

A Survey of Conservation Easement Restrictions on Private Forest Land to
Determine their Effects on Forest Management and Timber Supply.

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Abstract

Conservation easements are increasingly becoming a popular land use control for landowners, government agencies and non-profit conservation organizations. These legal documents restrict a landowner's development rights and constrain other property uses. The landowner (grantor) voluntarily places an easement on his or her property, while the government agency or qualified conservation organization (grantee) holds it in perpetuity.

While the Land Trust Alliance's (LTA) most recent estimate of easement-protected land amounts to nearly 2.6 million acres in 2000, an estimate of forestland protected is nonexistent. Additionally, no empirical studies address forest management on current easements nationwide, although a few studies address forestry at the state- or regional-level. As a result, this survey was designed to address three goals by sampling 1,527 conservation organizations and 63 state government agencies that may hold conservation easements. The first goal estimates total forestland protected. The second goal determines forestry restrictions commonly found in current easements. The third goal ascertains the impact of easements on forest management and timber supply.

Survey results show that over 536 conservation organizations and 20 state agencies hold over 16,025 conservation easements on 4.9 million acres of all land types. Of these totals, a minimum of 3,598 easements protect over 2.5 million forestland acres. Forest management restrictions tend to vary based on the protected property's forest resources. The desires of the grantee holding the easement also influence the type and level of forestry restrictions. To date, conservation easement restrictions do not appear to impact timber supply nationally, although local or regional timber supply may be impacted in the future, especially in the Northeast.

Several conclusions offer technical insights on forestland protection by conservation easements. First, grantees should complete a baseline forest inventory prior to placing an easement on a forested property. This inventory provides a basis for drafting effective easement

provisions and permits future monitoring. Second, grantees should encourage professionally-written forest management plans on every working forest easement. Third, all conservation organizations need to work cooperatively with government agencies in locating potential conservation lands. GIS/GPS technology helps demonstrate the spatial relationship of conservation easements to other government-protected lands, promoting efficient location of properties that augment other protected lands.

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Table of Contents

Abstract.....	ii
Acknowledgements.....	iv
List of Tables.....	vii
List of Figures.....	ix
Chapter 1	
1.1 Introduction.....	1
1.2 Research Significance.....	3
1.3 Background.....	7
1.4 Previous Research.....	11
1.4.1 Grantor-oriented Research.....	11
1.4.2 Grantee-oriented Research.....	12
1.5 Research Plan.....	13
1.5.1 Survey Participants.....	14
1.5.2 Survey Design Principles.....	15
1.5.3 Survey Format.....	15
1.5.4 Data Entry and Analysis	17
1.6 Contributions and Limitations.....	18
Chapter 2 – Easement Statistics Results	
2.1 Survey Response Rates.....	20
2.2 National Conservation Organization and Government Agency Statistics.....	21
2.2.1 Lands Protected by Conservation Organizations.....	21
2.2.2 Conservation Organization Existence.....	23
2.2.3 Conservation Organization Staff Number and Characterization.....	24
2.2.4 Professional Staff Employed by Conservation Organizations.....	27
2.2.5 Practical Assistance Provided by Respondents.....	27
2.2.6 Contact Information Provided by Respondents.....	29
2.3 National and Regional Conservation Easement Statistics.....	31
2.3.1 Regional Breakdown of Data.....	32
2.3.2 Number of Grantees and Easements.....	33
2.3.3 Easements Co-held with Other Organizations and Agencies.....	34
2.3.4 Total Acres Protected by Conservation Easements.....	36
2.3.5 Survey Respondents Retaining Forest Records.....	38
2.3.6 Total Forestland Easements and Acres Protected.....	40
Chapter 3 – Easement Document Results	
3.1 Affirmative Rights.....	45
3.1.1 Conservation Easement Monitoring.....	45
3.1.2 Conservation Easement Enforcement.....	48
3.2 Easement Restrictions.....	50
3.2.1 Common Non-forest Restrictions.....	51
3.2.2 Forest Management Restrictions.....	55

3.3 Reserved Rights.....	59
3.3.1 Reserved Right to Forest Management.....	60
3.3.2 Harvesting on Working Forest Conservation Easements.....	61
3.3.3 Forest Products from Working Forest Conservation Easements.....	63
3.4 Terms, Conditions and Other Provisions.....	64
3.4.1 Requirement of Baseline Inventory.....	64
3.4.2 Forest Stewardship Plan Requirement.....	65
3.4.3 Forestry Restrictions in Easement Document.....	70
3.4.4 Other Specific Clauses.....	70
 Chapter 4 – Discussion	
4.1 Conservation Easement Number and Acreage.....	74
4.2 Baseline Forest Inventory.....	75
4.3 Easement Monitoring.....	77
4.4 Forest Management and Planning.....	78
4.5 Forest Timber Supply.....	80
 Chapter 5 – Conclusions	
5.1 Easement Grantee Conclusions.....	84
5.2 Future Empirical Research.....	85
 Literature Cited.....	87
 Appendix	
A. List of Selected Books on Conservation Easements.....	92
B. Pre-notice Letter.....	93
C. Survey Cover Letter (1).....	94
D. Conservation Organization Questionnaire.....	95
E. Reminder Postcard.....	110
F. Survey Cover Letter (2).....	111
G. Reminder Email.....	112
H. Professional Staff Employed by Conservation Organizations.....	113
I. Geographic Regions of the United States.....	114
J. Major Forest Cover Types of the United States.....	115
K. List of Government Agencies Co-holding Easements with Respondents.....	118
L. List of Organizations Co-holding Easements with Respondents.....	120
M. List of Forestry Violations Encountered by Respondents.....	122
N. Complete List of Non-forest Use Restrictions Provided by Respondents.....	124
 Vita.....	125

List of Tables

	<u>Page</u>
Table 2-1: Survey response rates for conservation organizations and government agencies.....	20
Table 2-2: Other land types protected by respondents and equivalent percentage from Gustanski (1996-1998) and LTA (2001).....	22
Table 2-3: Staff characterization by the number of staff reported, in percent.....	27
Table 2-4: Practical assistance provided by respondents, in percent.....	28
Table 2-5: Respondents providing forestry contacts, in percent.....	30
Table 2-6: Respondents providing non-forestry contacts, in percent.....	31
Table 2-7: Number of grantees and conservation easements by USFS region and the total U.S.....	33
Table 2-8: Number of grantees co-holding easements with other organizations or government agencies.....	35
Table 2-9: Number of organizations and agencies by region that co-hold easements with grantees.....	35
Table 2-10: Property protected by respondents by USFS region and the total U.S. and equivalent total acres from LTA (2001).....	37
Table 2-11: Respondents with forestland records versus organizations holding forest easements with or without forestland records.....	38
Table 2-12: Total forest easements by conservation organizations and government agencies by USFS region and the total U.S.....	40
Table 2-13: Organizational respondents' actual forest acres in records versus possible total forest acres.....	41
Table 2-14: Agency respondents' actual forest acres in records versus approximated total forest acreage.....	44
Table 3-1: Average monitoring frequency of all easements by survey respondents.....	46
Table 3-2: Average monitoring frequency of respondents with forest easements and working forest conservation easements per year.....	46
Table 3-3: Violation statistics and outcomes reported by organizational respondents by USFS region and the total U.S.....	49
Table 3-4: Weighted average of grantee priority to restrict grantor's property uses (high priority = 1 to low priority = 3).....	52

Table 3-5: Respondents restrictions on non-forest property uses, in percent.....	52
Table 3-6: Respondents restrictions on recreational uses, in percent.....	54
Table 3-7: Weighted average of grantee priority to restrict grantor's forest management treatments (high priority = 1 to low priority = 3).....	55
Table 3-8: Respondents constraining the use of clearcutting on all forest easements and working forest easements, in percent.....	58
Table 3-9: Respondents with forest easements and working forest conservation easements allowing salvage operations, in percent.....	59
Table 3-10: Total respondents and numbers of WFCEs per USFS region and the U.S.....	60
Table 3-11: Number of protected properties harvested since easement inception.....	61
Table 3-12: Respondents with WFCEs that allow the respective harvesting technique, in percent.....	62
Table 3-13: Respondents with WFCEs that produce forest products, in percent.....	63
Table 3-14: Respondents completing baseline forest inventories before easement drafting, in percent.....	65
Table 3-15: Respondents requiring a forest stewardship or management plan that accounts for multiple uses on forest easements, in percent.....	66
Table 3-16: Respondents allowing plan revisions to account for unforeseen circumstances, in percent.....	70
Table 3-17: Respondents requiring additional forestry clauses in the easement document or stewardship plan, in percent.....	71
Table 4-1: Respondents' conserved forestland acreage as a percentage of regional and U.S. forestland base from Smith et al. (2001).....	81

List of Figures

	<u>Page</u>
Figure 1-1: Distribution of private ownerships, by size class ownership, United States, 1978 and 1994 (Adapted from Birch (1996), p. 5).....	5
Figure 2-1: Existence distribution of conservation organization respondents, in years.....	24
Figure 2-2: Staff employed by respondents, in percent (n = 383).....	25
Figure 2-3: Staff characterization of organizational respondents, in percent (n = 383).....	26
Figure 2-4: Forest resource reporting regions and subregions of the United States (Adapted from Smith et al. (2001) p. 4).....	32
Figure 2-5: Total forest acres from records plus additional percentage of total acres from organizations with working forests and no forest records.....	43
Figure 3-1: Conservation organization respondents requiring grantor presence during monitoring, in percent (n = 536).....	48
Figure 3-2: Timing of forest management plan preparation required by respondents.....	67
Figure 3-3: Timing of forest management plan revisions permitted by respondents.....	69
Figure 3-4: Typical harvesting constraints in SMZs provided by respondents.....	72

Chapter 1

1.1 Introduction

Gifford Pinchot began his work at the historic Biltmore Estate in Asheville, North Carolina. In early 1892, he mused that “trees could be cut and the forest preserved at one and the same time” (Pinchot 1947: 49). Since then, land and forest conservation has been at the forefront of political debates when the fear of timber famine lurked from excessive timber harvesting (Cubbage et al. 1993, McEvoy 1998). As a result, government agencies and non-profit conservation organizations have collected many land use controls including fee-simple purchase, leases, eminent domain and conservation easements. These controls have been used to conserve the U.S. land base and protect vital natural resources.

As early as the late 1960s, public agencies and non-profit conservation organizations worked cooperatively to protect private lands from development (Endicott 1993, Lehman 1995). Even with their own resource and budget limitations, conservation organizations could more efficiently use money and resources to curb the adverse effects development has on private lands than their government counterparts that experience unpredictable budget shortfalls and limited resources (Endicott 1993, Fairfax and Guenzler 2001, Foster 2001). These adverse effects include fragmentation and parcelization of lands from urbanization resulting in losses of wildlife habitat, working farm and forestland viability, and flood and erosion control.

Conservation easements are a legal acquisition, either through sale or donation of property rights, by a government agency or private organization (SAF 1998). These agencies and organizations usually seek the purchase or donation of development rights. The landowner or grantor keeps the fee title to the land, while the agency or organization (or grantee) holds the rights to development (Diehl and Barrett 1988, McEvoy 1998). Because the development rights are held by an entity other than the landowner, a land developer has no ability to persuade the landowner(s) into subdividing their land for a substantial price. In essence, the conservation easement alleviates the pressure on landowners to develop their properties.

Conservation easements are becoming a popular land use control for landowners, government agencies, and non-profit organizations alike for numerous reasons. First, the perpetual easements allow the government or non-profit organization to extinguish the development rights without actually purchasing the property in fee. Second, the government can

use easements as a market alternative for conservation instead of employing private land regulations or eminent domain to complete the same task. Third, the landowner(s) maintains ownership of the property and can in most cases continue active management of the agriculture and forest resources. Fourth, the landowner(s) voluntarily places the easement on his or her property. Fifth, landowners may receive tax benefits (i.e., federal and state income and estate taxes and local property taxes) under current tax law for their charitable contribution of the conservation easement (Haney et al. 2001, Small 2002).

An easement can assuage a landowner's tax liabilities that in some extreme cases would require the landowner to liquidate some, if not all, land to pay the taxes. For example, a "land rich, cash poor" landowner owns 2,000 acres of agriculture and forest land. This landowner is of retirement age. He does not currently manage this once viable farm. Assuming land values are increasing in the respective county, the landowner can expect the value of his property to increase. With all other factors held constant, an increase in land value results in an increase in the property tax bill. For a landowner without a sufficient amount of income, the only means to pay the taxes is to sell a portion of the property or harvest timber prematurely. The donation of an easement may help lower the value of the property and decrease this landowner's property tax bill.

Conservation easements also present a means for conservation-minded landowners to simply pass along a property to their heir(s) and assure the current land use is maintained in the future. Whether it results from development pressure, tax liabilities, or a desire to protect the natural resources, a conservation easement can prevent large (and small) tracts of land and forest from falling into the demise of urbanization.

Unfortunately, conservation easements do have disadvantages. This is especially true when easements are scattered over a landscape without a definite focus. Instead of preventing urban sprawl, the result is an island of protected land surrounded by development (Mahoney 2002). Over time, a landowner's reserved rights like timber harvesting and hunting may diminish when surrounding development makes those uses unviable or the public objects to them. Regulations at the local level continue to increase in number. They may preclude land uses that are legally permitted under the easement. Monitoring and enforcement costs are significant over time. These cost constraints could prevent organizations and agencies from

monitoring easements adequately, especially when easements change hands in the future (Merenlender et al. 2004).

Along with the restrictions on development, the government agency or conservation organization may impose other contractual restrictions on the landowners. They may include restrictions on mining, hunting, trail construction, agriculture, and forestry, as well as many others. These restrictions may have a profound effect on how the property is used in the future by the current and subsequent landowners.

This project investigates the forest management constraints imposed by government agencies and conservation organizations on non-industrial private forest (NIPF) landowners that have sold or donated a conservation easement on their forested property. Specifically, it investigates the total number of acres conserved by easements and determines the extent of forested acres conserved. It also describes what restrictions, if any, may prevent NIPF landowners from actively managing their forested properties. Finally, the conclusion contains an analysis on how forest conservation easements may affect long-term forest management and timber supply.

1.2 Research Significance

Assumptions on the type and amount of forestland offer inaccurate nationwide generalizations. Regional and local differences add to the complexity of monitoring the amount and use of these forests. For example, the Southeast United States has seen a relative increase in forestland area due to the economic attractiveness of pine plantations and to the conversion of unproductive and abandoned farmlands back to forest cover (Alig et al. 2002, Wear and Greis 2002, Adams et al. 2003).

On the other hand, the Northeast United States has experienced a decrease in forestland due to fragmentation and parcelization preceding development along the urban fringe of many large cities. U.S. population continues to rapidly expand along this urban fringe (Edwards and Bliss 2003). The amount of forestland has fluctuated slightly up and down since the 1920s, although it has remained relatively stable on average (Smith et al. 2001). The United States Department of Agriculture (USDA) Forest Service predicts the total U.S. timberland area to drop by as much as three percent by 2050 (Adams et al. 2003).

Broad assumptions about the land ownership characteristics of individuals and corporations are imperfect when considered on a nationwide scale. These characteristics change

year-to-year and decade-to-decade based on factors such as age of the primary landowner, total acres of each property, local economic influences on forestry, tax policies and even the level of ownership transfers in and out of industrial-owned forests. The factors mentioned are suggestive rather than exhaustive. Myriad factors influence how individuals and corporations decide to use their forested properties and eventually dispose of (or develop) them if they are not passed down to an heir(s) or other successor(s).

One visible landownership trend is the substantial increase in the number of NIPF landowners owning the relatively stable amount of total forestland nationwide. As of 1994, Birch (1996) estimated a nationwide total of 9.9 million forest landowners, up from the estimated 7.8 million owners in 1978. If we assume a constant rate of parcelization of existing forestlands since 1994, the total amount of NIPF landowners could have well surpassed the 10 million mark as of 2004.

Birch (1996) showed that the largest increases between 1978 and 1994 in the number of forestland owners and total acreage were in the size classes of 10 to 49 acres and 50 to 99 acres (Figure 1-1). The increase in these two size classes was a result of parcelization and fragmentation of the size classes greater than 100 acres. The outcome was an even smaller contingent of forestland acres owned by more landowners. Best (2002: 16) describes these smaller parcels as “highly fragmented by buildings, roads, cultivation, and other influences.”

Forest fragmentation and parcelization degrades the functionality of many NIPF lands. SAF (1998: 73) defines fragmentation as the “process by which a landscape is broken down into small islands of forest within a mosaic of other forms of land use or ownership.” The extensive patchwork of forests at the landscape level has a detrimental influence on wildlife species, water relations, fire regimes, agricultural land, and supports further development by residential, commercial or industrial interests (Best and Wayburn 2001). Land development and urban sprawl are critical factors in forestland fragmentation (NRCS 2002). NRCS (2002) noted that land development increased by over 150 percent between 1992 and 1997 compared to the period between 1982 and 1992.

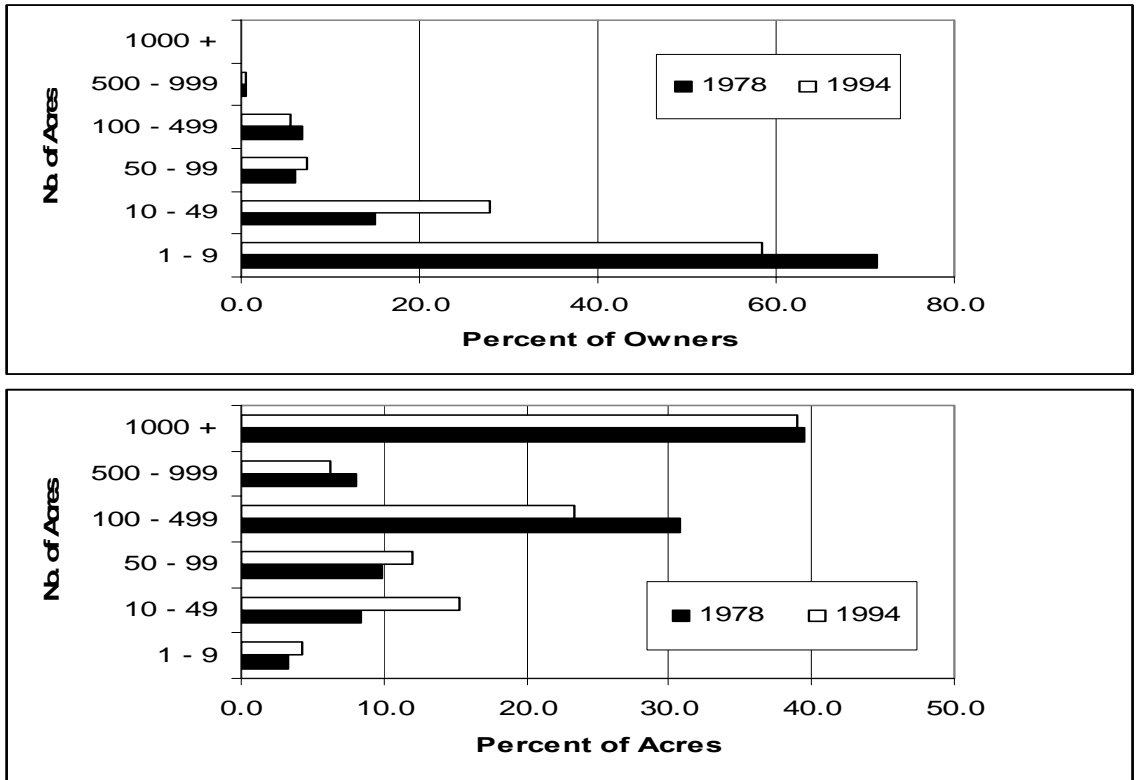


Figure 1-1: Distribution of private ownerships, by size class of ownership, United States, 1978 and 1994 (Adapted from Birch (1996), p. 5).

Best and Wayburn (2001: 34) address the repercussions of such landscape fragmentation as limiting the “ability of interested individual landowners to realize certain environmental goals within the patchwork of small parcels.” Adding each landowner’s differing views of preferred land use contributes another level to increases in fragmentation. One landowner may strive to harvest timber on his or her property in the future, whereas an adjacent landowner may want to forgo harvesting for aesthetic and recreational values on his property. Over an entire landscape, these differing views tend to support fragmentation.

Why has there been a continuation of parcelization and fragmentation of forests over time? Development and diverse landowner use preferences contribute to this continuation. However, Best and Wayburn (2001) offer two other historic shifts that have contributed to increases in parcelization and fragmentation.

Industrial private forest (IPF) owners that “restructure” and “divest” forestlands were the first shift. This shift has really come about over the past decade. Due to slumping pulp prices,

large pulp and paper companies restructured to compete in the world market. They divested their forestlands to acquire the forest's "locked-in appreciation" (Best and Wayburn 2001, Adams et al. 2003). Best (2002: 16) reviewed transactions since the early 1990s that point out "some 20 million acres changed hands this way."

The second shift was NIPF landowners undergoing "intergenerational transfer." Intergenerational transfer refers to aging landowners that seek to pass their land to heirs. Landowners of retirement age have increased both in number and in acres owned (Birch 1996). An estimated 27 percent of all forestland owners were over 65 years old in 1994 (Birch 1996).

Best (2002) points out a host of problems that may contribute to the parcelization and fragmentation of the retired owner's forestland. They include such problems as some owners having "too many heirs, some having no heirs, some have heirs with competing interests, and others have heirs with no interest" (Best 2002: 16). The outcome of intergenerational transfer differs from family to family. However, the heirs' demands for profit may lead them to parcel and sell the forestland. Lack of estate planning or excessive inheritance taxes may force heirs to sell the forestland to pay the estate and property taxes (Mehmood and Zhang 2001). In a study of Connecticut forestland owners, Broderick et al. (1994) discovered that inheritance taxes forced heirs to sell their inherited property in many cases.

Although conservation easements may not benefit all forestland owners, easements may help many landowners keep larger tracts of forestland intact without market pressure to parcelize them. Recent estimates from the Land Trust Alliance's (LTA) 2000 National Land Trust Census show that 2,589,619 acres were encumbered nationally by conservation easements (LTA 2001). The LTA found that this amount represented a 475 percent increase in the 1990 estimates of total acreage encumbered by easements (LTA 2001).

In some areas of the country, increases in total area protected by land purchases, conservation easements and government transfers have reached as much as 1,650 percent of the 1990 estimates (LTA 2001). The LTA's Southwest region accounts for this increase. This region comprises the states of Arizona, Colorado, New Mexico and Utah. The national average of total area protected approached 226 percent of 1990 estimates (LTA 2001).

The LTA (2001) estimated that 14 percent (871,532 acres) of the total land protected by conservation organizations was timberland. However, that estimate did not break this percentage down into acres conserved by conservation easement, outright ownership by land trusts, or

transfer to government agencies and other organizations. The lack of differentiation leads to the difficulty of determining whether this conserved timberland was being actively managed or completely preserved.

Numerous questions need to be addressed about the level of appropriate forest management techniques like implementing preliminary forest inventories, forest stewardship plans and forest easement monitoring. This project seeks to address these concerns. Conclusions offer technical insights for forest managers on forestland conservation and protection. These conclusions may assure that current and future forests protected by easements are managed sustainably into the future, whether actively or inactively.

1.3 Background

The conservation easement process is straightforward. A landowner wanting to prevent the development of his property in the future consults a conservation organization or government agency about ways to prevent development. He explains his goals for the property. Numerous land use controls are discussed including conservation easements.

If the landowner decides an easement is the preferred alternative, the grantee(s) and their lawyers draft a conservation easement agreement that accounts for the landowner's wishes and the organization's (or agency's) protection desires. The grantor and his lawyers should review the easement deed before agreeing on its final contents. If the grantor finds objectionable restrictions, discussions between both parties should commence to work out the problem(s) before the easement is finalized. Once both parties are satisfied, the final conservation easement deed is filed at the county clerk's office.

For example, a hypothetical landowner may have forestland that he may use for any number of reasons including timber, recreation, aesthetics, or residence. He recognizes the ecological, financial and other values of his working forestland. He wants to retain ownership of the land to pass to his children. However, he has received requests from residential developers to parcel off the additional forestland around his residence.

At the same time, the landowner's property taxes are escalating from market influences for developed land in his county. Sometimes, a property is assessed at a lower current-use value (e.g., agriculture or forestry) and then becomes assessed as developable land, usually at the highest and best use value (McEvoy 1998). This happens when agriculture or forestry is not perceived as a viable use for the property in the future (e.g., land-locked properties surrounded

by rapid urban development). Unfortunately, when the land value increases to this highest and best use assessment, the landowner's property tax bill will increase, sometimes even substantially.

After consultation with state foresters, U.S. Forest Service employees or conservation organization staff, the hypothetical landowner learns about the perceived benefits of conservation easements. He prefers keeping his land in forest, rather than non-forest, to pass to his children. The landowner thoroughly researches the easement process before making a decision that will affect every future landowner of this property. Appendix A provides an extensive list of books and manuals on conservation easements. These references can help the landowner learn the history of conservation easements and the intricacies of the easement drafting process.

The landowner can find many sources of information on conservation easements from the agencies and organizations that buy or accept their donation or sale. Landowners should be cautious to distinguish between promotional and factual guidance. At the local level, land trusts might be the most utilized source of conservation information for landowners. They offer promotional brochures on easements and may even offer tours of selected easements for potential donors (Diehl and Barrett 1988). Local land trusts can identify landowners and their properties that may benefit from a conservation easement. Due to financial and other resource constraints, however, local land trusts hold a limited number of easements.

National, state-wide and regional conservation organizations have firmer financial backing than their local counterparts. These organizations tend to hold more valuable easements on larger tracts of land. National organizations work closely with state and federal agencies to raise funds for the purchase of large, ecologically-significant forestland tracts. They tend to educate more through the media with commercials, public rallies and workshops. Examples of national and regional conservation organizations include the Land Trust Alliance, the Nature Conservancy (TNC), the Rocky Mountain Elk Foundation (RMEF) and the Pacific Forest Trust (PFT).

Some state government agencies play a role in the purchase of conservation easements. These agencies have great ability to locate ecologically-significant land within their respective states and purchase easements from interested landowners. Many state agencies receive funding for landowner assistance programs that enable them to educate landowners on the benefits of forestland protection. State-wide budget concerns in many states, however, threaten the funding

of many of these educational and research programs and the continued purchase of conservation easements. In Virginia, the Department of Forestry and the Virginia Outdoors Foundation (VOF) are two agencies that accept the donation or purchase of conservation easements. Many states have government agencies with similar protection goals, while a number of states, like West Virginia, are working to develop similar land conservation programs.

Federal agencies allocate monies for the funding of land and forest protection. Annual appropriations to conservation programs account for a large portion of funds allocated to easement purchases. Federal funding enables the purchase of easements not only on forestland, but on rangeland, historic sites and watersheds. Federal agencies that receive appropriations for conservation easements are the USDA Forest Service (USFS), the National Resource Conservation Service (NRCS), the Bureau of Land Management (BLM), the National Parks Service (NPS), the U.S. Fish and Wildlife Service (FWS) and the Army Corps of Engineers (ACE). Like their state counterparts, federal agencies offer informational brochures and booklets on conservation easements. They also answer questions on the easement process at their field offices and at sponsored workshops.

