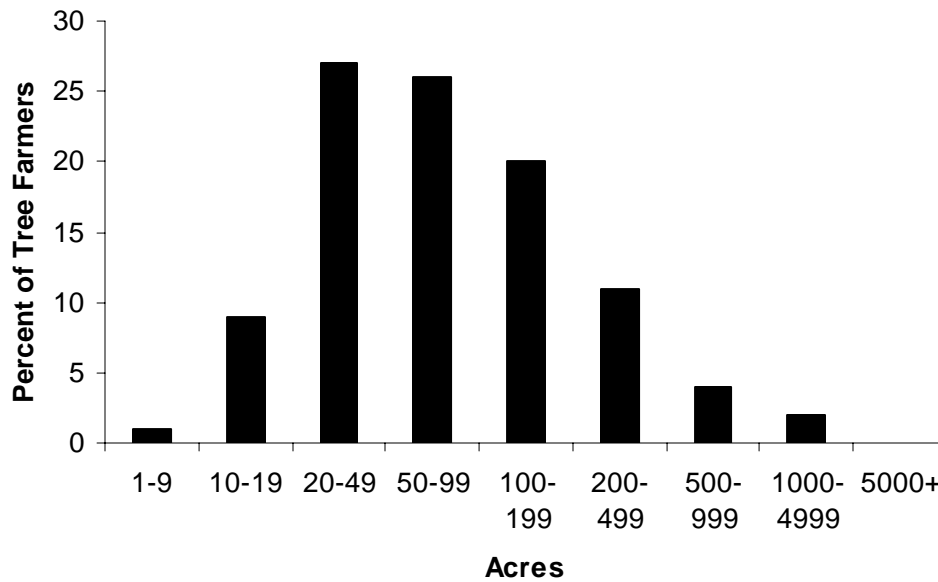


Figure 11-1. Estimated distribution of Tree Farmers by ownership parcel size.

An estimated 63 percent of tree farmers own 99 acres or fewer compared to 38 percent in the South and 52 percent in the West. Thirty-seven percent own fewer than 50 acres compared with 18 percent in the South and 38 percent in the West. Smaller tracts are more likely held as an investment or passive activity due to the smaller amounts of time required to manage them and infrequent harvesting activities. However, this is a general rule of thumb and not always the case. Overall, survey results indicate that owners in the North tend to own smaller parcels than those in the South.

Distance of ownership from residence

Fifty-three percent of Tree Farmers own forestland as part of their resident compared with 38 percent in the South (Table 10-8). Sixty-four percent live within five

miles of their ownership. Twenty-four percent live more than twenty-five miles from their ownerships, and 20 percent live fifty or more miles away from their ownerships.

Table 11-8. Distance from residence to nearest forest ownership.

Distance to forest ownership (Miles)	Percent of respondents (%)
Part of residence	53
< 1	05
2-5	06
6-15	08
16-25	04
26-50	04
50 +	20
Total	100

Results show that significant portions of northern Tree Farmers are absentee landowners.

Education

Estimates from survey data show that northern Tree Farmers are highly educated (Table 10-9). The distribution of Tree Farmers by educational level is shown in Figure 10-2. Sixty-two percent have a college degree or higher level of education as compared with 65 percent in the South and 71 percent in the West. Thirty-five percent either have some graduate education or a graduate degree compared to 37 percent in the South and 47 percent in the West. Twenty-seven percent have a graduate degree compared to 28

percent in the South and 32 percent in the West. Only 20 percent are estimated to have a high school diploma or lower level of education. Given the higher levels of education for northern Tree Farmers, the survey results showing the low awareness among Tree Farmers are surprising.

Table 11-9. Estimated education levels of northern Tree Farmers.

Level of education	Percent of respondents (%)
Elementary	01
High school or equivalent	19
Some college	19
College degree	27
Some graduate work	08
Graduate degree	27
Total	100

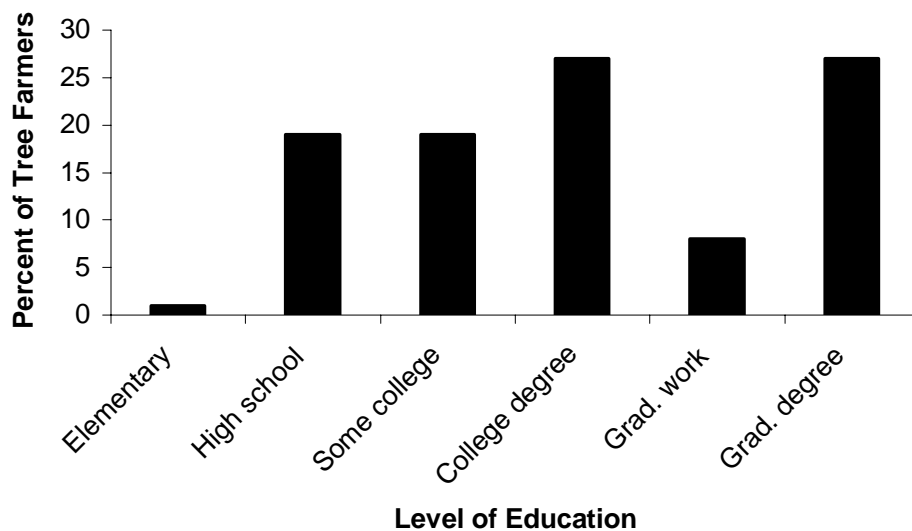


Figure 11-2. Distribution of Tree Farmers by level of education.

Occupation

Survey data were also gathered about participant occupation. Estimates concerning occupation are reported in Table 11-10.

Table 11-10. Occupations of northern Tree Farmers.

Occupation	Percent of respondents
Blue collar	10
White collar	32
Farmer	09
Homemaker	01
Retired	47
Other	02
Total	100

Forty-seven percent of northern respondents are retired compared to 50 percent in the South and 45 percent in the West. Another 32 percent consider themselves to be professional or white-collar workers compared to 30 percent in the South and 25 percent in the West. Ten percent of respondents consider themselves to be blue-collar workers compared to only 3 percent in the South and 5 percent in the West. Nine percent are farmers compared to 8 percent in the South and 16 percent in the West.

Miscellaneous

Information concerning landowner age and forestland acquisition date are included is included in Table 11-11. Average Tree Farmer age is 62 years compared to 66 in the South and 64 in the West. This estimate is very close to the 60 years estimated by Birch (1996).

**Table 11-11. Estimated miscellaneous
Tree Farmer characteristics.**

Category	Value
Average landowner age	62 years
<i>95% Confidence Interval</i>	1%
Average year of acquisition	1976
<i>95% Confidence Interval</i>	1 year
Proportion that has acquired land since 1978	48%
<i>95% Confidence Interval</i>	5%

Average year of acquisition is 1976 compared to 1972 in the South and 1973 in the West. Finally, 48 percent have acquired their forestland holdings since 1978 compared to 40 percent in the South and 45 percent in the West. This estimate is also very close to the 40 percent estimated by Birch (1996).

Chapter 12

Results of the American Tree Farm System Mail Survey - Western Region

The survey results for the Western Region ATFS participants are summarized in Chapter 12. Information concerning survey response rates is reported in Appendix C. Population proportions (all tables) and means (Table 12-11 only) concerning awareness and use of tax provisions were calculated using data gathered from the restricted random sample of Tree Farmers taken in the Western Region. The Western Region is identical to that identified by Birch (1996), and the states comprising this region are listed in Table 12-1.

Table 12-1. States comprising the Western Region.*

North Dakota	South Dakota	Nebraska
Kansas	Montana	Wyoming
Idaho	Nevada	Utah
Colorado	New Mexico	Arizona
Nevada	California	Oregon
Washington	Alaska	Hawaii

Source: Birch (1996).

The following formulas for population proportion, population mean, and respective confidence intervals were used to calculate the values in Tables 12-2 through 12-11:

Estimation of a population proportion for simple random sampling (Sincich 1996).

Point estimator:

$$\hat{\pi} = p = \frac{x}{n}$$

Approximate 95% confidence interval:

$$p \pm 1.96 \sqrt{\frac{p(1-p)}{n}} \sqrt{\frac{N-n}{N}}$$

Where:

- x = Number of sampling units possessing a specific attribute
- n = Number of sampling units in the sample
- N = Number of sampling units in the population
- $\hat{\pi}$ = Estimate of a population proportion

Estimation of a population mean for simple random sampling (Sincich 1996)

Point estimator:

$$\hat{\mu} = \bar{x} = \frac{\sum x}{n}$$

Approximate 95% confidence interval:

$$\bar{x} \pm 1.96 \frac{s}{\sqrt{n}} \sqrt{\frac{N-n}{N}}$$

Where: $s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$

- n = Number of sampling units in the sample
- N = Number of sampling units in the population
- $\hat{\mu}$ = Estimate of a population mean

Western Region results

Landowner Awareness of Favorable Tax Provisions

A summary of the awareness and use of the nine income tax provisions is reported in Table 12-2. Estimated levels of awareness range from 67 percent for the depreciation deductions to 29 percent for amortization of reforestation costs. Awareness of all nine provisions is considered low in the Western Region. However, the levels of awareness for each provision (except amortization) in the Western Region are higher than the nation-wide levels of awareness for each provision.

Table 12-2. Westwide estimated awareness by American Tree Farm members of tax provisions that make forest management more cost effective.

Awareness	Deduction			Section 179 deduction (%)	Depletion (%)	Amortization		Exclusion of cost-share payments (%)	Loss deductions (%)
	Capital gains (%)	of management costs (%)	Depreciation deductions (%)			Reforestation tax Credit (%)	of reforestation Costs (%)		
<i>Aware of the provision</i>	59	66	67	45	45	31	29	31	38
<i>95% Confidence interval</i>	10	10	10	10	10	10	09	10	10

Based on this study, the provisions to which LEV is most sensitive are capital gains (59 percent), deduction of management costs (66 percent), depletion (45 percent), and amortization of reforestation costs (29 percent) (Table 12-2). The importance of

depreciation (67 percent) as well as the Section 179 deduction (45 percent) varies depending on the amount of capital invested in depreciable assets. The reforestation tax credit (31 percent) has a small effect on LEV but provides substantial income to landowners in the year of reforestation. Exclusion of cost-share payments (31 percent) also has a small effect on LEV and can only be used when cost-share payments are received. Finally, sensitivity of LEV to loss deductions (38 percent) varies depending on the amount and severity of damage incurred (if any) during a rotation. Reasons for low levels of awareness are discussed in the demographics section below.

Landowner Use of Favorable Tax Provisions

Although a Tree Farmer may be aware of a favorable tax provision it does not necessarily presuppose that s/he has used the provision. For example, a landowner who is aware of capital gains treatment but who has never sold timber will never have used the provision. A summary of the use levels among those that *are* aware of the provisions is included in Table 12-3.

Use of the provisions by those aware of their existence is substantial. Except for loss deductions and exclusion of cost-share payments, all levels of use among those aware of the provisions in the West are higher than those in the North. The western Tree Farmers also had a higher use rate of the deduction of management costs, the section 179 deduction, and depletion provision than the South. Deduction of management costs and depletion had the highest use rates of 82 percent and 67 percent respectively while deduction of losses had the lowest (9 percent). However, use of the loss deduction provision mandates a casualty loss of some kind on the ground. As a result, use of such a

provision is understandably low since eligibility to elect this provision is sporadic at best. Exclusion of cost-share payments from gross income had the second lowest use rate (37 percent). Results in Table 12-3 seem to indicate that if more landowners were aware of these nine provisions more would use them.

Table 12-3. Estimated level of use of favorable tax provisions by Western Tree Farm members.

	Capital gains (%)	Deduction of management costs (%)	Depreciation deductions (%)	Section 179 deduction (%)	Depletion (%)	Reforestation tax credit (%)	Amortization of reforestation costs (%)	Exclusion of cost-share payments (%)	Loss deductions (%)
<i>Have used the provision</i>	63	82	66	65	67	56	44	37	09
<i>95% Confidence interval</i>	13	10	12	15	15	19	19	18	10

For example, Western Region awareness among Tree Farmers of the amortization of reforestation costs is 29 percent; however, 44 percent of that proportion of Tree Farmers have used it. Another example of relatively high use compared to awareness would be the use of the reforestation tax credit. Westwide awareness among Tree Farmers is 31 percent. However, 56 percent of this proportion have used the provision. Excluding loss deductions and depreciation, all provisions show a high level of use compared to their respective levels of awareness. Such results indicate that more effort could beneficially be made to inform landowners of the tax provisions available to them. Although one could argue that the levels of awareness are low because many landowners are not interested in harvesting their timber or managing their forests for income, it is possible

that landowners may change ownership objectives when informed of the tax benefits available to them.

