

THE DISTRIBUTION AND OBJECTIVES
OF LOCAL FORESTRY - RELATED
ORDINANCES IN THE
UNITED STATES

by

Christopher E. Martus

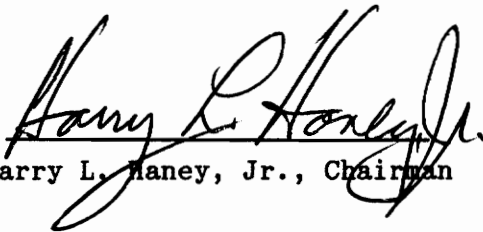
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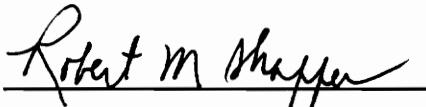
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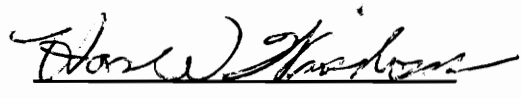
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(ABSTRACT)

Five hundred and twenty-two forest regulatory ordinances were identified in 493 local governments. The majority of these laws are found in the northeastern United States, which account for over sixty percent of the national total. Southern states contain approximately thirty-percent of this total, with western and central states contributing four and two percent, respectively.

Local forest laws are a relatively recent phenomenon. Over seventy percent of the ordinances identified were enacted in the last ten years, and almost fifty percent have been adopted in the last five years. Strong traditions of local authority, increasing environmental sentiments, reductions in local highway aid, changes in timber hauling methods and state environmental programs have all contributed to the growth of local forest laws.

The objectives of forest ordinances differ dramatically. Ordinances in the northeastern states are usually developed to protect local environmental resources from logging. By contrast, southern ordinances are commonly adopted to safeguard local investments in roads from log hauling, while western laws are enacted to comply with state programs. The requirements of these ordinances and the social

attributes of regulated communities vary greatly.

In several cases, local laws are concentrated in areas containing relatively little timberland and low levels of forest activity. In addition, the common requirements of forest ordinances are not viewed as being overly burdensome by loggers and pulpwood operators. For these reasons, local forest laws may impose less of a burden than their sheer numbers would suggest. Although forest ordinances have been extremely burdensome to loggers and forest landowners in certain areas, their the impact must be evaluated in context to local resource and market conditions.

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Chapter 1. Introduction

Environmental issues have been an important topic on the American agenda for well over twenty years. In recent years, however, environmental quality has received unprecedented attention (Ladd 1983). The American public has become sensitized to environmental issues, evidenced by increased interest in international environmental problems such as global warming, tropical deforestation and acid rain. This heightened awareness of environmental quality issues has been translated into increased regulatory action to preserve and protect environmental resources and natural features. In the last two decades, dozens of environmentally motivated laws have been implemented by federal and state governments. In addition, local governments have in recent years adopted laws to protect environmental quality. Increased environmental consciousness on the part of the American public and resulting environmental legislation, has greatly altered the manner in which forestry and silvicultural activities are conducted on private land in the United States.

Public regulation of private forestry is not a new development in the United States. State laws which restrict forestry and silvicultural practices on private land have existed for over fifty years. In addition, federal laws to protect water quality have empowered state governments to further restrict these activities (Haines and Siegel 1986). Recently, however, new trends have characterized the regulation of forestry. State forest practice legislation is no longer simply

"seed tree" or regeneration regulations. State forest practice laws now include a wide range of environmental considerations, which complement new federal environmental quality statutes. In addition, a proliferation of local ordinances that regulate forestry practices have also been identified (Haines and Siegel 1986). Federal and state regulation has received considerable attention. Local environmental regulation, however, has not been the subject of substantial analysis. The present study focuses on the regulation of forestry activities by local governments¹.

Local Regulatory Ordinances

In the last two decades, federal, state and local governments have enacted laws and regulations to correct perceived environmental problems. The federal government has enacted many well known environmental statutes such as the Federal Water Pollution Control Act Amendments of 1972, the Clean Air Act of 1970 and the National Environmental Policy Act of 1969. State governments have also been active in searching for legislative solutions to environmental problems. Local governments have attempted to improve environmental quality through a variety of methods including zoning and direct regulation.

A relatively large body of literature exists on federal and state forest practice legislation; however, research on local forest practice regulation has been much less extensive. Most of the literature on this

¹Local government applies to all structures of political administration below the state level; such as, cities, counties, towns, townships and boroughs.

subject is state specific; for example, Cubbage and Raney's study of Georgia's county logging regulations (Cubbage and Raney 1987) and Youell's analysis of municipal forestry regulation in Connecticut (Youell 1985). Unfortunately, few states have been the subject of comprehensive analysis. The only study with a national perspective was a "special study" conducted by the USDA Forest Service in conjunction with the 1993 Resource Planning Act (RPA) Assessment Update (Hickman and Martus 1991).

Local regulation of forest activities is not a new phenomenon in the United States. Local laws were enacted as early as the late 1930's to control forestry practices in California (Arvola 1970); local timber harvesting ordinances have existed in southern New York state since the late 1950's (NYSDEC 1985). Local regulation of forestry activities, however, was not pervasive until the late 1970's and early 1980's, which witnessed a rapid proliferation of ordinances. During this period local ordinances became common, especially in the states of New Jersey, New York, Connecticut, Pennsylvania and Georgia (Salazar 1986, Cubbage 1987, Hickman and Martus 1991).

Distribution of Local Ordinances

The Hickman-Martus (1991) study had identified 377 local forestry ordinances in the United States, as of January 1991. The majority of local laws were found in the states of New Jersey, Pennsylvania, New York, Connecticut and Maine, which comprised approximately seventy percent of the ordinances identified. Large numbers of ordinances were

also found in the southern states of Louisiana, Georgia, Florida and Virginia. These states accounted for roughly twenty percent of the ordinances identified. Western and mid-western states accounted for only a small percentage of the total number of ordinances identified, five and two percent, respectively. The nature, scope and purpose of regulatory ordinances was found to differ greatly among regions.