After thinking his decision through, the hypothetical landowner decides that a conservation easement is (or is not!) appropriate for his land. After further consultation with the grantee's staff, official documents are signed to start the easement process. These documents may vary with each representative organization or agency. The agency officials or organizational staff should assess the property in the office and in the field.

Usually, a comprehensive forest management plan is required by a grantee before a working forest easement is accepted (Lind 2001), but this is not always the case. The plan is the basic management guide for the landowner's working forest held under easement. It reinforces the landowner's goals and should adjust if these goals change over time. The plan also allows the agency or organization to address the landowner's primary and alternative forest uses. Plan completion is advantageous before easement drafting because both parties can address possible easement conflicts up front before management practices commence. The plan is incorporated with the easement document rather than considered an actual part of the document. The landowner should also retain the prerogative for plan approval.

The conservation easement deed is normally "tailor-made" for each landowner's property (Tiedt 1982). Bick and Haney (2001) offer five types of information included in the

conservation easement deed: general information, affirmative rights, restrictions, reserved rights, and terms and conditions.

The general information consists of names and addresses of the grantor and the grantee. The affirmative rights are those held by the grantee on the grantor's property, such as inspection, enforcement, and education. Affirmative rights for the grantee can also come in the form of continued recreation access and improvement, wildlife management, vegetation management, and water rights in the western states (Bick and Haney 2001).

Easement restrictions limit activities the grantor can perform on the property. Every property is different, so restrictions will vary for every easement. Typical restrictions include no residential, commercial, or industrial development, no mining, no dumping trash and the required use of Best Management Practices (BMPs) when timber harvesting (Bick and Haney 2001). BMPs are the "combinations of practices that are ...the most effective and practicable means (including technological, economic, and institutional considerations) of controlling point and nonpoint source pollutants" (SAF 1998: 15). Some easements may restrict timber harvesting altogether. Complete harvesting restrictions may prove detrimental to forest health and other property values if a protected property's forest conditions endanger individuals using the property. These forest conditions could jeopardize an adjacent unprotected property's forests, or vice versa, if a forest fire or insect outbreak spreads across property lines.

Bick and Haney (2001: 67) explain that "grantors traditionally wield the greatest influence in shaping agreements" with the reserved rights section. Some reserved rights include continuing agricultural and/or forest management practices, allowing development of a limited number of residential homes for family members, and the selling or leasing of the land. An important reserved right is the ability to make amendments to the easement while preserving the easement's integrity (Bick and Haney 2001).

Terms and conditions are typically the final legal sections in the easement. In this section, the grantor should specify the "intent that the easement qualify as a charitable contribution of conservation interest in land" under IRC §170 (Bick and Haney 2001: 71). Other components in this section are the administrative procedures such as situations where consent from both parties is needed, the property tax obligation, liability issues, amendments, public rights, and situations for extinguishing the conservation agreement (Bick and Haney 2001).

Once the easement paperwork and deed are reviewed by senior officials, the grantees consider funding sources. For federal agencies, funding for easements normally comes from The Land and Water Conservation Fund Act of 1965 or the Forest Legacy Program. State agencies usually have separate funds where they receive appropriations. They may also receive partial funding through federal sources like the Forest Legacy Program. Land trusts and other conservation organizations receive their funding through donations, fees for services, or fundraising. Land trusts may require the landowner to pay a “monitoring fund” to cover the operational costs of monitoring and enforcing the easement over its perpetual life (Barrett and Livermore 1983, Diehl and Barrett 1988).

1.4 Previous Research

Although conservation easements have seen widespread use for several decades, empirical research on conservation easements is still generally lacking. A number of university-sponsored studies and private institute research projects have been published that cover conservation easements at the state- or regional-level. This research is usually grantor-oriented, although it occasionally includes an analysis of easement holders or grantees. Non-profit conservation organizations like the Land Trust Alliance monitor the status and use of easements on the national-level via their land trust census. Completed every three years, the LTA Census is strictly grantee-oriented research that covers the broad protection efforts of conservation organizations nationwide.

1.4.1 Grantor-oriented Research

Most conservation easement studies have been completed by university researchers. The first study was completed in 1995 by Mary Ellen Boelhower at the University of Vermont. Boelhower’s (1995: 10) goal was to design a landowner and easement holder “case study, gathering both quantitative and qualitative information about conservation easements in the study area (Maine, New Hampshire and Vermont) that specifically allow commercial forest management.”

Because data on the amount of forestland conserved by easements and their use were not readily available, Boelhower (1995: 5) wanted to “evaluate past easements and determine what changes are necessary to ensure that easement-protected forests remain healthy forests forever.” Boelhower (1995) found that no major problems were encountered by either the easement grantor or grantee, over 90 percent of the landowners that actively manage their forests utilize

the expertise of foresters and 70 percent of the landowners used management plans. However, Boelhower (1995: 39) strikingly concluded from the survey respondents that “few easements are strong enough to protect environmental values and prevent unsustainable management practices.”

The second study was completed by Steven Bick in 1996 at Virginia Polytechnic Institute and State University. Bick’s (1996: 2) goal was to “describe forestland easements in the Northern Forest Region of New York and to develop an understanding of landowner behavior in considering a forestland easement grant.” Bick (1996) found that forestland easement deeds in the Northern Forest Region differed considerably based on the provisions included in each document. Bick (1996: 228) noticed that landowners would continue to use their property in the same manner, irrespective of the easement, which led him to conclude that “the market values surrendered...were exceeded by non-financial values” from the protected property. Bick (1996) expanded on guidelines used for easement deed content that included clearly defined affirmative and reserved rights.

The third study was completed by Deborah Anne Gaddis in 1999 at North Carolina State University. Gaddis’ (1999) goal was to characterize “landowner demographics, motivations for ownership, motivations for easements, and costs of granting the easement” from a sample of easement grantors in North Carolina. Gaddis (1999) found that easement grantors in North Carolina have higher incomes and levels of education, enjoy multiple benefits from their forested easements including timber harvesting and are highly motivated by environmental concerns. Gaddis (1999) noted that grantors remarked on the significant costs associated with granting an easement to pay for baseline documentation and management plans.

The fourth study is currently being completed by Jesse Richardson and Tamara Vance at Virginia Polytechnic Institute and State University and the Virginia Outdoors Foundation, respectively. Results are unpublished presently. Richardson and Vance are studying ways to improve landowner incentives and enhance the entire easement drafting process in Virginia.

1.4.2 Grantee-oriented Research

The first study was completed by Julie Ann Gustanski between 1996 and 1998. She completed “Phase III Expert Interviews conducted in conjunction with [her] doctoral research” (Gustanski and Squires 2000: 22). A sample of 120 conservation organization professionals were interviewed to gather data on organizational success, conservation tools used, public

attitudes, ranking procedures, and usefulness of proposed model (Gustanski and Squires 2000). She found that the “information sought is not easily quantified, complexities of real world experiences are not oversimplified, relationships among variables do not favor statistical interpretation,...” (Gustanski and Squires 2000: 23).

The second study was completed by Dominic Parker in 2002 for the Property and Environment Research Center (PERC) in Bozeman, Montana. Parker’s (2002) goal was to determine ways that conservation organizations can decrease the stewardship or transaction costs connected to conservation easements and identify the differences in the cost trade-offs between land ownership and easements.

Parker (2002) found that conservation organizations were more likely to preserve working lands and scenic amenities with easements. He revealed that larger tracts held under easement were more costly to monitor than smaller ones. Easements allowing structures to be built were more likely violated than other easements that prohibit such structures (Parker 2002).

The third study was the Land Trust Alliance’s 2000 National Land Trust Census, commonly known as the LTA 2000 Census for simplicity. The LTA plans to complete it every three years in the future. Thus, the LTA is initiating the 2003 census currently. As an umbrella organization of land trusts, the LTA census is strictly land trust-oriented.

The census takes into account the amount and types of lands that are owned fee-simple, held by conservation easement and transferred to government agencies by every land trust. The census also addresses the number of violations, if any, each land trust encounters on their easements. It reports any technical assistance provided to the easement donors and the general public.

1.5 Research Plan

This survey of conservation organizations and government agencies that hold easements on forestland addresses three objectives. First, this survey needs to determine how much land was protected by conservation easements as of December 31, 2003, and ascertain what portion of that total was forestland. Second, the survey attempts to determine what types of forest management restrictions were present on these easements. Third, the survey effort strives to determine the extent at which protected forests were being actively managed and how the easement restrictions prevent landowners from completing their forest management goals.

1.5.1 Survey Participants

The survey participants were conservation organizations and government agencies that hold conservation easements on all land types including forestland. An analysis of the LTA website found contact information for each conservation organization in every state. The LTA reported in their 2000 census a total of 1,263 conservation organizations that followed their *Land Trust Standards and Practices*. These *Standards and Practices* are a set of national guidelines that conservation organizations must adhere to be recognized by the LTA (LTA 2001). A separate database obtained from the LTA showed that approximately 564 organizations (or 45% of 1,263) protected land with conservation easements in 2000.

An analysis of the LTA website on May 30, 2003 showed that the LTA recognizes 1,527 conservation organizations. This represented an upsurge of approximately 264 conservation organizations that have protected open space since 2000. Open space is a more general category that includes forest, agriculture, and grazing lands. Roughly 59 land trusts were recognized as solely agriculturally-based, 44 land trusts were considered historically-based (i.e., battlefield, museums, etc.), and 18 land trusts could be classified as educationally-based (i.e., nature centers, research institutes, etc.). These land trusts were included in this study because of their ability to protect land that could contain forest cover.

The contact information was extracted from the website and put into a Microsoft Access™ spreadsheet. A mailing address for each organization was recorded. In addition, some organizations even included the executive director's email address and the organization's webpage. A questionnaire was sent to each of the 564 organizations that held easements in 2000. A survey was sent to the remaining 964 organizations to determine if they have protected land by easement since 2000. This was an attempt to prevent coverage error.

A web search was completed in December 2003 to locate all federal and state government agencies that utilize conservation easements as a land use control. Government agencies that hold easements were surveyed in a similar manner as the conservation organizations. A list of 63 different state agencies was discovered. Contact numbers and addresses were recorded for the individual(s) in each agency administering the conservation easement program. A survey was sent to this individual via mail or email.

1.5.2 Survey Design Principles

The survey was developed to sample each conservation organization's or public agency's program director. Survey design principles taken from Dillman's (2000) "tailored design method" were used to develop and administer the survey. A prenotice letter (Appendix B) was sent to the directors about five days before the questionnaire was sent. This letter briefly informed them of the forthcoming survey's purpose. A cover letter (Appendix C) and a questionnaire (Appendix D) were then sent.

If the questionnaire was not returned within three weeks, a reminder/thank you postcard (Appendix E) was sent to the director. For those that did not return the survey after five weeks, a replacement questionnaire was sent with a second cover letter (Appendix F) stressing the benefit of their response. Finally, a reminder email (Appendix G) was sent to all organizations three weeks later that had not responded to either of the first two survey contacts.

The questionnaire was sent via mail to each organization and agency. The questionnaire included contact information, response directions and additional space for comments and/or concerns. Contact information in the form of a postal address, email or phone number was provided on both the front and back cover. Directions for filling out the mail survey were given at the beginning of the questionnaire. Space on the questionnaire was provided for the land trust directors to voice concerns or to provide pertinent information and/or specific answers.

1.5.3 Survey Format

The survey's format addressed the three objectives noted above. It was broken into four general categories. The categories were current easement holdings, grantor restrictions, enforcement and assistance and land trust information. The only format difference was the deletion of the land trust information section for the government agency survey. A survey pre-test was completed by local conservation organizations in Southwest Virginia. The goal of the pre-test was to determine if question format and wording were unambiguous and unbiased. The pre-test participants found no problems with the question format or wording.

The first objective of determining the total amount of forestland encumbered by easements was ascertained in the current easement holdings category. Land trusts should have the total number of easements and the total amount of acres they have protected with easements readily available. To avoid double counting, organizations and agencies that co-held easements with other entities were asked to include only the easements that they primarily held. This

provided a means to compare easement statistics that were found in the LTA 2000 Census to more current estimates of total easement numbers and acreage.

Of the total acres conserved by easements, the proportion classified as forestland was determined. All forestland one acre and greater was considered on locations like family farms, woodlots, river bottoms, and swamps. Organizations and agencies provided the number of forestland easements, if any, that cover over 10 acres of contiguous forestland. This 10-acre figure was viewed as a minimum for landowners to consider applying forest management prescriptions on their forestland (Best and Wayburn 2001, Gaddis 1999).

The second survey category was landowner restrictions. Restriction categories were separated into two groups called unnatural and natural resource restrictions. Unnatural resource restrictions included restrictions on all forms of development, commercial signs, road construction and waste disposal. Natural resource restrictions were further divided into two categories, forest and non-forest restrictions. The forest resource restrictions included timber cutting, fire wood, use of chemicals for competing vegetation and prescribed fire. This list was the key to develop an understanding of the types of forest management prescriptions typically restricted by conservation easements. The non-forest resource restrictions included mining, agriculture, recreation, hunting, fishing and camping.

From this second category, general restriction statistics that land trusts use on a national basis were calculated. This helped address the second objective of determining the forest and non-forest restrictions commonly found on encumbered forestland easements. National restriction statistics were separated into the respective geographic regions to compare previous studies' statistics on the regional level.

The third category of the survey was conservation assistance and enforcement. This clarified what conservation assistance, if any, the conservation organizations and government agencies provide to grantors of conservation easements. Conservation assistance included any environmental education, forest health, wildlife advice and BMP training. Enforcement was addressed by what types of easement violations were commonly encountered and what were the penalties for those violations. Violations were separated into forest resource violation or non-forest resource violations. Forest resource violations included harvesting more than specified in the management plan and using prohibited herbicide. Non-forest violations included building

residences on areas where prohibited and posting prohibited road signs along easement roadways.

The final category was land trust information. This section gathered information on the conservation organizations, their staff and other protected lands. The first question asked how many staff members does each land trust employ and are they considered full-time, part-time, volunteer, or a combination of any of these categories. The next question addressed the employment of any professional natural resource management staff like foresters, wildlife biologists, fisheries biologist, forest ecologist and botanists. Some land trusts do not formally employ staff to complete their protection efforts. In this instance, a question was asked as to whether a board of directors oversees all conservation operations instead of a formal staff.

Another piece of information was the longevity of many land trusts, so a question was asked about how many years the land trust has been in existence. The directors were asked about other land types they protect with conservation easements. Because land trusts protect more than just forestland, the directors checked off other land types from a list. The other land types included working farms and ranch lands, grasslands, desert, wetlands, coastal areas, urban greenspace and others. The directors included any other land types that were not specified in the list.

1.5.4 Data Entry and Analysis

As each survey was returned, the responses were recorded in a Microsoft Excel™ document. Two separate documents were used for the land trust and government survey responses. Once all surveys were returned, the summary statistics were calculated using the Statistical Package for the Social Sciences, commonly known as SPSS® (Norusis 2002). The summary statistics were documented and compared to corresponding questions on both surveys. Any errors or irregularities found during this introductory analysis were corrected or omitted.

Once the introductory analysis was complete and approved by the graduate committee, the secondary analysis began. The secondary analysis compared this study's summary statistics to previous studies by Gaddis (1999), Bick (1996), Boelhower (1995) and others. Conclusions were made about the comparisons, or lack thereof, and about the impact of conservation easements on timber supply and forest management.

1.6 Contributions and Limitations

Past research on conservation easements, although limited, has provided further information for landowners to contemplate when deciding whether to donate or sell an easement on their forested land. This project will expand on its predecessors' work. It will accent current research and knowledge on the ecological and societal influences of forest conservation easements. One of the goals was to inform perspective landowners on the impacts of easements on their forested land. This project achieves that goal.

There may be economic benefits for landowners to sell or donate a conservation easement on their property. This project, however, does not address the economic or tax aspects of easements. Many informational articles and books such as Vance and Buttrick (1998), Bick and Haney (2001) and Small (2002) highlight these economic and tax benefits. Thus, it was beyond the scope of this study to address economic and tax aspects. The following paragraph explains briefly the tax law surrounding easements found in tax-related texts.

An important landowner consideration for selling or donating an easement is the state and federal tax incentives involved. The Taxpayer Relief Act of 1997 provided certain exclusions to land held in conservation easements (Campfield et al. 2002). Land that is held in an easement in perpetuity can be considered a charitable contribution deduction for a landowner's liability of property, income, estate or gift taxes. Bick and Haney (2001) state that a federal income tax deduction of "30 percent of the adjusted gross income in general" is claimed as a charitable deduction for qualified easements. Landowners can extend these deductions for an additional five years in order to capture the full tax benefit.

Qualifying landowners may also elect to exclude up to the lesser of 40 percent of the easement's value from donor's estate or \$500,000 (Haney et al. 2001). A gift of partial interest to qualified charities for conservation purposes is considered a qualified conservation contribution under Reg. § 170(f)(3)(B)(iii) (Kess 2001). Reg. § 170(h)(4) defines conservation purposes as the preservation of land for public recreation, the protection of natural wildlife and aquatic habitat, the preservation of open space, and/or the preservation of historical land and structures (Kess 2001). Landowners may claim any one of these purposes specified.

An easement's ability to protect a property from development is just as important for many landowners as the economic benefits. This research highlights the total acreage of land encumbered by easements. It classifies the portion of that total acreage as forestland. It helps

grasp the demand for forested properties during easement acquisitions. This research also helps inform perspective landowners of forest management restrictions in current easements that may be addressed in their easement agreement. These include restrictions on logging (type and amount), cutting firewood, use of pesticide and fertilizer, fire protection and road building. Lastly, this research benefits land trusts, government agencies, lawyers, and others when dealing with interested landowners who own forested land who may want to place an easement on the land.

Despite the contributions of this research, some limitations were present during the survey process. The first limitation was staying current on the number of land trusts accepting easements and keeping track of where their easements were located. New land trusts spring up each year in every state. Some conservation organizations do not consider state borders an obstacle when acquiring easements. Numerous state and national land trusts acquire easements in neighboring states or even in several states scattered around the country.

To alleviate this problem, land trusts were grouped by geographic region. This assumes that all of the land trust's easements fall within their respective region. Thus, great care was used when surveying land trusts that have easements in several states to avoid double sampling and misrepresenting the geographic location of the easements. Consideration was given for land trusts that co-hold easements with other conservation organizations and/or government agencies to avoid double sampling easements.

Second, conservation organizations may be unwilling to respond to the survey. For many local land trusts, the trust directors may not be active enough to contribute to the survey due to time and budget constraints. Likewise, some directors could feel that their easements do not contain a sufficient amount of forestland when actually they do have the required amount. Others directors may not have the official records on forestland to complete the survey on their current easements.

Chapter 2 – Easement Statistics Results

Chapter 1 comprises an introduction to conservation easements, research significance, background, previous research, research plan, contributions and limitations of this research. Easement statistics are addressed in Chapter 2. These include statistics on survey response rates, on national conservation organizations and government agencies and on national and regional conservation easements.

2.1 Survey Response Rates

Organizational surveys were sent out on October 31, 2003. A total of 1,527 surveys were sent to the sample of conservation organizations. The first surveys were returned on November 10, 2003. Since that time, a total of 934 conservation organizations returned their surveys for a preliminary response rate of 61.2 percent (Table 2-1). However, 16 organizations responded with unusable surveys that were left blank. A note on the survey or an email response was normally received that explained the reason for non-response. Common reasons for non-response were the organization was too busy to complete the survey (n = 5) and the organization simply chose not to respond (n = 8).

Table 2-1: Survey response rates for conservation organizations and government agencies.

	Organizational respondents (#)	Total (#)	Percent (%)	Agency respondents (#)	Total (#)	Percent (%)
All Responses	934	1527	61.2	29	63	46.0
"Yes" to CEs	536	934	57.4	20	29	69.0
"No" to CEs	382	934	40.9	9	29	31.0
Other (unusable)	16	934	1.7	0	29	0.0
Usable Responses	918	1527	60.1	29	63	46.0
"Yes" to CEs	536	918	58.4	20	29	69.0
"No" to CEs	382	918	41.6	9	29	31.0
LTA 2000 Census						
"Yes" to CEs	354	564	62.8	N/A	N/A	N/A

The unusable surveys leave responses from 918 organizations for a usable response rate of 60.1 percent (Table 2-1). Of the 918 organizations, 382 conservation organizations have not

conserved any type of land by conservation easement. Numerous organizations stated that they just used conservation methods like fee simple purchase and/or facilitating land transfers to public government or other organizations. The remaining 536 organizations currently hold conservation easements on various land types including forestland. These organizations represent 58.4 percent (536/918) of the survey responses. When compared to the organizations that responded to the LTA 2000 Census, 62.8 percent (354/564) of the organizations from the LTA 2000 Census responded to this survey.

A total of 63 surveys were sent to government agencies that may use conservation easements as land protection tools. Twenty-nine agencies responded to the survey for a response rate of 46.0 percent. Of those respondents, nine agencies returned their surveys blank. These agencies report not holding easements as of December 31, 2003. Many agencies admitted that their easement program(s) were recently established or not currently funded. Twenty government agencies returned completed surveys of their easements. These agencies represent 69.0 percent of the survey responses.

2.2 National Conservation Organization and Government Agency Statistics

The following statistics were based solely on survey respondents that hold conservation easements. Most statistics in Section 2.2 only apply to organizational respondents. When appropriate, agency statistics were included. The nationwide data on encumbered conservation easements is analyzed in Section 2.3. In this section, data from both organizational and agency respondents were analyzed. Forestland easement data were extracted from the nationwide data. The data were delineated into geographic regions for further analysis.

2.2.1 Lands Protected by Conservation Organizations

Conservation organizations serve diverse purposes, though they may adhere to similar land protection goals. These common goals include protecting significant land types in their locality. For national organizations, protecting diverse land types from development in many regions was a major goal. For example, with a goal that “conserves, restores, and manages wetlands and associated habitats for North America’s waterfowl” (Marrone 2003: 1), Duck Unlimited’s conservation efforts span the United States.

Besides protecting forestland, the organizational respondents specified other land types commonly protected by conservation easements. These other land types protected by easements are listed in Table 2-2. The two most commonly cited land types were wetlands (74%) and

riparian areas along streams and rivers (69%). Other common land types protected by respondents were scenic viewsheds (61%), working farm and ranch lands (55%), threatened and endangered species habitat (51%). The respondents also cited 27 other specific land types that each represents less than 50 percent of all organizational respondents.

Table 2-2: Other land types protected by respondents and equivalent percentages from Gustanski (1996-1998) and LTA (2001).

	Conservation organizations (n = 536) (%)	Gustanski (1996-1998) (n = 120) (%)	LTA (2001) (n = 564) (%)
Wetlands	74	60.4	52
Riparian areas along streams & rivers	69	49.0	51
Scenic viewsheds	61	55.7	34
Working farm & ranch lands	55	51.0	46
T & E species habitat	51	76.6	42
Grasslands	34	27.6	-
Urban greenspace	24	28.9	-
Coastal areas	23	35.2	18
Historical buildings & battlefields	18	46.2	24
Desert	2	15.8	-
Trails & footpaths	1	45.0	27
Archeological sites	1	25.7	-
Recreational areas	1	-	-
Community open space	1	22.9	10
Nature preserve	1	-	45
Wilderness & natural areas	1	-	-
Wildlife habitat	1	-	-
Hunt clubs	0.4	-	-
Open field with sparse forest	0.4	-	-
Horticulturally-significant estate	0.2	-	-
Wellfields	0.2	-	-
Old-Growth forest	0.2	-	-
Karst	0.2	-	-
Tribal sacred sites	0.2	-	-
Savannas	0.2	-	-
Upland scrub	0.2	-	-
Highway greenbelt	0.2	-	-
Arroyos	0.2	-	-
Vineyards	0.2	-	-
Granite outcrop	0.2	-	-
Riverwalk	0.2	-	-
Canoe & kayak trails	0.2	-	-

Julie Ann Gustanski found dissimilar percentages of lands protected during her Phase III analysis of 120 organizations between 1996 and 1998 (Gustanski and Squires 2000). These particular land types include trails and footpaths, archeological sites, and threatened and endangered species habitat. Conclusions about proportional differences may prove inaccurate because of Gustanski's lower sample size. Numerous factors could influence these proportional differences.

This survey sample shows different proportions of land types protected when compared to the LTA 2000 Census' findings. There were higher percentages (over 15% each) of respondents in this study protecting wetlands, riparian areas, and scenic viewsheds compared to the LTA Census. The LTA 2000 Census shows higher percentages of organizations protecting recreational trails, nature preserves, and historical buildings and battlefields.

These differences may result from the LTA 2000 Census' inclusion of all conservation organizations that use conservation easements and other land protection methods like fee-simple purchase. The higher percentages found in this survey could signify lands that are better suited for protection by easements like scenic viewsheds and riparian areas. Parker (2002) found that conservation easements were more likely the preferred alternative for organizations protecting scenic amenities and working lands, whereas the higher percentages found in the LTA 2000 Census could signify lands better suited for protection by fee-simple purchase or other means like nature preserves, recreational trails, and battlefields. Fee-simple ownership was more likely the preferred alternative for organizations that provide recreational amenities like public access to battlefields and trails (Parker 2002).

2.2.2 Conservation Organization Existence

Organizational respondents have varied operational existences. Of the respondents, the organization with the longest existence was over 108 years. Fourteen respondents have existed for less than one year. The mean existence for the respondents was 19.4 years. Gustanski and Squires (2000) noted land trust numbers increased dramatically after 1980. Figure 2-1 shows this dramatic increase in conservation organization numbers since 1980. It also shows that the increases really began between 41 and 50 years ago or during the late 1950s to early 1960s. This corresponds to the trends specified in LTA (2001) and Parker (2002). These trends follow the changes in tax laws and public policies associated with conservation easements.