Lack of Use

Specific reasons for knowing about a favorable tax provision but not using it are numerous; however, a list of presumed major reasons is shown in Table 12-4. Also reported in this table are the estimated proportions by reason of Tree Farmers in the West who are aware of the provisions but who fail to use them.

Table 12-4. Estimated proportions of Tree Farm members that are aware of the provisions but fail to use them.

	Deduction			Section	Depletion	Reforestation	Amortization	Exclusion of	Loss
	Capital	of	Depreciation	179		tax	of	cost-share	
	gains (%)	management	deductions	deduction (%)	(%)	credit (%)	reforestation	payments (%)	deductions (%)
		costs (%)	(%)				costs (%)		
Too complicated to understand	06	n/a	n/a	n/a	17	n/a	n/a	n/a	07
Benefit too small to bother with	17	30	28	25	25	27	17	29	14
Not applicable to landowner situation	50	40	67	58	58	73	75	43	61
Landowner does not want to use it	n/a	20	n/a	08	n/a	n/a	08	n/a	n/a
Other	28	10	06	08	n/a	n/a	n/a	29	18

Fifty percent of Tree Farmers in the West failed to use the capital gain provisions because it was not applicable to their situation. For example, the landowner may never have sold

timber or may have bought and sold timber before holding it for one year. Landowners who sell timber at a loss also would have a capital loss rather than a capital gain.

In terms of the deduction of management costs, forty percent reported that the provision is unapplicable to their situation. One suggestion for the reason that the provision is unapplicable to their situation is that these landowners hold their forestry operation for other than active trade or business purposes. Another 30 percent of Tree Farmers say that the benefit is too small to bother with, another possibility if costs are low or if the forestland is not held as an active trade or business.

Sixty-seven percent of respondents said that depreciation was unapplicable to their situation. In cases where landowners own land with no depreciable assets, it is not an option. Also if the forest is not held as a business and landowners take the standard deduction on their federal income taxes rather than itemize, taking depreciation deductions disappears as an option. Twenty-eight percent of respondents in the West said the benefit from the depreciation provision is too small to bother with. Such situations could exist when capital investments in depreciable assets is small or when landowners hold the property as an investment and are faced with the 2 percent of AGI limitation

Fifty-eight percent of landowners said that the Section 179 deduction was unapplicable to their situation. Landowners who fail to invest in depreciable assets will find both the option to depreciate and the section 179 deduction to be of little value. Another 28 percent said the benefit from the provision was too small to bother with.

Fifty-eight percent of respondents said that depletion was unapplicable to their situation. The most likely reason for the provision not applying to their situation is that the landowners have never sold timber, have sold timber but never established a basis, or

plan to sale timber but are waiting for timber to mature. Twenty-five percent of respondents reported the depletion provisions as having a benefit too small to bother with. Unless basis in timber is extremely low, this argument is questionable since every dollar of basis depleted is recovered tax-free. Another reason could be that the basis is extremely small as may be the case with natural reforestation methods. Another 17 percent said the provision was too complicated to understand.

Seventy-three percent of respondents said the reforestation tax credit is unapplicable to their situation. This could be possible in cases where landowners have purchased tracts with standing timber where thinnings or simply growth has taken place but no final harvest and subsequent regeneration has occurred. Another possibility is that landowners final harvested timber and then converted the land to another use. In cases of natural generation, the reforestation tax credit may or may not apply depending on if capital was invested in the process. Twenty-seven percent of the Tree Farmers who new about the reforestation tax credit but failed to use it said the benefit was too small to bother with. This higher percentage may indicate that some landowners do not understand the benefits associated with the reforestation tax credit and so do not pursue it.

Seventy-five percent of respondents who knew about the amortization of reforestation costs but failed to use the provision reported that amortization of reforestation costs was unapplicable to their situation. Seventeen percent of respondents reported the benefit from amortizing reforestation costs as too small to bother with. Eight percent said they do not want to use it.

Forty-three percent of respondents who know about the exclusion of cost-share payments but who failed to use this provision reported that it was unapplicable to their situation. Landowners who do not receive cost-share payments obviously cannot exclude them from gross income. Twenty-nine percent said the provision is too small to bother with. Obviously the more the value of the cost-share payment received and the higher the tax bracket of the landowner, the more valuable the benefit of excluding cost-share payments from gross income.

Sixty-one percent of landowners who knew about loss deductions but who failed to use them said that the loss deduction provision was unapplicable to their situation. It is possible that these landowners have incurred little damage to their timber. Fourteen percent said the benefit from the provision was too small to bother with. If a loss is small in terms of value, it is possible that the cost of hiring a forester to negotiate a sale and to determine the amount of loss is higher than the tax savings from using the provision in some situations. Another 18 percent gave other reasons for not using the provision (Table 12-4).

Use of a tax preparer

Caution must be used when interpreting numbers concerning awareness, use, and lack of use. Survey results show that 74 percent of western Tree Farmers use tax professionals to prepare their tax returns. If the tax professionals are well versed in dealing with timber income, some landowners may have the benefit of favorable provisions for which they are unaware.

Demographics

Results of the demographic portion of the survey are reported in Tables 12-5 through 12-11. Demographic data were gathered for several reasons. One of the major reasons was to attempt to find reasons why (or why not) a landowner knows about and uses the provisions.

Reasons for Ownership

Tree Farmers participating in the survey were asked to choose their primary reason for forestland ownership. The resulting data were compiled to estimate West-wide population proportions of landowners by reason of ownership. Choices given to the landowners in terms of reason for ownership are included in Table 12-5.

Table 12-5. Reasons western Tree Farmers give for timberland ownership.

Category	Percent (%)
Provide products for home and farm	01
Part of landowner residence	14
Esthetic enjoyment	15
Part of farm	10
Recreation	03
Timber production	40
Land investment	09
Other	08
Total	100

Based on survey results, Tree Farmers in the West place a similar emphasis on timber production as Tree Farmers in the South. Whereas 40 percent of Tree Farmers in the West hold their land for timber production, 49 percent of southern Tree Farmers hold their forestland for timber production purposes. Another 9 percent said they held the forestland as a land investment. As a result of these two categories, 49 percent of Tree Farmers in the West hold their timberland with some form of profit motive (given that timber production is with a profit motive). This is less than in the South (64 percent) but much higher than in the North (24 percent). The largest portion of western Tree Farmers listed timber production as their primary reason for owning forestland. Fifteen percent hold their forestland for esthetic enjoyment, 14 percent as a part of their residence, and 10 percent as part of their farm.

Harvesting attitudes

Survey participants were asked if they had harvested timber in the past and if they intended to harvest timber in the future. Responses were used to estimate the general attitudes among western Tree Farmers about timber harvesting (Table 12-6).

Table 12-6. Harvesting behavior and attitudes in the West.

<u>Category</u>	<u>Percent (%)</u>
Have harvested timber in the past	79
Have not harvested timber in the past	21
Plan to harvest timber in the future	74
Do not plan to harvest timber in the future	13
Undecided	13

Tree Farmers in the West have very positive attitudes about timber harvesting. An estimated 79 percent of Tree Farmers have harvested timber in the past, and another 74 percent plan to harvest in the future while 13 percent remain undecided about future harvests. Only 13 percent plan no future timber harvest (Table 12-6).

Parcel size

Survey respondents were asked the size of their forestland parcel or parcels. Respondents were given ranges they could select in the questionnaire to represent the parcel size they owned. These parcel size categories are listed in Table 12-7.

**Table 12-7. Western Tree Farmers
by parcel size.**

Parcel size (Acres)	Percent of respondents (%)
1-9	05
10-19	08
20-49	25
50-99	14
100-199	16
200-499	18
500-999	08
1,000-4,999	05
5,000+	01
Total	100

The data were then used to estimate the population distribution of ownership size. Most Tree Farmers own parcels in size from 20 acres to 499 acres (73 percent). Forty-eight percent own parcels of 100 acres or more. This is a smaller proportion than the 61 percent of Tree Farmers in the South who own 100 or more acres but more than 37 percent in the North. Birch (1996) stated that tracts in size of 100 acres or more facilitate effective forest management. Logically, owners of these larger tracts have a much better chance of qualifying as active business owners in order to apply all nine tax provisions to their forest holding without constraint. An estimated 32 percent own 200 or more acres compared with 42 percent in the South and 17 percent in the North, and 14 percent own more than 500 acres compared to 23 percent in the South and 6 percent in the North. The distribution of Tree Farmers by parcel size is shown in Figure 12-1. An estimated 52 percent of tree farmers own 99 acres or fewer compare with 38 percent in the South and 63 percent in the North. Thirty-eight percent own fewer than 50 acres compared with 18 percent in the South and 37 percent in the North. Smaller tracts are more likely held as an investment or passive activity due to the smaller amounts of time required to manage them and infrequent harvesting activities. However, this is a general rule of thumb and not always the case.

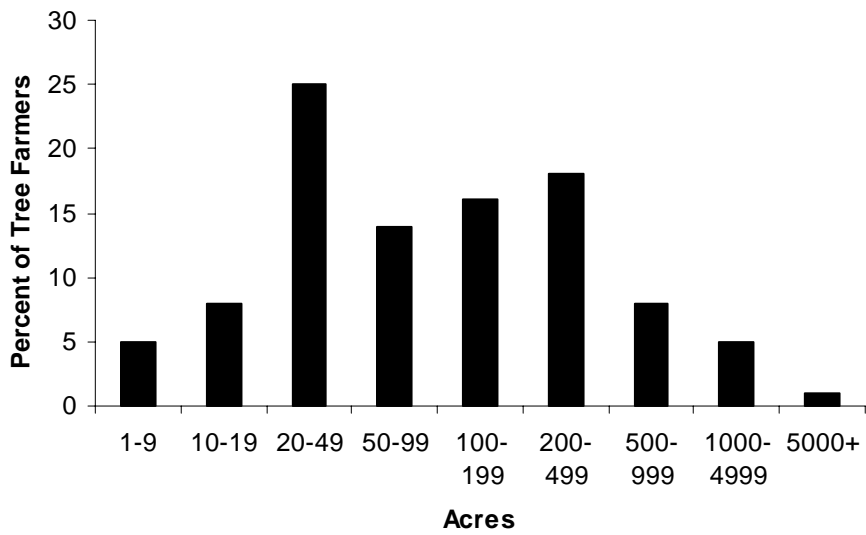


Figure 12-1. Distribution of western ATFS members by ownership parcel size.

Distance of ownership from residence

Fifty-one percent of Tree Farmers own forestland as part of their resident compared with 38 percent in the South and 53 percent in the North (Table 10-8).

Table 12-8. Distance from residence to nearest forest ownership.

Distance to forest ownership (Miles)	Percent of respondents
Part of residence	51
< 1	07
2-5	03
6-15	06
16-25	02
26-50	08
50 +	23
Total	100

Sixty-one percent live within five miles of their ownership. Thirty-one percent live more than twenty-five miles from their ownerships, and 23 percent live fifty or more miles away from their ownerships. Results show that a significant portion of western Tree Farmers are absentee landowners.

Education

Estimates from survey data show that northern Tree Farmers are highly educated (Table 12-9). The distribution of Tree Farmers by educational level is shown in Figure 12-2.

Table 12-9. Estimated education levels of Western Tree Farmers.

Level of education	Percent of respondents (%)
Elementary	02
High school or equivalent	15
Some college	13
College degree	24
Some graduate work	15
Graduate degree	32
Total	100

Seventy-one percent have a college degree or higher level of education as compared with 65 percent in the South and 62 percent in the North. Forty-seven percent either have

some graduate education or a graduate degree compared to 37 percent in the South and 35 percent in the north. Thirty-two percent have a graduate degree compared to 28 percent in the South and 27 percent in the North. Only 17 percent are estimated to have a high school diploma or lower level of education. Given the higher levels of education for western Tree Farmers, the survey results showing the low awareness among Tree Farmers are surprising.

