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## Abstract

Rural appraisers should be aware of the important contribution wildlife values and hunting leases make to forestland value. Many rural appraisals take place on small family holdings that constitute about 62 percent of private forestland in the United States. Roughly 12 percent of these small forest holdings are leased for hunting or some other recreational use, producing significant annual revenue. The methodology to value these contributions is described. Using southern hunting lease revenues and a six percent real discount rate, hunting leases increased forestland values by \$184.00 per acre on average, certainly a significant contribution to value.

## Contribution of Wildlife to the Value of U.S. Southern Forestland

By Thomas J. Straka

### Introduction

There are about 12.5 million paid hunting license holders, 16 years of age or older, in the United States. Their interest ranges from small game birds such as quail to larger game species like white tailed deer. They generated nearly \$23 billion of economic activity in 2006 (spending over \$700 million on hunting licenses alone). Over 10 million of these sportsmen, or 82 percent, hunt on privately-owned land (USDI, 2007).

Due to federal land ownership patterns, the vast majority of the nation's private forestland is in the eastern United States and large amounts of public lands are in the West. The Rocky Mountains region is about three-quarters public land and the Great Plains is about two-thirds public land. It is reversed in the eastern United States where three-quarters of forestland is privately owned (Smith et al., 2009). This means in the eastern United States, hunting takes place predominately on private lands (Butler, 2008).

Much of this hunting takes place on lands leased for hunting, creating an issue for rural appraisers as significant annual cash flows may result from these leases, contributing to the land value. The annual nature of hunting lease income provides steady cash flow, an advantage offered by few other enterprises on forestland. The focus of this article is the incremental component value of these hunting leases to forestland value. While this study concentrates on private lands in the South (public lands generally are not leased for hunting), results apply to forestlands across the United States.



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## The Hunting Lease

The concept of a private value of hunting wildlife originated in Central Europe. Medieval royalty perceived hunting as recreation and a pastime to develop skills of war during times of peace and as an opportunity to enjoy time with fellow nobility (MacKenzie, 1988). In 1800 the first formal hunting lease on record granted English gentry the right to hunt all game on the Albergeldie Estate in Scotland for a ten year period (Whitehead, 1980). Some of the early colonists may have been attracted to the Americas by the opportunity for “free” hunting rights, rather than the dangerous illegal poaching of the “King’s” deer (Baen, 1997). During the 1930s, Texas ranchers understood that hunting and wildlife management could be compatible with traditional natural resource operations and developed the groundwork for hunting leases in the U.S. Today, many private landowners (corporate, industrial, and family forest owners) have made hunting leases commonplace, especially in the Southeast, where wildlife management and hunting demand has fused with timber and agricultural operations (Yarrow, 1998).

Landowners do not own the wildlife inhabiting their property; wildlife exists as a public good. They do however own the access right on their land and any wildlife populations residing on the property. Private property rights grant the landowner the choice of who may legally access his/her land and what may occur. A hunting lease is an agreement between a lessor (landowner) and lessee (sportsman) which grants the lessee access rights to the landowner’s property for a pre-determined time period in order to hunt the agreed upon game species and participate in any other specified activities. A fee is commonly paid to the landowner, but in some instances, the land owner may ask the lessee to perform a service (e.g., provide security, maintain roads, or plant wildlife cover) on the land as payment.

There are four common types of agreements (Yarrow, 2009):

- Short-term
  - Generally range from one day to a week in length.
  - Can often be management-intensive with unpredictable future income.
- Long-term
  - Also known as annual multiple-year leases, can often provide the landowner with steady income.
- Charge by species and/or characteristics of animal harvested
  - Charge on a per-animal-harvested rate or based on animal characteristic such as size, sex, or antler development.

- The landowner may charge a daily fee as well as an extra fee for trophy game harvested.
- Outfitter/broker
  - Lease access rights to hunting club, sportsmen’s club, or outfitter.
  - The organization or individual manages access and controls hunters with regards to landowner’s specifications.