Local forest practice ordinances have been enacted for a number of reasons including environmental protection, natural feature and habitat preservation, the protection of public property and the preservation of forestland. These laws vary considerably in their regulatory requirements as well as in their level of enforcement. Many local laws simply require notification of local officials before harvest or hauling activities begin (Provencher and Lassoie 1982); other laws are highly restrictive and even prohibitive of forestry activities and the hauling forest products on local roads (Siegel and Haines 1987).

Local forest practice regulation is a very dynamic area of public forest policy. Three-quarters of the local laws identified by the RPA study were enacted in the last ten years and almost half in the last five years (Hickman and Martus 1991). New local laws are constantly being enacted as older laws are replaced, repealed or amended; for this reason, studies conducted to obtain counts of local laws are outdated.

Reasons for Proliferation of Local Ordinances

Several authors writing on local forest regulation topics have interpreted the proliferation of ordinances as a social conflict between

urban and rural residents in rapidly urbanizing, rural-urban interface communities (Cubbage and Raney 1987, Popovich 1984, Sheay 1988, Wolfgram 1984). Local ordinances are becoming increasingly common in densely populated states such as New York, New Jersey and Pennsylvania. One key factor in their proliferation appears to be the population shift from urban to more rural areas. Urbanites who move to more rural settings are generally unfamiliar with agricultural land management practices and have fewer economic and social ties to the resource value of the land (Hogan 1984). They may, therefore, initiate regulation to protect suburban/rural fringe areas from any damage that could result from forestry and agricultural activities (Cubbage 1985). It has been speculated that local regulation of forestry practices is basically a symptom of a social conflict between communities with differing values and attitudes towards the use of natural resources. In this sense, the proliferation of local forest laws reflects many of the sociologic issues which characterize the current environmental debate.

The maturation of many previously unmanaged woodlots, strong markets for products such as firewood and the strong "home rule" status of some municipalities, have also contributed to the growth of local forest ordinances (Harberger 1986, Hogan 1983, Youell 1985). Unfortunately, no analysis has determined the relationship between certain resource, market and demographic factors and the incidence of local regulation. Determining the common factors associated with localities which choose to regulate forestry activities, as compared with those that do not, would be of great interest. If local

regulation, in fact, reflects a social conflict, understanding these relationships is essential for anticipating regulatory problems, as well as implementing sound forest policy.

Local regulations have also been enacted in response to state and federal programs, established to protect natural features. Connecticut's Housatonic River Corridor, Maryland and Virginia's Chesapeake Bay Critical Area, and New Jersey's Pinelands Areas are all examples of states empowering local governments to regulate forestry activities. Federal and state governments have also authorized local governments to regulate forestry activities under the auspices of wetland protection statutes (Haines and Siegel 1987). The recent trend in American government toward more state and local action, the "new federalism" of the Reagan administration, has undoubtedly aided to the proliferation of local forest laws. State support for local forest ordinances, however, is far from universal.

In response to the growing number of forest regulatory laws, several states have passed legislation preempting or limiting the power of local governments to control forestry activities. Massachusetts's 1982 forest practice act, Georgia's Open Burning Law and New Hampshire's 1990 "Right-to-Harvest" law were all adopted, at least in part, to protect forestry activities from unreasonable and diverse local regulations (Salazar and Cubbage 1990, Anonymous. 1990, Haines and Siegel 1986). Despite the emergence of state preemptive measures, researchers who have studied local forestry regulation feel, without exception, that local laws will continue to increase in number (Cubbage

and Raney 1987, Cabbage and Siegel 1988, Harberger 1986, Hogan 1983, Salazar and Cabbage 1990, Youell 1985).

Costs and Benefits of Local Forest Ordinances

The cost imposed on individuals, businesses and government by environmental regulation is difficult to measure. It has been estimated that over 100 billion dollars is spent in the United States annually just to comply with federal environmental laws and regulations (US EPA 1990). Forest regulations can represent significant costs to producers, consumers, and to landowners. Unfortunately, little research has been conducted on the cost, to loggers and landowners, associated with complying with local forest laws. All of the literature on this subject is anecdotal in nature; therefore, it provides little empirical insight into the full economic impact of specific regulatory provisions (Anonymous 1990, Hogan 1983, Knittel 1989, Pollack 1987).

It is also important to consider that environmental degradation, resulting from improperly conducted forestry operations, represents a cost to society. In these situations, it may benefit a local community to regulate forestry activities. The expense of regulation is justified if its benefits outweigh its costs. It is important to determine, however, if local governments are capable of balancing these benefits and costs.

The cost imposed upon loggers and forest landowners from local forest regulatory laws can be significant. The full economic impact of regulation is determined by many factors which include: the

administrative costs of complying with these laws; the amount of penalties and fines; the level of regulation in neighboring communities; the proximity to local resource markets; and the quantity of the resource regulated. Understanding the magnitude of these costs and benefits is essential for creating effective environmental policy. These factors represent important considerations in evaluating the costs and the benefits of local forest practice regulation.

Study Objectives

The purposes of this study are to determine the distribution of local forest practice ordinances in the United States, to identify the scope of their regulatory provisions, to identify the demographic and resource factors associated with the proliferation of local regulation and to measure the impacts of these laws. The specific objectives of this study are to determine:

- 1) the nature and extent of local forest practice regulation in the United States;
- 2) the legislative history and evolution of local forest practice regulation in the United States;
- 3) important regional differences in the scope and purpose of local forest regulation;
- 4) the distribution of local forest ordinances in relation to various demographic and resource factors; and
- 5) the relative impact to loggers and forest landowners of complying with local forest regulation.

This study not only provides insight into the scope and importance of local forest ordinances but also provides insight into current, national environmental issues. The issues surrounding the local forest regulatory debate mirror many of the problems which are currently being debated nationally. Resource managers and landowners wishing to effectively participate in the formulation of public forest policy must understand the characteristics and motivations of environmentally conscious citizens. They must also be sensitive to regional differences in regulation so as to anticipate the proliferation and impact of local forest regulation. This information will also be helpful to local governments by identifying the economic and biological consequences of forest regulation.