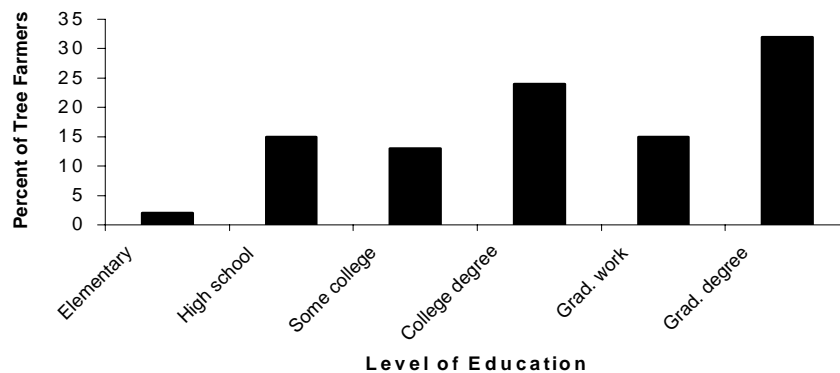


Figure 12-2. Distribution of western Tree Farmers by education.

Occupation

Survey data were also gathered about participant occupation. Estimates concerning occupation are reported in Table 12-10. Forty-five percent of western respondents are retired compared to 50 percent in the South and 47 percent in the North. Another 25 percent consider themselves to be professional or white-collar workers compared to 30 percent in the South and 32 percent in the North. Five percent of respondents consider themselves to be blue-collar workers compared to only 3 percent in

the South and 10 percent in the North. Sixteen percent are farmers compared to 8 percent in the South and 9 percent in the North.

Table 12-10. Estimated occupational allocation of Tree Farmers in the West.

Occupation	Percent of respondents (%)
Blue collar	05
White collar	25
Farmer	16
Homemaker	01
Retired	45
Other	08
Total	100

Miscellaneous

Information concerning landowner age and forestland acquisition date are included is included in Table 12-11. Average Tree Farmer age is 64 years compared to 66 in the South and 62 in the North. This estimate is very close to that estimated by Birch (1996). The average year of acquisition is 1973 compared to 1972 in the South and 1976 in the North. Finally, 45 percent have acquired their forestland holdings since 1978 compared to 40 percent in the South and 48 percent in the North. This estimate is also very close to that estimated by Birch (1996).

**Table 12-11. Miscellaneous Tree Farm
member characteristics
(Western Region).**

Category	Value
Average landowner age	64
<i>95% Confidence Interval</i>	11 years
Average year of acquisition	1973
<i>95% Confidence Interval</i>	4 years
Proportion that has acquired land since 1978	45%
<i>95% Confidence Interval</i>	10%

Chapter 13

A Comparison of ATFS and Forest Landowner Demographics as Described by Birch

Private Forest Landowners of the United States (Birch 1996)

Birch's study is based on the owners of 393 million acres of private forestland in the United States. According to Birch there are 423.8 million acres of private forestland in the United States. He states that 490 million acres of the nation's 736.7 million total acres of forest are classified as timberland. Birch (1996) defines timberland as "forest land that is producing or capable of producing crops of industrial wood (more than 20 cubic feet/acre/year) and that is not withdrawn from timber utilization". Birch notes that, 358 million of the total 490 million acres of timberland are privately owned. The 393 million acres on which the study is based consist of the 358 million acres of private timberland. In addition, another 35 million acres of forestland were included in the study. These acres, which were classified as 'other forestland', are located in parts of Texas, Oklahoma, Oregon and California. "In addition, data obtained on Indian lands in Arizona, Colorado, Nevada, New Mexico, and Utah included 'other forest-land' area" (Birch 1996). Finally, some land classified as forestland but not timberland from Alaska was included. Birch (1996) defines 'Other Forest' as, "Forest land other than timberland including oak woodlands in western Texas and Oklahoma; Juniper woodlands in California and Oregon; Pinon Juniper land in the Rocky Mountains, and much of interior Alaska."

Data used for Birch's publication were gathered from a mail survey. The survey was conducted by the Forest Inventory and Analysis Projects of the USDA Forest Service

in cooperation with the National Association of State Foresters and the USDA Natural Resources Conservation Service, in support of the Forest Stewardship Program of the USDA Forest Service, State and Private Forestry (Birch 1996). Researchers mailed questionnaires to 23,334 owners of 28,194 “privately owned forested sample plots” (Birch 1996). The study results are based on 11,742 ownerships. These ownerships contained 15,697 of the sample plots. Birches work is included here because it is the standard against which demographics from the respondents of the ATFS sample are compared in the section below. The purpose is to determine if they are the same, or if they are different from the “average” U.S. landowner.

ATFS members compared to typical U.S. landowners

The purpose of this section is to compare the demographics of the ATFS with those of the landowner demographics described by Birch (1996). Comparisons between the two populations are based on the following parameters: harvesting experience, primary reason for forestland ownership, parcel size of ownership, occupation, year of acquisition and the existence of a written management plan.

Comparisons utilize hypothesis tests to determine if differences exist between the two populations in terms of the characteristics described above. Written management plans and age are excluded from the comparisons utilizing hypothesis tests. Formulas for these hypothesis tests are described below (Sincich 1996):

Testing the difference between two population proportions:

Two tailed Test

$$H_o : (\pi_1 - \pi_2) = 0$$

$$H_a : (\pi_1 - \pi_2) \neq 0$$

One-tailed Test

$$H_o : (\pi_1 - \pi_2) = 0$$

$$H_a : (\pi_1 - \pi_2) > 0$$

or

$$H_a : (\pi_1 - \pi_2) < 0$$

Test Statistic:

$$z = \frac{p_1 - p_2}{\sigma_{(p_1 - p_2)}} \approx \frac{p_1 - p_2}{pq(1/n_1 + 1/n_2)}$$

Rejection Region

$$|z| > z_{\alpha/2}$$

Rejection Region

$$|z| > z_{\alpha}$$

or

$$z < -z_{\alpha}$$

Where:

$$p_1 = \frac{x_1}{n_1} = (\text{\# of successes in sample 1}) / (n_1)$$

$$p_2 = \frac{x_2}{n_2} = (\text{\# of successes in sample 1}) / (n_2)$$

$$p = \frac{x_1 + x_2}{n_1 + n_2} = (\text{Total \# of successes in both samples}) / (\text{Total sample size})$$

$$q = 1 - p$$

ATFS Demographic Characteristics

Except for age and questions concerning a written management plan, the following conclusions are supported by hypothesis tests used to compare ATFS demographics with the general U.S. landowner described by Birch. Hypothesis tests were made at the $\alpha=.01$ significance level. Actual results are included in the last section of this chapter.

Primary Reasons for Holding Forestland

The ATFS member is more timber management oriented than the general U.S. landowner. According to Birch (1996), only 3 percent of landowners hold their forestland primarily for timber production. By contrast, survey results show that 35 percent of ATFS members hold their lands primarily for timber production.

Similarly, a higher proportion of ATFS members holds their forestland as a land investment. Nine percent of the landowners described by Birch hold their land as an investment compared to 12 percent of ATFS members. In terms of reasons for holding land ATFS members are more timber production oriented and financially motivated than the general landowner.

Finally, fewer ATFS list the primary reason for holding their forestland as “part of their residence”. Only 8 percent of ATFS members list their primary reason for holding their forestland as part of their residence whereas, an estimated 27 percent of U.S. forest landowners own forestland simply because it is a part of their residence (Birch 1996).

Harvesting Experience

Tree Farmers have much more experience with timber harvesting than the general U.S. forest landowner. According to the mail survey results, 81 percent of Tree Farmers have harvested timber in the past. Birch (1996) reported that 46 percent of U.S. forest landowners had harvested timber at some point during their ownership history.

Age

Birch failed to publish information about landowner age in his 1996 publication. Bailey (1999) obtained Birch's landowner age estimate from the USDA Forest Service Southern Research Station in 1999 through a personal interview with Forest Service staff. Birch's estimate for the average landowner age was 60 years; however, since the variance was unobtainable, no hypothesis test for the difference between general landowner average age and Tree Farmer age was possible. The two are fairly close, because the ATFS mail survey results show the average age of ATFS landowners to be 66 years.

Occupation

A higher percentage of ATFS members are retired than the general U.S. landowner population. Mail survey results show 48 percent of Tree Farmers are retired. Birch reported only 29 percent to be currently retired.

The ATFS population contains a lower proportion of blue-collar workers than the general U.S. landowner population as described by Birch in 1996. Only 10 percent of ATFS members consider themselves to be blue-collar workers. By contrast, 16 percent of the population described by Birch was blue collar.

The proportions for white-collar workers and farmers for the two populations were identical. Because they were the same, no hypothesis test was made. Rather, the assumption was made that no differences concerning these proportions existed in the two populations.

Date of Acquisition

Statistically, there is no difference between the proportion of landowners described by Birch and the ATFS members who have acquired their land since 1978. Birch reported 40 percent while the ATFS member estimate is 44 percent. Although the two proportion estimates are different, a failure to reject the null hypothesis that the proportion of Tree Farmers was larger resulted from the hypothesis test.

Parcel Size

Most Tree Farmers own larger parcel sizes than do typical landowners (Table 13-1). Over one-half of landowners in 1994 owned only 1-9 acre parcel sizes. Only 1 percent of Tree Farmers owns 1-9 acres. Distributions of owners for the U.S. landowner population and the ATFS population are shown in Figures 13-1 and 13-2.

Table 13-1. Comparison of parcel size ownership between ATFS members and the typical U.S. landowner.

Parcel size (Acres)	U.S. landowner (%)	ATFS member (%)	Statistically different
1-9	58.6	1	N/A
10-49	27.9	26	N/A
50-99	7.2	22	Yes
100-499	5.6	35	Yes
500-999	0.4	7	Yes
1000+	0.3	8	Yes
Total	100	100	

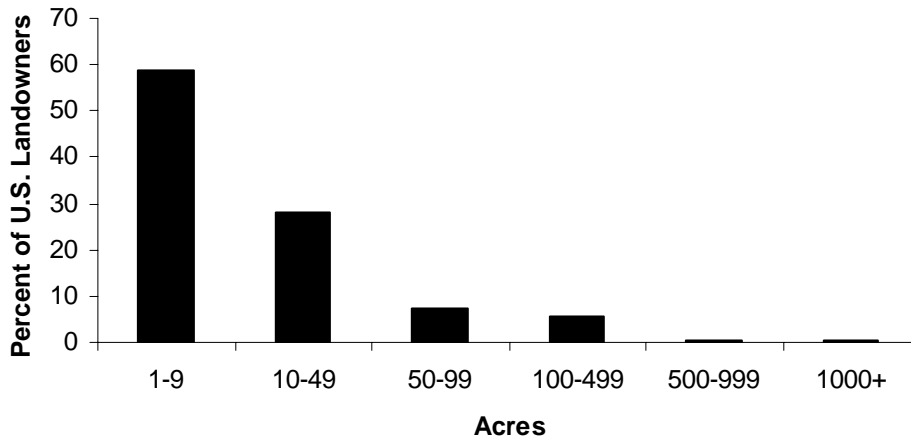


Figure 13-1. Percentage of the U.S. landowner population by parcel size.

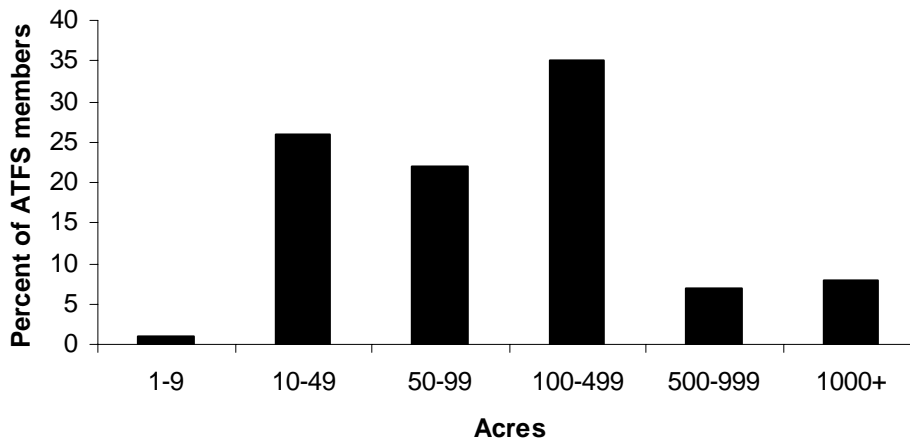


Figure 13-2. Percentage of the ATFS population by parcel size.