Additional forms of fee hunting include commercial memberships, shooting preserves, and permits (Yarrow, 2003). While granting the hunter access to private land with a paid fee, the management direction of these additional sources may become primarily focused on game populations and not forestland. Hunting is a dangerous activity and liability issues exist on both public and private forestlands open to hunting. Hunting leases on private lands normally include a clause to hold the lessor harmless against claims of loss, damage, and liability. Liability insurance is now a standard hunting lease requirement (Yarrow, 2009). Hunting leases can actually offer advantages to reduce liability, like restricting access to the land by the general public. But they also produce liability issues that should be addressed in determining the overall value of a hunting lease operation.

The U.S. total forestland area has remained relatively stable since the early 1900s. Although urban development has reduced the total acreage of forestland, afforestation and reduced conversions into agricultural land have tended to make up the difference (Smith et al., 2007). However, private lands open to hunting have decreased with increasing population pressure, leading to a declining per capita availability of private forestland available for recreation and hunting (Cordell, 2008). This corresponds to a general decrease in the supply of open recreational access on privately owned lands, causing a reduction in the accessibility of forests and grasslands to the general public (Mozumder et al., 2007). Due to this trend, the hunting lease has provided an increasing number of forestland owners with valuable additional income and management options.

The availability of the hunting lease option to a forestland owner greatly depends on the combination of game animal species present on the land, the hunting pressure demand for those game species, and the density of game species population in the area. The game species covered in hunting leases tend to be subject to regulatory laws, and are negotiated by the landowner and lessee. The same factors that determine forestland prices do not apply precisely to hunting leases;

generally, large and healthy populations of preferred high demand game species specimens lead to a market for hunting leases. Location relative to hunter populations also plays a role. Hunting lease revenue per acre can be variable within a region due to factors like knowledge of surrounding competition's lease price, game species, and property amenities (Rhyne and Munn, 2008; Stribling et al., 1992; Zhang, Hussain, and Armstrong, 2006).

Various factors account for the inconsistency of hunting lease fees across regions and states. One study in Mississippi found that hunting lease fees increased with the size of the tract leased and the amount of wildlife habitat improvement expenditures (Munn et al., 2005). Also, simple familiarity with hunting leases is a factor. Hunting leases are more common in some regions and people expect to pay for quality hunting as a matter of tradition. Recreational hunting activities vary throughout the world, but they all entertain the interests of a successful harvest and/or continuance of a family tradition. Few hunters have the luxury to journey into their "backyard" in search of wild game. Most end up searching for game habitat based on the hunter's knowledge of the land, game population, and successful harvest rate of the area. Hunters are more willing to affix a premium to the land that offers higher hunting success and better hunting experiences (Zhang, Hussain, and Armstrong, 2006), and when this land is privately owned a correspondingly higher price can be charged by the landowner for access to the hunting opportunity.

### Hunting Leases on Private Land

Family and individual-owned forests, often referred to as family forests, include forestland owned by individuals, couples, estates, trusts, or other groups of unincorporated individuals. These family forests were found to represent 92 percent of the private forest owners in the U.S. and 62 percent of the private forestland (Smith et al., 2009). Table 1 shows the percentage of family forest owners and acreages, in each state, that were leased for hunting where monies were collected (other than from logging) for allowing people to use the woodland for hunting leases (Butler, 2008).

Table 1 also provides an indication of the national private hunting lease market. It is a market dominated by the South, a region with a deep tradition of hunting and timber production, with an estimated 41,000 family forest owners providing hunting leases across 13,720,000 acres of forestland. As a result, nearly 13 percent of family forestland in the region is leased for hunting. In contrast, the North contains about 43 percent of eastern family forest acreage and has only 2 percent leased for hunting (Butler, 2008).

The U.S. population is centered in the North (U.S. Census Bureau, 2010). The American West has some of the highest percentages of family forestland acreage leased for hunting with several states leasing greater than eight percent and New Mexico leasing 33.35 percent. Although these percentages are impressive, the western private lands account for a small proportion of total forestland in the region. The family forestland owners of all western states total to less than half of the North region's owners and less than one-sixth of the South region's owners. In terms of acres leased for hunting, the South has over 70 percent of the private family forest area leased for hunting.