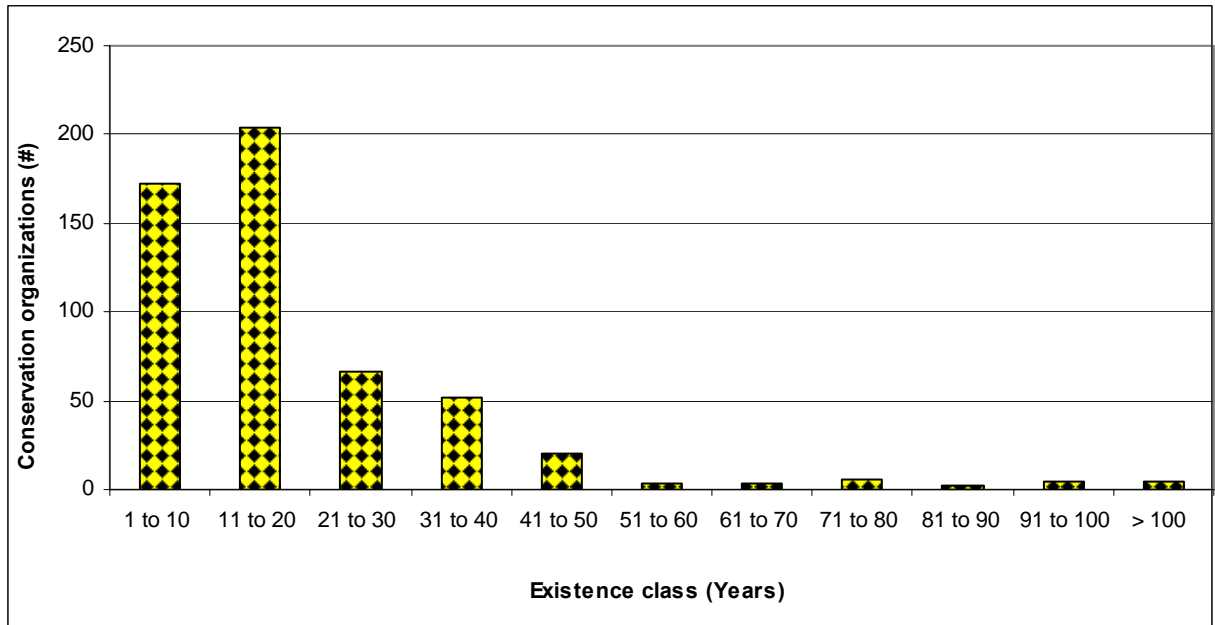


Figure 2-1: Existence distribution of conservation organization respondents in years.

2.2.3 Conservation Organization Staff Number and Characterization

Conservation organizations appear in all shapes and sizes. How many staff members normally administer each conservation organization’s operations? Do they have a board of directors that oversees organizational operations? A total of 383 organizations (or 71%) responded to having staff members. Of the respondents, 65 percent of the organizations employ between 1-and-4 staff members (Figure 2-2). Organizations that employ 5-to-9 and 10-or-more staff members represent 18 percent and 16 percent, respectively, of survey respondents. One percent of respondents report not knowing the exact number of staff members.

The remaining 153 organizations (or 29%) do not have a formal staff. In this case, a board of directors was typically assembled to oversee all conservation operations. In addition, 90 respondents (or 17%) with staff members specified that a board of directors oversaw and advised staff members on all organizational operations.

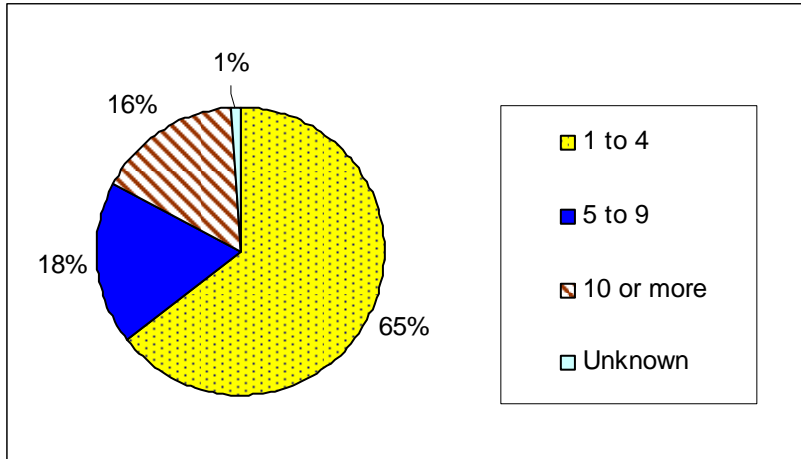


Figure 2-2: Staff number employed by respondents, in percent (n = 383).

Survey participants were asked how their staff members were characterized. Respondents were given three choices. The choices were full-time staff, some full-time and some volunteer or all volunteer. For organizations with other staff combinations, respondents were able to add characterizations that represent their situation. Seven different characterizations were specified by the respondents. An additional category was included for organizations that did not respond or skipped the question.

The three choices provided represent 80 percent of total responses (Figure 2-3). When considering organizations with any contingent of full-time staff, 80 percent of the respondents reported employing full-time staff members. An all volunteer staff was reported by 14 percent of the respondents. The remaining four characterizations represented less than 10 percent of the respondents collectively.

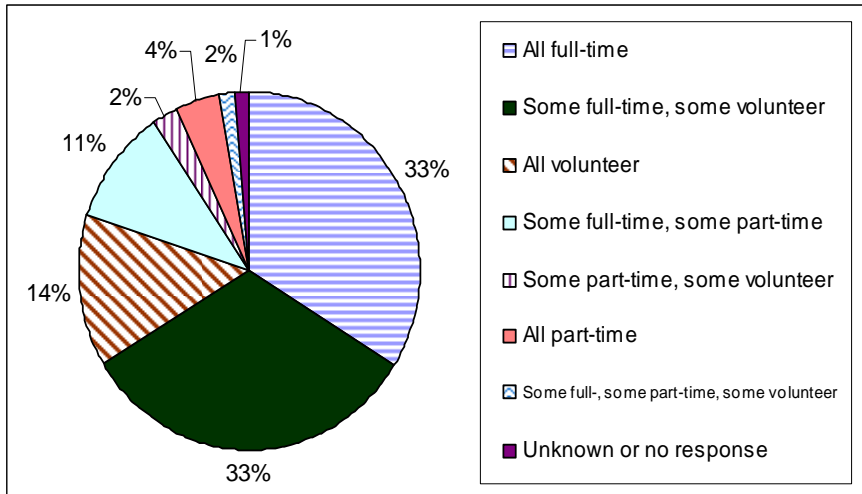


Figure 2-3: Staff characterization of organizational respondents, in percent (n =383).

Staff characterization percentages were compared to the number of staff members in Table 2-3. Please note that each row exhibits the percentage of respondents that characterize their staff as such within each representative number-of-staff category. Each row will add to 100 percent. For example, 54 percent of respondents with all full-time staff employ between 1-and-4 staff members. The remaining 46 percent of respondents with all full-time staff were split between the 5-to-9 category (22%) and the 10-or-more category (24%).

Organizational respondents that employ between 1-and-4 staff members represent 63 percent of all organizations with any combination of full-time staff. The other organizations with 5-to-9 staff and 10-or-more staff represent 18 percent and 19 percent of all organizations, respectively. This disparity between full-time staff numbers may result from limited funding and the sudden increase in the number of conservation organizations over the past 20 years.

Table 2-3: Staff characterization by the number of staff reported, in percent.

	Number of staff		
	1 to 4 (%)	5 to 9 (%)	10 ≤ (%)
All full-time	54	22	24
Some full-time, some volunteer	78	10	12
All volunteer	56	31	13
Some full-time, some part-time	54	29	17
Some part-time, some volunteer	100	0	0
All part-time	94	6	0
Some full-, some part-time, some volunteer	50	50	0
Unknown or no response	100	0	0

Conservation organizations normally experience limited funding for staff when starting operations. Thus, newer organizations may employ one or two full-time staff members while counting on the assistance of either part-time staff or volunteers for help. As conservation efforts and membership increase over time, organizations can employ larger full-time staff numbers with less dependence on part-time staff and/or volunteers. Respondents became less reliant on employing all part-time staff or some part-time and some volunteer staff when the total number of staff members increased as illustrated in Table 2-3.

2.2.4 Professional Staff Employed by Conservation Organizations

Conservation organizations benefit from employing professional staff that possesses knowledge of the natural resources protected in their respective geographic areas. These professional staff members can range from broadly-specialized like biologists or ecologists to highly-specialized like animal husbandry experts and weed specialists. They bring a scientific and/or legal foundation of knowledge to an organization.

Forty-eight different professional types were employed by the respondents (Appendix H). Respondents employed wildlife biologists (16%), botanists (11%) and foresters (10%) as professional staff. Organizations employing the remaining professional types represent less than 10 percent of respondents.

2.2.5 Practical Assistance Provided by Respondents

Survey participants protect valuable lands by numerous means. They also provide practical assistance for easement grantors, organizational members and the general public. The types of assistance commonly provided by the respondents are shown in Table 2-4. Open space

protection was the most frequent assistance provided by organizational respondents. Over 53 percent of all respondents provided this type of assistance. Open space protection includes the assessment of land holdings and available options (i.e., conservation easement, fee-simple purchase, donation for nature preserve) for protecting the values of these holdings.

Table 2-4: Practical assistance provided by respondents, in percent.

	Conservation organizations (n = 536) (%)	Government agencies (n = 18) (%)
Open space protection	53	33
Wildlife habitat protection	41	61
Environmental education	34	44
Water protection	32	33
Threatened and endangered species	32	56
Estate planning	21	-
Law and regulatory advice	20	33
Forest management	19	44
Forest health	14	33
Recreational services	12	22
Tax information	1	11
Restoration planning	0.4	-
Farm soil & water conservation	0.4	-
Drainage issues	0.2	-
Habitat maintenance and restoration	0.2	-
Ecosystem health	0.2	-
Archeological assessment	0.2	-
Family range management	0.2	-
Contract harvester suggestions	0.2	-
Molecular cell biology techniques	0.2	-
Invasive species control	0.2	-
Meadow/grassland restoration & conversion	0.2	-
Prairie management	0.2	-
Wetland protection	-	5
General resource information	-	5

Wildlife habitat protection was provided by 41 percent of the organizational respondents (Table 2-4). Like open space protection, habitat protection assistance can include protection options and restoration techniques. Organizations may use restoration techniques like removing exotic species and re-establishing native browse species and mast trees. Environmental education was provided by 34 percent of all respondents. The LTA (2001: n. p.) found that

around 72 percent of their respondents provide environmental education “in an effort to enhance their communities’ understanding of land conservation issues.” Noted earlier, this percentage difference may result from the LTA including all organizations that protect lands via fee simple purchase, easements and other means. All other assistance was provided by less than one-third of organizational respondents.

The top four types of practical assistance provided by agency respondents were wildlife habitat protection (61%), threatened and endangered species (56%), environmental education (44%) and forest management (44%). Other assistance was provided by the less than 33 percent of agency respondents (Table 2-4).

2.2.6 Contact Information Provided by Respondents

Easement grantors request professional advice in properly managing their land. Gaddis (1999) found that 74 percent of North Carolina easement grantors surveyed sought professional advice. The North Carolina grantors sought professional forestry advice from state foresters (46%), forest consultants (43%), North Carolina Cooperative Extension Services (26%) and industrial foresters (3%).

The percentages of survey respondents that provide professional forestry contacts to easement grantors and the public are illustrated in Table 2-5. Note that respondents provided multiple contacts that cause these statistics not to equal 100 percent. A total of 346 organizations (or 65%) provide professional contacts. The top four forestry contacts provided by organizational respondents were private consulting foresters (57%), state foresters (52%), wildlife biologists (46%) and cooperative extension forester (34%).

A total of 13 government agencies (or 72%) provide professional contacts. The top four forestry contacts provided by agency respondents were state foresters (77%), private consulting foresters (54%), cooperative extension foresters (54%) and wildlife biologists (54%). Respondents only provide four other professional contacts.

Table 2-5: Respondents providing forestry contacts, in percent.

	Conservation organizations (n = 346) (%)	Government agencies (n = 13) (%)
Private consulting forester	57	54
State forester	52	77
Wildlife biologist	46	54
Cooperative extension forester	34	54
Forest ecologist	23	38
Arborist	12	8
U.S. Forest Service forester	12	15
Industrial forester	3	15
Local woodland association staff	1	-
County conservation district forester	0.6	-
State parks & wildlife ranger	0.3	-
Soil, water & conservation district rep.	0.3	-
Tree farm association staff	0.3	-
Contract harvester & woodcutter	0.3	-
Restoration consultants	0.3	-

Grantees should provide non-forestry professional contacts as well. Gaddis (1999) found the easement grantors sought advice from appraisers (94%), lawyers (89%), surveyors (74%), accountants (51%), and estate planners (9%). A list of these professionals helps easement grantors before and during the easement drafting process. Conservation organizations should withhold the contacts of lawyer(s) and other professionals associated with their conservation efforts to avoid any conflicts of interest (Bick and Haney 2001).

The percentages of survey respondents that provide professional non-forestry contacts to grantors and the public are visible in Table 2-6. Professional appraiser (71%), attorney (58%) land surveyor (51%), and NRCS extension agent (47%) contacts were provided by organizational respondents. Other contacts were provided by less than one-quarter of respondents.

Table 2-6: Respondents providing non-forestry contacts, in percent.

	Conservation organizations (n = 346) (%)	Government agencies (n = 13) (%)
Appraiser	71	8
Attorney	58	-
Land surveyor	51	8
NRCS extension agent	47	62
Accountant	22	-
Agriculture specialist	18	23
Landscape architect	13	-
Horticulture specialist	9	15
Urban planner	7	-
Geologist	1	-
Conservation consultant	1	-
Agriculture land preservation specialist	1	-
Hydrogeologist	0.3	-
Grassland ecologist	0.3	-
Estate planner	0.3	-
Ornithologist	0.3	-
State-sponsored biologist	0.3	-
Wetlands biologist	0.3	-
Environmental liability consultant	0.3	-
Prairie agent	0.3	-

Agency respondents provide professional non-forestry contacts of NRCS Extension agents (62%) more frequently than any other (Table 2-6). They provide to a lesser extent the professional contacts of agricultural specialists (23%), horticulture specialists (15%), appraisers (8%) and land surveyors (8%). Respondents do not provide any other non-forestry contacts.

2.3 National and Regional Conservation Easement Statistics

National conservation easement data sheds light on the holistic efforts of conservation organizations and government agencies protecting private and public lands from development. This analysis also covers conservation efforts at the regional-level. Regional statistics are important because levels of protection vary by region. In the Northeast, for example, development pressures threaten private forestlands more than in the Great Plains region. Thus, a substantially greater number of easement-protected acres were found in the Northeast. Obviously, national data does not allow for this specificity. Regional statistics promote a means for comparison to other empirical studies that were completed on the regional- or local-level.

2.3.1 Regional Breakdown of Data

USFS geographic regions were used for this analysis. The eight different regions are delineated in Figure 2-4. The eight regions include the Northeast, North Central, Southeast, South Central, Great Plains, Intermountain, Pacific Northwest, and the Pacific Southeast. The states that correspond to each region are cataloged in Appendix I.

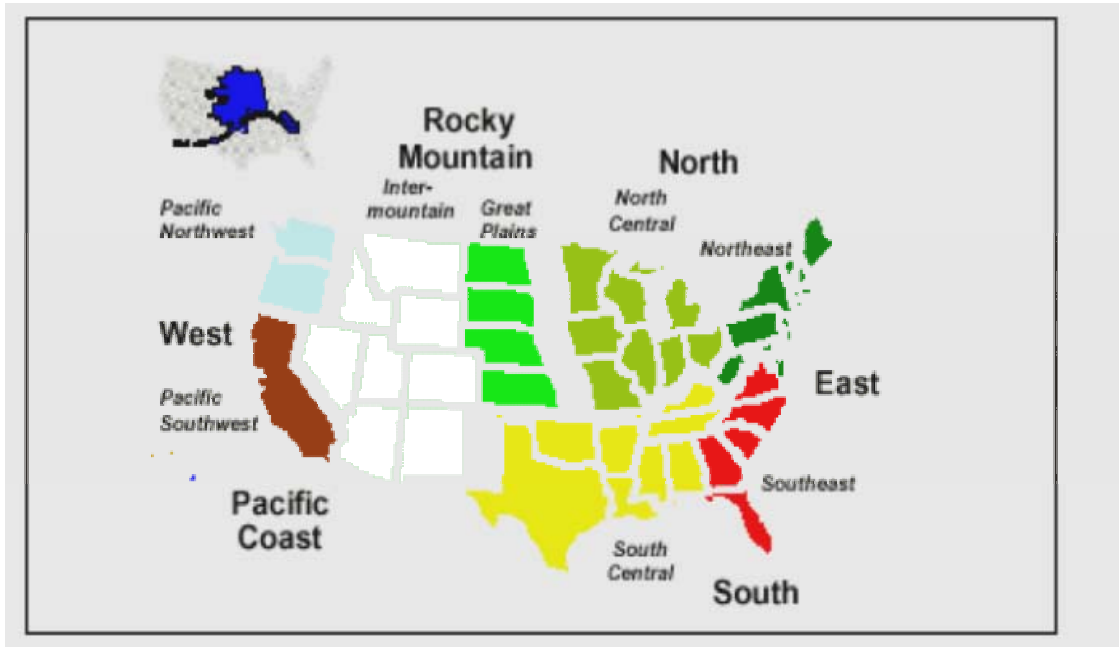


Figure 2-4: Forest resource reporting regions and subregions of the United States (Adapted from Smith et al. (2001) p. 4).

The LTA (2001) provides its data in regional and state forms. Like the USFS, the LTA categorizes eight different regions. The LTA's regional delineations vary somewhat from the USFS delineations. Despite the differences, the LTA's state data was grouped into USFS regions to offer direct comparisons.

The LTA delineations differ by name and by the states included in each region. Instead of two regions in the eastern U.S., the LTA splits the eastern states into three regions. These regions were the Northeast, the Mid-Atlantic and the Southeast. The LTA's Midwest region groups the USFS' Great Plains and North Central regions together. The LTA includes only Arkansas, Louisiana, Oklahoma and Texas in their South Central region. This region was half

the size of the USFS region with the same name. Like in the eastern U.S., the LTA splits the western states into three regions. These regions are the Northwest, Southwest and the Pacific regions. These three regions share the states formally categorized in the USFS' Intermountain region.

The USFS regions were preferred because a wealth of forestland data was available for each region. Smith et al. (2001) provide the most current volume and acreage estimates of forest resources by region. This information was essential to make assumptions about the effects of conservation easements, if any, on available timber supply from private forestlands. The 22 major forest types by state plus two other types in Alaska are listed in Appendix J. These major forest types were extracted from SAF (1980).

2.3.2 Number of Grantees and Easements

Usable survey responses were received from 536 conservation organizations (Table 2-7). Forty-nine percent (263/536) of the respondents were found in the Northeast region. The North Central region accounts for 17 percent (93/536) of the respondents. All other regions each account for less than 9 percent of the respondents.

Table 2-7: Number of grantees and conservation easements by USFS region and the total U.S.

	Number of land trust:		Number of government:	
	Grantees (#)	Easements (#)	Grantees (#)	Easements (#)
Northeast	263	6,783	7	256
North central	93	2,141	4	3,041
Southeast	47	516	4	79
South central	21	370	1	2
Great plains	4	29	1	100
Intermountain	40	1,553	2	40
Pacific northwest	26	281	0	0
Pacific southwest	42	853	1	3
United States	536	12,526	20	3,521

The organizational respondents protect land with 12,526 conservation easements (Table 2-7). LTA (2001) did not provide the number of conservation easements in its Census for comparison. In this survey, 6,783 easements (or 54%) were found in the Northeast. The respondents in the North Central and Intermountain regions possess a considerable percentage of conservation easements at 17 percent and 13 percent, respectively. Respondents from each of the remaining regions protect lands with less than 7 percent of all easements nationwide.

Twenty government agencies responded to the survey (Table 2-7). The agency respondents protect land with a minimum of 3,521 conservation easements. This easement total was considered the lower bound. Two agencies withheld the number of properties protected by easement. Four respondents from the North Central region protect land with over 86 percent (3,041/3,521) of the government-held easements (Table 2-7).

2.3.3 Easements Co-held with Other Organizations and Agencies

Conservation organizations and government agencies often need or want to co-hold easements with other entities for legal and other reasons. Local conservation organizations may co-hold easements with well-established regional or national organizations that provide financial support. If the local organization ceases to exist, this circumstance allows the transfer of the easement(s) to another organization(s) or government agency (Diehl and Barrett 1988). This transfer assures that easement monitoring and enforcement continue in perpetuity.

Over 168 organizational respondents report co-holding easements with other conservation organizations or government agencies (Table 2-8). These grantees represent 31 percent (168/536) of all organizational respondents. Eighty-one percent (or 136 organizations) of the respondents co-holding easements were found on the eastern half of the U.S. Organizations from the Northeast region account for one-half (84/168) of all respondents that co-hold easements.

Government agencies also co-hold conservation easements with other organizations and agencies. Thirty-three percent of agency respondents (or 6 agencies) co-hold easements with other organizations and agencies (Table 2-8). Three agencies (or 50%) in the Southeast region co-hold easements. The North Central, Intermountain and Pacific Southwest regions both contain one agency with co-held easement(s).

Table 2-8: Number of grantees co-holding easements with other organizations or government agencies.

	Number with co-held easements:	
	Organizations (#)	Agencies (#)
Northeast	84	0
North central	29	1
Southeast	17	3
South central	6	0
Great plains	0	0
Intermountain	17	1
Pacific northwest	3	0
Pacific southwest	12	1
United States	168	6

The number of respondents that co-hold easements with other organizations or agencies by co-holder category is shown in Table 2-9. The co-holder categories were federal agencies, state/local agencies and other conservation organizations. Eleven organizational respondents report co-holding easements with federal agencies. The specific federal agencies that collaborate with the survey respondents are listed in Appendix K. Majority of those organizations (or 64%) were found in the Northeast region. Agency respondents do not report co-holding any easements with other federal government agencies.

Table 2-9: Number of organizations and agencies by region that co-hold easements with grantees.

	Survey respondents with easements co-held by:					
	Federal agencies		State/local agencies		Other organizations	
	Orgs. (#)	Agencies (#)	Orgs. (#)	Agencies (#)	Orgs. (#)	Agencies (#)
Northeast	7	0	55	0	47	0
North central	1	0	16	1	20	1
Southeast	1	0	9	3	11	1
South central	0	0	2	0	4	0
Great plains	0	0	0	0	0	0
Intermountain	2	0	9	0	10	1
Pacific northwest	0	0	2	0	3	0
Pacific southwest	0	0	8	0	6	1
United States	11	0	101	4	101	4

A total of 101 organizational respondents report co-holding easements with either state or local government agencies (Table 2-9). The specific state, county and town government agencies provided by the respondents are listed in Appendix K. Organizations in the Northeast region co-hold easements with the majority of state and local agencies. They represent 54 percent (55/101) of all respondents. All other regions possess less than 16 organizational respondents each. Four government agency respondents report co-holding easements with other state or local agencies. Respondents in the North Central and Southeast regions account for these four agencies.

A total of 101 organizational respondents report co-holding easements with other conservation organizations (Table 2-9). The specific national, statewide and local conservation organizations provided by the respondents are listed in Appendix L. The regional proportions were similar to the organizations co-holding easement with state and local government agencies. Respondents from the Northeast region represent 47 percent of organizations co-holding easements with other conservation organizations. Four government agencies co-hold easements with other conservation organizations.

2.3.4 Total Acres Protected by Conservation Easements

The organizational respondents protect 3,915,160 acres total in the United States (Table 2-10). Nearly 61 percent of those total acres were located in the Northeast region. Respondents from the Intermountain and North Central regions account for 17 percent and 11 percent, respectively, of total acres protected by conservation easements. The other five regions protect the remaining 20 percent of total protected U.S. acres.

Government agency respondents protect 999,627 acres total in the U.S (Table 2-10). A single agency in the Intermountain region protects the vast majority (36%) of that total. It deals specifically with wildlife habitat protection. Agency respondents from five other regions account for the other 64 percent of agency-protected acres.

Regional acreage estimates were addressed as the minimum protected by agency respondents. Two agencies left the total easement acreage question blank on their surveys. In one case, the agency respondent chose not to provide the easement acreage and the total number of easements. In another case, the respondent found all easement files, especially older easements, in a state of disarray. This particular respondent could not provide an accurate approximation of total state-wide acreage protected.

Table 2-10: Property protected by respondents by USFS region and the total U.S. and equivalent total acres from LTA (2001).

	<u>Property protected:</u>		<u>Total property protected:</u>	
	(1) Land trust (Acres)	(2) Government (Acres)	(3) Huff (2004) (Acres)	(4) LTA (2001) (Acres)
Northeast	2,382,625	421,768	2,804,393	1,062,487
North central	411,237	125,734	536,971	72,235
Southeast	85,491	93,131	178,622	339,583
South central	195,898	154	196,052	65,002
Great plains	3,162	0	3,162	12,206
Intermountain	674,554	355,000	1,029,554	841,299
Pacific northwest	16,853	0	16,853	36,132
Pacific southwest	145,340	3,840	149,180	160,675
United States	3,915,160	999,627	4,914,787	2,589,619

The total property protected from this survey and from LTA (2001) is provided in Table 2-10. From this survey, the total protected acres from both conservation organizations and government agencies were 4,914,787 acres. The LTA (2001) found a total of 2,589,619 acres protected by conservation easements in 2000. The change in three years was an increase in over 2,325,168 acres. The current total acreage represents a 90 percent increase in number from LTA (2001).

The LTA (2001) acreage values only include lands protected by conservation organizations. The total acreage values in the preceding paragraph include both organization and government agencies. Considering the regional acres by conservation organizations only, columns (1) and (4) of Table 2-10 offer direct comparisons. Organizational respondents protect 1,321,540 acres (or 51%) more than organizations surveyed in LTA (2001).

Regional increases and decreases in easement acreage were visible (Table 2-10). The Northeast region demonstrated the lowest percentage increase (124%) since 2000. It possessed, however, the greatest number of protected acres since 2000 at 1,320,138 acres. The South Central region's total acreage increased 201 percent (or 130,896 acres) since 2000. Protected acreage in the North Central region increased an astounding 469 percent (or 339,002 acres) since 2000.

Decreases in total acreage by region were also visible. The Southeast, Great Plains, Intermountain, Pacific Northwest, and Pacific Southwest regions show decreases in acreage since 2000. Easement transfers to government agencies probably contribute to these acreage decreases. The other likely cause was non-response from organizations that hold a significant amount of easement acreage in these regions.

LTA (2001) found that their respondents' easements protected a combined 1,389,895 acres of land in these five regions. In the same regions, respondents of this survey protect over 925,400 acres of land with easements. The difference was 464,494 acres or 33 percent of the respective acres in LTA (2001). The Intermountain and Pacific Southwest regions' acreage was at least 80 percent and 90 percent, respectively, of the LTA 2000 Census estimates. The respondents from the Southeast region protect only 25 percent of the equivalent LTA 2000 Census estimate.

2.3.5 Survey Respondents Retaining Forest Records

Survey participants were asked if records were kept on total forestland acreage protected by their easements. For a respondent to have official forest records, they must provide an estimate of total forestland acreage and/or the total number of easements with over 10 acres of forest. A total of 241 conservation organizations kept forestland records on their easements (Table 2-11).

Table 2-11: Respondents with forestland records versus organizations holding forest easements with or without forestland records.