Written Management Plan

In order to be a Tree Farmer, members must have a written management plan. By default, the Tree Farmer is much more motivated to have a written management plan. Having a business plan (forest management plan) is more characteristic of profit oriented motives. According to Birch, only 5 percent of landowners nationwide have a written plan.

Hypothesis Tests

In this section the individual hypothesis tests are listed that were made to arrive at the conclusions about the two populations which are discussed above. Some clarification is needed before going further. Birch sampled forestland ownership units, not landowners. An ownership unit “refers to persons, combinations of persons or legal entities, such as corporations, partnerships, clubs, trusts, Indian Tribes, and Native

corporations” (Birch 1996). According the Birch’s publication, “One person may own several parcels or partial interest in several parcels. An ownership unit has the control of a parcel or a group of parcels of land.....Therefore, we are sampling ownership units and not owners” (Birch 1996). The mail survey of ATFS members consisted of sampling actual owners. During the hypothesis tests, the ownership units identified by Birch were treated as actual landowners so that direct comparison could be made to landowners in the ATFS sample. As a result, some error is inevitable. Birch’s study also includes both NIPF and industrial landowners while the ATFS survey included only NIPF’s. The individual hypothesis tests are listed on the following pages:

Harvesting Experience

H_0 : Tree farmers have the same harvesting experience as the landowners described by Birch (a one-tailed test).

H_a : Tree farmers have more harvesting experience than the landowners described by Birch.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion with harvesting experience = 81% (p_1)

Birch: Proportion with harvesting experience = 46% (p_2)

Test
Statistic: = 21.35

p-value: < 0.001

Decision: Reject the null hypothesis in favor of the alternative hypothesis.

Acquisition dates

H_0 : The proportion of Tree Farmers who have acquired land since 1978 is the same as for the population described by Birch.

H_a : The proportion of ATFS members acquiring land since 1978 is larger.

Significance

Level: $\alpha = 0.01$

Rejection

Region: = Reject if $z > 2.33$

ATFS: Proportion acquiring land since 1978 = 44% (p_1)

Birch: Proportion acquiring land since 1978 = 40% (p_2)

Test

Statistic: = 2.25

p-value: = 0.012

Decision: Fail to reject null hypothesis.

Reason for ownership-Timber Production

H_0 : The proportion of Tree Farmers who hold forestland for timber production purposes is the same as the U.S. forest landowner population

H_a : The proportion of ATFS members holding forestland primarily for timber production is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion holding land for timber production = 35% (p_1)

Birch: Proportion holding land for timber production = 3% (p_2)

Test
Statistic: = 39.46

p-value < 0.001

Decision: Reject null hypothesis.

Reason for ownership –Land Investment

H_0 : The proportion of Tree Farmers who hold forestland primarily for land investment purposes is the same as the U.S. forest landowner population

H_a : The proportion of ATFS members holding forestland primarily as a land investment is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion holding as land investment = 12% (p_1)

Birch: Proportion holding as a land investment = 9% (p_2)

Test
Statistic: = 2.76

p-value = 0.003

Decision: Reject null hypothesis.

Reason for ownership –Part of Residence

H_0 : The proportion of Tree Farmers who hold forestland primarily as a part of residence is the same as the U.S. forest landowner population

H_a : The proportion of ATFS members holding forestland primarily as part of residence is lower than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z < -2.33$

ATFS: Proportion holding as part of residence = 8% (p_1)

Birch: Proportion holding as part of residence = 27% (p_2)

Test
Statistic: = -11.56

p-value < 0.001

Decision: Reject null hypothesis.

Occupation-Retired

H_0 : The proportion of Tree Farmers who are retired is the same as the U.S. forest landowner population

H_a : The proportion of ATFS members who are retired is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion who are retired = 48% (p_1)

Birch: Proportion who are retired = 29% (p_2)

Test
Statistic: = 11.6

p-value < 0.001

Decision: Reject null hypothesis.

Occupation-Blue –Collar

H_0 : The proportion of Tree Farmers who are blue collars is the same as the U.S. forest landowner population

H_a : The proportion of ATFS members who are blue collars is lower than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z < - 2.33$

ATFS: Proportion who are blue collar workers = 10% (p_1)

Birch: Proportion who are blue collar workers = 16% (p_2)

Test
Statistic: = -4.6

p-value < 0.001

Decision: Reject null hypothesis.

Parcel size- -1000+ acres

H_0 : The proportion of Tree Farmers who own 1000 or more acres is the same as the U.S. forest landowner population proportion

H_a : The proportion of ATFS members who own 1000+ acres is higher than the proportion in the general U.S. forest landowner population.

Significance

Level: $\alpha = 0.01$

Rejection

Region: = Reject if $z > 2.33$

ATFS: Proportion who own 1000+ acres = 8% (p_1)

Birch: Proportion who own 1000+ acres = 0.3% (p_2)

Test

Statistic: = 24.07

p-value < 0.001

Decision: Reject null hypothesis.

Parcel size- 500-999 acres

H_0 : The proportion of Tree Farmers who own 500-999 acres is the same as the U.S. forest landowner population proportion

H_a : The proportion of ATFS members who own 500-999 acres is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion who own 500-999 acres = 7% (p_1)

Birch: Proportion who own 500-999 acres = 0.4% (p_2)

Test
Statistic: = 20.26

p-value < 0.001

Decision: Reject null hypothesis.

Parcel size- 100-499 acres

H_0 : The proportion of Tree Farmers who own 100-499 acres is the same as the U.S. forest landowner population proportion

H_a : The proportion of ATFS members who own 100-499 acres is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion who own 100-499 acres = 19% (p_1)

Birch: Proportion who 100-499 acres = 6% (p_2)

Test
Statistic: = 14.40

p-value: < 0.001

Decision: Reject null hypothesis.

Parcel size- 50-99 acres

H_0 : The proportion of Tree Farmers who own 50-99 acres is the same as the U.S. forest landowner population proportion

H_a : The proportion of ATFS members who own 50-99 acres is higher than the proportion in the general U.S. forest landowner population.

Significance
Level: $\alpha = 0.01$

Rejection
Region: = Reject if $z > 2.33$

ATFS: Proportion who own 50-99 acres = 22% (p_1)

Birch: Proportion who 50-99 acres = 7% (p_2)

Test
Statistic: = 15.48

p-value: < 0.001

Decision: Reject null hypothesis.

Chapter 14

Conclusion

Results of the mail survey of forest landowners who belong to the American Tree Farm System indicate that awareness and use of federal income tax provisions that make forest management more cost effective are low. Based on demographic characteristics, the ATFS landowners are much more motivated in terms of timber production than the general U.S. forest landowner population described by Birch. They own bigger parcels of land than the average forest landowner and have more harvesting experience than the general forest landowner population. They are similar in age to the general landowner population and are highly educated. Results from the ATFS member survey are consistent with the results from the South Carolina Forest Landowners Association mail survey (Greene et al. 2001). Conclusions from both studies indicate that awareness and use of federal income tax provisions that make forest management more cost effective are low.

Results from the ATFS mail survey show that a high percentage of landowners that are aware of the beneficial tax provisions tend to use them. This suggests that more landowners would use the tax provisions if they knew about them. Thus, an effort to inform landowners of tax provisions for which they are eligible would probably be effective. Due to the volatility in tax legislation in recent years, staying current on tax issues has become increasingly difficult for taxpayers and financial professionals. Increased stability of tax policy and current tax laws would likely result in higher awareness of the tax provisions over time. Simplification of the tax code concerning

forestry investment would also be likely to yield positive results in terms of landowner use of the nine income tax provisions.

After-tax LEV analysis shows that failure by landowners to take advantage of tax provisions significantly reduces financial returns. LEV analyses show the cumulative effects of choosing to omit use of available tax provisions to have large impacts on profitability of forest management endeavors. Landowners bidding on property for timber production purposes who are aware the tax provisions have a much better chance of being competitive in the market place than those who are unaware.

Tax laws constantly change. With the change in capital gains tax rates from 20 percent to 15 percent, forestry investments are favored more now by the tax code than previously. LEV analysis shows that use of tax provisions by high-income landowners is more beneficial than use by lower income landowners although both groups benefit. Knowing about the tax provisions is only the first step for effective use. Since complying with tax law can be complex with many possible tax forms involved, landowners are advised to seek professional tax assistance when dealing with timber investments and businesses. The legal structure in which forestland is held greatly influences which provisions can be used and to what extent they can be used. Businesses have the greatest flexibility in terms of use of the provisions while investments and passive activities are more restricted in terms of use.

Survey results should be read with caution. Most ATFS members use tax professionals to prepare their tax returns. It is possible that only awareness of the provisions is low and that use is much higher than reported if the tax professionals involved are familiar with the nine tax provisions.

Proficiency with federal tax provisions by consulting foresters, accountants and other professionals serving landowners is a business opportunity. As forestland is divested by major timber firms, the demand for knowledgeable and experienced managers should increase.

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Appendix A
Rotation Optimization of the Intense Loblolly Pine
Management Regime Used in LEV Analysis.

Southern Scenario

The purpose of this chapter is to develop a hypothetical forest management scenario in the South that results in a high land expectation value. The scenario will then be used for timber tax analysis in subsequent chapters. Pulpwood prices in the South have been depressed over the past few years. As a result, forest managers are planting fewer trees per acre and managing timber more intensively using by participating in activities such as fertilization and herbicide application at establishment and fertilizing at mid-rotation. The objective of this kind of intense management is to produce less pulpwood and to produce sawtimber more quickly (Amateis 2004). In addition, thinning a stand only once has become common practice by many industrial managers.

In order to create a landowner scenario that would result in a relatively high LEV, Amateis (2004) recommended planting between 400 and 500 trees per acre, applying fertilizer and herbicide at establishment, using genetically improved stock, and performing a mid-rotation fertilization at the time of the first and only thin.

Based on these recommendations, dynamic programming (Davis and Johnson 1987) was used to find a management regime that would offer a high LEV. PTAEDA 3, a loblolly pine growth and yield simulator (Burkhart et al. 2003), was used simulate volumes resulting from several possible management regimes.

Tract Description

A tract size of 135 acres was selected for the dynamic programming analysis. In order to make the scenario analysis realistic; the tract was designed to include the following features:

Road

The road provides access to the interior of the tract. It is 1/8 mile long and has a gravel surface. In addition, it contains two 18" culverts.

Streamside Management Zone

The SMZ consists of 15 of the total 135 acres. It is a hardwood forest. Although some management and harvesting would be possible without violating BMP guidelines, the landowner has elected to neither actively manage nor harvest in this area. He enjoys the aesthetics of the area. The remaining 120 acres of the tract will be managed intensively, and he enjoys knowing that this area will be left undisturbed by his timber management practices as much as possible. In addition, it serves as a favorite spot for the hunters who lease the tract annually.

Intensively Managed Area

This area consists of 120 of the total 135 acres. It was clearcut harvested in the year prior to purchase. It will be planted and established as a loblolly pine plantation. The access road mentioned above lies within this area only and does not cross the SMZ.

Possible thinning ages, residual basal areas, and final harvest ages considered

Several possible management regimes and thinning intensities were considered and simulated with PTAEDA 3. LEV analysis was performed on the simulated results, and all feasible regimes were considered in the dynamic programming process that was

used to identify the management path that maximized LEV. The possible thinning ages, residual basal areas, and final harvest ages considered were:

Possible thinning ages:	15, 17, or 19 years
Possible thinning residual basal areas:	60 ft² or 80 ft²
Possible harvest ages:	28, 30, or 32 years

Management Regime

In accordance with the recommendations made for an intensively managed plantation with fewer trees per acre, the following management regime was adopted:

Site preparation by chopping and burning.