Hunt-lease programs offer more than increased cash flows to forest owners. Trespassing or poaching is a common concern among family forest owners that participated in hunting lease activities. These uninvited guests have been known to cut and steal timber, poach wildlife and plant species, and even start forest fires. Two primary benefits from hunting leases are public relations (building relationships with neighbors and the local community) and reduction of property damage (Gynn and Marsinko, 2003). Reduction of property damage occurs because the leasee gains an active interest in the property and usually spends considerable time scouting and recreating on the property outside of actual hunting time. "These protection benefits occur when hunt clubs and individuals act as an (monetarily) unpaid police force to limit trespassing on industrial lands and reduce property damage (Morrison, Marsinko and Gynn, 2001)". In effect, the leasee performs a security guard function. Also, an active hunting program on a property can help control wildlife populations where agricultural crop damage is a problem (Conover, 2001).

### Trends in Hunting Leases

Hunting leases tend to occur more often on larger tracts (Zhang, Hussain, and Armstrong, 2006; Butler, 2008) which produce higher per acre hunting fees (Standiford and Howitt, 1993; Pope and Stoll, 1985; Messonnier and Luzar, 1990; Rhyne and Munn, 2008). Non-industrial private forest landowners in Mississippi who leased their land for hunting owned twice as much land as those who did not (Jones et al., 2000). Figure 1 shows a similar relationship on family forestlands. Tracts between 1,000 and 4,999 acres were most popular for hunting leases and those between 500-999 acres seemed to be relatively less popular. The impact of the North region's population density is also apparent, as the region has the highest percentage of leasing on smaller tracts. Oregon, Washington, and California have large continuous tracts of forestland and it's not surprising to observe high hunting lease participation in the two largest tract categories.

The forest industry consolidated during the 1990s and a few firms ended the decade controlling a very large proportion of timberland (Morrison, Marsinko and Guynn, 2001). The forest industry often leased hunting rights to state programs where public hunting is allowed in Wildlife Management Areas (WMA). After consolidation, the forest industry was more sensitive to return on investment and often shifted to private hunting leases that usually offered higher fees. By 1999, the lease fees to public WMA programs had increased 600 percent to \$1.72 per acre and lease fees to private hunting clubs/individuals increased 180 percent to \$3.92 per acre. Overall, the percentage of the total landholdings involved in hunting lease programs on forest industry lands increased from about two-thirds in 1984 to nearly 84 percent in 1999 (Guynn and Marsinko, 2001). Forest industry found hunting lease revenue to be an excellent source of annual revenue, valuable public relations, and a land security program.

The last few decades have witnessed forest industry land ownership shifting to Timberland Investment Management Organizations (TIMOs), where demands for access control and public relations are often huge concerns. Forest industry and timber investment management organizations (TIMO) were contacted by the author to obtain current hunting lease fees. Many TIMO managers considered their hunting leases to be underpriced. A large amount of TIMO land was purchased from the forest industries, with most existing hunting leases transferred as well. Unlike forest industry, these TIMOs have minimal on-site supervision of their forestlands, making access control and public relations vital functions to prevent unwanted intrusions on their holdings. Thus, many TIMOs have maintained hunting lease fees at levels lower than the market would bear simply to maintain these vital functions on their tracts. They recognize they are giving up significant incremental hunting lease revenue, but the increased tract security and public relations more than pay for the difference (Healey, Corriero, and Rozenov, 2005). TIMOs may be following a similar trend of the 1999 forest industries; nearly 88 percent of the southeastern forest-industry landowners considered residence of lessees when awarding hunting leases (Marsinko, Guynn and Roach, 1998).

### Land Expectation Value

Land expectation value (LEV) is a discounted cash flow (DCF) analysis technique using the income capitalization approach to value bare forestland. It is also called soil expectation value or bare land value and sometimes is referred to as the Faustmann formula (named after the nineteenth century European tax appraiser who developed

the concept). LEV determines the net present value of perpetual timber rotations on bare land. It is the maximum price that should be paid if a rate of return equal to the discount rate used in the LEV calculation is expected (Straka and Bullard, 1996). The land expectation value must be calculated for a specific site, species, management regime, and rotation age (cutting cycle) with respect to site quality, costs, prices, and interest rate (Bullard and Straka, 1998).