Chapter 2. Literature Review

One of the most important debates in public forest policy in the United States over the past seventy years has been the role of government in managing private forestland. Federal, state and local governments all influence forest policy through a variety of policy mechanisms, including taxation, subsidies, zoning and formal regulation. Direct regulatory control of forest practices has historically been the most controversial method of governmental action to modify forest practices on private land (Haines and Siegel 1987).

Historical Background

The idea of preserving natural resources is not a new concept in North America. Some of the earliest colonial statutes involved the conservation of forest resources, by prohibiting the wasteful use of timber. Early American colonists decided to preserve natural resources even when the frontier of natural resources was considered "boundless" (Kawashima and Tone 1983). Natural resource laws of the colonial period express concern for a wide variety of environmental issues. The Plymouth Colony, for example, passed laws prohibiting the cutting of trees without official permission as early as the seventeenth century (Siegel and Cabbage 1985). Colonists had enacted laws prohibiting the deposition of certain materials in rivers and had established fire and hunting seasons as early as 1700 (Kawashima and Tone 1983). Environmental regulation in this period was not limited to English

colonies. A Spanish decree of 1813 provided for the conservation of trees in California (Arvola 1962). All of these laws show a level of environmental awareness, undoubtedly a predecessor of modern environmental legislation.

After the colonial period, however, public regulation of private forestry received little attention, resulting in the widespread exploitation of timber for over one hundred years. Federal legislation, promoted by this exploitation, resulted in the establishment of national forests in the late nineteenth century (Haines and Siegel 1987). The early twentieth century witnessed the expansion of the national forest system and increased cooperation between state and federal governments prompted by the Weeks Act of 1911 and the Clarke McNary Act of 1924. The late 1930's experienced rapid growth in the adoption of state-wide forest laws. In 1930's and 1940's, fifteen states enacted legislation to control forestry activities by requiring owners of forestland to reforest after harvests (Salazar 1987).

The status of state forest practice regulation changed very little until the early 1970's, at which time a widening of the scope of forest practice legislation occurred. The emergence of the environmental movement in the late 1960's and early 1970's was the principal factor which contributed to the renewed interest in state regulation of private forestry activities. These laws were created not only to provide for reforestation but to cover a wide range of issues such as air and water quality, fish and wildlife, soil productivity and aesthetics (Haines and Siegel 1987).

Recently, local governments have become increasingly active in controlling forestry activities on private forestland. Local governments have enacted laws over concerns for water quality, noise, wildlife habitat, preservation of public property and scenic values (Salazar 1987). These laws, in some cases, have been highly restrictive and even prohibitive of forestry operations (Haines and Siegel 1987). Local regulations of private forestry were first adopted in 1937 in San Mateo County, California. By 1956, county regulations had been enacted in at least four other California counties (Arvola 1970). Local forest regulation originated in the East in the southern New York towns of Oyster Bay and Yorktown in 1959 (NYSDEC 1985). Generally, local regulation of forestry activities is a recent phenomenon with the majority of ordinances being enacted since the late 1970's (Hickman and Martus 1990, Salazar 1987, Youell 1982, Wolfgram 1984).

The authority of local governments to enact harvesting restriction has been the major source of controversy. The degree of local discretionary authority enjoyed by local governments differs greatly among states, as does the form and structure of local governmental entities. The state-local relationship is an important consideration in determining the legitimacy and tenure of local ordinances. The early California ordinances, for example, were subsequently preempted by the state's forest practice act. Understanding the relationship between states and local governments is an important component in determining the foundation of local forest regulatory law.

The Legal Basis of Local Regulatory Ordinances

It is important to consider two factors when evaluating the legal basis of local governmental regulation of land and resource use. First, does the local government in question have the legal discretionary authority, granted by the state, to regulate land uses? Second, does this regulation constitute the unreasonable taking of property right from the owner of the resource? These questions are central to the issues related to forest ordinances and laws, which restrict land use on private property. The mechanisms through which local governments are granted authority to enact local laws as well as the definition of a public taking of property through regulation are salient issues in the controversy surrounding local forestry practice laws.

Types of Local Government

At this point, it is useful to outline the structures used by states to organize land and individuals into political or administrative units. A firm understanding of these terms is essential for comprehending the methods used by various states to delegate authority, since the form of local government usually dictates the services it will provide to its citizenry. According to the US Bureau of Census, local communities must possess the following attributes to be counted as a government: (1) existence as an organized entity; (2) government character; and (3) substantial autonomy (U.S. Department of Commerce 1983). Governments must, therefore, have some form of organization, and the power to own property and to enter into contracts. It must

serve and be accountable to inhabitants of the community, it must have the power to create budgets, enforce laws and raise revenues (Maddax and Fuquay 1975). Although this definition is extremely broad, it helps to distinguish between autonomous forms of local government and political subdivisions such as voting districts.

Local governments can be further classified into two general categories: general governments and special governments. General governments are created to provide a wide range of governmental services, while special governments usually offer a single service (Grant and Omdahl 1989). General governments include counties, municipalities, townships, towns and boroughs. School districts, water districts, planning zones and health districts all represent units of special government. Special governments therefore represent another level of regulatory authority below the county or municipal level. A confounding factor in analyzing local laws is determining the jurisdictional boundaries of the multiple layers of governmental units, since combinations of federal, state, county, municipal and special governmental regulation can all be applied to almost any property. In addition, studies involving local governmental units are also complicated by the large number of governmental entities in the United States. In 1987, the Bureau of Census counted over 83,000 local governmental units in the United States. This includes 3,045 counties, 19,200 municipalities, 16,691 towns and townships and 44,252 special governments (U.S. Department of Commerce 1990). The function and definition of each of these types of local government will now be

examined.

Counties. Counties are found in every state except Connecticut and Rhode Island. The principle political subdivisions in Louisiana and Alaska are parishes and boroughs, respectively, which are equivalent to counties. Counties are legally designated as "quasi-municipal corporations", meaning they are subdivisions of the state. Counties are usually created to administer statewide functions on a local level such as law enforcement, welfare services and social services (Maddax and Fuquay 1975). Unlike municipal corporations, cities and incorporated towns and boroughs, quasi-municipal corporations were created to act as agents of the state (Leach and O'Rourke 1988). Although counties are a common unit of local government, they are not uniformly important. In the New England states, counties have limited functions. In approximately one-third of these states, counties share governmental responsibilities with townships. By contrast, counties in the South and West are the principle unit of local governmental authority (Maddax and Fuquay 1975). Recently, counties have been given greater authority to enact regulations and to provide a wide range of services in many regions of the country (Grant and Omdahl 1989).