Plant 500 trees per acre.

Application of herbaceous weed control at establishment (2-year control).

Application of an NPK fertilizer mix at establishment.

Application of 25 pounds of phosphorous and 200 pounds of nitrogen per acre at the time of the first thinning.

Road Maintenance Regime

The road will be re-surfaced immediately following reforestation at time 0.

The road will be re-surfaced following the mid-rotation thinning.

Cost for resurfacing the road are \$1175 in 2004 dollars (Aust 2004).

Site Factors

The site description is as follows (Amateis and Burkhart 2004):

Site Index:	67 base age 25
Location:	Coastal plain
Drainage:	Well drained

Harvesting constraints and financial assumptions used in dynamic programming analysis

Several rules concerning harvesting decisions and financial analysis were used during the dynamic programming process. Sources for these costs and fees and timber prices are found at the end of this chapter. These rules are as follows:

The stand could be thinned to the specified basal area of 60 ft² or 80 ft² only if 10.0 or more cords per acre could be removed.

All revenues and costs were on a pre-income tax basis.

Timber prices were held constant (real terms).

All non-timber costs and revenues were held constant (real terms).

A real, pre-tax discount rate of 6 percent was used in the LEV calculations.

Costs and Fees

Reforestation costs per acre (Dubois et al 2003):

Site preparation:	\$166.28
Planting:	\$48.92
Herbicide:	\$70.18
Fertilizer:	\$56.04

Seedlings:	\$20.03
Total:	\$361.45

Mid-rotation fertilizer costs per acre (Dubois et al. 2003):

Fertilizer and application:	\$56.04
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Management costs per acre:

Annual fee:	\$5.00
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Property taxes per acre:

Annual fee:	\$3.80
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Consulting fees (total):

Commission on gross timber revenue:	6%
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Road Costs (Aust 2004)

Total road costs (resurface and culverts):	\$1175
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Road costs per acre (120-acre intensive

area bears the cost):	\$9.79
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Annual Revenues

Hunting lease revenue:

Annual income per acre: \$4.00

Stumpage Prices (Timber Mart South 1992-2003)

Pulpwood (per cord): \$24.20

C-N-S (per cord): \$70.40

Sawtimber (Scribner MBF): \$287.44

Product Specifications

Pulpwood: Minimum DBH 5 inches

Minimum top diameter 6 inches

C-N-S: Minimum DBH 9 inches

Minimum top diameter 6 inches

Sawtimber: Minimum DBH 12 inches

Minimum top diameter 8 inches

15-Acre SMZ

LEV analysis is often made on per acre basis. As a result, financial calculations are often based on a single hypothetical acre that supports a loblolly pine plantation. In the theoretical sense such application is possible. However, such analysis tends to lead to overly optimistic land expectation values. Such high LEV's result because the assumption is made that all land in the forest is financially productive. However, this is rarely the case. When a tract of land is purchased for the purpose of intensive forest management, many acres are often allocated to other uses than plantation management. Some areas are established as streamside management zones. Some acres are taken up by roads. Other acres may be designated as wildlife forage plots.

When a land purchase is made for the purpose of timber production, and when the purchase is based on for-profit motives, a tract of land as a whole should be able to generate enough income to be profitable relative to the landowner's acceptable discount rate. Very seldom are tracts of land found where every acre is suitable for timber production. These other acres do provide benefits such as road access, clean water through stream buffers and wildlife health. However, in terms of generating cash flow, they are rather limited. One way to classify these areas is to label these acres as a cost that must be paid for with the acres that are productive (intensively managed acres). When viewed this way, the negative and positive (if any) cash flows from the "unproductive acres" should be allocated on a per acre basis to the intensively managed acres. This will give lower but more realistic LEV calculations for the productive acres.

The 15-acre SMZ produces no harvest revenue. The only revenue produced by the SMZ is the \$4.00 per acre annual hunting lease fee. However, this portion of the tract produces ample costs. The \$3.80 per acre property tax is assessed annually as well as the \$5.00 per acre annual management cost fee. Therefore, the SMZ is seen in financial terms as a net annual cost. For dynamic programming purposes, the 120-acre management area must produce enough income to pay for itself as well as the road costs and the SMZ costs. For example, if this 135-acre tract were to be purchased on the open market, the buyer could not purchase only the 120-acre plantation area. He would be forced to buy the whole tract including the SMZ. Therefore, the positive and negative cash flows generated by the SMZ are allocated on per-acre basis to the 120-acre management area. For example, the SMZ generates a total of \$75 ($\5×15 acres) per year of management costs. When viewed as a drain (cost) on the revenue produced by the plantation, the SMZ lowers the per acre LEV of the 120-acre management area. This annual fee of \$75.00 should therefore be allocated on a per acre basis to the intensive management area at a rate of \$0.62 ($\$75.00 / 120$ acres) per acre. Because, the plantation must carry the management costs of the SMZ as well as itself, each acre of the plantation area actually incurs an annual management cost of \$5.62. The same allocation process is used for the property tax and hunting revenues generated by the SMZ. Using this method of cost allocation, the SMZ is seen as an amenity that must be carried by the plantation.

Dynamic programming approach

The objective of the dynamic programming approach is to find the management regime that maximizes the per acre LEV of the 120-acre plantation area. LEV is often

used to determine the bid price per acre when purchasing a tract. However, the best way to interpret the LEV in terms of bid price is to multiply the LEV by 120. This will produce the total price that can be paid for the entire tract. If the purchaser wants a total per acre bid price for the entire tract, this total bid price must then be divided by 135.

Feasible management paths

The possible management scenarios considered are shown in Table A-1. Due to the 10.0 cord per acre thinning constraint, the following three management possibilities were eliminated from the dynamic programming approach since they were not feasible:

Thin to 80 basal area at age 15, and final harvest at age 28

Thin to 80 basal area at age 15, and final harvest at age 30.

Thin to 80 basal area at age 15, and final harvest at age 32.

Table A-1. Possible management scenarios.

SCENARIO	THIN AGE	BASAL AREA	HARVEST	FEASIBLE
1	15	60	28	YES
2	15	60	30	YES
3	15	60	32	YES
4	15	80	28	NO
5	15	80	30	NO
6	15	80	32	NO
7	17	60	28	YES
8	17	60	30	YES
9	17	60	32	YES
10	17	80	28	YES
11	17	80	30	YES
12	17	80	32	YES
13	19	60	28	YES
14	19	60	30	YES
15	19	60	32	YES
16	19	80	28	YES
17	19	80	30	YES
18	19	80	32	YES

Using dynamic programming, the forward recursion rule (Davis and Johnson 1987) was used to evaluate the above possible scenarios and to identify the optimal management path in terms of maximizing LEV. Possible management paths are shown in Figure A-1. Net present values for each arc in Figure A-1 were calculated and are shown in Table A-2. The forward recursion rule allows the dynamic programmer to identify the path to a particular node that yields the highest net present value. Other paths which lead to the same node but that result in a lower NPV are then eliminated. Finally, these net present values are converted to land expectation values. As a result, the programmer can find the optimal paths for planning a 28, 30 or 32-year rotation (Figure

A-2). In addition, the rotation age and path that leads to the best overall LEV can be selected.

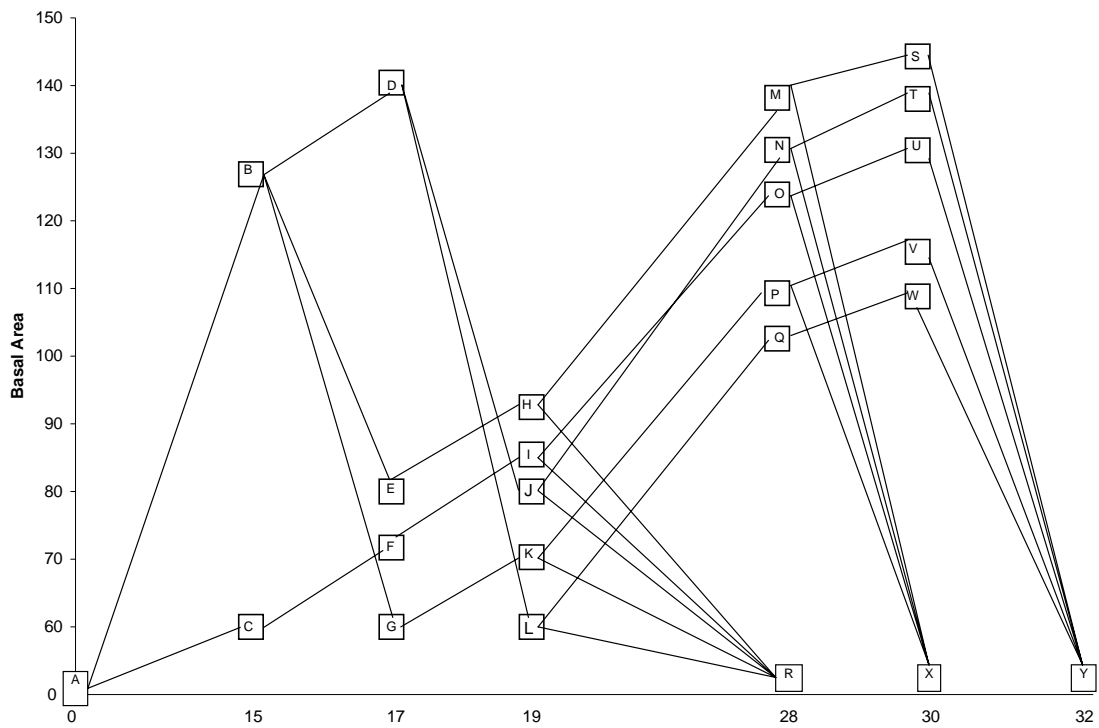


Figure A-1. Possible management paths that meet the 10.0 cords per acre thinning constraint.

Table A-2. Net present value of feasible management arcs found in Figure A-1.

Arc Number	Arc Name	Beginning Basal Area (ft ²)	Ending Basal Area (ft ²)	Volume Removed				Timber Revenue (\$)	Lease Revenue (\$)	Costs (\$)	Arc Present Value (\$)
				Pulp Cords	C-N-S Cords	Sawtimber Cords	Sawtimber MBF Scribner				
1	AB	0.0	126.9	0.0	0.0	0.0	0.00	104.74	230.44	-52.45	
2	AC	0.0	60.0	10.2	2.9	0.0	0.00	104.74	323.33	96.98	
3	BD	126.9	140.4	0.0	0.0	0.0	0.00	9.27	20.40	-4.13	
4	BE	126.9	80.0	8.3	4.6	0.0	0.00	9.27	117.71	154.58	
5	BG	126.9	60.0	12.8	4.6	0.0	0.00	9.27	124.25	192.60	
6	CF	60.0	71.7	0.0	0.0	0.0	0.00	9.27	20.40	-4.13	
7	DJ	140.4	80.0	10.5	6.1	0.0	0.00	9.27	127.24	186.93	
8	DL	140.4	60.0	13.7	7.7	0.0	0.00	9.27	138.65	245.98	
9	EH	80.0	92.5	0.0	0.0	0.0	0.00	9.27	20.40	-3.68	
10	FI	71.7	85.5	0.0	0.0	0.0	0.00	9.27	20.40	-3.68	
11	GK	60.0	70.3	0.0	0.0	0.0	0.00	9.27	20.40	-3.68	
12	HM	92.5	138.2	0.0	0.0	0.0	0.00	51.72	113.77	-12.14	
13	HR	92.5	0.0	0.0	20.2	28.7	10.63	51.72	382.40	811.18	
14	IO	85.5	123.9	0.0	0.0	0.0	0.00	51.72	113.77	-12.14	
15	IR	85.5	0.0	0.0	6.6	38.4	14.30	51.72	388.28	829.19	
16	JN	80.0	130.5	0.0	0.0	0.0	0.00	51.72	113.77	-12.14	
17	JR	80.0	0.0	0.0	14.5	32.1	11.94	51.72	380.95	806.73	
18	KP	70.3	109.3	0.0	0.0	0.0	0.00	51.72	113.77	-12.14	
19	KR	70.3	0.0	0.0	5.1	34.8	12.94	51.72	358.48	737.88	
20	LQ	60.0	102.6	0.0	0.0	0.0	0.00	51.72	113.77	-12.14	
21	LR	60.0	0.0	0.0	2.8	34.8	12.99	51.72	349.71	710.99	
22	MS	138.2	144.3	0.0	0.0	0.0	0.00	9.27	20.40	-1.94	
23	MX	138.2	0.0	0.0	16.6	36.4	13.60	9.27	325.10	829.21	
24	NT	130.5	138.0	0.0	0.0	0.0	0.00	9.27	20.40	-1.94	
25	NX	130.5	0.0	0.0	11.9	39.4	14.79	9.27	325.71	830.87	
26	OU	123.9	130.4	0.0	0.0	0.0	0.00	9.27	20.40	-1.94	
27	OX	123.9	0.0	0.0	5.6	43.6	16.43	9.27	327.43	835.57	
28	PV	109.3	115.4	0.0	0.0	0.0	0.00	9.27	20.40	-1.94	
29	PX	109.3	0.0	0.0	2.5	41.2	15.49	9.27	298.08	755.50	
30	QW	102.6	108.8	0.0	0.0	0.0	0.00	9.27	20.40	-1.94	
31	QX	102.6	0.0	0.0	1.0	40.5	15.33	9.27	289.03	730.80	
32	SY	144.3	0.0	0.0	13.4	42.1	15.87	9.27	350.71	800.15	
33	TY	138.0	0.0	0.0	9.5	46.2	17.48	9.27	361.98	827.52	
34	UY	130.4	0.0	0.0	3.9	49.5	18.84	9.27	361.72	826.89	
35	VY	115.4	0.0	0.0	1.1	46.1	17.50	9.27	326.78	742.06	
36	WY	108.8	0.0	0.0	1.0	44.2	16.95	9.27	316.87	718.00	