LEV is a special case of net present value (NPV) where all present and future revenues and costs expected from a tract of land are considered (Bullard and Straka, 1998). On an even-age management schedule, the individual costs and revenue occurring during the period of one rotation, or cutting period, are compounded to the end of the first rotation. The cost should then be subtracted from the revenues, resulting in the net future value (NFV) of one timber rotation expected in perpetuity. The present value (PV) of the infinite series of identical rotations is then calculated by using the PV of a perpetual periodic series formula, dividing NFV by  $[(1+i)^n - 1]$ :

$$(1) \quad LEV = \frac{NFV}{(1+i)^n - 1}$$

where “ $i$ ” represents the interest rate expressed as a decimal and “ $n$ ” represents the length (in years) of one timber rotation (Straka and Bullard, 1996).

In order to realize the individual effects of annual costs or revenues during the cutting cycle, we need to expand the LEV formula as the present value of a perpetual series of periodic “net values:”

$$(2) \quad \frac{[Net\ Timber\ Revenue] \pm a \left[ \frac{(1+i)^n - 1}{i} \right]}{(1+i)^n - 1}$$

Simplifying this equation produces:

$$(3) \quad \frac{[Net\ Timber\ Revenue]}{(1+i)^n - 1} \pm \frac{a}{i}$$

where *Net Timber Revenue* is the timber revenue expected every  $n$  years, and  $a$  represents the annual revenue or annual cost. The annual cost or revenue is separated from the main formula so that the impacts of the capitalized cost or revenue can be observed individually. LEV is considered the standard discounted cash flow analysis technique to value timberland and Equation (3) shows that the hunting lease component can be valued in the approach as a perpetual annual income stream and dividing hunting lease revenue by the discount rate which produces its contribution to LEV.



The net value at rotation is sensitive to all revenues and costs associated with growing timber on the land in perpetuation. Hunting leases, particularly in the South, provide forest landowners with revenue that can match and even offset reoccurring costs. A common practice of landowners has been to provide hunting leases at a price relative to the property tax rates, often between \$5.00 to \$10.00 per acre in the South (Guynn and Marsinko, 2003; Butler, 2008; Cook, 2007). The southeastern forest industries implemented private and public hunting-lease programs across millions of acres of forestland from 1984-1999. The hunting leases role as an additional revenue source became obvious to many forest industries as the rate of respondents with hunting leases rose to 100 percent (Guynn & Marsinko, 2003). The average hunting lease price of the survey year is displayed in Table 2 and represents what was commonly obtained.

The 1999 Southeastern forest industry hunting lease prices were adjusted to current 2010 purchasing power by using the United States Department of Labor's CPI Inflation Calculator (USDL, 2010). Thus, the estimates displayed in Table 3 are in nominal terms, including inflation averaging 2.5 percent annually over the period. The 2010 average net contribution of hunting lease revenue on LEV (using a 6% real interest rate that is customary today for forest industry and TIMO investments) in the South was found to be \$184.00 per acre. When this 2010 value from Table 3 is applied to tracts of forestland more often associated with hunting leases in the U.S. from Figure 1, the influences become quite noticeable. Leasing a large tract, for example 5,000 acres, could result in a value contribution from hunting lease revenue of \$920,000 in nominal terms.

This estimate is likely on the conservative side for hunting lease revenue. Forestlands involved in greater levels of wildlife management, considered prime hunting areas, and/or are manipulated to comfort the leasee will often fetch a much higher price. Commercial hunting camps and plantations often cater to the hunter and may provide hunting guides. Hunting leases on such forestland have been known to sell for up to \$50 per acre in South Carolina. Although these prices are rare, the appraiser should realize the significant contribution to forestland values.

## Conclusion

Hunting leases in the U.S. have developed through the centuries into influential programs on forest industry, institutional, and private family forestlands. The implementation and increase in lease fees has provided many landowners with an enhanced revenue stream. As lands once available for public hunting access decline, the need for supplemental lands will continue to exist. The additional benefits derived from hunting leases, such as land protection, represent important nonmonetary benefits to many forestland owners.