	<u>Organizations with:</u>		<u>Agencies with:</u>	
	Forest records (#)	Records and without (#)	Forest records (#)	Records and without (#)
Northeast	114	171	3	5
North central	48	68	0	4
Southeast	17	28	2	4
South central	8	12	1	1
Great plains	3	3	0	0
Intermountain	16	24	1	1
Pacific northwest	15	21	0	0
Pacific southwest	20	28	1	1
United States	241	355	8	16

The organizations retaining forest records include both grantees that do and do not hold actively-managed forest conservation easements. When cross-referenced to the grantees that hold working forest conservation easements, an additional 114 organizations hold working forestland easements without retaining forestland records. Thus, a total of 355 organizations protect forestland with conservation easements whether retaining records or not.

This difference between organizations that retain records and those that do not was important for two reasons. First, nearly 33 percent (114/355) of grantees hold forest conservation easements that were actively managed and do not know how many forestland acres were protected by these easements. Second, if grantees with working forestland easements do not retain forestland records, can it be assumed that a similar number of grantees with non-working forest easements may not have records too? It was safely assumed, at least, that other grantees with non-working forest easements do not retain forestland records. Thus, 355 grantees were assumed the sample minimum that protect forestland.

Respondents hold working forestland easements without retaining forestland records on every region except the Great Plains (Table 2-11). The Southeast region comprises the highest percentage of organizations without forestland records at 39 percent. Respondents from the Northeast region make up the majority of easement grantees without forestland records. A total of 57 organizations (or 33%) do not retain forestland records on their easements in that region. All other regions range between 29 percent and 33 percent of organizations without forestland records.

Of the organizational respondents, 66 percent (355/536) protect forestland by easements. The Northeast region demonstrated the highest percentage of grantees (65%) protecting forestland with conservation easement. The origination of the conservation movement in this region contributes to this high percentage of grantees trying to slow or prevent the development of open space areas. The LTA (2001) reports over 255 conservation organizations are located in Connecticut and Massachusetts alone.

Respondents from the South Central region exhibit the lowest regional percentage (or 57%) of all respondents that protect forestland. The Great Plains region respondents possess the lowest percentage (or 0.8%) of total grantees protecting forestland. This was not surprising with only sparse forest cover along rivers and in northwestern Nebraska and northeastern North

Dakota. Considerable forest cover was found in eastern Kansas and the Black Hills of South Dakota.

Sixteen agencies reported holding forestland easements with and without forestland records (Table 2-11). Eight agencies retain forestland records of their easements. The remaining eight agencies provide only an approximation of total forestland protected. All agency respondents from the North Central region do not retain forestland records. In addition, forestland records were not retained by two other Northeast and Southeast region respondents.

2.3.6 Total Forestland Easements and Acres Protected

Forestland was protected in over one-quarter of all easements. A minimum of 3,431 forest conservation easements were tallied by all organizational respondents (Table 2-12). The Northeast region exhibited the largest number of forestland easements at 1,795 easements (or 52%). The North Central region respondents hold the second largest percentage of forest conservation easements at 27 percent. Respondents from the remaining regions hold the other 20 percent of total forestland easements.

Table 2-12: Total forest easements by conservation organizations and government agencies by USFS region and the total U.S.

	Forest easements:	
	Organizations (#)	Agencies (#)
Northeast	1,795	147
North central	932	0
Southeast	186	2
South central	154	1
Great plains	6	0
Intermountain	125	15
Pacific northwest	114	0
Pacific southwest	119	2
United States	3,431	167

When considering the forest easement percentages within each region, the forest conservation easements represent 44 percent (932/2,141) of all organization-held easements in the North Central region. Forest easements represent 42 percent and 41 percent of all easements in the South Central and Pacific Northwest regions, respectively. The Northeast region

maintains the fourth largest regional forest easement percentage at 27 percent. The remaining regional forest easement percentages were all less than 17 percent each. The Intermountain region experienced the lowest percentage of forest easements at 8 percent of all easements in that region.

Government agencies protect forestland with 167 conservation easements (Table 2-12). This number underestimates the actual forestland easement number because it only includes the easements with chronicled forestland on them. Forestland easement estimates held by agencies without records would prove grossly inaccurate. Eighty-eight percent (147/167) of these forest conservation easements were held in the Northeast region.

How does the estimated forestland acreage of all 355 organizations correspond to the actual forestland acreage provided by the 241 organizations retaining forestland records? The dramatic difference in forestland acres protected is shown in Table 2-13 when an assumed percentage of those 114 organizations' total acreage was added by respective region. The 241 organizations that retain forestland records protect a total of 796,555 forestland acres. This forest acreage represents 20 percent of the total acreage protected by conservation organizations nationwide. Respondents in the Northeast and Intermountain regions protect the largest contingent of forest acres at 405,055 and 253,236 acres, respectively.

Table 2-13: Organizational respondents' actual forest acres in records versus possible total forest acres.

	Forest records:	Plus percent of working forests w/ no records:		
	Total (Acres)	25% Total (Acres)	50% Total (Acres)	100% Total (Acres)
Northeast	405,055	762,069	1,119,135	1,833,215
North Central	64,227	115,749	167,329	270,310
Southeast	26,545	33,669	40,798	55,056
South Central	4,071	51,096	98,121	192,171
Great Plains	270	270	270	270
Intermountain	253,236	321,105	388,974	524,712
Pacific Northwest	7,346	8,783	10,219	13,091
Pacific Southwest	35,804	50,931	66,058	96,312
United States	796,555	1,343,673	1,890,903	2,985,137

In addition to the actual recorded forest acreage, the additional forest acreage possibly protected by organizations that do not retain forest records is demonstrated in Table 2-13. It assumes the percentage of total forest acreage protected by these 114 conservation organizations. At the maximum extreme of 100 percent of working forest acreage, for example, conservation organizations would protect over 2,985,137 acres of forestland. However, the working forest easements do not represent 100 percent of these 114 organizations' easements. So, it was inaccurate to assume that 100 percent of the total acres were forested.

A more conservative estimate of forest acreage protected was 50 percent of each organization's total easement acreage. In this instance, an estimated forestland total of 1,890,903 acres was protected by all 355 organizations with or without forestland records. This 50 percent estimation adds an additional 1,094,349 acres (or 137%) to the total forest acreage reported by conservation organizations with forest records.

An ultraconservative estimate was 25 percent of the total easement acreage for each organization. In this instance, an estimated 1,343,673 forest acres were protected by conservation easements. This represents a 69 percent increase (or 547,119 acres) in the forest acreage reported by respondents retaining forest records. The value appears underestimated. In the Northeast region, for example, one organizational respondent has protected large forest holdings (750,000 + acres) without retaining records on the total forestland protected.

The graphical depiction of Table 2-13 by region is shown in Figure 2-5. The far left portion of each horizontal column represents the acreage reported by organizations with forest records. The two middle portions of each horizontal column represent 25 percent and 50 percent, respectively, of the total acreage of those organizations that do not retain forest records in each region. The far right portion of each column represents the maximum possible forest acreage (or 100%) protected by these additional 114 organizations. The relationship of an adjustment in respective percentages by region that could change the total forest acres nationwide is shown in Figure 2-5. For example, a one-percent positive adjustment in regional forest acreage yields far more total acres in the Northeast region than in the Intermountain region.

At first glance, respondents from the Northeast region protect the largest number of forest acres. The level of forestland protected in the Northeast compared to other regions is placed into context in Figure 2-5. It illustrates that a significant number of working forest acres were not

recorded in this region. Assuming 50 percent of the additional acreage was forested, the total forestland acreage in the Northeast region would increase by over 714,080 acres to 1,119,135 acres (Table 2-13). In the light of the organization with large forest holdings mentioned earlier, a higher unrecorded forestland percentage may prove more accurate in this region.

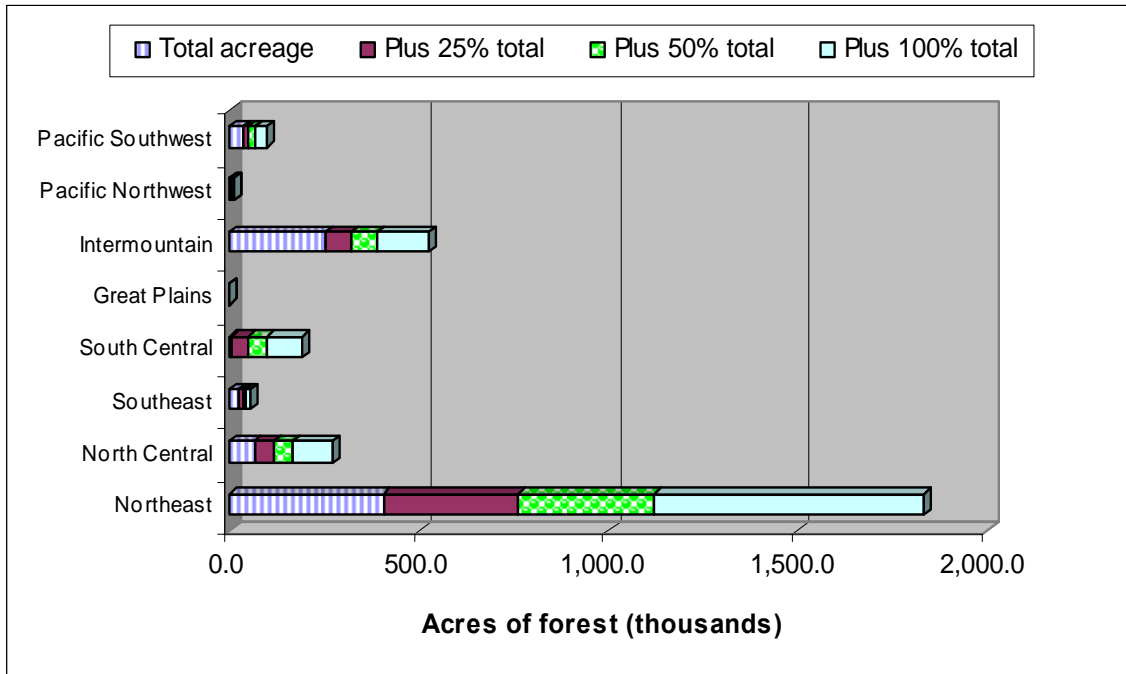


Figure 2-5: Total forest acres from records plus additional percentage of total acres from organizations with working forests and no forest records.

The Intermountain region retains a considerable amount of forest acres recorded by conservation organizations. The number of additional acres in unrecorded working forest easements was considerably less than that of the Northeast region (Figure 2-5). Assuming 50 percent of the additional acreage was forested, the total forestland acreage in the Intermountain region would increase by over 135,738 acres to 388,974 acres total (Table 2-13). Other regions demonstrate slight overall differences between recorded and unrecorded forest acreage.

The disparity between the approximated total forestland acreage and the acreage specified by agency respondents retaining forestland records is visible in Table 2-14. The total recorded forestland acreage held by the eight organizations was 223,572 acres. The

approximated forest acreage of all sixteen organizations was 654,073 acres. The difference was 430,501 forest acres (or 193%) held by the eight agencies that approximated their total forestland acreage.

Table 2-14: Agency respondents’ actual forest acres in records versus approximated total forest acreage.

	Actual forest (n = 5) (Acres)	Approx. total forest (n = 16) (Acres)
Northeast	67,850	407,150
North central	0	42,501
Southeast	607	45,607
South central	115	115
Great plains	0	0
Intermountain	155,000	155,000
Pacific northwest	0	0
Pacific southwest	0	3,700
United States	223,572	654,073

As organizations and agencies continue to protect forestland with conservation easements, they must determine exactly how much forestland acreage they will protect before placing an easement on a property. It seems counterintuitive to protect a property’s forestland in perpetuity when accurate records of the forestland base are not available. This follows along the same lines of having records on structures that were on the property when the easement was placed.

If records of structures were not kept, how could grantees distinguish if a newly-built structure was on a remote section of a property when the easement was first drafted, for example, 100 or 200 years before? It would be difficult to prove in a court of law that a structure was not on the property upon easement drafting if records were not available to confirm otherwise. Though this may seem like an extreme example, it exhibits the need of keeping accurate forestland records.

Chapter 3 – Easement Document Results

General easement statistics from survey respondents were reported in the previous chapter. It addressed the first objective of determining the total amount of land and forestland protected by conservation easements. The remaining two objectives of this study are covered in this chapter. These objectives consist of determining the forest management restrictions commonly found on the forestland easements and addressing the stewardship status of these easements' forest resources. To address these objectives, four sections that correspond to information commonly found in the easement document are considered in this chapter. The four sections are affirmative rights, restrictions, reserved rights and terms, conditions and other provisions.

3.1 Affirmative Rights

Affirmative rights are held by the easement grantee on the grantor's property. Grantees traditionally affirm the right to monitor and enforce the easement if violations are present or suspected. These rights are required for administration purposes and IRS qualifications (Bick and Haney 2001). Beyond monitoring and enforcing, grantees may affirm the right to use the property for educational pursuits, scientific studies, emergency access, boundary maintenance, and others (Bick and Haney 2001). These specific rights differ from easement to easement.

3.1.1 Conservation Easement Monitoring

Grantees use easement monitoring as a means to assure that grantors and others adhere to the easement's provisions. The average easement monitoring frequency reported by survey respondents is shown in Table 3-1. For organizational respondents, 70 percent report monitoring their easements an average of one time per year. Many noted that they would monitor more often, if needed. It was unclear from their responses how they would know if they needed to monitor more often. Some circumstances that might trigger more frequent monitoring are unusual weather conditions like torrential rains over an extended period during timber harvesting and other natural disasters. A grantor's reputation for violating the easement agreement may warrant more frequent monitoring if their property uses are questionable.

Table 3-1: Average monitoring frequency of all easements by survey respondents.

	Conservation organizations (n = 536) (%)	Government agencies (n = 18) (%)
< 1 time per year	14	39
1 time per year	70	61
1 time per year <	11	0
Not applicable	1	0
No response	4	0

Government agency responses vary from that of the conservation organizations. Sixty-one percent of respondents monitor their easements an average of one time per year (Table 3-1). Like conservation organization respondents, numerous agency respondents noted they would monitor easements more frequently, if the need arose. No agency respondents report monitoring easements more than one time per year on average.

The percentages of respondents with non-working and working forest conservation easements by monitoring frequency are shown in Table 3-2. Organizational percentages varied within each respective monitoring frequency. Sixty-seven percent of organizations with non-working forest conservation easements monitor these easements one time per year. For organizations with working forestland easements, the percentage rises to 81 percent of respondents monitoring their easements on average one time per year.

Table 3-2: Average monitoring frequency of respondents with forest easements and working forest conservation easements per year.

	<u>Organizations with:</u>		<u>Agencies with:</u>	
	Non-WFCE (n = 115) (%)	WFCE (n = 240) (%)	Non-WFCE (n = 2) (%)	WFCE (n = 16) (%)
Less than 1 time	21	11	50	37
One time per year	67	81	50	63
More than 1 time	12	8	0	0

Sixteen agencies reported protecting working forestland with their easements. The percentage of these agencies monitoring one time per year was 63 percent (Table 3-2). Whether protecting working lands or not, it seems the government agencies do not change their usual monitoring regimen to account for the increased likelihood of violations on actively-managed easements. Budget shortfalls and staff limitations normally contribute to the cause.

Monitoring frequency was analyzed to detect any significant correlations between the frequency and forest conservation easements. The monitoring frequency was assumed to be independent of forestland easement type (working versus non-working). A chi-square test was completed using SPSS® to determine if easement type and monitoring frequency were actually independent. For organizational respondents, grantees holding working forestland easements were more likely to monitor one time per year ($Pr = .010$) than grantees holding non-working forestland easements at the 95 percent confidence level. For agency respondents, no statistical difference was found between forestland easement types.

Easement grantees should persuade active grantor participation in the monitoring process (Merenlender et al. 2004). Boelhower (1995) found that 22 percent of survey respondents were unaware of how and when inspections took place. When the grantee contacts the grantor(s) regarding the inspection date, the grantee should schedule the inspection when both parties are available. If not available, the grantor may request that a representative like a forester or family member attend the inspection.

Some grantees require the easement grantor's attendance during the inspection for easement compliance. The percentage of organizational respondents requiring grantor attendance is demonstrated in Figure 3-1. Eighty-four percent of conservation organization respondents report not requiring grantor attendance.

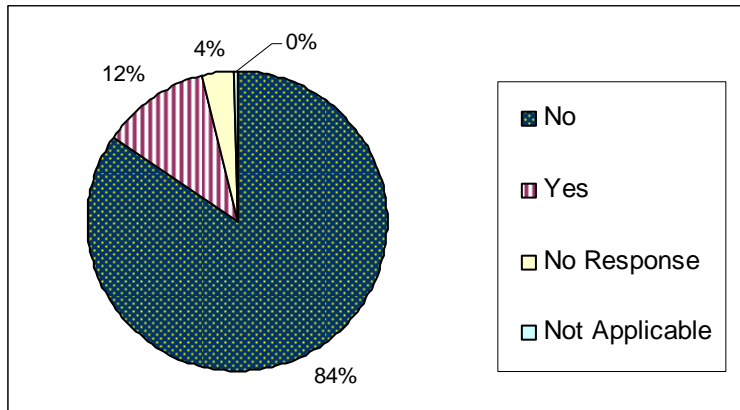


Figure 3-1: Conservation organization respondents requiring grantor presence during monitoring, in percent (n = 536).

Government agencies also encourage grantor participation during easement inspections. A total of three agencies reported this requirement. They represent 20 percent of the agency respondents. Most agencies noted that grantors were asked to attend if they were not required to do so already. A simple requirement of grantor attendance may improve a grantor’s knowledge of easement inspections and violation assessment. This requirement is a proactive step to increase the grantor’s knowledge of their property’s conservation qualities and the benefit of their protection.

3.1.2 Conservation Easement Enforcement

Boelhower (1995) and Parker (2001) report their survey respondents experienced several violations of easement provisions. Organizations and agencies are aware there is a potential for easement non-compliance. They should assess how to administratively and financially handle easement violations. If a violation occurs, the preferred scenario requires the grantor to stop all undesirable actions and mitigate the violation(s), if possible. Sometimes, litigation resolves easement violations. Other times, Diehl and Barrett (1988) offer arbitration, mediation, and restoration as possible solutions. Grantees should stay firm on their stance to enforce easement provisions.

Boelhower (1995) reported five organizations experiencing forestry violations on their easements in Maine, New Hampshire and Vermont. Grantees found that problems arose from loggers misunderstanding easement provisions, harvesting without management plans and land

clearing issues (Boelhower 1995). Similarly, respondents from this survey reported experiencing easement violations. The violation statistics and outcomes faced by organizational respondents are listed in Table 3-3.

Table 3-3: Violation statistics and outcomes reported by organizational respondents by USFS region and the total U.S.

	<u>Total number of:</u>		<u>Outcomes by organization*:</u>	
	Organizations (#)	Violations (#)	Resolved (#)	Litigation (#)
Northeast	24	61	18	5
North central	8	10	5	1
Southeast	5	7	5	0
South central	2	2	2	0
Great plains	0	0	0	0
Intermountain	4	8	2	1
Pacific northwest	5	14	4	0
Pacific southwest	4	10	1	2
United States	52	112	37	9

* Note: Only 46 organizations responded to the violation outcome questions. The remaining six organizations chose not to respond.

Fifty-two organizational respondents report violations on their easements (Table 3-3). The organizations represent nearly 10 percent of all survey respondents. The Northeast region comprises the largest number of respondents (or 24) reporting violations. These respondents report a total of 112 different easement violations. Sixty-one violations (or 50%) were encountered in the Northeast region.

The specific violations encountered by respondents are listed in Appendix M. The violations were divided into five categories. The violation categories were forest management, water and soil quality, recreation and access, adjacent landowner and other common violations. Forest management violations were reported more than all others. The majority of reported forest management problems dealt with timber harvesting. The most often cited harvesting violations include illegal use of clearcutting, harvesting near streams, harvesting in excess of easement limits, and harvesting in prohibited areas. The remaining violations include management plan-related issues and other forestry-related violations like slash clean-up.

Some respondents encountered water and soil quality violations. A total of six violations were found. Water quality violations include illegal stream crossing, wetland alteration and tracking into wet areas. All soil quality violations were related to erosion during timber harvesting. Recreation and access violations were encountered by five organizations. Recreation violations include illegal camping, fires and ATV trails. Access violations encountered by respondents dealt with illegal or excessive road construction.

Ten respondents reported violations that were not committed by the easement grantor. These violations were caused by adjacent landowner(s). Most violations associate with timber harvesting by an adjacent landowner on the protected property, whether intentionally or not. Two organizations reported adjacent landowners unintentionally harvesting the easement grantor's trees. One respondent reported a third-party timber trespass violation. Another respondent noted a bulldozing violation on a protected property by an adjacent landowner and fire department to reduce a "non-existent" fire risk. Other common, non-forestry violations include illegal dumping, use of fencing, and one building.

Thirty-seven organizations (or 71%) reported that the grantors or other guilty parties resolved violations before litigation was needed (Table 3-3). A total of nine respondents required litigation to resolve the disputes. Six organizations declined to respond if violations were resolved or required litigation. In the Northeast region, 75 percent of respondents (or 18 organizations) reported that violations were resolved before litigation. Five respondents used litigation in the Northeast region. They represent 55 percent of all organizations that have required litigation for dispute resolution.

Two agency respondents experienced violations on their easements. Each agency reported one violation to date. One violation dealt with prohibited tree removal. The other respondent's violation was a result of not following BMPs. In both cases, the grantor or other parties resolved the violation before litigation was needed. One agency reported the additional need of litigation in one case to clear up other issues.

3.2 Easement Restrictions

Grantees limit activities on protected properties with easement restrictions. Preventing property development is the ultimate objective. Some easements allow limited construction of additional residences. Along with development restrictions, grantees impose other contractual restrictions on easement grantors. For this analysis, two general groups characterize these

restrictions. These general groups were non-forest restrictions and forest management restrictions. Non-forest restrictions include preventing detrimental uses like wetland destruction and land subdivision. Forest management restrictions encompass all restrictions relating to the management of a protected property's forest resources.

3.2.1 Common Non-forest Restrictions

The particular focus of this study was not on common non-forest grantor restrictions. The survey included three questions on these restrictions. For this analysis, the restrictions were discussed in a general sense. It was understood that these restrictions vary by grantee and by individual easement. Bick and Haney (2001) provide a more thorough analysis of common restrictions found on easements.

Survey participants were asked how they would prioritize restrictions when developing an easement document for their average protected property. For example, one grantee may place a high priority on restricting topography alteration on their average easement. Another grantee may place a low priority on topography alteration restrictions. The survey offered three priority levels for each restriction. The priority levels included high, moderate and low. The levels ranged from one (1.0) for high priority to three (3.0) for low priority.

The survey respondents' weighted averages of restriction priority level are demonstrated in Table 3-4. When placing a high priority on a particular activity, respondents declare that they restrict the activity's use on most, if not all, protected properties. For moderate priority restrictions, respondents restrict an activity's use on selected properties. In this case, they do not necessarily restrict use on a majority of their protected properties. For low priority restrictions, respondents rarely restrict the particular use on their properties, if ever.

Conservation organizations and government agencies prioritize common grantor restrictions similarly (Table 3-4). For both grantee types, restrictions on development rights received the highest priority at 1.06 and 1.00. Apart from one use, all other restrictions range between high and moderate priority. Restrictions on fences ranged between low and moderate priority.

Table 3-4: Weighted average of grantee priority to restrict grantor's property uses (high priority = 1 to low priority = 3).

	Conservation organizations	Government agencies
Development rights	1.06	1.00
Land conversion to residential	1.17	1.18
Division or subdivision	1.22	1.36
Waste disposal	1.33	1.27
Billboards	1.40	1.20
Topography alteration	1.41	1.42
Underground mining	1.50	1.73
Radio and phone towers	1.59	1.55
Personal storage	1.62	1.55
Fences	2.45	2.64

An abbreviated list of the common non-forest property uses restricted by survey respondents is shown in Table 3-5. All non-forest use restrictions provided by the respondents are listed in Appendix N. Organizational and agency respondents restricted the destruction of wetlands more than any other use. Sixty-eight percent of organizations and 85 percent of government agencies restricted this use. This was self-explanatory since the typical easement’s goal was to prevent the destruction of a property’s natural resources.

Table 3-5: Respondents restrictions on non-forest property uses, in percent.

	Conservation organizations (n = 536) (%)	Government agencies (n = 18) (%)
Destruction of wetlands	68 [•]	89
Surface mining	64*	72
Stream alteration	56 [•]	50
Agriculture practices	41	56
Intensive livestock operations	40*	56
Pond construction	29 [•]	44
Livestock grazing	25	56
Land application of biosolids	25	22
Wind & solar power devices	15	33

[•] Correlation based on 90% significance level.
^{*} Correlation based on 95% significance level.

A higher percentage of government agencies restricted non-forest uses compared to their organizational counterparts (Table 3-5). Actual government percentages may be lower (or higher) because of the smaller sample size of agency respondents. In either case, majority of survey respondents prohibit uses like surface mining, stream alteration, agriculture practices and intensive livestock operations that could negatively impact the protected property's resources.

Other uses restricted less often were pond construction, livestock grazing, land application of biosolids and power devices. Twenty-one additional uses were prohibited by less than one percent of all conservation organization respondents (Appendix N). Respondents specified these use restrictions in addition to the non-forest use restrictions provided in the survey. If included in the initial survey, these additional restrictions would likely demonstrate higher percentages.

These non-forest property use restrictions were analyzed to detect any significant correlations between each restriction and forest conservation easements, in general. The restrictions were assumed to be independent of easement type (forest vs. non-forest). A chi-square test was completed using SPSS® to determine if forest easements and non-forest property use restrictions were actually independent. For organizational respondents, grantees holding forestland easements (working or not) are more likely to restrict intensive livestock operations ($Pr = .009$) and surface mining ($Pr = .0005$) than grantees protecting non-forest easements at the 95 percent confidence level.

Restrictions on pond construction ($pr = .052$), destruction of wetlands ($pr = .051$), and stream alterations ($pr = .087$) were correlated to forest easements at the 90 percent significance level. Thus, grantees are more likely to restrict these non-forest uses on forestland easements. There was no significant difference between the expected values and the observed values of the other non-forest restrictions. For agency respondents, no significant difference was found between forest and non-forest easements that restrict non-forest property uses.

Occasionally, grantees find the need to restrict recreational uses that impact a property's natural resources. These recreational restrictions may apply to the easement grantor(s) or the general public, if property access was granted. The percentage of respondents that restrict recreational uses on protected properties is demonstrated in Table 3-6.

Seventy-one percent of organizations and 61 percent of agency respondents restrict the use of all-terrain vehicles (ATVs) on protected properties (Table 3-6). Excessive ATV use

disrupts wildlife interactions, damages habitat, and causes soil erosion along trails and waterways. Studies found that local plant communities were impacted by ATV use (Ahlstrand and Racine 1993, Hannaford and Resh 1999). Yarmoloy et al. (1988) showed that ATVs negatively affected the reproductive rates and behavior of mule deer does (*Odocoileus hemionus*).

Less than one-third of all respondents restrict the remaining recreational uses (Table 3-6). Trapping, camping, hunting and mountain biking were restricted by more than 30 percent of organizational respondents. Over 28 percent of agency respondents restricted camping and trail construction on protected properties.