$R_{t,s} =$	$Max \left[\frac{pht}{(1+i)^t} + R_{t-1,S} \right]$					
Where:	$pht =$	Net present value of moving from previous node to the current node.				
	$R_{t-1,S} =$	Net present value of being at previous node.				
	$i =$	Discount rate (6% in real terms).				
	$t =$	Stand age at current node (years).				
Optimality Condition:	Whatever intermediate node arrived at, the path must be the best one from the initial node to that intermediate node.					
Righthand Column:	Notation of the righthand column is Pnodeb:nodea . P stands for the optimal path. For example, PB:A means that the optimal path to node B is through node A.					
STAGE ONE	NPV of Previous Node		NPV of Arc		NPV at Current Stage	Possible Paths to Stage
RB = RA + rab =	-371.24	+	-52.45	=	-423.69	PB:A
RC = RA + rac =	-371.24	+	96.98	=	-274.26	PC:A
STAGE TWO						
RD = RB + rbd =	-423.69	+	-4.13	=	-427.82	PD:B
RE = RB + rbe =	-423.69	+	154.58	=	-269.11	PE:B
RF = RC + rcf =	-274.26	+	-4.13	=	-278.39	PF:C
RG = RB + rbg =	-423.69	+	192.6	=	-231.09	PG:B
STAGE THREE						
RH = RE + reh =	-269.11	+	-3.68	=	-272.79	PH:E
RI = RF + rfi =	-278.39	+	-3.68	=	-282.07	PI:F
RJ = RD + rdj =	-427.82	+	186.93	=	-240.89	PJ:D
RK = RG + rgk =	-231.09	+	-3.68	=	-234.77	PK:G
RL = RD + rdl =	-427.82	+	245.98	=	-181.84	PL:D
STAGE FOUR						
RM = RH + rhm =	-272.79	+	-12.14	=	-284.93	PM:H
RN = RJ + rjn =	-240.89	+	-12.14	=	-253.03	PN:J
RO = RI + rio =	-282.07	+	-12.14	=	-294.21	PO:I
RP = RK + rkp =	-234.77	+	-12.14	=	-246.91	PP:K
RQ = RL + rlq =	-181.84	+	-12.14	=	-193.98	PQ:L

Figure A-2. Results of using the forward recursion rule to identify optimal management paths.

STAGE FOUR CONTINUED						
	RH + rhr =	-272.79	+	811.18 =	538.39	
	or					
	RI + rir =	-282.07	+	829.19 =	547.12	
	or					
RR = MAX	RJ + rjr =	-240.89	+	806.73 =	565.84	→ PR:J
	or					
	RK + rkr =	-234.77	+	737.88 =	508.11	
	or					
	RL + rlr =	-181.84	+	710.99 =	529.15	
STAGE FIVE						
	RS = RM + rms =	-284.93	+	-1.94 =	-286.87	PS:M
	RT = RN + rnt =	-253.03	+	-1.94 =	-254.97	PT:N
	RU = RO + rou =	-294.21	+	-1.94 =	-296.15	PU:O
	RV = RP + rpv =	-246.91	+	-1.94 =	-248.85	PV:P
	RW = RQ + rqw =	-193.98	+	-1.94 =	-195.92	PW:Q
	RM + rmx =	-284.93	+	829.21 =	544.28	
	RN + rnx =	-253.03	+	830.87 =	577.84	→
RX = MAX	RO + rox =	-294.21	+	835.57 =	547.36	PX:N
	RP + rpx =	-246.91	+	755.5 =	508.59	
	RQ + rqx =	-193.98	+	730.8 =	536.82	
STAGE SIX						
	RS + rsy =	-286.87	+	800.15 =	513.28	
	RT + rty =	-254.97	+	827.52 =	572.55	→
RY = MAX	RU + ruy =	-296.15	+	826.89 =	530.74	PY:T
	RV + rvy =	-248.85	+	742.06 =	493.21	
	RW + rwy =	-195.92	+	718 =	522.08	

Figure A-2 continued.

The results of the dynamic programming results allow the identification of the best management path in terms of financial return if the stand were to be harvested in:

- 1). Year 28
- 2). Year 30
- 3). Year 32

Optimal paths that maximize NPV are found in Table A-3.

Table A-3. Paths that optimize NPV.

Rotation Length	Optimal Path	Net Present Value*
28 Years	A:B:D:J:R	\$565.84
30 Years	A:B:D:J:N:X	\$577.84
32 Years	A:B:D:J:N:T:Y	\$572.55

Paths that maximize LEV are found in Table A-4.

Table A-4. Paths that optimize LEV.

Rotation Length	Optimal Path	Land Expectation Value
28 Years	A:B:D:J:R	\$703.46
30 Years	A:B:D:J:N:X	\$718.38
32 Years	A:B:D:J:N:T:Y	\$711.80

Overall Best Path

The path that maximizes LEV is determined to be the best overall path since infinite identical rotations are assumed. The best overall path is shown in table 4. This path consists of:

Thinning to 80 ft² of basal area at age 19

Performing a final harvest at age 30.

All management treatments and maintenance schedules listed above are maintained during this rotation.

Interpretation of LEV

The per acre LEV for the 120-acre management area is \$718.38. Therefore, the total price that can be paid for the 135-acre tract is \$86,205.60 (120 acres x \$718.38). When this purchase price is translated into a per acre purchase price for all 135 acres, the purchase price per acre becomes \$638.56 per acre (\$86,205.60 / 135 acres). The proper interpretation of this purchase price of \$638.56 is:

Assuming indefinite, identical rotations and road maintenance schedules, a landowner can pay \$638.56 per acre for the 135-acre tract and earn 6% in real terms before tax. This purchase price is also based on the assumption that there are no real price increases in costs and fees. This \$638.56 purchase price is low enough to pay for the road maintenance costs and property taxes and annual management fees on the SMZ as well as the 120-acre management area and still produce the 6% return. Please note

that closing costs were completely ignored in this scenario. Any state tax credits offered to landowners for SMZ preservation and allocation were also ignored.

Appendix B
Cover Letters and Mail Survey
Questionnaire

Cover Letter #1:

Date

Landowner
Forestry Street
Blacksburg, VA

Several federal income tax provisions designed to promote forest management and to save forest landowners money have been created over the years by Washington policymakers. These provisions have the potential to provide forest landowners with substantial tax savings. However, no one really knows how well forest landowners have been informed of these provisions. Nor does anyone know if forest landowners find these income tax provisions beneficial and useful.

You are one of 2,000 people who are being asked to share their knowledge of these income tax provisions and to provide their opinions of the benefits of the provisions. This 2,000 person sample was drawn in a random sample of the national registry of the American Tree Farm System. In order for the results of this study to truly reflect the awareness and use of federal income tax provisions by members of the Tree Farm System, it is crucial that all questionnaires be completed and returned through the mail.

Should you choose to participate in this study, your answers will be treated with complete confidentiality. Notice that the questionnaire has an identification number on it. This number is used solely for mailing purposes. The purpose of the number is to allow us to check off your name on the mailing list when we receive your questionnaire.

Results of this study will be published and made available to the United States Department of Agriculture Forest Service as well as some professional journals. As a participant, you are welcome to a summary of our research findings. If you would like to receive a summary of the results simply write, "copy of results requested", along with your name and address on the back of your return envelope. Please do not put your name, address, or a request for study results on the questionnaire itself.

If you have any questions concerning this survey, I would be happy to hear from you. I may be reached by telephone at (540) 552-3420 or by e-mail at nasmith@vt.edu. In addition, you may also mail me questions using the return address on the envelope.

Thank you for your help.

Sincerely,

Nathan Smith
Forestry Research Assistant

Post Card Content

Date

Last week, a questionnaire inquiring about your level of awareness and use of several federal income tax provisions which significantly reduce timber income taxes was mailed to you. Your name was one of 1,200 drawn from a nation-wide random sample of all members of the American Tree Farm Association.

If you have already returned the completed questionnaire, we thank you for your participation. If you have not yet completed and returned the questionnaire, please do so today. Because of the small sample size drawn, it is extremely important that your questionnaire be included with the other respondents in order to ensure the accuracy of the study results.

If by some chance your questionnaire has been misplaced or if you never received one, please call me today at (540) 231-3596, and I will mail another one to you.

Sincerely,

Nathan Smith
Forestry Research Assistant

Follow-up Letter #1

Date

Landowner
Forestry Street
Blacksburg, VA

Approximately three weeks ago, I sent you a questionnaire seeking to learn about your awareness and use of several federal income tax provisions that can significantly reduce the income tax burden associated with forest management. As of today, I have not received your completed questionnaire.

The Virginia Tech Department of Forestry has implemented this research project because it believes that federal income taxes significantly reduce the forest landowner's ability to reinvest in sound forest management practices. While several federal timber income tax provisions have been made available to forest landowners in order to lessen the forestry tax burden and make sound forest management more affordable, no one really knows what proportion of forest landowners are aware of these federal income tax provisions. Nor does anyone know if forest landowners who *are* aware of the provisions find them useful or helpful.

I am writing you again because your input in this study is significant in terms of the accuracy of the study results. You are one of only 1,200 forest landowners nation-wide who have been asked to participate in this study. This 1,200 person sample was drawn randomly from the names of all members of the American Tree Farm Association. Because of the small sample size, it is essential that your response be included in the study and that your completed questionnaire be returned.

A replacement questionnaire has been enclosed in the event that the original one mailed to you has been misplaced. I may be reached by phone at (540) 552-3420 or (540) 231-3596 if you have any questions. I may also be reached by e-mail at nasmith@vt.edu.

Your cooperation is greatly appreciated.

Sincerely,
Nathan Smith
Forestry Research Assistant

P.S. We hope to have study results out by early or mid Spring of 2004.

Final Follow-up Letter

Date

Landowner
Forestry Street
Blacksburg, VA

I am writing you about our study of nation-wide forest landowner awareness and use of federal income tax provisions designed to promote forest management. I have not yet received your completed questionnaire.

Although I have been encouraged by the large number of questionnaires returned, whether the study results will accurately reflect the awareness and use of the income tax provisions depends on the responses of you and others who have not yet returned their completed questionnaires. It is quite possible that the responses of you and the others who have not yet participated in the study may be significantly different from those who have already mailed in their questionnaires.

The results of this study are of great importance to forestry professionals and will help them know where landowner assistance efforts and resources should be allocated. The usefulness of our results depends on how accurately we can describe current landowner tax provision awareness and use. For these reasons, I am sending you this fourth letter and am requesting that you complete the questionnaire and return it by mail today. A replacement questionnaire has been included for you in the event that the previous one sent has been misplaced.