Recent trends within the forest products industry have caused a number of forest land owners to ponder whether they should convert their forestlands to other uses. The land values established by appraisers can have great influences on such decisions. Appraisers should be aware that the existence of a hunting lease on forestland can represent a significant additional annual positive cash flow. The LEV model can be easily adapted to most forestland management plans and should be a part of the appraiser's tool bag.

Forestland value has been traditionally associated with timber value, the main commercial product that produces revenue. Of course, timber continues to be the main commercial product. However, other values resulting from multiple use of the forest have become quite significant. Family forest landowners (who control over 60% of private forestland in the nation) list scenic beauty, nature protection, hunting and fishing, and other recreation as higher priorities than timber production (Butler, 2008). Appraisers who take a traditional approach to forestland valuation and concentrate on timber values may find that nontraditional forest commodities like recreation, hunting, and aesthetics are contributing much more to forest land values than they thought. In appraising forestland value, clearly these values have become major components of the utility forest owners receive from their properties and ignoring them can seriously understate appraisal results.

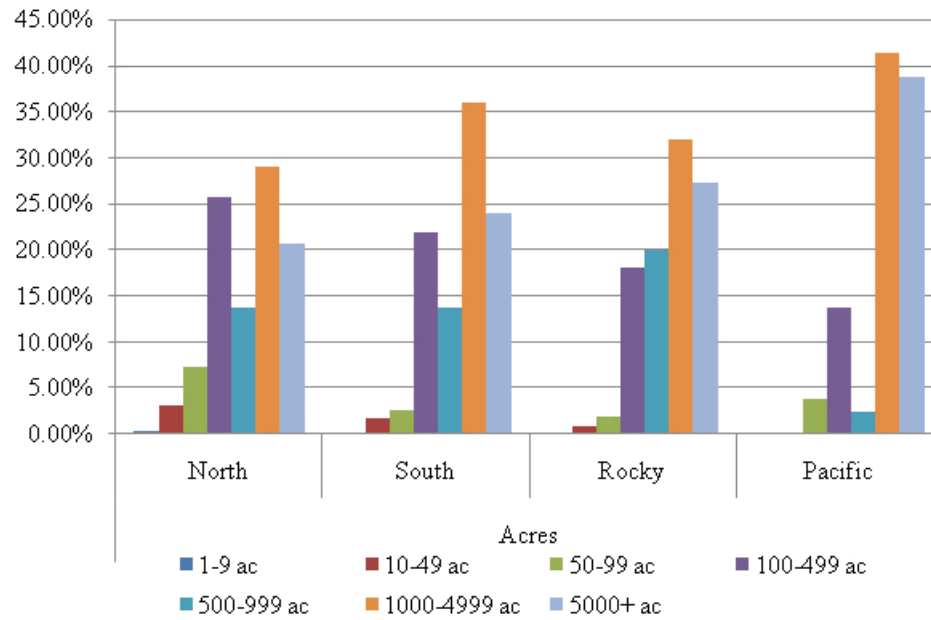
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*Figure 1. Percent of family forestland leased for hunting by tract size and region*



*Table 1. Percentage of family forestland owners participating in hunting leases and acres leased for hunting (National Woodland Owner Survey; Butler 2008)*