Table 3-6: Respondents restrictions on recreational uses, in percent.

	Conservation Organizations (n = 536) (%)	Government Agencies (n = 18) (%)
All-terrain vehicles (ATV)	71	61
Trapping	33 [•]	17
Camping	33	28
Hunting	33*	17
Mountain biking	30	17
Trail construction	24	28
Flower & berry picking	16	17
Fishing	13 [•]	17
Hiking	11*	0
Snowmobiles	1	0
Horseback riding	1	6
Public access	1	11
Motorized vehicles	1	0
Dog walking	1	0
Campfires	1	0
Exotic game farms	0.4	0
Firearm discharge	0.2	0
Archery	0.2	0
Kayaking	0.2	0
Commercial recreation	0	6

[•] Correlation based on 90 percent significance level.

* Correlation based on 95 percent significance level.

These recreational use restrictions were analyzed to detect any significant correlations between each restriction and forest conservation easements. The restrictions were assumed to be independent of easement type. A chi-square test was completed using SPSS® to determine if easement type and recreational restrictions were actually independent. For organizational respondents, grantees holding forestland easements were less likely to restrict hunting (Pr = .002) and hiking (Pr = .001) than grantees holding non-forest easements at the 95 percent confidence level. Recreational restrictions on fishing (pr = .053) and trapping (pr = .073) were correlated to forestland easements at the 90 percent significance level. Organizational grantees were less likely to restrict these recreational uses on forestland easements. There was no significant difference between the expected values and the observed values of the other recreational restrictions. For agency respondents, no significant difference was found between forest and non-forest easements that restrict recreational uses.

3.2.2 Forest Management Restrictions

Along with other contractual restrictions, grantees may constrain the use of forest management on protected properties. On some properties, the grantor and grantee may mutually decide to restrict forest management all together. On others, the grantee(s) may allow active forest management and restrict the types of management treatments permitted.

Some grantees permit any type of forest management treatment recommended in a professionally-written forest stewardship plan. The survey respondents' weighted average of each restriction's priority level on typical forest management treatments is demonstrated in Table 3-7. These were analyzed in the same manner as the common grantor restrictions from Table 3-4.

Table 3-7: Weighted average of grantee priority to restrict grantor's forest management treatments (high priority = 1 to low priority = 3).

	Conservation Organizations	Government Agencies
Pesticide use	1.86	2.00
Herbicide use	1.90	2.20
Plantation reforestation	1.96	2.18
Fertilization	2.13	2.30
Prescribed burning	2.28	2.36
Forest thinning	2.43	2.18
Timber stand improvement	2.51	2.55
Wildlife food plots	2.59	2.20

SAF (1998: 175) defines timber stand improvement (TSI) as the “intermediate treatment made to improve the composition, structure, condition, health, and growth of even- or uneven-aged stands.” This improvement can benefit both timber production and wildlife management simultaneously (Decker et al. 1990). Respondents demonstrated similar levels between moderate and low priority for restricting TSI (Table 3-7). This shows that respondents may restrict an easement grantor’s TSI treatments in a few cases or not ever.

Forest thinning usually incorporates an intermediate harvest that aims at reducing stand density or controlling species composition (Smith et al. 1997). Many factors influence the timing and appropriate method of these intermediate harvests (Hilts and Mitchell 1999). Some factors include species type(s), stocking, stand age, geographic region and others. Like TSI, organizational respondents consider forest thinning a lower priority when restricting forest management (Table 3-7). Agency respondents make thinning a moderate priority when restricting management.

Wildlife food plots are sometimes used on properties where the landowner wants to manage for game and non-game species like white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo L.*), song birds and others. A mixture of herbaceous plants and grasses cover wildlife food plots (Decker et al. 1990). These plots tend to remain clear of trees. Preferred wildlife browse like clover (*Trifolium pratense*) and alfalfa (*Medicago sativa*) are annually planted using active agricultural procedures like tilling and mowing. Organizational respondents collectively rate food plots as the lowest restriction priority of all treatments (Table 3-7). Agency respondents place a slightly higher priority on restricting this use.

Plantation reforestation refers to the act of replanting a recently-harvested site with pure pine or hardwood species. Landowners routinely use this practice in the South and Pacific Northwest regions. This practice receives criticism from adversaries that support species diversity and discourage monocultures (Smith et al. 1997). Organizational and agency respondents report plantation reforestation as a moderate priority (Table 3-7).

Landowners may use chemical applications to improve the health and growth of existing forest stands. Fertilization, herbicide, and pesticide are common chemical applications used by landowners. When forest soils lack proper nutrients, landowners may supplement the soil with fertilizers (Smith et al. 1997). Landowners may use herbicide to kill exotic species or weeds that may compete with forest trees for limited nutrients and water resources. Landowners and

government agencies frequently apply pesticide to forest stands to combat forest pests like Gypsy Moth (*Lymantria dispar L.*) and spruce budworm (*Choristoneura fumiferana*).

Fertilization, herbicide use and pesticide use restrictions were considered moderate priority by conservation organization respondents (Table 3-7). Agency respondents report slightly lower priority levels for the same restrictions. Both organizational and agency respondents report restrictions on pesticide use as the highest priority for management treatment restrictions.

Prescribed burning reduces forest fuels and controls competing vegetation (Smith et al. 1997). Forestry and fire professionals use great care to prevent full-blown forest fires. These major fires result sometimes when conditions change (e.g., wind speed and direction), and a prescribed fire goes out of control. The average priority level for both organization and agency respondents was slightly lower than moderate priority. Organizational and agency respondents report a priority level of 2.28 and 2.36, respectively, for restricting prescribed burning (Table 3-7).

Clearcutting is a preferred harvesting technique for some forest types like pine plantations and oak stands to support even-aged management. Survey participants were asked what type of forest clearcutting constraints were normally placed on their typical easements. The respondents were given the choices of no constraint on clearcutting, constrained to a maximum acreage (e.g., 40 acres maximum), clearcutting not allowed or prohibited, and constraints differed based on property's characteristic. The percentages of respondents constraining clearcuts on their protected properties are shown in Table 3-8. It also demonstrates the percentage change from non-working to working forest conservation easements.

Sixty-five percent of organizational respondents prohibit the use of clearcutting on non-working forest easements (Table 3-8). The organizational percentage drops to 45 percent on working forest easements. Less than 10 percent of organizations allow the use of clearcutting with some or no constraint on non-working forestland easements. The percentage increases to nearly 50 percent of respondents with working forest easements.

Table 3-8: Respondents constraining the use of clearcutting on all forest easements and working forest easements, in percent.

	Organizations with:		Agencies with:	
	Non-WFCE (n = 115) (%)	WFCE (n = 240) (%)	Non-WFCE (n = 2) (%)	WFCE (n = 16) (%)
No constraint	2	8	0	18
Constrained to max acreage (2)	1	6	0	36
Not allowed (3)	65	45	0	27
Constraints differ by property (4)	5	34	0	27
Combination of 2, 3,& 4	0	0	0	18
Other	0	0	0	9
Not applicable	15	3	100	0
No response	12	5	0	9

A greater percentage of agency respondents report allowing clearcutting on their conservation easements compared to their organizational counterparts. Two agency respondents with non-working easements report clearcutting as not applicable (Table 3-8). The other 16 respondents possessed working forestland easements. Over 64 percent of respondents allow the use of clearcutting with some or no constraint.

Natural disasters occur that may require the need to salvage timber on a protected property. Hurricanes, tornadoes, strong wind storms and forest fires cause dangerous conditions in the forest. Possible injuries or death can result to forest users if these hazardous conditions are not mitigated. In other cases, forest insects and/or pathogens may kill trees and infest surrounding trees. Salvage operations remove the dead trees and slow the spread to adjacent trees, forest stands or properties.

The percentage of respondents allowing salvage operations on their conservation easements is shown in Table 3-9. Responses were received by 115 organizations with non-working forestland easements and 240 organizations with working forest easements. Sixteen agency responses were received with working easements. Two agencies responded with non-working forestland easements. Majority of organizational and agency respondents allow the use of salvage operations in most cases.

Table 3-9: Respondents with forest easements and working forest conservation easements allowing salvage operations, in percent.

	Organizations with:		Agencies with:	
	Non-WFCE (n = 115) (%)	WFCE (n = 240) (%)	Non-WFCE (n = 2) (%)	WFCE (n = 16) (%)
No	14	2	0	6
Yes	43	69	0	81
Sometimes	24	25	0	13
Not applicable	9	2	100	0
No response	10	3	0	0

These salvage allowances were analyzed to detect any significant correlations between the salvage operations and working forestland conservation easements. The allowances were assumed to be independent of forestland easement type (working vs. non-working). Using SPSS®, a chi-square test was used to determine if forestland easements and salvage allowance were actually independent. For organizational respondents, grantees holding working forestland conservation easements were more likely to allow salvage operations ($p = .0005$) than grantees that hold non-working forest easements at the 95 percent confidence level. For agency respondents, there was no significant difference between the observed and expected values of grantees holding working or non-working easements that allow salvage operations.

3.3 Reserved Rights

During easement drafting, grantors reserve the legal right to manage their property for specific uses. The grantor and grantee negotiate the specific rights in legal terms. These rights are normally agreed upon as long as they do not negatively influence the protected property’s conservation values. Like easement restrictions, reserved rights appear in numerous varieties based on the characteristics of the property.

Bick and Haney (2001) offer three fundamental reserved rights for every easement grantor. These particular reserved rights allow the grantor to use the property in any way within the bounds of the easement, to transfer the property and to exploit any existing structures on the property (Bick and Haney 2001). Bick and Haney (2001) present an extensive list of other reserved rights commonly found on conservation easements nationwide.

3.3.1 Reserved Right to Forest Management

All forested properties should contain specific easement clauses that address forest management. Even if forest management is not the present landowner’s intended use, grantors should reserve the right for future landowners to manage a property for multiple uses, including forestry. Over one-quarter of all conservation easements protect forestland. This equates to a minimum of 3,431 forest conservation easements protected by conservation organizations. Government agencies protect an additional 167 forest easements.

Unfortunately, this survey was unable to determine the specific forestry-related reserved rights found on these forest easements. To address the reserved right to forest management, survey participants were asked about the number of easements that were actively managed for any type of forest product. It was assumed that grantors reserved the right to actively manage their forests on these easements. Their respective easements were designated working forest conservation easements. They were considered the minimum number of forest easements with the reserved the right to forest management.

The number of respondents with working forest conservation easements and the number of those easements is demonstrated in Table 3-10. A total of 240 organizations and 16 agencies hold at least one working forest easement (Table 3-10). The Northeast region possessed the greatest number of respondents protecting working forest easements at 119 organizations and six government agencies. All other regions contain significantly fewer organizations.

Table 3-10: Total respondents and numbers of WFCEs per USFS region and the U.S.

	Respondents with WFCEs:		Number of WFCEs:	
	Organizations (#)	Agencies (#)	Organizations (#)	Agencies (#)
Northeast	119	6	751	13
North central	46	3	677	12
Southeast	23	4	124	13
South central	7	1	146	1
Great plains	1	0	1	0
Intermountain	20	1	79	12
Pacific northwest	12	0	44	0
Pacific southwest	12	1	45	2
United States	240	16	1,867	52

The 240 organizations hold a minimum of 1,867 working forest easements (Table 3-10). Majority of the working easements were found in the Northeast and North Central regions. Roughly 90 percent of the working forest easements were found in the eastern U.S. The 16 government agency respondents hold at least 52 working forest easements (Table 3-10). Slightly more than 75 percent of the agency-held working easements were found in the eastern U.S.

3.3.2 Harvesting on Working Forest Conservation Easements

Survey participants were asked how many of these working forest easements were harvested since encumbrance. Organizational respondents estimated a minimum total of 895 easements were harvested (Table 3-11). This was 48 percent of the total organization-held working forest easements. Numerous respondents did not know the exact number of protected properties harvested and left the question blank. Respondents from the North Central and Northeast regions report the most harvested properties. Trees were harvested on a minimum of 64 agency-held working conservation easements (Table 3-11). Numerous agencies were also not exactly sure how many properties were harvested and left the question blank. Almost all the harvested properties were found in the Northeast and North Central regions.

Table 3-11: Number of protected properties harvested since easement inception.

	WFCEs Harvested:	
	Organizations (#)	Agencies (#)
Northeast	319	48
North central	364	10
Southeast	37	1
South central	82	0
Great plains	0	0
Intermountain	52	4
Pacific northwest	18	0
Pacific southwest	23	1
United States	895	64

What types of harvesting practices were allowed on current working forest conservation easements? The percentage of respondents that allow each respective harvesting technique is listed in Table 3-12. These techniques were deemed appropriate in either the property’s forest

management plan or in easement document. The 240 organizational and 16 agency respondents were the sample sizes with working forest easements.

Organizational respondents with working forest easements allow single-tree selection harvesting more frequently than any other harvesting technique. Single-tree selection involves the harvest of mature, individual trees within a forest stand to achieve an uneven-aged mix of species (Smith et al. 1997). Seventy-one percent of respondents report allowing this technique (Table 3-12). Like organizational respondents, agency respondents (or 81%) also allowed single-tree selection most often.

Table 3-12: Respondents with WFCEs that allow the respective harvesting technique, in percent.

	Respondents Allowing Technique:	
	Organizations (n = 240) (%)	Agencies (n = 16) (%)
Single-tree selection	71	81
Consumptive firewood	64	69
Nonnative & undesirable	63	75
Group-tree selection	55	69
Thin to minimum BA	48	81
Crop tree release	39	63
Clearcut	25	56
No harvest allowed	3	0

The majority of organizational respondents report allowing the removal of selected trees for consumptive firewood use only (64%), the removal of all non-native and undesirable species (63%) and group-tree selection (55%). Group-tree selection is similar to single tree selection. The difference involves the number of mature trees harvested at one time. In group-tree selection, two or more mature trees are harvested within a close proximity (Smith et al. 1997). The other techniques were permitted less often by organizational respondents. Three percent of respondents report not permitting any timber harvesting on working forest easements.

A higher percentage of agency respondents tend to allow the respective harvesting techniques compared to organizational respondents. Majority of agency respondents permit thinning to a minimum basal area (81%), removal of non-native and undesirable species (75%),

removal of selected trees for consumptive firewood use only (69%), group-tree selection (69%) and crop tree release of preferred species (63%). Clearcutting was allowed by less than half of agency respondents. No agencies restricted harvesting altogether.

3.3.3 Forest Products from Working Forest Conservation Easements

Survey participants were asked about the types of forest products typically managed for on working forest conservation easements. In addition to forest products like timber and pulpwood, non-timber forest products were included in the list. The percentage of respondents with working easements that produce the forest products listed is shown in Table 3-13.

Timber and firewood were the two primary forest products harvested from the respondents' working forest conservation easements. Seventy-seven percent of organizational respondents report timber production on their protected properties (Table 3-13). Agency respondents (94%) report timber as the most common forest product on their protected properties.

Table 3-13: Respondents with WFCEs that produce forest products, in percent.

	Respondents with WFCE Products:	
	Organizations (n = 240) (%)	Agencies (n = 16) (%)
Timber	77	94
Firewood	66	63
Pulpwood	32	38
Maple syrup	15	19
Christmas trees	15	25
Nuts and berries	6	0
Floral greenery and handicraft	5	6
Wild plants	3	0
Post and poles	2	0
Medicinal products	1	0
Fruit	0.4	0
Botanicals	0.4	0
Tree and shrub nurseries	0.4	0
Pine straw	0.4	0
Wildlife habitat & forage	0.4	0
Wildlife hunting	0.4	0
Hay	0.4	0

Organizational (66%) and agency (63%) respondents maintain similar proportions with firewood as a forest product. Pulpwood, maple syrup and Christmas trees were forest products on between 15 percent and 33 percent of both respondents' working forest easements. The remaining timber and non-timber forest products were each harvested on less than 10 percent of respondents' working forest easements.

3.4 Terms, Conditions and Other Provisions

Easements documents may include additional terms, conditions and other provisions deemed appropriate for each protected property. These additional items cover topics not addressed previously in the easement document. Bick and Haney (2001) suggest including items such as IRS qualifying clauses, administrative issues, property tax considerations, liability issues, amendment process, and easement extinguishment.

Other forestry-related items include the baseline inventory report, forest management plan provisions, and other forestry clauses. The protected property's baseline inventory is attached or referenced in this section of the easement document. This information describes the property's physical and natural characteristics at the time the easement was placed on it. The information is also essential to determine before-and-after valuation for IRS purposes (Gaddis 1999, Bick and Haney 2001, Small 2003).

On forested properties, forest management plan specifications should explain the timing and frequency of plan revisions. They should include directions for distributing the newly-revised plan to the relevant parties. If not addressed in other deed sections or the management plan, additional forestry clauses are included. These clauses can cover topics like BMPs, stream-side management zones (SMZs), logging road design and old growth forest targets.

3.4.1 Requirement of Baseline Inventory

Survey participants were asked if baseline forest inventories were completed on each easement before the drafting of the easement document. These baseline inventories are considered the basis for future inspections and other forest assessments. Only 181 organizations (or 51% of 355) have completed a baseline forest inventory before the drafting of the easement document. Sixty-two percent of organizational respondents report not completing a baseline forest inventory prior to protecting a non-working forest easement (Table 3-14). The percentage decreases to 55 percent for organizations with working forest easements.

Table 3-14: Respondents completing baseline forest inventories before easement drafting, in percent.

	<u>Organizations with:</u>		<u>Agencies with:</u>	
	Non-WFCE (n = 115) (%)	WFCE (n = 240) (%)	Non-WFCE (n = 2) (%)	WFCE (n = 16) (%)
No	62	55	100	62
Yes	33	44	0	38
Not applicable	3	0	0	0
No response	2	1	0	0

A greater percentage of agency respondents do not complete baseline forest inventories. Every agency respondent refrains from completing the inventory on their non-working forest conservation easements (Table 3-14). For respondents with working easements, the percentage decreases to 62 percent of agency respondents. Only 38 percent of agency respondents report completing a baseline forest inventory prior to easement drafting on working forest easements.

These baseline forest inventory responses were analyzed to detect any significant correlations between the inventory completion and working forestland conservation easements. The inventories were assumed to be independent of forestland easement type (working vs. non-working). Using SPSS®, a chi-square test was used to determine if respondents with forestland easements and completing baseline inventories were actually independent. For organizational respondents, grantees holding working forestland conservation easements were more likely to complete a baseline inventory ($p = .036$) than grantees that hold non-working forest easements at the 95 percent confidence level.

3.4.2 Forest Stewardship Plan Requirement

A forest stewardship or management plan reflects the landowner’s current forest management goals. These two names were used synonymously in this analysis. For easement grantors, it serves as the management guide for a property’s forest resources. Both working and non-working forest easements benefit from a professionally-written plan that covers multiple forest uses like wildlife habitat, recreation, aesthetics and timber harvesting.

Survey participants were asked if forest stewardship or management plans were required for their forest easements. A total of 223 organizational respondents (or 42% of 536) require such plans. Thirty-three percent of organizational respondents with non-working forestland

easements require a plan for their protected properties (Table 3-15). When considering only respondents with working forest easements, the percentage requiring a plan increases to 62 percent of organizations.

A total of eleven agencies require forest stewardship plans. Similar agency percentages require forest stewardship plans compared to organizational percentages. The percentages were slightly higher than the organizational respondents’ percentage. Sixty-nine percent of agency respondents with forest easements require a plan.

Table 3-15: Respondents requiring a forest stewardship or management plan that accounts for multiple uses on forest easements, in percent.

	<u>Organizations with:</u>		<u>Agencies with:</u>	
	Non-WFCE (n = 115) (%)	WFCE (n = 240) (%)	Non-WFCE (n = 2) (%)	WFCE (n = 13) (%)
No	62	37	50	31
Yes	33	62	50	69
Not applicable	3	0	0	0
No response	2	1	0	0

When do easement grantees typically require the stewardship plan’s completion? Survey participants were given three choices. The choices include before easement drafting, during easement drafting and after easement drafting. The after-easement-drafting choice includes the clause “but before any type of land management.” It was assumed that any type of management operations trigger the need to establish a plan. Survey respondents provided additional categories like a combination of during and after drafting, any or all times and other. The timing of plan preparation required by respondents is shown in Figure 3-2.

A greater percentage of organizations require the stewardship plan’s completion before the agency respondents’ requirement. The majority of respondents (62%) require the stewardship plan’s completion after easement drafting but before management operations commence. The remaining categories make up less than thirty-eight percent of organizations.

Agency respondents tend to require the completion of the stewardship plan after easement drafting but before management operations begin. Forty-nine percent of agency

respondents represent this scenario. The remaining 51 percent of respondents require the plan's completion either during and/or after easement drafting. No respondents require plan completion before easement negotiations or drafting, during easement drafting or any others.

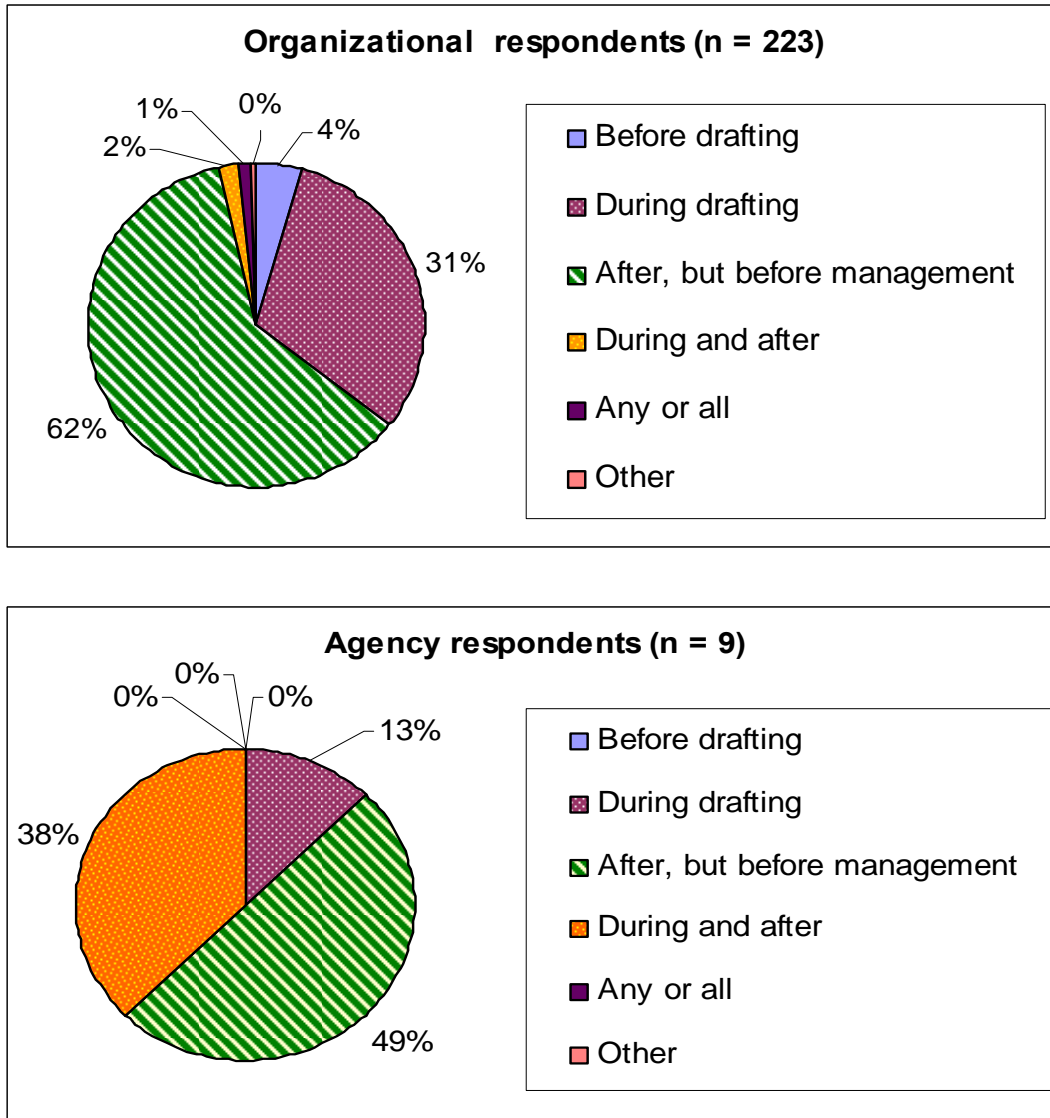


Figure 3-2: Timing of forest management plan preparation required by respondents.

Easement grantees normally require the review and/or approval of forest stewardship plans completed after easement drafting. Easement provisions tend to require this approval or review (Lind 2001). For plans completed before or during easement drafting, grantors and

grantees must mutually examine the plan's contents before the easement's finalization. This process allows grantors to discuss goals and property uses with the grantee(s) that may or may not jeopardize the easement's conservation values.

Of the grantees that require plan completion before easement drafting, 80 percent of organizational respondents report reviewing the stewardship plan before finalizing the easement. Ninety-seven percent of organizational respondents requiring plan completion during easement drafting review the plan before easement finalization. For agency respondents that require plan completion either during or after drafting, 66 percent review the plan before finalizing the easement.

Under normal circumstances, a grantor's management goals may change over time. As these goals change, the management plan must change to accommodate these goals. Even if the grantor's goals remain unchanged, property conditions may warrant the revision of the stewardship plan. Lind (2001) indicates that revisions are appropriate on five- to 20-year intervals.

The percentage of respondents with working easements that permit the revision of forest management plans by timing is revealed in Figure 3-3. One half of organizational respondents report permitting plan revision "as needed." A similar proportion (or 45%) of agency respondents permit "as needed" revisions. When grantees answer "as needed," they provide grantors with greater ability to adjust the stewardship plan as goals and conditions change, sometimes unexpectedly, in the future.

The second most permitted revision timing was 10 years. Twenty-three percent of organizations and 33 percent of agencies permit 10-year revisions. Less than 22 percent of agency and organizational respondents permit revisions more frequently on 5-year intervals. Agency respondents permit no other revision timings. On the other hand, organizational respondents did permit other timings. The most significant of those other timings was the 9 percent of respondents that do not allow plan revisions. This seems counterproductive for an actively-managed property protected in perpetuity.