Municipalities. A municipality is essentially a municipal corporation established to provide services for a population concentration within a defined area. Municipalities, like counties, are political subdivisions of the state; unlike a county, however,

municipalities are incorporated to provide specific services desired by specific communities (Maddax and Fuquay 1975). Municipalities are, therefore, created at the request of citizens, through a charter, rather than by the will of a state legislature, as are counties (Grant and Omdahl 1989). Local custom and statutory provision usually requires that municipalities must be known as cities, towns, villages or boroughs. While the meanings of these terms differ, large municipalities are always designated as cities (Maddax and Fuquay 1975).

The use of the term "town" is often a point of confusion, since it is frequently used to refer a unit of local government more properly termed a township. In addition, unincorporated settlements with no government structure are frequently referred to as towns (Maddax and Fuquay 1975). In many states, it is common to refer to any small municipality as a town; technically however, a town must be incorporated to qualify as a municipality. Town incorporation simply involves the granting of a charter by the state to a municipality in order to provide services to a specified population of individuals.

The smallest unit of municipal government is commonly termed a village. Suburban communities located outside larger cities are commonly designated as villages. The structure of this form of government is generally simpler and its powers are usually less extensive than other forms of municipal government. Connecticut, New Jersey and Pennsylvania legally design small municipalities as boroughs. Boroughs differ very little from incorporated towns and villages in other states.

Townships. Governmental subdivisions known as townships are found in twenty states. Like counties, townships are generally quasi-municipal corporations, created directly by state statutory provision to administer state services (Grant and Omdahl 1989). After cities, townships are the principle units of local government in New England, providing many of the services furnished by counties and municipalities in other regions (Maddax and Fuquay 1975). Townships in New York, New Jersey and Pennsylvania also represent the basic unit of rural government (Grant and Omdahl 1989).

The large number and type of governmental units in the United States greatly complicates any analysis associated with this subject. Compounding this problem is the fact that the function, structure and authority granted to local governmental units differs considerably between states. Towns, counties and municipalities in one state may have dramatically different levels of local authority as compared to local governments in another state. Local governments are basically creatures of the states; and for this reason, it is important to understand the relationship between states and local governments.

The State-Local Relationship

The status of local discretionary authority in relation to state and federal government is not mentioned in the Constitution of the United States. Subsequently, local governments were generally inactive in the governing process until after the Civil War. The relationship between state and local governments since this period has been defined

by the effort of governments to enlarge the scope and degree of local discretionary authority. (ACIR 1981).

Dillon's Rule. To understand the relationship between state and local governments, it is important to understand mechanisms used by states to delineate the authority granted to the states and those delegated to local governments. In interpreting the relationship between state and local governments, state courts have traditionally adhered to the rule of strict constructionism known as "Dillon's Rule". The rule of strict constructionism was outlined in a 1868 decision of Judge John F. Dillon who held:

"the true view is this: Municipal Corporations owe their origin to and derive their power and rights wholly from the legislature... We know no limitation on this right as the corporations themselves are concerned. They are so to phrase it, the mere tenets at the will of the legislature." (City of Clinton v. Cedar Rapids and Missouri Railroad Company, 24 Iowa 455 at 461 1868).

In 1903, the Supreme Court of the United States upheld the constitutionality of Dillon's Rule, stating that the political subdivisions of states may only exert power expressly granted to them by state [Atkins v. Kansas, 191 U.S. 207 at 220 -221 (1903)]. Dillon's Rule holds that local governments have no power except those powers specially granted by the state; when in doubt, the court should rule against the local government (Grant and Omdahl 1989). The effect of Dillon's rule has been to greatly limit local discretionary power and authority.

Although the rule of strict construction prevailed in most states

through the early 1900's, the historical significance of Dillon's Rule was to induce a counter movement toward greater authority for local governing bodies. The first grants of local power by state governments was seen in the early 1870's. Several states allowed cities and counties limited authority to determine the structure of local government. The movement to grant greater discretionary authority to local governments has been termed "home rule" and has generally taken the form of state statutory provisions or by the amending state constitutions to grant greater powers to local governments.

Home Rule. The granting of authority by states to local governmental bodies has generally taken two forms: statutory and constitutional amendment. Constitutional "home rule" is the grant of local government authority, free from state control, through an amendment to the state constitution; similarly, statutory home rule involves the grant of local authority through legislative action (Maddax and Fuquay 1975). Technically, the term "home rule" only applies to a constitutional grant of authority; however, in practice, it is used to define both constitutional and statutory grants. Constitutional home rule is generally viewed as a stronger grant of discretionary authority, since it is usually easier for a state legislature to revoke statutory powers as compared to constitutional ones (Maddax and Fuquay 1975). The true degree of authority given to local governments is ultimately determined by the wording, use and interpretation of constitutional or statutory home rule provisions. In general, the overall level of local

authority is larger under constitutional as compared to statutory home rule. State-local government relationships defined by Dillon's Rule display the smallest amount of local discretionary authority. The relationship for each state and its local governments are shown in Table 2.1 (ACIR 1981).