| State/Region       | Acres<br>(Percent) | Owners<br>(Percent) | State/Region             | Acres<br>(Percent) | Owners<br>(Percent) |
|--------------------|--------------------|---------------------|--------------------------|--------------------|---------------------|
| <b>South</b>       |                    |                     | New York                 | 2.05               | 0.17                |
| Alabama            | 17.81              | 1.04                | Ohio                     | 3.33               | 0.61                |
| Arkansas           | 10.24              | 0.60                | Pennsylvania             | 1.87               | 0.43                |
| Florida            | 5.29               | 1.24                | Rhode Island             | 0.00               | 0.00                |
| Georgia            | 14.74              | 0.62                | Vermont                  | 2.06               | 0.00                |
| Kentucky           | 1.72               | 0.22                | West Virginia            | 3.12               | 0.47                |
| Louisiana          | 25.79              | 4.00                | Wisconsin                | 1.33               | 0.29                |
| Mississippi        | 19.78              | 1.85                | North Total:             | 2.00               | 0.33                |
| North Carolina     | 4.77               | 0.43                | <b>Rocky Mountain</b>    |                    |                     |
| Oklahoma<br>(east) | 5.23               | 0.00                | Arizona                  | 0.00               | 0.00                |
| South Carolina     | 7.73               | 0.79                | Colorado                 | 17.65              | 0.00                |
| Tennessee          | 5.67               | 0.60                | Idaho                    | 0.00               | 0.00                |
| Texas (east)       | 32.24              | 3.48                | Kansas                   | 8.35               | 2.04                |
| Virginia           | 5.83               | 0.76                | Montana                  | 5.25               | 0.00                |
| South Total:       | 12.80              | 0.97                | Nebraska                 | 8.18               | 1.89                |
| <b>North</b>       |                    |                     | New Mexico               | 33.35              | 1.82                |
| Connecticut        | 0.00               | 0.00                | North Dakota             | 0.00               | 0.00                |
| Delaware           | 0.00               | 0.00                | South Dakota             | 11.65              | 0.00                |
| Illinois           | 3.28               | 0.04                | Utah                     | 14.43              | 0.00                |
| Indiana            | 0.74               | 0.00                | Wyoming                  | 2.26               | 0.00                |
| Iowa               | 1.45               | 0.69                | Rocky Mountain<br>total: | 13.77              | 0.79                |
| Maine              | 2.45               | 0.00                | <b>Pacific Coast</b>     |                    |                     |
| Maryland           | 3.27               | 0.00                | Alaska (coastal)         | 0.00               | 0.00                |
| Massachusetts      | 0.00               | 0.00                | California               | 8.86               | 0.51                |
| Michigan           | 2.09               | 0.49                | Oregon                   | 7.24               | 0.69                |
| Minnesota          | 1.50               | 0.53                | Washington               | 2.27               | 0.00                |
| Missouri           | 1.92               | 0.62                | Pacific Coast<br>total:  | 7.08               | 0.35                |
| New Hampshire      | 0.81               | 0.81                |                          |                    |                     |
| New Jersey         | 0.00               | 0.00                | U.S. Total:              | 8.39               | 0.63                |

*Table 2. Forest industry hunt-lease fees in the southeastern United States from 1984-1999 (Gynn and Marsinko 2003)*

| Year     | Lease Fees Revenue (\$/acre) |        | Administrative Costs (\$/acre) |
|----------|------------------------------|--------|--------------------------------|
|          | Hunt Clubs                   | Public |                                |
| 1984     | 1.56                         | 0.25   | 0.82                           |
| 1989     | 2.14                         | 1.33   | 0.41                           |
| 1994     | 2.74                         | 0.66   | 0.68                           |
| 1999     | 3.92                         | 1.72   | 0.70                           |
| Average: | 2.59                         | 0.99   | 0.65                           |

*Table 3. Current estimates of hunting lease contribution towards forestland value using Consumer Price Index values to adjust 1999 southeastern forest industry data*

| Year                         | 1999      |                        |                  | 2010      |                        |                  |
|------------------------------|-----------|------------------------|------------------|-----------|------------------------|------------------|
|                              | Lease Fee | Public Relations Value | Protection Value | Lease Fee | Public Relations Value | Protection Value |
|                              | \$/acre   | \$/acre                | \$/acre          | \$/acre   | \$/acre                | \$/acre          |
| Average Revenue              | 3.92      | 1.86                   | 3.33             | 5.15      | 2.44                   | 4.37             |
| Contribution to LEV          | 65.33     | 31.00                  | 55.50            | 85.83     | 40.67                  | 72.83            |
| Net LEV Contribution         | 53.67     | 31.00                  | 55.50            | 70.50     | 40.67                  | 72.83            |
| Gross Total LEV Contribution | \$151.83  |                        |                  | \$199.33  |                        |                  |
| * Net Total Contribution     | \$140.17  |                        |                  | \$184.00  |                        |                  |

*\* sum of Net LEV components*