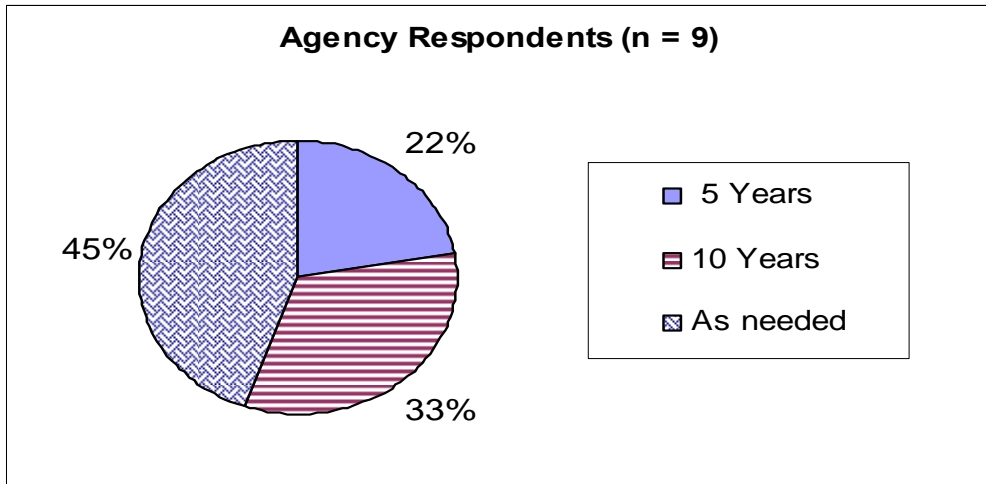
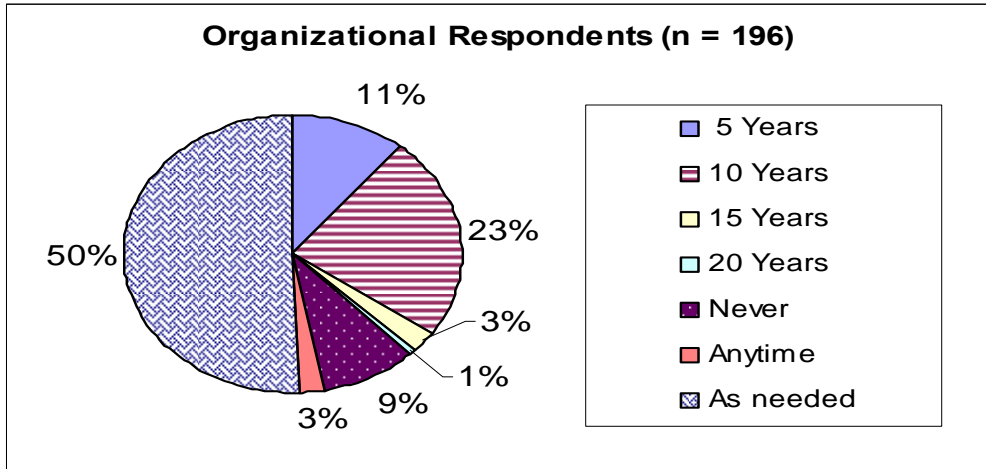


Figure 3-3: Timing of forest management plan revisions permitted by respondents.

Unforeseen circumstances may occur that make current stewardship plans undesirable or out-of-date. Many times, these circumstances transpire between allowed revisions. Some unforeseen circumstances include natural disturbances like fire and tornadoes, tax law changes, financial burdens and others. Survey participants were asked if the stewardship plans were revisable to account for unforeseen circumstances. It was assumed that these revisions would not jeopardize the easement's integrity.

Table 3-16: Respondents allowing plan revisions to account for unforeseen circumstances, in percent.

	Organizations (n = 223) (%)	Agencies (n = 11) (%)
No	7	0
Yes	54	73
Depends	35	27
Not applicable	1	0
No response	4	0

The majority of both respondents look favorably on allowing grantors to revise the stewardship plan for future unforeseen circumstances. In fact, only 7 percent of organizational respondents would not permit plan revisions under these circumstances (Table 3-16). No agency respondents prevent revisions for unforeseen circumstances.

3.4.3 Forestry Restrictions in Easement Document

Some grantees use the easement document to spell out restrictions on forest management. They may choose this route if a stewardship plan was not required. They may even include such restrictions in the document to compliment the stewardship plan. A total of 291 conservation organizations incorporate specific forest management restrictions in their easement documents. When considering grantees that hold working forest easements, 55 percent (or 132/240) of organizational respondents organize restrictions in the easement document. Ninety-one percent or 120 organizations do not require a forest stewardship plan. Thus, 41 percent of respondents (or 120/291) use the restrictions in the document in lieu of the plan.

Five agency respondents (or 33%) report spelling out forest management restrictions in the easement document. Two agencies use the easement document for forestry restrictions in lieu of a management plan. The remaining three agencies include restrictions in the easement document along with a plan.

3.4.4 Other Specific Clauses

Grantees may find other specific forestry-related clauses pertinent for a protected property. These clauses are either found in the easement document, addressed in the stewardship plan or both. Four clauses were addressed in the questionnaire. They include BMPs, SMZs, logging road design and old-growth attributes. The first three clauses were considered additional

restrictions placed on forest management. The last clause, old-growth attributes, was considered a grantee’s affirmative right or a grantor’s reserved right for a protected property.

When used in conjunction with a forest stewardship plan, BMPs are a means to link soil conservation to forest management operations (Lind 2001). Survey participants were asked if a state-sponsored BMP clause(s) was required to address soil and water quality concerns from harvesting, if permitted. A total of 148 organizational respondents require a BMP clause(s). They represent 62 percent of organizations with working forest easements (Table 3-17).

Table 3-17: Respondents requiring additional forestry clauses in the easement document or stewardship plan, in percent.

	Respondents* Requiring Clause:			
	Organizations		Agencies	
	Yes (%)	No (%)	Yes (%)	No (%)
BMPs	62	35	75	25
SMZs	68	17	75	0
Logging road	31	63	38	56
Old-growth attributes	31	68	31	69

* **Note:** Percentages do not necessarily add up to 100%. Blank and N/A responses were omitted from table.

Seventy-five percent of agency respondents report requiring a state-sponsored BMP clause(s) (Table 3-17). Respondents not requiring BMP clauses on working lands ranged from 25 percent to 35 percent for both groups. The highest percentage of organizational respondents (51%) and agency respondents (44%) were found in the Northeast region. The North Central region demonstrated the second highest respondent percentages at 19 percent of organizational and 22 percent of agency respondents.

SMZs are forested areas along streams and rivers that receive special management treatment during harvesting to protect water quality (SAF 1998). Survey participants were asked how they handle these areas for timber harvesting on their typical easements. Of the respondents with working forestland easements, 201 organizations (or 84%) responded to the question. The remaining 39 respondents did not answer or wrote not applicable. Sixty-eight percent of

organizational respondents address SMZs in either the easement document or the plan (Table 3-17). A similar percentage (75%) of agency respondents addressed SMZs on their easements.

Methods for restricting harvesting in SMZs vary with geographic location and property conditions. Participants were given four choices of SMZ constraints. These constraints include no-harvest stream buffers of a specified width (e.g., 100 feet), stream buffers with harvesting constraints (e.g., minimum basal area), no stream buffers but maintain hydrologic characteristics (e.g., water temperature) and no stream buffer or harvesting constraints. Respondents added three other responses like buffers depend on State-sponsored BMPs, combination of buffers of specified width or harvest constraints and others. Respondents handle SMZs in numerous ways on their typical easements (Figure 3-4).

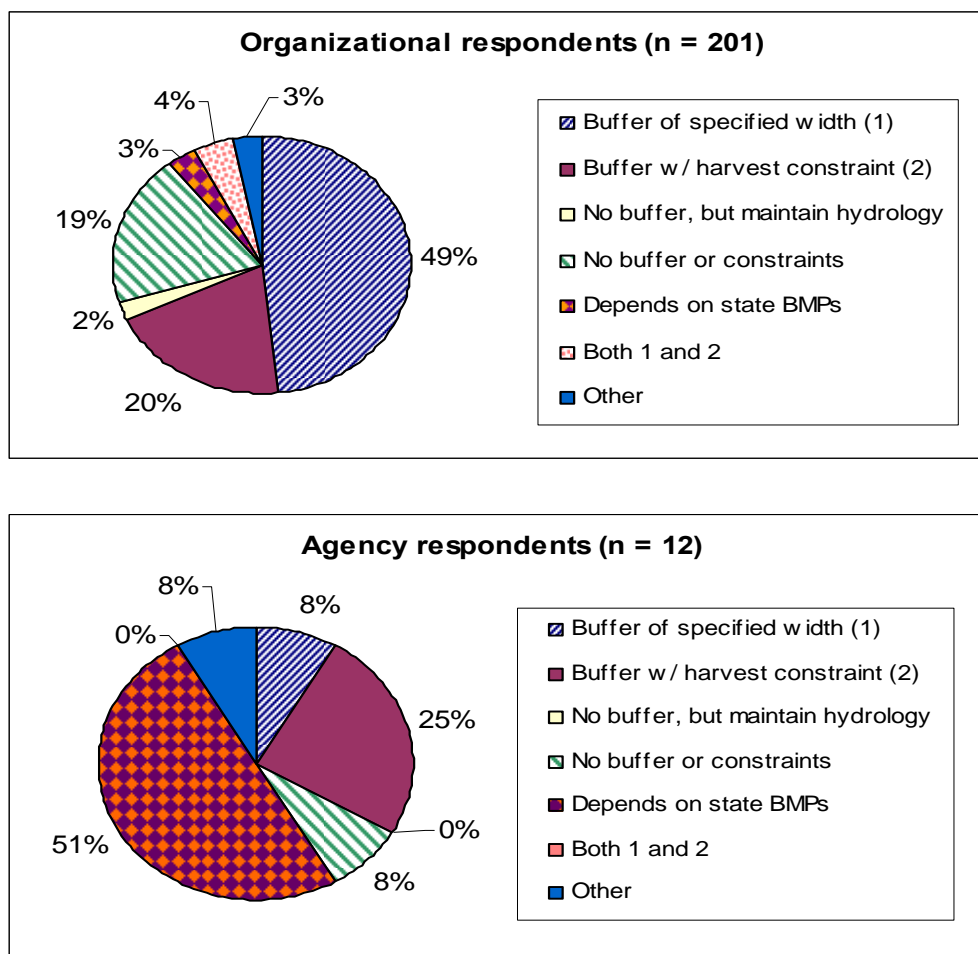


Figure 3-4: Typical harvesting constraints in SMZs provided by respondents.

Organizational respondents handle SMZs with various types of constraints. The majority of respondents constrain harvesting in SMZs via stream buffers of specified width or with specific harvesting constraints. Most respondents (or 49%) place a no-harvest stream buffer of a specified width on their working forest easements (Figure 3-4). Less than 20 percent of respondents each handle SMZs with other constraints.

Agency respondents handle SMZs in various ways. Unlike organizational respondents, agency respondents use State-sponsored BMPs more often to dictate constraints on harvesting in SMZs. Fifty-one percent of respondents handle SMZs this way. Nearly 50 percent of these respondents were found in the Northeast region. Agency respondents (25%) place harvesting constraints in SMZs. Other respondents report handling SMZs with specified width constraints, with other constraints and with no buffers or constraints.

A clause on logging road design and implementation may prevent excessive road building. It may avert road placement in a protected property's sensitive areas. Survey participants were asked if they include provisions in the document or plan that provides specifications for logging road design and implementation. Respondents replied with either a no, yes, or sometimes.

Thirty-one percent of organizational and 38 percent of agency respondents answered affirmatively with a yes or sometimes (Table 3-17). Organizational respondents from the Northeast region represent 55 percent of the organizations with logging road clauses. The majority of respondents, however, do not require a clause on logging road design and implementation.

A recent push by conservationists promotes the accumulation or restoration of old-growth forest attributes and/or other biological targets (TNC 2004). Survey participants were asked if a clause was included in their typical easements addressing the restoration of old-growth attributes or targets. Affirmative responses were received from 134 organizations and four agencies.

Thirty-one percent of both organizational and agency respondents with working easements incorporate an old-growth clause into the easement document (Table 3-17). Of these organizations, 65 percent were either found in the Northeast or the North Central regions. The majority of both respondents, however, do not include this type of clause on their working easements. These respondents both represent 68 percent of organizations and agencies.

Chapter 4 – Discussion

The three research goals were addressed in Chapter 2 and Chapter 3 using the sample data. A discussion of important findings is found in this chapter. The findings are discussed in separate sections. The sections include conservation easement numbers and acreage, baseline forest inventory, easement monitoring, forest management and planning, and forest timber supply.

4.1 Conservation Easement Numbers and Acreage

Conservation easement numbers and acreage will most likely increase in the future from continued protection efforts by government agencies and non-profit conservation organizations. This holds true assuming previous protection trends are an indication of future protection efforts. Organizational trends show the number of conservation organizations holding easements continues to grow. A total of 536 conservation organizations responded to the survey. An additional 210 organizations did not respond. These organizations reported holding easements in the LTA 2000 Census. In three years, at least 182 organizations have initiated land protection efforts with conservation easements since the LTA 2000 Census.

In total, a minimum estimate of 746 organizations hold conservation easements in the United States. This assumes that no organization has transferred their easements to any other entity and/or has extinguished operations. When combined, 72 percent (or 536/746) of the total estimated organizations protect an additional 1,321,540 acres (or 51%) since the LTA 2000 Census. If the remaining 28 percent of organizations responded, this acreage could increase substantially.

Twenty government agencies responded to the survey. Total easement number and acreage estimates held by government agencies were absent from previous empirical studies. Federal and state funding levels dictate the percentage increase in easement number and acreage. No matter the level, these agencies will continue to protect various land types with conservation easements.

The first goal of this study was to determine national conservation easement numbers and total acres protected. These numbers were further delineated into their respective USFS geographic regions (See Table 2-7 and Table 2-10). Survey respondents hold an estimated 16,025 conservation easements on over 4.9 million acres of land. Of that, over 3,598 easements (or 22%) protect a minimum of 2.54 million forestland acres (or 52%). Federal sources report

holding an additional 8,534 conservation easements on over 2.4 million acres of different land types.

The second goal was to determine the types of restrictions found on current forest conservation easements. The third goal investigates the impacts of these easement restrictions on forest management and timber supply. These two goals are addressed in the following section. The sections pertain to baseline forest inventory and documentation, easement monitoring, forest management and planning and the effects on timber supply.

4.2 Baseline Forest Inventory

For conservation easements to endure as a proven land use control in the future, easement grantees need to develop adequate means to document and inventory *every* property's physical and natural characteristics before easement drafting. The level of documentation and inventory depends on the property's characteristics. For example, a 1,000-acre forested property requires a more thorough inventory than a 50-acre woodlot surrounded by agriculture land.

No matter the land types protected, proper inventory and documentation will assure that future personnel of the conservation organization or government agency can pick up right were current personnel left off for monitoring and other administrative purposes. This proves essential if the grantee experiences a high turn-over rate in personnel, or if volunteers make up a large portion of the grantee's staff. New staff need this information to accurately monitor the easements. They cannot locate sensitive areas on a protected property if no documentation or maps demonstrate where to find them, for instance.

This baseline documentation serves scientific and legal purposes as well. Has the property's physical and natural characteristics changed over time? If so, in what way and by how much? Quantitative forest data can shed light on changes in forest characteristics like total forest acreage, trees per acre and others. Has the easement been an effective tool to prevent development and protect the respective property? These questions cannot be fully answered by current generations. Only future generations can answer them if, and only if, current protected properties are adequately documented and inventoried.

For grantors interested in the tax benefits of conservation easement, the IRS has specific requirements for baseline documentation (See Reg. § 1.170A-14(g)(5)(i)). The Service requires documentation completion before the easement is finalized by either the grantor or grantee,

depending on the circumstances. The documentation also serves as evidence in the court of law if easement violations were found that require litigation.

A number of interesting trends were observed in the data. These trends were observed despite the fact that conservation organizations with working forest easements were statistically more likely to complete a baseline forest inventory than organizations with non-working forestland easements. First, respondents kept insufficient records concerning total forestland conserved on each easement. A total of 241 organizations provided an estimate of total forestland acreage conserved for each easement and/or the number of easements with at least a 10-acre contiguous block of forestland, representing 68 percent of 355 organizations with any type of forestland easement (See Table 2-11). For agency respondents, only 50 percent (or 8 agencies) had actual forestland acreage values in their records. The other eight agencies provided an estimate of the forestland conserved.

Second, even fewer respondents than those with forestland records have completed a baseline forest inventory on their easements. Of the 355 organizations, only 40 percent (or 143 organizations) have completed a baseline forest inventory before easement drafting. The more alarming fact was that only 44 percent of organizations with working forestland easements have a baseline forest inventory. Likewise, only 38 percent of agency respondents report having a baseline inventory completed on working forest easements.

The lack of property documentation and inventory leads to concerns about the drafting and administration of current forest easements. How can clear, scientifically-sound easement restrictions be drawn up when a grantee does not know the characteristics of a property's forestland? Because easement restrictions are perpetual, it only seems proper that conscientious decision-making is employed concerning the long-term impact of each property's restrictions. Conscientious decisions come from familiarity with the property's forest resources. For working forestland easements, grantees should consider the impacts of timber harvesting on residual forest resources. More adequate assessments of these impacts will result if a property's forest resources are properly documented and inventoried.

Thus, it is imperative that organizations and agencies make a better effort to complete a baseline forest inventory before easement drafting. For entities that do not regularly complete this information, efforts should begin presently to complete forest inventories before any other easements are drafted. Grantees should complete an inventory as soon as possible on previously

encumbered easements that were not properly documented. If not for the sake of the protected property, grantees should complete the inventory for future personnel to continue the protection of current conserved properties. Likewise, periodic updates of the inventory should be considered every 25 to 50 years or when deemed necessary based on the level of forest management.

4.3 Easement Monitoring

Easement monitoring is a fundamental grantee obligation. Periodic inspections by the grantee assure the grantor adheres to the easement's provisions. Inspection frequency varies based on the protected property's uses. In most cases, a grantee monitors each property annually (Wright 1993, Bick and Haney 2001, Lind 2001, Rilla 2002). For working properties, grantees should administer inspections more frequently. Lind (2001) recommends "day to day monitoring" in addition to the annual inspections when trees are actively harvested on a property.

On working forest easements, the grantee may visit the property the same day active management begins or shortly thereafter. This allows the grantee(s) to introduce themselves to any independent foresters and timber harvesters. An opportunity arises for dialogue between all parties. The forester(s) can walk the grantee(s) or their representatives around the property where harvesting is scheduled to take place. Foresters can answer grantee questions about possible erosion problems, location of logging decks, and other concerns that may come up during this walk through. From the forester's standpoint, these questions can help identify areas where the harvesting crew should take great care to prevent easement violations. Identifying sensitive areas beforehand may prevent some major (or minor) violations after timber harvesting begins.

Periodic inspections demonstrate the commitment of the grantee to protect the property after harvest operations start. These inspections are not necessarily extensive or time-consuming. Experienced professionals must complete the inspections to assure the best results. The grantee inspects the area harvested since the last visit. The sensitive areas noted before harvesting commenced should receive particular attention. Minor easement violations found may be addressed immediately before they become bigger problems. For example, timber harvesters should ameliorate deep ruts caused by skidders to prevent further soil degradation and erosion problems.

Dialogue between the foresters and harvesters during these inspections helps grantees determine when harvesting operations terminate. Grantees should complete a thorough post-harvest inspection within two weeks to several months. If easement violations are not found, the grantee sends copies of the final harvest inspection report to the grantor, similar to the process given by Diehl and Barrett (1988) for annual monitoring. If violations are found, the grantor and grantee should negotiate the method to correct the problem(s) indicated in the final report.

Grantees may complete an updated forest inventory for monitoring purposes shortly after harvesting operations cease. This depends on the level of management activity and the residual forest resources. For instance on protected hardwood sites, the initial baseline inventory data used for monitoring a property 50 to 100 years in the future is unsuitable if the property's species composition changed dramatically as a result of prior timber harvesting.

Concerns about inspection frequency abound from easement advocates and opponents alike. This is especially true when the ownership of a protected property changes hands (Merenlender et al. 2004). Over the next several decades, many easements will transfer to other individual(s) or entities (Boelhower 1995). Frequent monitoring is imperative to assure that successive landowners adhere to the easement's provisions.

The inspection frequency on working easements is also of great concern. Are current working easements monitored frequently enough to assure protection? Merenlender et al. (2004) note that no matter how carefully active management was planned, unexpected situations arise that can jeopardize the protection of an easement. This survey cannot answer specifically whether each easement is monitored frequently enough. Protected properties require different monitoring approaches and timing. Chi-square tests (See Page 47) on the data, however, show that grantees with working forest conservation easements are more likely to monitor each easement one time per year than grantees with non-working forest easements. There was no statistical proof that grantees with working easements were more likely to monitor those easements more than once per year.

4.4 Forest Management and Planning

Grantees should require easement grantors to consider sustainable forest management and planning on working forest conservation easements. Even on non-working easements, grantors should consider this planning. The most appropriate way to encourage planning for the future is

by requiring grantors to complete a comprehensive forest stewardship plan that accounts for multiple goals and uses.

The majority of organizational (62%) and agency respondent (69%) already require such plans on working forest easements, although a substantial percentage does not. Thirty-three percent of grantees with non-working easements require stewardship plans. Grantees must advocate the requirement of stewardship planning on working easements. They should persuade the grantor(s) to have a professional forester create a plan for each working easement, even if the plan is not required. For easements with no plan requirement, Boelhower (1995: 41) states that there is no clear direction on what management practices will be acceptable to the easement holder.” Thus, grantees should advocate management planning on all working forest easements.

Grantees should also avoid placing stewardship restrictions in the conservation easement document that are better considered in a management plan. These restrictions could include permitted harvesting practices, size of harvests, and other forest management treatments. These decisions are better left for professional foresters to decide upon based on the property’s characteristics. The management plan can evolve with scientific and technological changes in forest management more than the permanent easement document.

Both parties should decide either before or during easement drafting when a forest stewardship plan should be completed. The literature tends to promote plan completion during easement drafting or before any active management begins (Boelhower 1995, Lind 2001). The survey data shows that plan completion typically results after easement drafting but before any type of land management. Sixty-two percent of organizational and over 49 percent of agency respondents require plan completion using this scenario.

One criticism of management plan completion after easement drafting is the grantor’s incapacity to know whether the easement document was drafted in a way to actually promote active forest management. Other non-forestry-related easement restrictions may bind the ability of the grantor or successive landowners to sustainably manage the protected property’s forest resources. By not developing a plan before easement drafting, a landowner cannot guarantee that easement provisions compliment their forest management goals. For grantees that require plan approval before management, grantors are not assured that future organizational or agency staff will permit management based on the professionally-written plan.

Grantees should encourage plan completion earlier in the easement drafting process. This can “advance easement negotiations and clarify landowner and easement holder expectations, giving a level of comfort to both parties” (Lind 2001: 31). Likewise, when an easement transfers to another individual, grantees should persuade the development of the new landowner’s management plan up front to address their stewardship goals.

Grantees should provide grantors with the ability to revise their stewardship plans when the need arises. Most respondents allow plan revisions “as needed.” This provides grantors with great flexibility on revision timing, although it could have the undesirable effect of prolonging the time between revisions. Plan revision every 10 years was the most frequent response after “as needed.” This seems acceptable as a fixed revision timing.

Grantees should permit plan revisions for unforeseen circumstances such as natural disturbances, tax law changes and financial hardships. Survey respondents typically allow these types of revisions depending on the circumstance(s). No agency respondents and less than 7 percent of organizational respondents prevent these revisions.

As for specific land-use restrictions, grantee and grantors negotiate them in legal terms for each individual property. General non-forest restrictions are tailored to the property’s characteristics and the grantees conservation desires. For example, ATV use on protected properties was the most frequent recreational use restricted by respondents on all easements.

Easement restrictions on forest management should supplement and/or complement provisions in the forest stewardship plan. Organizational respondents tend to place a higher average priority on restricting forest management treatments than agency respondents (See Table 3-7). Both organizational and agency respondents place higher priority on restricting plantation reforestation and the application of herbicides and pesticides compared to all other treatments. Clearcutting was restricted by 45 percent of organizational and 25 percent of agency respondents with working forest easements. Only two percent of organizational respondents prevent the salvage of dead or diseased trees to benefit overall forest health.

4.5 Forest Timber Supply

No empirical research addresses the current and future impacts of conservation easement restrictions on timber supply. These effects were indirectly addressed in the survey. This survey estimated the regional and nationwide total of forestland protected by conservation easements.

The forestland acreage protected by respondents was compared to the total acreage estimates of regional and U.S. private forestland base from Smith et al. (2001).

Each individual forest easement dictates the level of timber harvesting, if permitted, on a protected property. In this analysis, working and non-working forestland easements were considered together. An assumption was made about the collective effects of easement restrictions. Thus, the collective effect of timber harvesting restrictions decreases the acreage available for harvest each year. This was a satisfactory assumption because typical harvesting constraints limit harvest size or types of harvest techniques allowed compared to an unencumbered property where the landowner has full reign over harvesting decisions.

The respondents' conserved forestland as a percentage of the regional and national private forestland base is demonstrated in Table 4-1. Smith et al. (2001) estimate over 430 million acres of forestland was privately-held by non-industrial landowners and forest industry in 1997. Current forestland easements represent roughly one-half percent of this national estimate (Table 4-1). Timber supply on the national level does not appear impacted by current conservation easement restrictions. Over time, the impacts may become more evident when the national percentage of easement-protected forests increases due to preferences for regulations and others.

Table 4-1: Respondents' conserved forestland acreage as a percentage of regional and U.S. private forestland base from Smith et al. (2001).

	Respondents' Conserved Forestland:	Percent of U.S. Private Forestland:
	(Acres)	(%)
Northeast	1,236,285	1.75
North central	209,830	0.16
Southeast	85,798	0.11
South central	98,236	0.09
Great plains	270	0.01
Intermountain	543,974	1.55
Pacific northwest	10,219	0.02
Pacific southwest	69,758	0.39
United States	2,254,369	0.45

Local and regional timber supplies may feel the greatest impact of harvesting restrictions on current and future conservation easements. Easement restrictions will impact private land timber supply in the Northeast and Intermountain regions before all others. This analysis does not account for the predominance of public land timber supply in the Intermountain region. Current forestland easements account for 1.75 percent of total private forestland in the Northeast region and 1.55 percent in the Intermountain region (Table 4-1). The collective level of restrictions will dictate how easements will impact timber supply in these regions. Year-to-year supply will fluctuate from working forest easements to maintain sustainable harvests in the future.

Besides easement restrictions on timber harvesting, numerous other factors influence an easement's impact on timber supply. The spatial relation to other working forest conservation easements may affect local and regional timber supplies. Over time, if conservation easements become land-locked by development, costs associated with forest management rise (Haynes 2002). Location of available markets and transportation costs to those markets influence the profitability of timber harvesting. As a result, protected forests may descend from manageable timber supply, if management costs increase.

Social costs must be taken into account also. In rapidly developing rural areas, new residents may object to forestry uses and look to stop them altogether (Barlow et al. 1998, Edwards and Bliss 2003, Shelby et al. 2004). Malmsheimer and Floyd (1998: 27) state that some residents "turn to the courts and local governments to impose their values on existing land uses." This leads to unfavorable local forestry regulations in many instances.

The increasing number of local forest regulations may influence timber supply from working forest easements. Some local forest regulations may further restrict a landowner's right to harvest timber (Mehmood and Zhang 2001, Shelby et al. 2004) on protected and unprotected properties alike. This becomes a problem when the perpetual easement document permits timber harvesting. These added restrictions could exacerbate the decrease in available timber on protected working forest easements in the future.