Table 2.1 States classified by state-local grant of authority: constitutional grant of power, statutory grant of power or Dillon's Rule

State	Relationship	State	Relationship
Alabama	Dillon's Rule	Montana	Constitutional
Alaska	Constitutional	Nebraska	Constitutional
Arizona	Constitutional	Nevada	Dillon's Rule
Arkansas	Dillon's Rule	New Hampshire	Constitutional
California	Constitutional	New Jersey	Statutory
Colorado	Constitutional	New Mexico	Constitutional
Connecticut	Constitutional	New York	Constitutional
Delaware	Statutory	North Carolina	Statutory
Florida	Constitutional	North Dakota	Constitutional
Georgia	Constitutional	Ohio	Constitutional
Hawaii	Constitutional	Oklahoma	Constitutional
Idaho	Constitutional	Oregon	Constitutional
Illinois	Constitutional	Pennsylvania	Constitutional
Indiana	Dillon's Rule	Rhode Island	Constitutional
Iowa	Constitutional	S. Carolina	Constitutional
Kansas	Constitutional	South Dakota	Dillon's Rule
Kentucky	Dillon's Rule	Tennessee	Constitutional
Louisiana	Constitutional	Texas	Constitutional
Maine	Constitutional	Utah	Constitutional
Maryland	Constitutional	Vermont	Dillon's Rule
Massachusetts	Constitutional	Virginia	Statutory
Michigan	Constitutional	Washington	Constitutional
Minnesota	Constitutional	West Virginia	Constitutional
Mississippi	Dillon's Rule	Wisconsin	Constitutional
Missouri	Constitutional	Wyoming	Constitutional

The level of discretionary authority provided by states to local governments is also determined by the structure through which authority is granted. All attempts by states to empower local governments have consisted of a combination of two approaches. The "*Imperium in Imperio*" approach and the "devolution of powers" approach represent the two structures through which states have implemented increased local rule. (ACIR 1982).

The *Imperium in Imperio* approach, or state within a state, involves the specification of local powers and placing these outside the control of state legislatures. This concept, based on the federalism between state and local government, was an early attempt to stop what was perceived as the excessive tampering of the state in "local affairs". Early constitutional grants of authority through *Imperium in Imperio* did not outline specific local powers, but implied that certain local powers were implicit in the grant to adopt and amend a home rule charter. As a result, courts were eventually needed to determine the powers which resided with the local and state government; consequently, strict judicial interpretation of local powers limited the effectiveness of this approach as a means of local empowerment.

The limitations of *Imperium in Imperio* facilitated the development of devolution of powers approach, which was developed to remove courts from the decision of the regulatory responsibilities of state and local governments (ACIR 1982). Through this approach all powers of government are delegated to the local, except for the power to enact

civil law and the power to define punishment. Under the devolution of powers, local governments are allowed to act under a broad range of granted authority. A state-local relationship defined by the devolution of powers approach should provide the largest amount of local discretionary authority. Under Dillon's rule, no action can be taken without legislation permission; similarly, under *Imperium and Imperio*, local governments must have relatively explicit authorization to take action. Authority is granted to local governments under the devolution of powers approach unless it is preempted by the state government. The devolution of powers, therefore, gives the largest amount of local discretionary authority (ACIR 1984).

Local Discretionary Authority. Although these definition are useful in explaining the relationship between state and local governments, they provide little help in the categorization of states by various levels of local discretionary authority, since most home rule provisions are statutory or constitutional amendments containing features of both *Imperium in Imperio* and the devolution of powers. While only Alaska and Pennsylvania have adopted the devolution of powers approach in total, all states enacting new home rule provisions in the last fifty years, except for Oregon, have basically followed the devolution of powers approach. The Oregon County provision of 1958 created an *Imperium in Imperio* (ACIR 1982). In general, home rule applies to any state in which the state-local relationship is not

governed by Dillon's Rule, and the level of discretionary authority at the local level varies widely between states. The degree of fiscal, budgetary and legislative autonomy enjoyed by individual localities may also differ within states. The true level of local authority must ultimately be determined by the specific provisions of the statutory or constitutional amendment and through use and judicial interpretation.

The Taking Issue

An important question associated with all land use legislation is when does a law restricting the use of private land constitute a taking of property rights? This is an important issue, since the protection of private property from public seizure is guaranteed by Article V of the United States Constitution, which says: "No person shall... be deprived of life, liberty and property, without due process of law; nor shall private property be taken for public use without just compensation" (Article V in the Amendments to the Constitution of the United States, December 15, 1791 (the Bill of Rights)). Many landowners have argued that restricting the use of private land constitutes a government seizure of private rights, since prohibiting certain land uses will undoubtedly result in a financial loss. For this reason, some forest property owners contend that forest regulations and restrictions represent a confiscation of private rights which should be constitutionally prohibited. To better comprehend this issue, one must study the legal rules used and the judicial precedents established to deal with the government taking of private property.

Traditionally, court decisions have established that compensation is not required if a law regulating land use is a proper execution of the police powers of the state. Police powers include any power used to protect the health, morals or safety of the community. In Richmond, Fredricksburg and Potomac Railroad v. Richmond, 96 U.S. 521, the Supreme Court held that:

"The power to govern implies the power to ordain and establish suitable police regulations...Appropriate regulation of the use of property is not 'taking' property within the meaning of the Constitutional prohibition."

The federal, state and local governments, therefore, can restrict or even prohibit activities on private land, if it is determined that the restriction or prohibition is within the paternalistic powers inherent to government. Courts have generally used a combination of two tests to determine if government "taking" is in fact within its police powers; historically, courts have used the "balancing test" or the test of diminution of value.

The Balancing Test. An early decision rule established to evaluate the tradeoff between government taking of private rights and public benefits was defined by Supreme Court Justice Oliver Wendell Holmes in 1908. Justice Holmes argued that the delineation between police power and taking is determined by the degree or magnitude of the use impacted. This rule has come to be known as the "balancing test", which has been used as the basis for countless court decisions on the taking issue (Beuter 1987). This test compares the economic losses of

the landowner with the benefits which will be accrued to society. The basic idea behind the "balancing test" is outlined in Justice Holmes' 1908 opinion of Hudson Water Co. v. McCarter:

"For instance, the police power may limit the height of buildings, in a city, without compensation. To that extent it cuts down what otherwise would be the rights of property. But if it should attempt to limit the height so far as to make an ordinary building lot wholly useless, the rights of property would prevail over the public interest, and police power would fail" (Hudson Water Co. v. McCarter (209 U.S. 349)).

The balancing test is a utilitarian notion in which each case must be evaluated separately, on the basis of its individual merit. The boundary between police power and taking is therefore simply a tradeoff between public and private interests. Using the societal benefits to justify the seizure of private property rights, however, has not been universally supported by recent court decisions.