If you would like a copy of the study results, I'll be happy to send you one. Simply place your name, address, and write "copy of results requested" on the back of the return envelope. I may be reached by phone at (540) 552-3420 or (540) 231-3596 if you have any questions. I may also be reached by e-mail at nasmith@vt.edu. We plan on having the results available by early to mid spring of 2004. Thank you.

Sincerely,

Nathan Smith
Forestry Research Assistant

Questionnaire



**ARE YOU AWARE OF
THE MONEY-SAVING
OPTIONS AVAILABLE
TO YOU?**

**- A 2003 NATION-WIDE SURVEY OF THE
AWARENESS AND USE OF INCOME TAX
PROVISIONS AVAILABLE TO FOREST
LANDOWNERS -**

- A recent study has shown that many forest landowners are unaware of the tax provisions available to them. These provisions make sound forest management more affordable for landowners. Your answers to this survey will help forestry professionals better coordinate resources to keep you informed of timber tax options. Please answer all of the questions and return the questionnaire. A comments section has been reserved on the back cover if you have additional thoughts. -



Department of Forestry
Cheatham Hall (0324)
Virginia Tech
Blacksburg, Virginia 24061

TIMBER INCOME CAN QUALIFY AS A LONG-TERM CAPITAL GAIN

If you have owned timber for more than one year and have held it as an investment or as a business, the profit from the sale of the timber can qualify as a long-term capital gain. Therefore, the maximum federal tax rate will be 15% which is much lower than ordinary income tax rates. (Please answer the following questions by circling the appropriate number).

Q-1. Did you know about this tax provision?

- 1 NO
2 YES
(If yes)

IF YOU ANSWERED "NO" TO Q-1, SKIP TO Q-8 AT THE TOP OF PAGE 2.

Q-2. Have you used this provision in the past?

- 1 NO
2 YES
(If yes)

IF YOU ANSWERED "NO" TO Q-2, SKIP FROM HERE TO Q-7 ON THIS PAGE.

Q-3. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
2 2 TO 5 YEARS AGO
3 MORE THAN 5 YEARS AGO

Q-4. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
2 2 - 5 TIMES
3 MORE THAN 5 TIMES

Q-5. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
2 IT HAS BENEFITTED ME SOME.
3 IT HAS BENEFITTED ME A LOT.
4 IT HAS NOT BENEFITTED ME.

Q-6. Do you plan to use this provision again in the future?

- 1 NO
2 YES
3 MAYBE

SKIP Q-7, AND CONTINUE WITH Q-8 ON THE NEXT PAGE.

Q-7. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
4 I DON'T WANT TO USE IT
5 OTHER _____ (Please continue with Q-8)

ANNUAL FOREST MANAGEMENT COSTS CAN BE DEDUCTED

If you hold timber as a business, actively participate in its management activities, and can show that you entered the business for the purpose of generating a profit; you can deduct the cost of timber management practices such as fees paid to consulting foresters, other professional fees, costs of hired labor, insect control, fire control and other costs related to the management, conservation, or maintenance of the property. You can also deduct these expenses if you hold the timber as an investment or do not qualify as an active manager. More restrictions would apply, however, in terms of the amounts which can be deducted. (Please answer the following questions by circling the appropriate number).

Q-8. Did you know about this tax provision?

- 1 NO
2 YES

IF YOU ANSWERED "NO" TO Q-8, SKIP TO Q-15 AT THE TOP OF PAGE 3.

(If yes)

Q-9. Have you used this provision in the past?

- 1 NO
2 YES

IF YOU ANSWERED "NO" TO Q-9, SKIP FROM HERE TO Q-14 ON THIS PAGE.

(If yes)

Q-10. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
2 2 TO 5 YEARS AGO
3 MORE THAN 5 YEARS AGO

Q-11. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
2 2 - 5 TIMES
3 MORE THAN 5 TIMES

Q-12. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
2 IT HAS BENEFITTED ME SOME.
3 IT HAS BENEFITTED ME A LOT.
4 IT HAS NOT BENEFITTED ME.

Q-13. Do you plan to use this provision again in the future?

- 1 NO
2 YES
3 MAYBE

SKIP Q-14, AND CONTINUE WITH Q-15 ON THE NEXT PAGE.

Q-14. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
4 I DON'T WANT TO USE IT
5 OTHER _____ (Please continue with Q-15)

YOU CAN TAKE DEPRECIATION DEDUCTIONS

If you hold forestland as a business or as an investment, you can take annual depreciation deductions on many of the investments you have made in the property. For example, you may take depreciation deductions for fences, tractors, road surfaces, culverts, and other management equipment. By taking annual depreciation deductions, you can lower your overall income tax liability. (Please answer the following questions by circling the appropriate number).

Q-15. Did you know about this tax provision?

- 1 NO
- 2 YES

IF YOU ANSWERED "NO" TO Q-15, SKIP TO Q-22 AT THE TOP OF PAGE 4.

(If yes)

Q-16. Have you used this provision in the past?

- 1 NO
- 2 YES

IF YOU ANSWERED "NO" TO Q-16, SKIP FROM HERE TO Q-21 ON THIS PAGE.

(If yes)

Q-17. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
- 2 2 TO 5 YEARS AGO
- 3 MORE THAN 5 YEARS AGO

Q-18. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
- 2 2 - 5 TIMES
- 3 MORE THAN 5 TIMES

Q-19. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
- 2 IT HAS BENEFITTED ME SOME.
- 3 IT HAS BENEFITTED ME A LOT.
- 4 IT HAS NOT BENEFITTED ME.

Q-20. Do you plan to use this provision again in the future?

- 1 NO
- 2 YES
- 3 MAYBE

SKIP Q-21, AND CONTINUE WITH Q-22 ON THE NEXT PAGE.

Q-21. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
- 2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
- 3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
- 4 I DON'T WANT TO USE IT
- 5 OTHER _____ (Please continue with Q-22)

SECTION 179 DEDUCTION

If you hold forestland as an active business and have active business income, you can elect to take a Section 179 deduction. Under Section 179 you can deduct up to \$100,000 per year of the cost of newly purchased tangible property. For example, computers, machinery, and equipment used in the management of your forestland qualify as Section 179 property. Section 179 allows you to recover an investment in property much more quickly than using just alternative depreciation methods. (Please answer the following questions by circling the appropriate number).

Q-22. Did you know about this tax provision?

- 1 NO
- 2 YES

IF YOU ANSWERED "NO" TO Q-22, SKIP TO Q-29 AT THE TOP OF PAGE 5.

(If yes)

Q-23. Have you used this provision in the past?

- 1 NO
- 2 YES

IF YOU ANSWERED "NO" TO Q-23, SKIP FROM HERE TO Q-28 ON THIS PAGE.

(If yes)

Q-24. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
- 2 2 TO 5 YEARS AGO
- 3 MORE THAN 5 YEARS AGO

Q-25. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
- 2 2 - 5 TIMES
- 3 MORE THAN 5 TIMES

Q-26. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
- 2 IT HAS BENEFITTED ME SOME.
- 3 IT HAS BENEFITTED ME A LOT.
- 4 IT HAS NOT BENEFITTED ME.

Q-27. Do you plan to use this provision again in the future?

- 1 NO
- 2 YES
- 3 MAYBE

SKIP Q-28, AND CONTINUE WITH Q-29 ON THE NEXT PAGE.

Q-28. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
- 2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
- 3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
- 4 I DON'T WANT TO USE IT
- 5 OTHER _____ (Please continue with Q-29)

YOU CAN RECOVER YOUR INVESTMENT THROUGH DEPLETION

As a general rule, when you make an investment in property, you have the right to recover your original investment tax-free when the property is sold. For example, if you purchase land for \$9,000 and sell it for \$10,000, only the \$1,000 gain (\$10,000-\$9,000) is taxable since it is the amount of earnings. Deduction of your investment is known as capital recovery. Depletion is the capital recovery method used to recover your investment in timber when it is sold. If all timber is sold at once, your entire basis would be recovered. Landowners often only sell a portion of their timber, however. When this happens, a portion of the original basis may be deducted based on a calculated depletion unit. For example, if your depletion unit was calculated to be \$5.00 per ton, and you sold timber for \$40.00 per ton, your gain per ton would be \$35 (\$40 per ton - \$5 per ton). (Please answer the following questions by circling the appropriate number).

Q-29. Did you know about this tax provision?

- 1 NO
2 YES
(If yes)

IF YOU ANSWERED "NO" TO Q-29, SKIP TO Q-36 AT THE TOP OF PAGE 6.

Q-30. Have you used this provision in the past?

- 1 NO
2 YES
(If yes)

IF YOU ANSWERED "NO" TO Q-30, SKIP FROM HERE TO Q-35 ON THIS PAGE.

Q-31. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
2 2 TO 5 YEARS AGO
3 MORE THAN 5 YEARS AGO

Q-32. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
2 2 - 5 TIMES
3 MORE THAN 5 TIMES

Q-33. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
2 IT HAS BENEFITTED ME SOME.
3 IT HAS BENEFITTED ME A LOT.
4 IT HAS NOT BENEFITTED ME.

Q-34. Do you plan to use this provision again in the future?

- 1 NO
2 YES
3 MAYBE

SKIP Q-35, AND CONTINUE WITH Q-36 ON THE NEXT PAGE.

Q-35. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
4 I DON'T WANT TO USE IT
5 OTHER _____ (Please continue with Q-36)

REFORESTATION TAX CREDIT

A tax credit is a calculated amount which can be directly subtracted from the taxes you owe. For example, if you fill out a form 1040 and find that you owe \$20,000 in taxes, and you also have a \$3,000 tax credit, then you only pay \$17,000 in taxes. The Reforestation Tax Credit provision allows individuals to take 10% of expenses incurred to establish or reestablish trees on an area as a tax credit. The maximum amount you can take is 10% of \$10,000 in reforestation expenses –or \$1,000– per year. (Please answer the following questions by circling the appropriate number).

Q-36. Did you know about this tax provision?

1 NO →

2 YES

(If yes)

IF YOU ANSWERED "NO" TO Q-36, SKIP TO Q-43 AT THE TOP OF PAGE 7.

Q-37. Have you used this provision in the past?

1 NO →

2 YES

(If yes)

IF YOU ANSWERED "NO" TO Q-37, SKIP FROM HERE TO Q-42 ON THIS PAGE.

Q-38. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
- 2 2 TO 5 YEARS AGO
- 3 MORE THAN 5 YEARS AGO

Q-39. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
- 2 2 - 5 TIMES
- 3 MORE THAN 5 TIMES

Q-40. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
- 2 IT HAS BENEFITTED ME SOME.
- 3 IT HAS BENEFITTED ME A LOT.
- 4 IT HAS NOT BENEFITTED ME.

Q-41. Do you plan to use this provision again in the future?

1 NO →

2 YES →

3 MAYBE →

SKIP Q-42, AND CONTINUE WITH Q-43 ON THE NEXT PAGE.

Q-42. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
- 2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
- 3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
- 4 I DON'T WANT TO USE IT
- 5 OTHER _____ (Please continue with Q-43)

AMORTIZATION OF REFORESTATION COSTS OVER 8 YEARS

If you incur costs to reforest an area (establish or reestablish trees) then you can amortize up to \$10,000 per year of reforestation expenses over an eight year period. To amortize means to deduct over time. For example, if you spent \$10,000 one year to reforest an area, you could deduct a portion of the \$10,000 each year until you had deducted the entire \$10,000 by the end of the eighth year. An individual can elect to take both the reforestation tax credit discussed earlier as well as amortize costs. If you take the credit, however, you can only amortize 95% of reforestation costs. Therefore, the maximum allowable by law would be \$9,500. (Please answer the following questions by circling the appropriate number).

Q-43. Did you know about this tax provision?

- 1 NO
2 YES

(If yes)

IF YOU ANSWERED "NO" TO Q-43, SKIP TO Q-50 AT THE TOP OF THE PAGE 8.

Q-44. Have you used this provision in the past?

- 1 NO
2 YES
(If yes)

IF YOU ANSWERED "NO" TO Q-44, SKIP FROM HERE TO Q-49 ON THIS PAGE.