There were several shortcomings to this survey for addressing timber supply. First, the survey does not allow for the specificity of total harvested easements. An estimated number of harvested easements was given by respondents. Survey questions did not address the acreage

harvested on those easements. This prevents accurate assumptions about the level of restrictions and harvests on current working easements. Second, no questions asked about the number and acreage of easements where harvesting was restricted. This could have further delineated the actual easements that were working and non-working.

A more accurate timber supply analysis would include determining the actual forest management taking place on forest conservation easements. This is achieved by sampling individual easement grantors on the local or regional level. In most cases, the grantors make the decisions on how the protected property is managed or not. By surveying individual easement grantors on the local or regional level, better conclusions can be drawn about the specific impact of easements on timber supply.

Chapter 5 - Conclusions

Several conclusions may offer the advancement of current and future conservation efforts of grantees. In some cases, these conclusions may not benefit the grantees that already follow these suggestions. For grantees that are beginning operations or looking to begin protection of forested properties, these conclusions may offer insights to effectively protect forestland with conservation easements. Conclusions were considered for easement grantees and future research on conservation easements.

5.1 Easement Grantee Conclusions

- Grantees should complete and/or update documentation and inventory records on previously encumbered forestland easements where an inventory is absent. From this point forward, grantees should complete forest inventories before easement drafting on future conservation easements. Organizational grantees can use stewardship software like Erler's LandSteward™ to “easily organize, store and access project and stewardship information for land trust protected properties” (LTA 2003: 1). This software can link to GIS programs to produce detailed property maps (LTA 2003).
- Grantees should require the grantor(s) to draft a qualified forest management plan for their forest conservation easements, even on non-working easements. The issue of who pays for the plan depends on the circumstances. If the grantor receives all income from the harvest, they should shoulder the cost of the plan. If the grantee receives a portion of the income from a harvest(s), they should provide financial support for the plan. For non-working forest easements, the grantee and grantor could split the plan's cost. Grantees should encourage landowners to address their management goals, if any, and consider other beneficial uses of the property. On a non-working forest easement for example, a stewardship plan can address how to improve existing habitat for wildlife species through plantings or other methods. These plans do not necessitate active timber harvesting, although they should leave it as an option. Grantees and grantors should also decide on a set revision schedule in addition to “as needed” to prevent long periods of time between revisions. Still, grantees should allow the flexibility to revise the plan if unforeseen circumstances appear.
- Forest management clauses in the easement document should re-enforce activities specified in the stewardship plan. When the timing of plan completion happens during

easement drafting, grantors are provided with a complete understanding of all forestry restrictions. Grantees should avoid referencing additional clauses that restrict activities based on current scientific principles in the easement document. In many cases like BMPs and SMZs, technological improvements and regulations change making some practices obsolete over time. Grantors and/or grantees can adapt the management plan to reflect changes in forest conditions that would otherwise be impossible if restricted in the easement document.

- Grantees should invest in GIS/GPS technology for monitoring and inventory purposes. Although a substantial investment up front, this technology can make forest monitoring and inventory activities more time efficient and cost effective over the long-term (Oderwald and Boucher 2003, Wing and Bettinger 2003). It also allows for land type delineations (i.e., forest, meadow, farmland and others) and acreage estimates on individual easements. Structures and other property features are documented on easements using this technology. This technology can be used to locate features at the time of easement encumbrance and any time in the future for monitoring purposes.
- Conservation organizations should work cooperatively with government agencies to locate lands suitable for protection (Foster 2001). By doing so, GIS-based maps can show where current conservation easements are located in relation to other government-protected lands. This allows for more efficient location of properties that could augment previous and/or current land protection efforts. One organizational respondent discussed how his land trust is using GIS technology to locate possible areas where their land protection efforts should concentrate. Some state governments have the capability to produce conservation maps that show the spatial location of protected properties. Some examples of these capabilities are the Massachusetts Office of Geographic and Environmental Information's MassGIS and Virginia Department of Forestry's Forest Resource Information Mapper (ForestRIM).

5.2 Future Empirical Research

- Researchers should consider analyzing the spatial relationship of existing conservation easements to other protected lands. A national analysis of this type would be a monumental task. Local or regional analysis would prove more beneficial. This could show where patchwork or landlocked conservation easements exist. This type of analysis

also provides a sense of the geographic resources protected by current easements. For example, a GIS data layer of current easements in the eastern panhandle of West Virginia could show the protection of farm and forest resources in the Ridge and Valley region of the Appalachian Mountains.

- Researchers should continue research on easement grantors. State- or region-based surveys may prove more accurate than national surveys resulting from the diverse landownership base nationwide. These surveys can determine exactly how current forest easements are managed in the respective state(s) or region(s). They could offer more concise conclusions rather than rough generalizations. Researchers should address specific forest types and appropriate management practices commonly found within the survey coverage area. Surveys of easement grantors would more accurately depict the effects of easements on state and local timber supply, given the actual acreage harvested versus the acreage removed from harvest. These types of surveys can also demonstrate the level of grantor participation in the monitoring process and the stewardship of forest easements.
- Researchers should continue to survey easement grantees at either the local, state, regional or national level depending on the focus of the survey. They should try to develop a lasting relationship with easement grantees, especially conservation organizations. These relationships could initiate access to current easement grantors for additional research purposes. Seventy-three percent of organizational respondents would not provide a contact list or forward surveys to current easement grantors for a secondary analysis of national forestland easements. Only 2 percent of respondents provided a list of current grantors.

Literature Cited

- Adams, D. M., P. J. Ince, R. J. Alig, B. J. Butler, J. R. Mills, D. J. Brooks, R. W. Haynes, K. E. Skog, and X. Zhou. 2003. Chapter 2: assumptions and methods used in projections. *in*. Haynes, R. W., tech. coord. 2003. An analysis of the timber situation in the United States: 1952 to 2050. General Technical Report PNW-GTR-560. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 254 p.
- Ahlstrand, G. M. and C. H. Racine. 1993. Response of an Alaska, U.S.A., shrub-tussock community to selected all-terrain vehicle use. *Arctic and Alpine Research* 25(2): 142-149.
- Barlow, S. A., I. A. Munn, D. A. Cleaves, and D. L. Evans. 1998. The effect of urban sprawl on timber harvesting. *Journal of Forestry* 96(12): 10-14.
- Barrett, T. S. and P. Livermore. 1983. The conservation easement in California. Island Press, Covelo, CA. 173 p.
- Best, C. 2002. America's private forests: challenges for conservation. *Journal of Forestry* 100(3): 14-17.
- Best, C. and L. A. Wayburn. 2001. America's private forests: status and stewardship. Island Press, Washington D.C. 268 p.
- Bick, S. 1996. Donations and sales of conservation easements on forestland in the Northern Forest of New York State. Diss. Virginia Polytechnic Institute and State University. 299 p.
- Bick, S., and H. L. Haney, Jr. 2001. The landowner's guide to conservation easements. Kendall/Hunt Publishing Company, Dubuque, IA. 179 p.
- Birch, T. W. 1996. Private forest-land owners of the United States, 1994. Resource Bulletin NE-134. Radnor, PA: U.S. Department of Agriculture, Forest Service, North Eastern Research Station. 58 p.
- Boelhower, M. E. 1995. Forest forever: a comprehensive evaluation of conservation easements on working forests in Maine, New Hampshire, and Vermont. Masters Thesis. University of New Hampshire. 81 p.
- Broderick, S. H., K. P. Hadden, and B. Heninger. 1994. The next generation's forest: woodland owners' attitudes toward estate planning and land preservation in Connecticut. *Northern Journal of Applied Forestry* 11(2): 47-52.
- Campfield, R. W., M. B. Dickinson, and W. J. Turnier. 2002. Taxation of estates, gifts, and trusts. West Group, St. Paul, MN. 945 p.

- Cubbage, F. W., J. O'Laughlin, and C. S. Bullock III. 1993. Forest resource policy. John Wiley & Sons, Inc., New York, NY. 562 p.
- Decker, D. J., J. W. Kelley, T. W. Seamans, and R. R. Roth. 1990. Wildlife and timber from private lands: a landowner's guide to planning. Information Bulletin 193. Cornell Cooperative Extension, Ithaca, NY. 56 p.
- Diehl, J. and T. S. Barrett. 1988. The conservation easement handbook: managing land conservation and historic preservation easement programs. Land Trust Exchange and the Trust for Public Land, Alexandria, VA. 269 p.
- Dillman, D. A. 2000. Mail and internet surveys: the tailored design method. John Wiley & Sons, Inc., New York, NY. 464 p.
- Edwards, K. K. and J. C. Bliss. 2003. It's a neighborhood now: practicing forestry at the urban fringe. *Journal of Forestry* 101(3): 6-11.
- Endicott, E. ed. 1993. Land conservation through public/private partnerships. Island Press, Washington, DC. 361 p.
- Fairfax, S. K. and D. Guenzler. 2001. Conservation trusts. University Press of Kansas, Lawrence, KS. 255 p.
- Foster, C. H. W. 2001. Non-profits in forestry: lessons from three New England states. *Journal of Forestry* 99(1): 27-31.
- Frederickson, T. S., B. D. Ross, W. Hoffman, E. Ross, M. L. Morrison, J. Beyea, M. B. Lester, and B. N. Johnson. 2000. The impact of logging on wildlife: a study in northeastern Pennsylvania. *Journal of Forestry* 98(4): 4-10.
- Gaddis, D. A. 1999. An analysis of conservation easements on private nonindustrial forest lands in North Carolina. in An analysis of wetlands regulation and conservation easements on private nonindustrial forest lands in North Carolina. Diss. North Carolina State University. Available online at <http://www.cals.ncsu.edu/wq/LandPreservationNotebook/PDFDocuments/gaddis.pdf>; last accessed in March 2003.
- Gustanski, J. A. and R. H. Squires, ed. 2000. Protecting the land: conservation easements past, present, and future. Island Press, Washington, D.C. 566 p.
- Hannaford, M. J. and V. H. Resh. 1999. Impact of all-terrain vehicles (ATVs) on pickleweed (*Salicornia virginica* L.) in a San Francisco Bay wetland. *Wetland Ecology and Management* 7: 225-233.

- Haney, H. L., W. L. Hoover, W. C. Siegal, and J. L. Greene. 2001. Forest landowners' guide to the federal income tax. Agriculture Handbook No. 718. USDA Forest Service, Washington, DC. 157 p.
- Haynes, R. W. 2002. Forest management in the 21st century: changing numbers, changing context. *Journal of Forestry* 100(2): 38-43.
- Hilts, S and P. Mitchell. 1999. The woodlot management handbook: making the most of your property for conservation, income, or both. Firefly Books, Buffalo, NY. 282 p.
- Institute of Environmental Education (IEE). 1993. Common groundwork: a practical guide to protecting rural and urban land. IEE, Chagrin Falls, OH. 207 p.
- Kess, S. and A. D. Campbell. 2001. CCH financial and estate planning guide. CCH Inc., Chicago, IL. 983 p.
- Lehman, T. 1995. Public values, private lands: farmland preservation policy, 1933-1985. The university of North Carolina Press, Chapel Hill, NC. 233 p.
- Lind, B. 2001. Working forest conservation easements: a process guide for land trusts, landowners, and public agencies. Land Trust Alliance. Washington, D.C. 44 p.
- Land Trust Alliance (LTA). 2001. Summary data from the national land trusts census. Available online at http://www.lta.org/newsrom/census_summary_data.htm; last accessed in July 2003.
- . 2003. Erler's LandSteward software tutorial. Available online at http://www.lta.org/resources/els/Tutorial_4_30_03.htm; last accessed in April 2004.
- Mahoney, J. D. 2002. Perpetual restrictions on land and the problem of the future. *Virginia Law Review* 88(4): 739-787.
- Malmsheimer, R. W. and D. W. Floyd. 1998. The right to practice forestry: laws restricting nuisance suits and municipal ordinances. *Journal of Forestry* 96(8): 27-32.
- Marrone, D. 2003. Conservation easements: protection in perpetuity. Ducks Unlimited, Inc., Memphis, TN. 15 p.
- McEvoy, T. J. 1998. Legal aspects of owning and managing woodlands. Island Press, Washington D.C. 219 p.
- Mehmood, S. R. and D. Zhang. 2001. Forest parcelization in the United States: a study of contributing factors. *Journal of Forestry* 99(4): 30-34.

- Merenlender, A. M., L. Huntsinger, G. Guthey, and S. K. Fairfax. 2004. Land trusts and conservation easements: who is conserving what for whom? *Conservation Biology* 18(1): 65-75.
- Natural Resources Conservation Service (NRCS). 2002. 1997 National resources inventory: highlights. Available online at <http://www.nrcs.usda.gov/technical/land/pubs/97highlights.html>; last accessed in December 2002.
- Norusis, M. J. 2002. SPSS 11.0 guide to data analysis. Prentice Hall, Inc., Upper Sadler River, NJ. 637 p.
- Oderwald, R. G. and B. A. Boucher. 2003. GPS after selective availability: how accurate is accurate enough? *Journal of Forestry* 101(4): 24-27.
- Parker, D. 2002. Cost-effective strategies for conserving private land: an economic analysis for land trusts and policy makers. Available online at <http://www.perc.org/pdf/landtrust.pdf>; last accessed in December 2002.
- Pinchot, G. 1947. Breaking new ground. Harcourt, Brace, and Co., New York, NY. 552 p.
- Rilla, E. 2002. Landowners, while pleased with agricultural easements, suggest improvements. *California Agriculture* 56(1): 21-25.
- Shelby, B., J. Thompson, M. Brunson, and R. Johnson. 2003. Changes in scenic quality after harvest: a decade of ratings for six silviculture treatments. *Journal of Forestry* 101(2): 30-35.
- Shelby, B., J. A. Tokarczyk, and R. L. Johnson. 2004. Timber harvests and forest neighbors: the urban fringe research project at Oregon State University. *Journal of Forestry* 102(1): 8-13.
- Small, S. J. 2002. Preserving family lands: book III. Landowner Planning Center, Boston, MA. 170 p.
- Smith, D. M., B. C. Larson, M. J. Kelty, and P. M. S. Ashton. 1997. The practice of silviculture: applied forest ecology. John Wiley & Sons, Inc., New York, NY. 537 p.
- Smith, W. B., J. S. Vissage, D. R. Darr, and R. M. Sheffield. 2001. Forest resources of the United States, 1997. General Technical Report NC-219. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 190 p.
- Society of American Foresters (SAF). 1980. Forest Cover Types of the United States and Canada. The Society of American Foresters, Washington D.C. 148 p.

———. 1998. The dictionary of forestry. The Society of American Foresters, Washington D.C. 210 p.

The Nature Conservancy (TNC). 2004. Imagining the future: our long term vision for the forests of the Berkshire Taconic landscape. Available online at <http://nature.org/wherewework/northamerica/states/berkshire/about/art2313.html>: last accessed in April 2004.

Tiedt, G. F. 1982. Conservation easements. *in* Private options: tools and concepts for land conservation. Montana Land Reliance and Land Trust Exchange, Island Press, Covelo, CA. 292 p.

Vance, T. and S. Buttrick. 1998. Open space land conservation: new federal and state financial incentives. *Horizons* 10(1): no page numbers.

Wear, D. N. and J. G. Greis. 2002. Southern forest resource assessment: summary of findings. *Journal of Forestry* 100(7): 6-14.

Wing, M. G. and P. Bettinger. 2003. GIS: an updated primer on a powerful management tool. *Journal of Forestry* 101(4): 4-8.

Wright, J. B. 1993. Conservation easements: an analysis of donated development rights. *Journal of the American Planning Association* 59(4): 487-493.

Yarmoloy, C., M. Bayer, and V. Geist. 1988. Behavior responses and reproduction of mule deer, *Odocoileus hemionus*, does following experimental harassment with an all-terrain vehicle. *Canadian Field-naturalist* 102(3): 425-429.

Appendix A

List of Selected Books on Conservation Easements

- Barrett, T. S. and P. Livermore. 1983. The conservation easement in California. Island Press, Covelo, CA. 173 p.
- Best, C. and L. A. Wayburn. 2001. America's private forests: status and stewardship. Island Press, Washington D.C. 268 p.
- Bick, S., and H. L. Haney, Jr. 2001. The landowner's guide to conservation easements. Kendall/Hunt Publishing Company, Dubuque, IA. 179 p.
- Brewer, R. 2003. Conservancy: the land trust movement in America. Land Trust Alliance, Washington, DC. 348 p.
- Diehl, J. and T. S. Barrett. 1988. The conservation easement handbook: managing land conservation and historic preservation easement programs. Land Trust Exchange and the Trust for Public Land, Alexandria, VA. 269 p.
- Gustanski, J. A. and R. H. Squires, ed. 2000. Protecting the land: conservation easements past, present, and future. Island Press, Washington, D.C. 566 p.
- Land Trust Alliance (LTA). 2003. Conservation options: a landowner's guide. Land Trust Alliance, Washington, DC. 57 p.
- Lind, B. 2001. Working forest conservation easements: a process guide for land trusts, landowners, and public agencies. Land Trust Alliance. Washington, D.C. 44 p.
- McEvoy, T. J. 1998. Legal aspects of owning and managing woodlands. Island Press, Washington D.C. 219 p.
- Small, S. J. 1985. The federal tax law of conservation easements. Land Trust Alliance, Washington, DC. 437 p.
- 1997. Preserving family lands: book II – more planning strategies for the future. Landowner Planning Center, Boston, MA. 119 p.
- 1998. Preserving family lands: book I (3rd Edition). Landowner Planning Center, Boston, MA. 100 p.
- 2002. Preserving family lands: book III – new tax rules and strategies and a checklist. Landowner Planning Center, Boston, MA. 170 p.

Appendix B

Pre-notice Letter



Department of Forestry
UNIVERSITY EXEMPLARY DEPARTMENT

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

College of Natural Resources
304 Cheatham Hall (0324), Blacksburg, Virginia 24061 USA
(540) 231-6958 Fax: (540) 231-3698 jhuff@vt.edu

Date

Organization Name

Attn: Executive Director or Administrator

Address

City or Town, State Zip Code

Within the following week, you will receive a brief questionnaire in the mail to fill out and return. We would be thankful if you helped us with this important research project at Virginia Polytechnic Institute and State University.

The survey concerns conservation easements on forestland in the United States. Conservation easements are one of the more popular conservation tools currently used by land trusts and government agencies. Because of this popularity, scientific research is essential to monitor forestland use on easements in perpetuity as total forested acres conserved increases nationally.

Scientific research on easements is still in its infancy, although conservation easements have been used commonly for over two decades. Numerous local and regional surveys have been completed that have studied landowner preferences and use of conservation easements. The Land Trust Alliance (LTA) completes the only national survey of land trusts that focuses on general conservation topics like total encumbered acres, primary land uses or types, and easement violations. Our survey is important because it will be the first national study to address specific forestland conservation topics like land-use restrictions, forestland management, and landowner assistance and monitoring of easements.

We would like to thank you in advance for your time and consideration in filling out our survey. Your response is strictly voluntary. However, your gracious assistance in responding will insure that our research project will be a formidable success. It is conservation-minded individuals like you and your staff that will assure ecologically diverse forestlands will be protected from future development and land conversion. If you do not have the authorization to fill out this survey, may I have you forward the survey to the person on the land trust's staff that can fill it out. I thank you kindly for your assistance.

Sincerely,

Jeffrey S. Huff
Graduate Research Assistant
Department of Forestry

*A Land-Grant University – Putting Knowledge to Work
An Equal Opportunity/Affirmative Action Institution*

Appendix C

Survey Cover Letter (1)



Department of Forestry
UNIVERSITY EXEMPLARY DEPARTMENT

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

College of Natural Resources
304 Cheatham Hall (0324), Blacksburg, Virginia 24061 USA
(540) 231-6958 Fax: (540) 231-3698 jhuff@vt.edu

Date

Organization Name

Attn: Executive Director or Administrator

Address

City or Town, State Zip Code

I have contacted your conservation organization to ask for your help in a research project being completed at Virginia Polytechnic Institute and State University. This survey seeks to lend scientific credence to the popular belief that working conservation easements can be used to conserve forestland in perpetuity.

Your organization was selected either from the Land Trust Alliance's (LTA) list of organizations that adhere to their *Land Trust Standards and Practices* or from a web search for any remaining or newly-formed organizations. It is our understanding that conservation organizations like yours consider a variety of land protection methods including the use of conservation easements. We would like to better understand how your organization determines what land types to conserve and how the land will be used in the future.

The survey results will first show the collective efforts of conservation organizations nationwide to conserve forestland by conservation easement. Secondly, the results will exhibit the types of forestland uses commonly found on easements and demonstrate how the easements will be monitored in perpetuity. This information will not only help established conservation organizations plan for holding these easements in perpetuity, but it will also shed light on the intricacies of forestland conservation for newer organizations that may be considering the use of a conservation easement for the first time.

A random number is assigned to your organization, and you will see that number on the first page of the questionnaire. When you return the completed questionnaire, we will delete your organization's name and corresponding number from our mailing list. From that point forward, no one including myself will be able to differentiate who responded. This process is the most effective way to guarantee your organization's confidentiality. For added assurance, the statistical analysis of the data will be in aggregate form, so individual responses cannot be linked back to the respondent.

If you have any questions and/or remarks about this survey, you can feel free to contact me anytime at (540) 951-3945, or write to me at the address listed on the letterhead above.

I thank you dearly for taking the time to complete this questionnaire.

Sincerely,

Jeffrey S. Huff
Graduate Research Assistant
Department of Forestry

*A Land-Grant University – Putting Knowledge to Work
An Equal Opportunity/Affirmative Action Institution*

Appendix D

Conservation Organization Questionnaire (Cover Page)

**Conserving Forestland by Conservation Easement:
A Land Trust Survey**



Photo courtesy of Anthony Scardina

Sponsored by the Virginia Tech Department of Forestry
with support from USDA Forest Service

Please return your completed questionnaire in the enclosed envelope
by December 20, 2003 to:

Department of Forestry
304 Cheatham Hall (0324)
Attn: Jeffrey Huff
Virginia Tech
P.O. Box 850
Blacksburg, VA 24063-9959

Questionnaire (Page 2) - Blank

Questionnaire (Page 3)

Conserving Forestland by Conservation Easement: A Land Trust Survey

Dear Executive Director or Administrator:

We are surveying land trusts in the United States that conserve forestland by conservation easement. The Land Trust Alliance (LTA) found in their 2000 Census that approximately 560 land trusts held easements on over 2.5 million acres of open space. In 2003, the LTA estimates the existence of nearly 1,300 land trusts that conserve open space. But, little is known about the total amount and type of forestland that is held under easement. This survey is designed to help us understand the current amount and determine the use, if any, of the forestland. It is essential for you or a member of your organization to complete this survey, so your organization's conservation efforts will be represented thoroughly in the scientific analysis.

You will see a random identification (ID) number in the top-right corner of this page. The ID number serves two purposes. First, it allows us to remove your organization from our mailing list upon the return of the questionnaire. The mailing list will be destroyed when all surveys are returned. Second, it will assure your organization's strict confidentiality during the statistical analysis of the survey responses. Because your organization will be represented by an ID number instead of a name, your survey responses cannot be linked directly to your organization when survey statistics are presented in aggregate for all land trusts nationwide.

We kindly thank you for your assistance in completing this survey of forestland conservation easements. If you require additional space for an answer, use the blank page provided on the inside of the back cover and label the answer with the corresponding question number. Please answer all questions to the best of your ability. Thank you.

Current Easement Holdings

1) Does your conservation organization protect any type of forestland, farmland, open space, green space, wetlands, and/or ecologically rare sites via conservation easements or restrictions?

- Yes → *Skip to 2*
- No

If No, please return the survey in the enclosed envelope. Thank you for your assistance.

Questionnaire (Page 4)

2) How many conservation easements does your organization hold as of November 1, 2003? _____

3) Are any of these easements co-held by another conservation organization?

- Yes
- No → *Skip to 5*

If Yes, only answer the remaining questions for the easements that are primarily held by your organization. If No, answer for all easements held by your organization.

4) What other types of organizations co-hold easements with your organization? If you need additional space, use the blank page provided on the inside of the back cover.

- Federal Government
(Specify: _____)
- State or Local Government
(Specify: _____)
- Other Conservation Organizations
(Specify: _____)

5) How many total acres are covered by these easements? _____

6) Does your organization have records on total forestland conserved for each easement?

- Yes
- No → *Skip to 9*

7) Approximately how many total acres are covered by any type of forest cover from seedlings to mature trees on your easements? _____

8) How many easements possess at least a 10-acre contiguous block of forestland with trees of any size or age? _____

Questionnaire (Page 5)

Grantor Restrictions

9) How would your organization prioritize each of these common grantor restrictions on your organization’s typical easements? (Check the box of the appropriate priority level–high, moderate, low or not applicable)

	High	Moderate	Low	N/A
	▼	▼	▼	▼
Development Rights.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Division or Subdivision of Property.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Conversion to Residential.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underground Mining.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Topography Alteration.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste Disposal.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal Storage (i.e., old cars, RVs, etc)....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Billboards.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radio and Phone Towers.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fences.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10) What types of non-forest natural resource restrictions are commonly found on your typical easements? (Check the box for all that apply)

- Agricultural Practices
- Intensive Livestock Operations
- Land Application of Biosolids
- Surface Mining
- Livestock Grazing
- Pond Construction
- Stream Alteration
- Destruction of Wetlands
- Wind & Solar Power Devices
- Others (Specify: _____)

Questionnaire (Page 6)

11) What types of restrictions on natural resource recreation are commonly found on your typical easements? (Check the box for all that apply)

- Hiking
- Trail Construction
- All-terrain Vehicle Use
- Mountain Biking
- Flower & Berry Picking
- Camping
- Hunting
- Trapping
- Fishing
- Others (Specify: _____)

12) How many of your conservation easements have working forests that are being actively managed for any type of forest product? _____

13) To the best of your knowledge, what types of forest products are being managed for on these easements? (Check the box for all that apply)

- Firewood
- Christmas Trees
- Timber
- Pulpwood
- Maple Syrup
- Nuts and Berries
- Wild Plants (i.e. ginseng, onion, etc)
- Floral Greenery and Handicraft
- Botanicals
- Medicinal Products
- Others (Specify: _____)

Questionnaire (Page 7)

14) Are baseline forest inventories completed on each easement before the drafting of the easement document?

- Yes
- No

15) Does your organization require a forest stewardship or management plan that accounts for multiple uses (i.e., timber, wildlife, recreation, etc.) for the working conservation easement?

- Yes
- No → *Skip to 20*

16) (If yes) At what point during the easement's drafting does your organization require the plan to be completed?

- Before easement negotiations
- During easement drafting
- After easement drafting, but before any type of land management

17) If a forest stewardship plan is completed before or during easement drafting, does your organization review the plan's contents with the grantor before the easement is finalized?