Diminution of Value. An alternative method used to evaluate the taking issue is the test of diminution of value. This method focuses on the loss in value to the landowner from regulation, ignoring the public benefits accrued through regulation. The test of diminution of value, however, does not determine the loss in value resulting from regulating the most profitable land use; it only determines if the regulation leaves the landowner with a reasonable selection of profitable uses for the property in question (Brizee 1976). An example of this is the 1972 case of *Just v. Marinette County*. In this case, the plaintiff was prohibited by Marinette County's shoreland zoning ordinance from filling a wetland area of his property. The court ruled that the ordinance was

a legitimate use of the county's police powers (Ciracy-Wintrup and Bishop 1975). The court ruled that the regulation was an attempt to maintain the natural character of the site and was not designed to create a benefit for which compensation would be required. Although the landowner claimed the value of his property had been diminished by the ordinance, the courts held that there was no diminution of land value in its natural state, only a diminution of the speculative value after filling the property (Brizee 1976).

The taking issue is an important factor concerning the regulation of private land practices in the United States. Liberal judicial interpretation of Article V has given federal, state and local governments considerable latitude to regulate land use, without violating constitutional limitations on taking of private property. The scope of local regulations will continue to be defined by court decisions involving the authority to regulate land use under state and federal law. State courts have heard numerous cases involving the authority of local governments to regulate land use (Brizee 1976; Ciracy-Wintrup and Bishop 1975; and Siegel et. al. 1991). State courts have in some cases given counties, townships and municipalities broad powers to regulate forestry activities on private land. The legal consequences of local regulation of private forestry can be seen by examining two cases involving forest laws in New Jersey.

Borough of Kinnelon v. South Gate Associates. In *Borough of Kinnelon v. South Gate Associates* (172 N.J. Super. 216 1980), the

Appellate Division of the Superior Court in New Jersey held that municipalities may regulate and even prohibit commercial timber harvesting and forestry activities. The regulation of commercial forestry activities was found to be within the inherent power of local government and was not preempted by the constitution of the New Jersey or by the policy of the state to preserve farmland and forest as outlined in New Jersey's Farmland Assessment Act (Hogan 1984). This decision was later allowed to stand by the Supreme Court of New Jersey, which refused to hear it in appeal in 1980 (.85 N.J. 94 1980). Under this interpretation of state law, local governments were given considerable authority to regulate forestry activities. A second case shows an example of how court decisions have resulted in rather perverse consequences on the management of natural resources.

Clearview Estates, Inc. v. Borough of Mountain Lakes. The Farmland Assessment Amendment was added to the Constitution of New Jersey in 1964 to protect farmland and forests. The amendment was to preserve these resources by providing for lower tax assessments for parcels of land used in forestry and agricultural activities. Ironically, local laws, designed to protect the natural environment, have had the effect of circumventing objectives of this act (Hogan 1984). In Clearview Estates, Inc. v. Borough of Mountain Lakes (1988 N.J. Super. 99 1982), the State Appellate Court held that since harvesting of timber was prohibited under a municipal zoning ordinance, forestland was no longer eligible for a reduced tax assessment under the

provisions of the Farmland Assessment Act. Local forest laws in these areas, therefore, result in significantly higher tax assessments for forest land-owners. For example, a forty-acre tract in a town with a forest ordinance cannot be assessed at its forest use value of \$900 but at its market value of \$235,000. The result is a higher tax burden on forestland owners which could result in placing forestland into its highest and best use, development (Hogan 1983, Hogan 1984, Sheay 1982). Ordinances established for the purpose of protecting environmental quality by limiting forest harvesting have, in some cases, evaded the objectives of the ordinance and the Farmland Assessment Act by creating incentives for increased land clearing and development.

Legal Challenges. Local logging ordinances have been successfully challenged in court by loggers and landowners on the basis that the local ordinances exceed the police powers granted to local governments. A Natchitoches Parish, Louisiana logging ordinance was successfully challenged, in state court, by a local logger on the grounds that it unfairly burdened the forestry sector (Cubbage 1989b). In a similar case involving local forestry regulation, the Appellate Division of the New Jersey Superior Court ruled in favor of a landowner to invalidate a section of the Rockaway Township zoning ordinance. The court held that Rockaway's zoning ordinance was "arbitrary and capricious" in regulating forestry activities and was therefore an excessive use of the township's police powers (Sheay 1988). The problem faced by loggers and landowners is that legal challenges to local forestry laws can be expensive. The

legal fees and opportunity costs of pursuing a legal remedy to burdensome local laws quickly become prohibitive (Knittel 1989, Perschel 1984). In addition, legal challenges are risky; an unfavorable decision will result not only in a financial loss but can also create a legal precedent which could foster more local regulation (Cubbage 1989b).

The Distribution and Purpose of Local Regulatory Ordinances

Over the last ten years several noteworthy studies have been conducted to quantify the magnitude of local forest regulation in the United States. Unfortunately, most of these analyses have been state specific; such as, Cubbage and Raney's study of Georgia's county logging and hauling ordinances (Cubbage and Raney 1987) or Youell's investigation of local forest regulation in Connecticut (Youell 1984). The only comprehensive, national study was conducted by the USDA Forest Service in conjunction with the 1993 RPA, Resources Planning Act, Assessment Update (Hickman and Martus 1991). The purpose of this section is to provide a broad overview of the distribution, scope and extent of local regulation. New local laws regulating forest practices are constantly being adopted, amended and revised. The process of compiling local laws is also complicated by the large number of local governmental units in the United States. Local ordinances and laws are not always easily recognizable, since vague language and liberal interpretation of zoning laws, resource extraction ordinances and road policies have also been used to regulate timber harvest and forest practice regulation (Cubbage 1989, Cubbage and Siegel 1988, Provencher

and Lassoie 1982 and Youell 1984b). Local regulation is a very dynamic field of public policy, in which surveys and tallies become quickly outdated, for this reason, counts by states and region will be used to illustrate trends in the scope and extent of local regulation.

The nature and extent of local forest regulatory laws vary considerably among regions of the country. For this reason, the country will be divided into four geographic regions to facilitate this analysis (Figure 2.1). Regions will be compared on the basis of the number of ordinances, the forms of local governmental entities, the types of activities regulated and the dates of enactment of local laws. The northeastern region of the United States, identified in Figure 2.1 will be examined first.