Q-45. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
2 2 TO 5 YEARS AGO
3 MORE THAN 5 YEARS AGO

Q-46. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
2 2 - 5 TIMES
3 MORE THAN 5 TIMES

Q-47. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
2 IT HAS BENEFITTED ME SOME.
3 IT HAS BENEFITTED ME A LOT.
4 IT HAS NOT BENEFITTED ME.

Q-48. Do you plan to use this provision again in the future?

- 1 NO
2 YES
3 MAYBE

SKIP Q-49, AND CONTINUE WITH Q-50 ON THE NEXT PAGE.

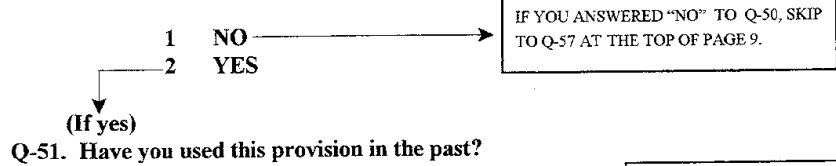
Q-49. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
4 I DON'T WANT TO USE IT
5 OTHER _____ (Please continue with Q-50)

YOU CAN EXCLUDE COST SHARE PAYMENTS FROM GROSS INCOME

Under Section 126 of the Internal Revenue Code, you can exclude from gross income a calculated part of qualifying government cost-share payments made for certain conservation or environmental improvements. For example, a portion of cost-share payments to establish or reestablish trees, protect watersheds, create wildlife habitat, and reclaim disturbed mine areas is often excludable from gross income. If the property being improved by the cost-share payment has produced substantial income during the 3 years prior to receipt of the cost share payment, it is likely that most or all of the payment may be excludable. Most Federal and some state programs qualify. (Please answer the following questions by circling the appropriate number).

Q-50. Did you know about this tax provision?



Q-56. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
- 2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
- 3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
- 4 I DON'T WANT TO USE IT
- 5 OTHER _____ (Please continue with Q-57)

LOSS DEDUCTIONS

If your timber is destroyed by a natural or man-caused disaster, stolen, or dies from insect or disease attack, you can take a deduction for the amount you had invested—your basis—in the lost timber. This includes public condemnations. Note that if the return from a salvage harvest, court award, insurance settlement, etc., is more than your basis in the timber, you will have a taxable gain instead of a loss. (Please answer the following questions by circling the appropriate number).

Q-57. Did you know about this tax provision?

- 1 NO
2 YES

IF YOU ANSWERED "NO" TO Q-57, SKIP TO Q-64 AT THE TOP OF PAGE 10.

(If yes)

Q-58. Have you used this provision in the past?

- 1 NO
2 YES

IF YOU ANSWERED "NO" TO Q-58, SKIP FROM HERE TO Q-63 ON THIS PAGE.

(If yes)

Q-59. When was the last time you used this provision?

- 1 ON MY LAST TAX RETURN
2 2 TO 5 YEARS AGO
3 MORE THAN 5 YEARS AGO

Q-60. About how many times have you used this provision since acquiring your forestland?

- 1 1 TIME
2 2 - 5 TIMES
3 MORE THAN 5 TIMES

Q-61. How would you describe the financial benefit of this provision?

- 1 IT HAS BENEFITTED ME A LITTLE.
2 IT HAS BENEFITTED ME SOME.
3 IT HAS BENEFITTED ME A LOT.
4 IT HAS NOT BENEFITTED ME.

Q-62. Do you plan to use this provision again in the future?

- 1 NO
2 YES
3 MAYBE

SKIP Q-63, AND CONTINUE WITH Q-64 ON THE NEXT PAGE.

Q-63. Why haven't you used this provision? (Choose the best answer)

- 1 IT'S TOO COMPLICATED TO UNDERSTAND
2 THE BENEFIT ISN'T LARGE ENOUGH TO BOTHER WITH
3 IT DOESN'T APPLY TO MY SITUATION BECAUSE _____
4 I DON'T WANT TO USE IT
5 OTHER _____ (Please continue with Q-64)

DEMOGRAPHIC QUESTIONS

Please answer the following questions that address demographic information that we will use for research purposes only. This information will be kept strictly confidential and will be reported only in aggregate form. (Circle the number which applies to you.)

Q-64. How many acres of land do you own, altogether?

- | | | | |
|---|-----------|---|-------------|
| 1 | 1 - 9 | 6 | 200 - 499 |
| 2 | 10 - 19 | 7 | 500 - 999 |
| 3 | 20 - 49 | 8 | 1000 - 4999 |
| 4 | 50 - 99 | 9 | 5000+ |
| 5 | 100 - 199 | | |

Q-65. How many acres of forestland do you own?

- | | | | |
|---|-----------|---|-------------|
| 1 | 1 - 9 | 6 | 200 - 499 |
| 2 | 10 - 19 | 7 | 500 - 999 |
| 3 | 20 - 49 | 8 | 1000 - 4999 |
| 4 | 50 - 99 | 9 | 5000+ |
| 5 | 100 - 199 | | |

Q-66. What would you say is the single most important reason for you owning forestland?

- | | | | |
|---|-----------------------------------------------|---|-------------------|
| 1 | TO PROVIDE PRODUCTS I USE FOR MY FARM OR HOME | | |
| 2 | PART OF MY RESIDENCE | 5 | RECREATION |
| 3 | ESTHETIC ENJOYMENT | 6 | TIMBER PRODUCTION |
| 4 | PART OF MY FARM | 7 | LAND INVESTMENT |
| 8 | OTHER REASONS NOT LISTED | | |

Q-67. Do you belong to a forest landowner organization?

- 1 YES
- 2 NO

Q-68. Do you have a written forest management plan?

- 1 YES
- 2 NO

Q-69. What is the highest level of formal education you have completed?

- | | | | |
|---|---------------------------|---|--------------------|
| 1 | ELEMENTARY SCHOOL | 4 | COLLEGE DEGREE |
| 2 | HIGH SCHOOL OR EQUIVALENT | 5 | SOME GRADUATE WORK |
| 3 | SOME COLLEGE | 6 | GRADUATE DEGREE |

Q-70. What year did you acquire your INITIAL piece of forestland? (Please give the year in the blank below)

(Year)

Q-71. How far do you live from your NEAREST forestland ownership?

- 1 MY FORESTLAND IS PART OF MY HOMESTEAD OR RESIDENCE.
- 2 LESS THAN 1 MILE
- 3 2 - 5 MILES
- 4 6 - 15 MILES
- 5 16 - 25 MILES
- 6 26 - 50 MILES
- 7 50+ MILES

Q-72. What is your occupation?

- 1 BLUE COLLAR OR CLERICAL
- 2 WHITE COLLAR OR PROFESSIONAL
- 3 FARMER
- 4 HOMEMAKER
- 5 RETIRED
- 6 OTHER

Q-73. When filing your taxes, which of the following do you normally do?

- 1 PREPARE THE TAX FORMS YOURSELF
- 2 HAVE A PROFESSIONAL TAX PREPARER FILL OUT THE FORMS
- 3 OTHER _____
(please explain)

Q-74. Have you ever had timber harvested from your lands?

- 1 NO
- 2 YES

Q-75. Do you plan to harvest timber from your lands sometime in the future?

- 1 YES
- 2 NO
- 3 MAYBE

Q-76. Prior to reading this survey, were you aware that several programs at the federal and state levels are available to provide cost-share payments for qualified conservation purposes?

- 1 YES
- 2 NO

Q-77. What is your age? (Please fill in the blank below)

_____ YEARS

(PLEASE TURN TO THE BACK COVER)

ARE THERE ANY ADDITIONAL COMMENTS OR QUESTIONS YOU WOULD LIKE TO MAKE CONCERNING THIS STUDY OF THE AWARENESS AND USE OF INCOME TAX PROVISIONS AVAILABLE TO FOREST LANDOWNERS? ANY COMMENTS WHICH YOU FEEL WOULD HELP US IMPROVE LANDOWNER AWARENESS OR HELP US IMPROVE ON UNDERSTANDING WHY OR WHY NOT THE TAX PROVISIONS ARE USED IS WELCOMED AND APPRECIATED

COMMENTS SECTION:

(Feel free to write your comments and questions in this blank section.)

THANK YOU FOR CONTRIBUTING TO THIS STUDY. IF YOU WOULD LIKE A COPY OF THE RESULTS OF THIS STUDY MAILED TO YOU, PLEASE PRINT YOUR NAME AND ADDRESS ON THE BACK OF THE RETURN ENVELOPE. (PLEASE DO NOT PRINT YOUR NAME AND ADDRESS ON THIS QUESTIONNAIRE). I WILL ENSURE THAT YOU RECEIVE ONE.

Appendix C
Survey Response Rate for the Nationwide Survey
and the Northern, Southern, and Western Regions

Originally, 2000 mail surveys were sent out. Three restricted random samples were drawn from the Tree Farm member list of 55,392 names. Once the decision was made to send out 2,000 questionnaires, three random samples were drawn: one from the Southern Region, one from the Northern Region, and one from the Western Region. Sample sizes for each of the three regions were based on the proportion of the 55,392 members that lived in each region (Table C-1).

Table C-1. Mail survey response rates for each region and at the national level.

	SOUTH	NORTH	WEST	TOTAL
ORIGINAL SAMPLE SIZE	992	825	183	2000
<i>BAD ADDRESSES</i>	113	54	13	180
<i>DECEASED</i>	18	7	5	30
<i>SOLD LAND</i>	9	11	2	22
ACTUAL SAMPLE SIZE	852	753	163	1768
RESPONSES	351	410	89	850
RESPONSE RATE	0.41	0.54	0.55	0.48

Southern Region

Originally 992 questionnaires were mailed to the Southern Region. Unfortunately, 113 questionnaires were mailed to bad addresses, 18 people selected to participate were deceased, and 9 had sold their land. As a result, the actual sample size of questionnaires that went to valid, living landowners consisted of 852 people (Table C-1). Three hundred and fifty-two of the 852 selectees responded which resulted in a response rate of 41 percent for the Southern Region.

Northern Region

Originally 825 questionnaires were mailed to the Northern Region. Unfortunately, 54 questionnaires were mailed to bad addresses, 7 people selected to participate were deceased, and 11 had sold their land. As a result, the actual sample size of questionnaires that went to valid, living landowners consisted of 753 people (Table C-1). Four hundred and ten of the 753 selectees responded which resulted in a response rate of 54 percent for the Northern Region.

Western Region

Originally 183 questionnaires were mailed to the Western Region. Unfortunately, 13 questionnaires were mailed to bad addresses, 5 people selected to participate were deceased, and 2 had sold their land. As a result, the actual sample size of questionnaires that went to valid, living landowners consisted of 163 people (Table C-1). Eighty-nine of the 163 selectees responded which resulted in a response rate of 55 percent for the Western Region.

One other note of importance about the Western Region sample is that 50 of the 89 respondents are from Washington, Oregon, and California. That is 56 percent of the western sample came from these three states. This is not a problem since these three states represent a major portion of the timber management activities in the West. However, when the western results from the survey are studied, one should be aware that over one-half of the response came from these three states.

Nation-wide

National response rate was calculated by pooling all three regions. The response rate was calculated by dividing total questionnaires mailed to valid living landowners by the total of responses. The national response rate is 48 percent.

Vita

Nathan Ryan Smith was born on July 10, 1974 in Baytown, Texas. He was reared in Livingston, Texas and graduated from Livingston High School in Livingston, Texas in May 1992. He became interested in forestry after attending a two-week summer forestry camp sponsored by the USDA Forest Service during the summer of 1991. After graduating high school, he attended Stephen F. Austin State University in Nacogdoches, Texas where he earned a Bachelor of Science in Forestry with a second major in Spanish in 1997.

During college he worked as a research intern for Champion International Corporation and also assisted in land management and wood procurement. After graduation, he worked for Tom Crater and Associate Consulting Foresters in Lufkin, Texas for eighteen months. He then worked for Temple-Inland Forest Products Corporation in Diboll, Texas for 3 years where he served in quality control, harvest supervision and timber management. He resigned from Temple-Inland to pursue a Master of Science in Forestry with an emphasis in Resource Management and Economics at Virginia Tech which he will receive in 2004. He is happily married to Shana Smith.