- Yes
- No

18) How often does your organization permit a grantor to revise a forest management plan to reflect changing forest conditions and uses under normal circumstances?

- Every 5 years
- Every 10 years
- Every 15 years
- Every 20 years
- Never
- Other (Specify: _____)

Questionnaire (Page 8)

- 19) Does your organization allow the plan to be revised to account for future unforeseen circumstances (i.e., natural disturbances, tax law changes, finances) as long as the revisions do not jeopardize the easement's integrity?**
- Yes
 - No
 - Depends on circumstances
- 20) If your organization does not require a separate plan, are the forest management restrictions spelled out specifically in the easement document?**
- Yes
 - No
- 21) Does your organization require a clause about state-sponsored Best Management Practices (BMPs) in the plan or easement document to address water quality concerns from tree harvesting, if permitted?**
- Yes
 - No
- 22) How are Streamside Management Zones (SMZs) (i.e., forestland along streams and rivers that are managed to protect water quality) handled for tree harvesting on your typical conservation easements?**
- No-harvest stream buffers of specified width (e.g., 100 feet)
 - Stream buffers with harvesting constraints (e.g., minimum basal area)
 - No stream buffers, but maintain hydrologic characteristics (e.g., temperature)
 - No stream buffer and no harvesting constraints
- 23) Does your organization include provisions in the easement document that provide specifications for logging road design and implementation?**
- Yes
 - No
 - Sometimes

Questionnaire (Page 9)

24) How likely is it that your organization would constrain a grantor’s ability to utilize each of these forest management treatments? (Check the box of the appropriate level of likelihood—highly likely, somewhat likely, unlikely or not applicable)

	Highly ▼	Somewhat ▼	Unlikely ▼	N/A ▼
Timber Stand Improvement.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest Thinning.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife Food Plots.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plantation-style Reforestation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fertilization.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Herbicide Use.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pesticide Use.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prescribed Burning.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25) Do your typical easement documents include a clause(s) that promotes the accumulation or restoration of old-growth forest attributes and/or other biological targets?

- Yes
- No

26) How many forestland easements held by your organization had trees harvested on them since the easement was placed? _____

27) What type of forest harvesting practices does your organization allow on typical forestland easements as specified in the management plan or easement deed? (Check the box for all that apply)

- Single-tree selective harvesting
- Group-tree selective harvesting
- Thinning to a minimum basal area
- Crop tree release of preferred species
- Removal of all non-native and undesirable species
- Removal of selected trees for consumptive firewood use only
- Clearcutting
- None Permitted

Questionnaire (Page 10)

28) What types of harvest constraints are normally placed on forest clearcutting?

- No constraint on clearcutting
- Clearcutting constrained to a maximum acreage (e.g., 40 acres)
- Clearcutting not allowed
- Clearcutting constraints differ based on property's forest characteristics

29) Is the salvage of dead or diseased trees permitted on your forestland easements to benefit overall forest health?

- Yes
- No
- Sometimes

Assistance and Enforcement

30) What types of practical assistance does your organization commonly provide for easement grantors during and after the easement's drafting?

(Check the box for all that apply)

- Forest Health
- Forest Management
- Environmental Education
- Wildlife Habitat Protection
- Threatened and Endangered Species
- Open Space Protection
- Water Protection
- Recreational Services
- Law and Regulatory Advice
- Estate Planning
- Others (Specify: _____)

Questionnaire (Page 11)

31) Does your organization provide contact information of professional assistance for grantors in the region where the conservation easement is located?

- Yes
- No → *Skip to 34*

32) What professional forestry contacts does your organization usually provide easement grantors if they need forestry advice? (Check the box for all that apply)

- Private Consulting Forester
- State Forester
- U.S. Forest Service Forester
- Industrial Forester
- Cooperative Extension Forester
- Forest Ecologist
- Wildlife Biologist
- Arborist
- Others (Specify: _____)

33) What professional non-forestry contacts does your organization usually provide easement grantors? (Check the box for all that apply)

- NRCS Extension Agent
- Agriculture Specialist
- Horticulture Specialist
- Urban Planner
- Land Surveyor
- Landscape Architect
- Accountant
- Appraiser
- Attorney
- Others (Specify: _____)

Questionnaire (Page 12)

34) How often does your organization monitor each conservation easement on average for easement compliance?

- Less than one time per year
- One time per year
- More than one time per year

35) Do you require the easement grantor to be present during an inspection for easement compliance?

- Yes
- No

36) Has your organization encountered any forestry violations of the easement document?

- Yes
- No → *Skip to 41*

37) (If yes) How many different forestry violations have been encountered thus far on your organization's easements?

_____ Number of Violations

38) What specific forestry violations were found? *If you need additional space, use the blank page provided on the inside of the back cover.*

_____ Specific Violations

39) If forestry violations were found, did the grantor resolve the problems before legal action was needed?

- Yes → *Skip to 41*
- No

40) (If no) Have any of the violations required litigation to resolve the dispute?

- Yes
- No

Land Trust Information

41) How many people are on your organization's staff?

- None → *Skip to 44*
- 1 to 4
- 5 to 9
- 10 or more

42) How would you characterize your staff?

- All Full-time
- Some Full- and/or Part-time, Some Volunteer
- All Volunteer

43) Does your organization currently employ any of the following professional staff?

(Check the box for all that apply)

- Forester
- Wildlife Biologist
- Fisheries Biologist
- Forest Ecologist
- Botanist
- Others (Specify: _____)

44) If there is no staff, does a board of directors oversee all conservation operations?

- Yes
- No

Questionnaire (Page 14)

45) How long has your organization been in existence?

_____ Number of Years

46) What other land types besides forestland does your organization conserve with conservation easements? (Check the box for all that apply)

- Working Farm and Ranch Lands
- Grasslands
- Uninhabitable Desert
- Wetlands (e.g., swamps, marshes, etc.)
- Riparian Areas along Streams and Rivers
- Threatened and Endangered Species Habitat
- Coastal Areas (e.g., islands, beaches, etc.)
- Scenic Viewsheds
- Historical Buildings and Battlefields
- Urban Greenspace
- Others (Specify: _____)

47) Would you be willing to provide us with the contact information (i.e., name and address) of only your forestland easement grantors? We would like to complete an additional survey of specific land use on each forestland easement by a random sample of easement grantors nationwide.

- Yes, I will include a list of the contact information with the completed survey.
- No, but I would be happy to forward the surveys to my forestland easement grantors if you send me the surveys first with all the required postage.
- No, I cannot give you a list or forward surveys to my forest easement grantors.

If Yes, we will guarantee the confidentiality of each grantor in the same manner we have guaranteed your organization's confidentiality. The contact information will be destroyed after the survey is returned and no names will be divulged during our analysis. Thank you.

◆◆◆◆ The Survey is Complete ◆◆◆◆

Questionnaire (Page 15)

Additional Space for Question Responses and/or Comments

Questionnaire (Page 16)

Thank you for taking the time to fill out this survey on forestland conservation easements. Your assistance in providing this information is very much appreciated. Is there anything else you would like to tell us about your organization and its conservation efforts to help us understand more about how your organization chooses the conservation lands it does and what types of land uses are preferred? If you have any other questions and/or remarks about this survey, you can feel free to contact me anytime at (540) 951-3945, or write to me at the address listed below.

Please return your completed questionnaire and grantor contact list if you choose in the envelope provided to:

Department of Forestry
304 Cheatham Hall (0324)
Attn: Jeffrey Huff
Virginia Tech
P.O. Box 850
Blacksburg, VA 24063-9959

Appendix E

Reminder/Thank You Postcard

Date

Dear Executive Director or Administrator:

A questionnaire on conserving forestland by conservation easements was sent to you two weeks ago. Your organization was chosen from a list of conservation organizations that may use conservation easements as a tool to protect ecologically valuable land from development and other destructive land uses.

Unfortunately, we have not received your completed questionnaire yet. We understand that your time is valuable, and we are grateful for your efforts to complete our important questionnaire. If you have completed the questionnaire and recently put it in the mail, we would like to extend our sincere thanks in advance. If you have not, please do so today.

If by chance you did not receive or misplaced the questionnaire, you may email us at jhuff@vt.edu or call us at (540) 951-3945. We would be happy to send you another questionnaire today.

Jeffrey Huff, Graduate Research Assistant
Virginia Polytechnic Institute and State University



Appendix F

Survey Cover Letter (2)



Department of Forestry
UNIVERSITY EXEMPLARY DEPARTMENT

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

College of Natural Resources
304 Cheatham Hall (0324), Blacksburg, Virginia 24061 USA
(540) 231-6958 Fax: (540) 231-3698 jhuff@vt.edu

Date

Organization Name

Attn: Executive Director or Administrator

Address

City or Town, State Zip Code

A questionnaire on conserving forestland by conservation easement was sent to you over a month ago. Unfortunately, we have not received the completed questionnaire from your organization as of this date.

I have received a positive response from other conservation organizations. This survey has already accounted for over 7,029 conservation easements on a total of 1.65 million acres of ecologically-significant lands. Of those 1.65 million acres, well over 566,000 acres are classified as forestland. These forested acres have come from small woodlots on family farms and ranches to forested wetlands and riparian zones to large working forestland easements.

I am contacting your organization one more time because of the importance of your organization's conservation efforts in our analysis. Even if your organization has not conserved any forestland by conservation easement, your organization's efforts in protecting **all** types of land by conservation easements are important and will be considered in my analysis. For my final results to be truly representative, I need the response of every organization like yours that may have used conservation easements as a conservation tool. If your organization has not used conservation easements as a conservation tool, simply check "no" on the first page of the survey and return it in the enclosed envelope.

I have received numerous emails and phone calls from organizations concerned that their conservation efforts do not meet the criteria for this survey. For example, I have received a number of comments that state that very little or no forestland has been conserved by easement, so the director did not plan to respond. Because their response is valuable to me, I simply asked them (and I ask you!) to write "not applicable" (N/A) for the forestry questions that do not pertain to their conservation efforts and fill out the remaining questions that do. If you have any similar concerns or questions, please contact me anytime at jhuff@vt.edu or at (540) 951-3945, and I would be happy to discuss those concerns or questions.

I hope you can make a conscious effort to return the questionnaire as soon as possible. I understand that as the year comes to an end, your organization will remain extremely busy. I would like to thank you dearly in advance for taking the time to complete this questionnaire during this hectic month of December. If you choose not to respond to the questionnaire, please return it in the enclosed envelope with a simple note stating you choose not to respond.

Sincerely,

Jeffrey S. Huff
Graduate Research Assistant
Department of Forestry

*A Land-Grant University – Putting Knowledge to Work
An Equal Opportunity/Affirmative Action Institution*

Appendix G

Reminder Email

Subject: Conserving Forestland by Conservation Easements: A Land Trust Survey

Dear Director or Administrator:

Over the past two months, a series of survey contacts were sent to all conservation organizations that adhere to the Land Trust Alliance (LTA) Land Trust Standards and Practices. I am thrilled to announce the positive response I have received from your conservation colleagues. To date, 864 organizations (56.6% of those in our database) have returned their questionnaires. I have accounted for over 3.55 million acres of conserved land, of which a minimum of 740,000 acres is forested.

Unfortunately, I have not received a response from your organization. As a student member of the LTA, I have recognized on a daily basis the conservation successes of organizations like yours. I applaud your efforts to protect ecologically-valuable lands from development for our future generations and to prevent the fragmentation and parcelization of large tracts of these lands. Through contact with LTA officials, I am aware that your organization has protected ecologically-significant lands with conservation easements.

It is not too late to return your questionnaire, so your organization's conservation efforts can be included in my analysis. Every additional completed and returned questionnaire will allow me to compile data that more precisely represents your organization's conservation efforts. In turn, my analysis and conclusions will be more statistically accurate because your organization's responses are included.

I value your organization's conservation efforts and would like to include them in my analysis even if those efforts are not on forested lands. As you can see from the preliminary stats above, over 75% of the total acres are non-forested which includes agricultural land, desert, CA scrubland, islands, and countless other land types.

If you have already returned the questionnaire, I thank you for your time and efforts to complete it. If not, could I ask for 15 minutes of your valuable time to complete it? Or, you may have another member of your organization complete and return it.

Additional questionnaires are available upon request if you did not receive one or discarded the others. An electronic questionnaire is also available that is more time- and cost-efficient and could help expedite your response. I look forward to your reply.

Thank you for your time and effort to complete the questionnaire. I wish you the best of luck with your organization's future conservation efforts.

Sincerely,

Jeffrey Huff
Graduate Research Assistant
Department of Forestry

Appendix H

List of Professional Staff Employed by Conservation Organizations

1. Forester
2. Wildlife Biologist
3. Fisheries Biologist
4. Forest Ecologist
5. Botanist
6. Ranger
7. Environmental Educator
8. Landscape Architect
9. Watershed Specialist
10. Hydrologist
11. Soil Scientist
12. Conservation Biologist
13. Horticulturalist
14. Weed Specialist
15. Naturalist
16. Wildlife Inventory Specialist
17. Restorationist
18. GIS Specialist
19. Ecologist
20. Generalist
21. Planner
22. Land-use Specialist
23. Entomologist
24. Wetland Specialist
25. Water Quality Expert
26. Range Ecologist
27. Mammalogist
28. Ornithologist
29. Biologist
30. Land Protection Specialist
31. Surveyor
32. Environmental Specialist
33. Conservation Easement Specialist
34. Animal Husbandry Specialist
35. Anthropologist
36. Aquatic Ecologist
37. Geologist
38. Zoologist
39. Attorney
40. Fundraiser
41. Communication Specialist
42. Accountant
43. Administrator
44. Real Estate Mitigation Specialist
45. Biogeographer
46. Writer
47. Conservationist
48. Policy Analyst

Appendix I

Geographic Regions of the United States (Adapted from Smith et al. (2001) p. 52-53)

1) Northeast Region

- Connecticut
- Delaware
- Maine
- Maryland
- Massachusetts
- New Hampshire
- New Jersey
- New York
- Pennsylvania
- Rhode Island
- Vermont
- Washington, DC
- West Virginia

2) North Central Region

- Illinois
- Indiana
- Iowa
- Michigan
- Minnesota
- Missouri
- Ohio
- Wisconsin

3) Southeast Region

- Florida
- Georgia
- North Carolina
- South Carolina
- Virginia

4) South Central Region

- Alabama
- Arkansas
- Kentucky
- Louisiana
- Mississippi
- Oklahoma
- Tennessee
- Texas

5) Great Plains Region

- Kansas
- Nebraska
- North Dakota
- South Dakota

6) Intermountain Region

- Arizona
- Colorado
- Idaho
- Montana
- Nevada
- New Mexico
- Utah
- Wyoming

7) Pacific Northwest Region

- Alaska
- Oregon
- Washington

8) Pacific Southwest Region

- California
- Hawaii

Appendix J

Major Forest Types of the United States (Adapted from SAF (1980) p. 3)

<u>Eastern Forest Types (FT)</u>	<u>Western Forest Types (FT)</u>
1. White – Red – Jack Pine	11. Douglas-fir
2. Spruce – Fir	12. Hemlock – Sitka Spruce
3. Loblolly – Slash Pine	13. Ponderosa Pine
4. Loblolly – Shortleaf Pine	14. Western White Pine
5. Oak – Pine	15. Lodgepole Pine
6. Oak – Hickory	16. Larch
7. Oak – Gum – Cypress	17. Fir – Spruce
8. Elm – Ash – Cottonwood	18. Redwood
9. Maple – Beech – Birch	19. Noncommercial Hardwoods
10. Aspen - Birch	20. Ohia
	21. Chaparral
	22. Piñyon-juniper
<u>Alaska Forest Types</u>	
▪ Hemlock – Sitka Spruce	
▪ Spruce – Hardwoods	

Northeast Region

	FT 1	FT 2	FT 3	FT 4	FT 5	FT 6	FT 7	FT 8	FT 9	FT10
Connecticut	X					X			X	
Delaware				X	X	X	X			
Maine	X	X						X	X	
Maryland				X	X	X	X		X	
Massachusetts	X			X	X	X		X	X	
New Hampshire	X	X				X			X	
New Jersey				X	X	X		X	X	
New York	X	X				X		X	X	
Pennsylvania				X	X	X			X	
Rhode Island						X				
Vermont	X	X							X	
Washington, DC										
West Virginia		X		X		X			X	

North Central Region

	FT 1	FT 2	FT 3	FT 4	FT 5	FT 6	FT 7	FT 8	FT 9	FT10
Illinois						X	X	X		
Indiana						X	X	X	X	
Iowa						X		X		
Michigan	X	X				X		X	X	X
Minnesota	X	X				X		X	X	X
Missouri					X	X	X	X		
Ohio						X		X	X	
Wisconsin	X	X				X		X	X	X

Southeast Region

	FT 1	FT 2	FT 3	FT 4	FT 5	FT 6	FT 7	FT 8	FT 9	FT10
Florida			X		X	X	X			
Georgia			X	X	X	X	X			
North Carolina	X		X	X	X	X	X			
South Carolina			X	X	X	X	X			
Virginia	X			X	X	X	X			

South Central Region

	FT 1	FT 2	FT 3	FT 4	FT 5	FT 6	FT 7	FT 8	FT 9	FT10
Alabama			X	X	X	X	X			
Arkansas				X	X	X	X			
Kentucky					X	X	X	X		
Louisiana			X	X	X	X	X			
Mississippi			X	X	X	X	X			
Oklahoma				X	X	X	X			
Tennessee	X			X	X	X	X			
Texas*			X	X	X	X	X			

* Contains the non-commercial Piñon-juniper forest type in central and west Texas.

Great Plains Region

	FT 11	FT 12	FT 13	FT 14	FT 15	FT 16	FT 17	FT 18	FT 19-22
Kansas*°									
Nebraska°				X					
North Dakota*°				X					X
South Dakota°				X					X

* Contains areas of Oak – Pine forest type along eastern portion of state.

° Contains areas of Elm – Ash – Cottonwood forest type along rivers and other waterways.

Intermountain Region

	FT 11	FT 12	FT 13	FT 14	FT 15	FT 16	FT 17	FT 18	FT 19-22
Arizona				X				X	X
Colorado	X			X		X		X	X
Idaho	X			X	X	X	X	X	X
Montana	X			X	X	X	X	X	X
Nevada				X		X			X
New Mexico	X			X				X	X
Utah	X			X				X	X
Wyoming	X			X		X		X	X

Pacific Northwest Region

	FT 11	FT 12	FT 13	FT 14	FT 15	FT 16	FT 17	FT 18	FT 19-22
Alaska*°									
Oregon	X	X	X	X		X	X	X	X
Washington	X	X		X	X	X	X	X	X

* Contains Hemlock – Sitka Spruce forest type along southern coastal areas.

° Contains Spruce – Hardwood forest type within interior mainland.

Pacific Southwest Region

	FT 11	FT 12	FT 13	FT 14	FT 15	FT 16	FT 17	FT 18	FT 19-22
California	X		X	X		X		X	X
Hawaii									X

Appendix K

List of Government Agencies Co-holding Easements with Respondents

1) Federal Government Agencies

- USDA Forest Service
- USDA Natural Resources Conservation Service
- USDA Farmland Protection
- U.S. Fish and Wildlife Service
- National Park Service

2) State Government Agencies

- California Department of Game and Fish
- California Board of Conservation
- Colorado Division of Wildlife
- State of Connecticut
- Illinois Nature Preserves Commission
- Indiana Department of Natural Resources
- Commonwealth of Kentucky Heritage Council
- State of Maine
- Maine Atlantic Salmon Commission
- Maine Department of Environmental Protection
- Maryland Department of Natural Resources
- Maryland Environmental Trust
- Massachusetts Department of Fisheries and Wildlife
- Massachusetts Department of Food and Agriculture
- State of North Carolina
- North Carolina Water Management Trust Fund
- Ohio Department of Agriculture
- Rhode Island Department of Environmental Management
- Rhode Island State Agriculture Preservation
- State of Tennessee
- Tennessee State Natural Areas
- Vermont Agency of Agriculture, Food, and Markets
- Vermont Department of Forests, Parks, and Recreation
- Vermont Housing and Conservation Board
- Virginia Outdoors Foundation
- Virginia Department of Historic Resources
- Wisconsin Department of Natural Resources

3) County Government

- California Resource Conservation Districts
- Santa Barbara County, CA
- Pitkin County, CA Open Space and Trails
- Anne Arundel County, MD
- Calvert County, MD Agriculture Preservation Board
- BOCC of Calvert County, MD
- Baltimore County, MD
- Hartford County, MD
- Essex County, NY
- Ohio Soil and Water Conservation Districts
- Ohio Park Districts
- Bedminster Township, PA
- Solebury Township, PA
- Oley Township, PA
- Lancaster County, PA Agriculture Preservation Board
- Loudon County, VA

4) Town or City Government

- City of Basalt, CO
- Town Glastonbury, CT
- Town of Wilton, CT
- Town of Acushnet, MA
- Town of Carlisle, MA
- Town of Medford, MA
- Town of Orleans, MA
- Town of Sherborn, MA
- Groton, MA Conservation Commission
- City of Falmouth, ME
- City of Gorham, ME
- City of Missoula, MT
- Town of Littleton, NH
- City of Kent, OH
- City of Portland, OR
- Town of Peacham, VT
- Town of Granby, VT
- Town of Stowe, VT
- City of Dunn, WI

Appendix L

List of Organizations Co-holding Easements with Respondents

1) National Conservation Organization

- The Nature Conservancy
- The Trust for Public Land
- Trustees of Reservations
- Open Space Institute
- American Farmland Trust
- Ducks Unlimited
- National Audubon Society

2) Statewide Conservation Organizations

- Iowa Natural Heritage Foundation
- Massachusetts Audubon Society
- New England Forestry Foundation
- Society for the Protection of New Hampshire Forests
- Natural Audubon
- Conservation Trust of North Carolina
- New Jersey Audubon Society
- Pennsylvania Historical Society
- Utah Open Lands
- Vermont Land Trust

3) Local and Regional Conservation Organizations

- Nevada County Land Trust
- La Plata Open Space Conservancy
- Cacapon and Lost River Land Trust
- Sheffield Land Trust
- Naromi Land Trust
- Palouse land Trust
- Massachusetts Audubon and Green Hill Park Coalition
- Ausbon Sargent Land Trust
- Squam Lakes Conservation Society
- Upper Charles Conservation Land Trust
- Severn River Land Trust
- Demariscotta River Association
- Sheepscot Valley Conservation Association
- Maine Coast Heritage Trust
- Southeast Michigan Land Conservancy
- Grand Traverse Regional Conservancy
- Piscataquog Watershed Association

- Pine Creek Valley Watershed Association
- Lancaster County Conservancy
- Block Island Conservancy
- Palmetto Conservation Foundation
- Western Virginia Land Trust
- James River Association
- Gathering Waters Conservancy

Appendix M

List of Forestry Violations Encountered by Respondents

Note: Violation (#) = Number of Incidents

I. Forest Management Violations

1) Timber Harvesting

- Illegal Use of Clearcutting (4)
- Clearcut More Extensive than Permitted
- Timber Clearing (2)
- Illegal Diameter Limit Harvest
- 2-acre Harvest Not Permitted
- Cutting Trees in Prohibited Areas (3)
- Prohibited Thinning of Trees
- Tree Removal (2)
- Harvest in Excess of Easement Limits (3)
- Excessive Volume Harvested
- Illegal Logging for Better Scenic Views
- Harvesting near Streams (3)

2) Management Plan and Prior Notice

- Harvesting Timber without Management Plan (5)
- No Management Plan (2)
- Harvesting Contrary to Management Plan
- Harvesting without Prior Notice (2)

3) Other Forest-related Violations

- Slash Clean-up
- Cutting Vegetation
- Illegal Clearing
- Illegal Cutting

II. Water and Soil Quality Violations

1) Water Quality

- Water Truck Intrusion into Spring
- Tracking into Wet Areas
- Illegal Stream Crossing
- Wetland Alteration

2) Soil Quality

- Erosion from Harvesting Operations
- Excessive Erosion on Log Landing from Unusual Rain Event

III. Recreation and Access Violations

1) Recreation

- Illegal Camping
- Illegal Fires
- Illegal ATV Trails by Local Club

2) Access

- Illegal Road Construction for Access
- Excessive Road Clearing

IV. Adjacent Landowner Violations

1) Timber Harvesting

- Cutting a Stand of Dead Trees
- Harvest of Grantor's Trees by Mistake (2)
- Harvest of Trees on Nature Preserve
- Trees Cut along a Rail-Trail
- Illegal Tree Topping
- 3rd Party Timber Trespass
- Harvest of Trees with Grantor's Permission

2) Other Violations

- Bulldozing for Fire Risk
- Encroachment

V. Other Common Violations

1) Illegal Dumping (3)

2) Dumping of Yard Wastes

3) Illegal Use of Fencing

4) One Building

5) Boundary Violation

6) Brush Piles too High

Appendix N

Complete List of Non-forest Use Restrictions Provided by Respondents

Table 3-5: Respondents restricting non-forest property uses, in percent.

	Conservation Organizations (%)	Government Agencies (%)
Destruction of Wetlands	68	85
Surface Mining	64	77
Stream Alteration	56	46
Agriculture Practices	41	62
Intensive Livestock Operations	40	54
Pond Construction	29	46
Livestock Grazing	25	54
Land Application of Biosolids	25	23
Wind & Solar Power Devices	15	31
Impervious Road Construction	1	0
Cell Phone Towers	1	0
Water Drilling	1	0
Oil Extraction	0.4	0
Outdoor Lighting	0.4	0
Vegetation Alteration	0.4	0
Soil Alteration	0.4	0
Golf Course Construction	0.2	0
Stonewall Destruction	0.2	0
Feedlots	0.2	0
Prairie Destruction	0.2	0
Campground	0.2	0
Poaching	0.2	0
Aerial Biocide Application	0.2	0
Mowing Meadows	0.2	0
Land Filling	0.2	0
Limiting Impervious Cover	0.2	0
Archeological Excavation	0.2	0
Agriculture in Wetlands	0.2	0
Vineyard Development	0.2	0
Livestock Access to Streams	0.2	0

Vita

Jeffrey S. Huff was born in Grand Forks, North Dakota on June 26, 1979. He is the son of (Ret.) CMSgt. Robert K. and Julie A. Huff. He grew up in a military family that lived in North Dakota, South Dakota, Nebraska, Virginia, West Virginia and overseas in the United Kingdom. After graduating from Lakenheath American High School (UK) in 1997, he attended the University of Maryland University College (European Division) for nearly two years. He transferred to West Virginia University in 1999 to study forestry. In 2002, he received his B.S. in Forestry from West Virginia University, graduating *Magna Cumme Laude*. He completed summer forestry internships with the West Virginia Division of Forestry as a forestry aide and with the West Virginia University Division of Forestry as a research aide under Dr. Mary Ann Fajvan. In the fall of 2002, he enrolled at Virginia Polytechnic Institute and State University to pursue a M.S. degree in Forestry. He is an active member of the Society of American Foresters.

Jeffrey S. Huff