Northeastern Region

By all accounts, local regulation of forestry is most prevalent in the northeastern United States (Cubbage and Siegel 1988, Hickman and Martus 1990, Popovich 1984, and Salazar 1986). As of January 1991, the USDA Forest Service had compiled 271 local forest regulations in the Northeastern United States, accounting for over 75 percent of the ordinances discovered in the eastern United States. The states in which ordinances were found, and the number of laws in each state is: Connecticut, thirty-one; Maine, nineteen; Maryland, thirty-six; Massachusetts, two; New Hampshire, three; New Jersey, eighty-seven; New York, thirty-eight; and Pennsylvania, fifty-five (Hickman and Martus

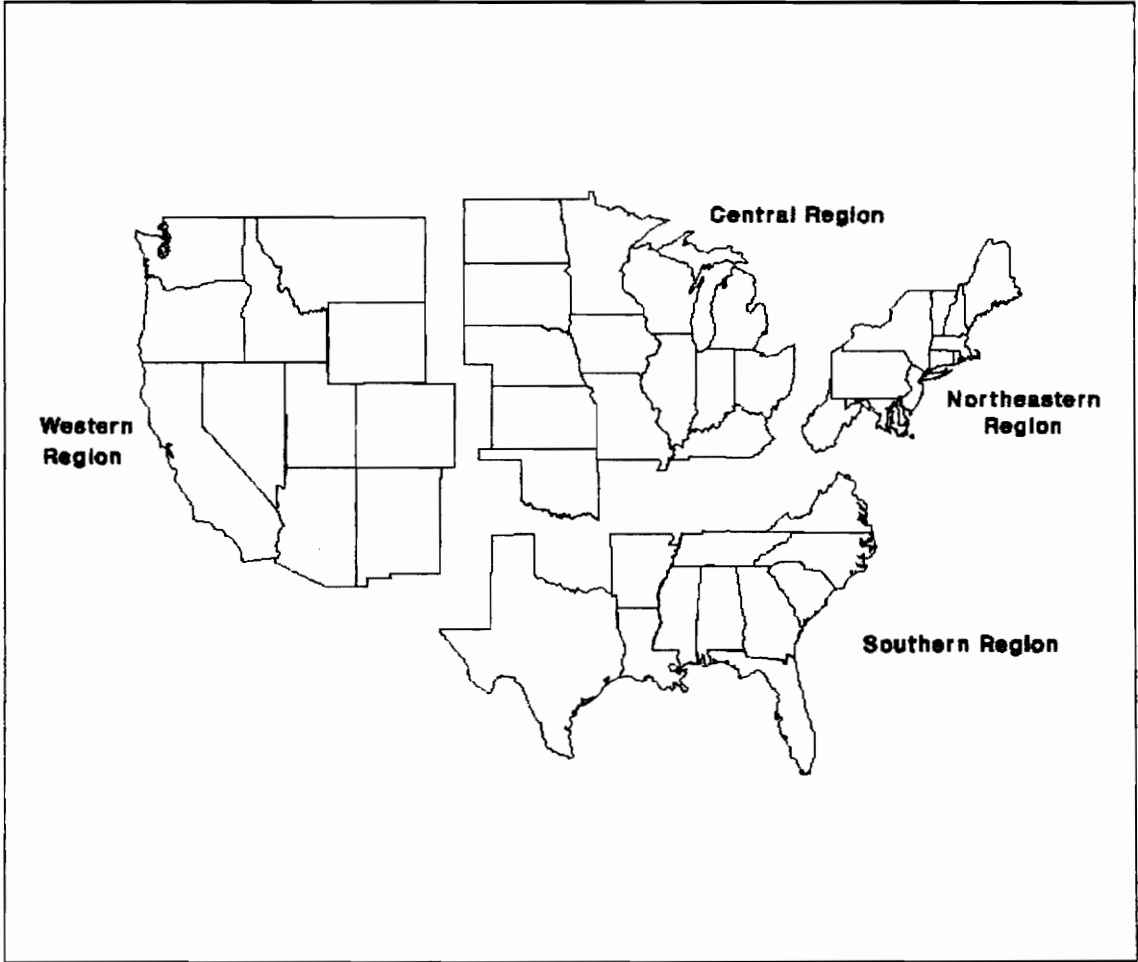


Figure 2.1 Boundaries of the five geographic regions recognized

1991). Tallies of local ordinances conducted in 1984 in Connecticut and New York identified twenty and twenty-four ordinances in each state, respectively (Wolfgram 1984 and Youell 1984). Comparing these results with the RPA tallies shows an increase of approximately sixty percent, in each state, in just over five years. In addition, a 1984 article referred to over 100 local laws in New Jersey which regulate forestry activities (Hogan 1984). Many of these laws cited in this article are

not specifically aimed at timber harvesting but were simply strictly interpreted zoning regulations, which did not explicitly permit forestry activities. These examples show two of the factors which complicate the task of tallying local laws in the Northeast, the rapid proliferation and the difficulty of identifying forestry laws.

Ordinances were enacted in the northeastern states in order to provide for a wide variety of environmental considerations. Approximately fifty percent of these ordinances were adopted to protect the environmental values associated with forested systems, which include sedimentation and erosion, water and air quality and wildlife habitat concerns. Most of these laws were enacted to directly regulate forest harvesting and forest road construction by requiring harvest plans and by restricting specific forestry activities. The second most common type of local ordinance enacted in the northeastern region were laws adopted to provide for environmental quality in urban and suburban settings. Approximately, one-third of the ordinances identified in the Northeast by the Forest Service study were enacted to protect the environmental values associated with individual trees or wooded tracts in urban or suburban areas. They were usually established to regulate timber harvesting associated with land clearing and development (Hickman and Martus 1991). These laws require permits or licenses before harvesting, performance bonds, site plans and replanting provisions. The remainder of ordinances in this region were created to protect natural resources in fragile environments. Wetlands, wildlife habitats, scenic river corridors and shoreland and coastal zones are all examples

environments protected by local laws. Most of these ordinances place strict restrictions on timber harvesting and forest road construction. They usually require permits, harvest plans and buffers strips when harvesting within protected zones; in other cases, timber harvesting is completely prohibited within these areas (Hickman and Martus 1991).

Most local regulations adopted in the Northeast were enacted to protect environmental quality and forest amenities. Erosion and sedimentation considerations as well as concerns for noise, mud and traffic associated with hauling logs and pulpwood on local roads were the most commonly cited reasons given by northeastern counties, townships, boroughs and municipal for adopting local forest legislation (Cubbage and Siegel 1988, Hogan 1984, RC&D 1985, Wolfgram 1984, and Youell 1984). All types of local governments have been active in enacting forestry ordinances in the northeastern United States. Municipalities and townships have been most active units of local government, each accounting for approximately 40 percent of the ordinances counted. Northeastern counties and boroughs have accounted for thirteen and eight percent of forest laws identified, respectively (Hickman and Martus 1991).

Local forest regulations in the Northeast have not been limited to the regulation of forest harvesting. Eight local governments in this region have implemented ordinances which have totally prohibited the use of forest herbicides (Siegel et. al. 1991), and local governments in the Northeast have taken on a strong role in the management of wetland areas, in recent years (Siegel and Haines 1990). Local governments in

the northeastern United States have also taken a active role in managing natural resources, and they now regulate a wide range of environmental activities and concerns.

Southern Region

The South has historically remained relatively free of forestry regulation; recently however, local regulation of forestry activities and logging have began to proliferate in some parts of the South (Cubbage 1989b). As of January 1991, seventy-eight ordinances had been identified in the southern region. The states in which ordinances were found, and the number of law in each states is: Florida, twenty-five; Georgia, eighteen; North Carolina, one; Virginia, one; Arkansas, three; Louisiana, twenty-three; Mississippi, three; and Texas, four (Hickman and Martus 1991). A survey of county governments conducted by the Dale Greene, Martha Baxter and Ben Jackson in 1991 identified a total of 48 ordinances, policies and regulations in Georgia; in addition, at least twenty of these ordinance were adopted in the last three years (Greene et. al. 1992). In recent years, additional ordinances have also been implemented in Virginia, Louisiana and Florida to regulate timber harvesting and natural resource activities. Local laws regulating forestry activities continue to proliferate throughout the South. The objectives of local ordinances drafted in the southern states differ between urban and rural ordinances. In urban areas ordinances are usually created to restrict tree cutting in order to prevent soil loss and erosion and to protect amenity values from damage associated with

land clearing and development. Rural ordinances are usually created to prevent damage to public roads and rights of way and to provide for public safety by limiting the hauling of forest products (Cubbage 1989b, Cubbage and Raney 1987).

Approximately sixty percent of the ordinances identified in the southern region were adopted to provide for the protection of public property and to insure traffic safety. The majority of these types of laws regulate the hauling of forest materials on local roads. The use of culverts, gravel pads and the removal of mud and debris from roads ditches and rights of way are all common provisions of these types of laws. Many public property and safety protection ordinances empower local officials to restrict the use of county roads and rights of way during "wet" weather (Hickman and Martus 1991). Approximately thirty percent of the southern ordinances identified were adopted to protect urban and suburban trees and woodlots. These laws were usually enacted to regulate timber harvesting associated with land developing activities (Hickman and Martus 1991). Many of these ordinances are found in the metropolitan areas of larger southern cities; such as, New Orleans or Atlanta to protect trees from cutting or bulldozing by developers (Cubbage 1989b). They are usually adopted to restrict indiscriminate cutting of trees and woodlots in rapidly developing areas. The remaining ordinances in this region were concerned primarily with protecting aesthetics associated with forests and special environmental areas. Restrictions are placed on harvesting and road construction in order to limit erosion, sedimentation and water quality degradation and

habitat loss associated with timber harvesting. Local regulations of this type were developed to limit timber harvesting in special resource areas such as wetlands, shorelines and scenic river corridors (Hickman and Martus 1991).

Interestingly, the protection of public property and safety was the most common regulatory objective of southern ordinances, yet these types of ordinances accounted for only one percent of ordinances identified in the Northeast (Hickman and Martus 1991). Northeastern counties, townships and municipalities appear to be much more likely to regulate forestry activities for environmental and aesthetic considerations as compared to their southern counterparts. Destruction of local roads and structures were the primary reasons cited by southerners for adopting local regulations. Problems associated with mud on roads, litter on logging sites, damage to private property and aesthetic considerations have also been cited as contributing factors (Cubbage 1988, Cubbage 1989, Cubbage and Raney 1987). Ninety-seven percent of the southern ordinances identified in the Hickman and Martus survey were enacted by county forms of governments, with only three percent of the local laws enacted by municipalities (Hickman and Martus 1991). This was expected due to importance of the county form of government in the South. The scope of local environmental regulation is not limited to forest activities.

Local governments in the South have begun to regulate a wide range of environmental activities. Florida's local Water Management Districts have, for example, have been empowered to regulate a wide variety of

land management activities in wetland and riparian areas (Cubbage 1989b). Although agricultural activities are exempt from the provisions of Florida's water management district regulations, the regulation shows a trend in which state governments have begun to delegate authority to restrict environmental activities to local governments and agencies. Virginia and Maryland's Chesapeake Bay Critical Area legislation is another example of states empowering local governments to protect natural features and environmental resources (Cubbage 1989b). Local governments have also begun to regulate a wide range of forest activities; for example, local governments in Georgia and Florida have implemented local laws to restrict the use of forestry herbicides (Siegel et. al. 1991). The South, which has traditionally trailed the rest of the country in enacting environmental legislation, now constitutes a major source of local forestry regulation (Cubbage 1989a, Hickman and Martus 1991, Cubbage and Siegel 1988).

Central Region

As compared to other regions of the country the central region contained the fewest number of local regulatory ordinances (Hickman and Martus 1991). As of January 1991, the Forest Service identified only ten ordinances in the entire region. The state with ordinances, and the number of ordinances in each are: Indiana, four; Michigan, five, and Minnesota, one.

Four ordinances adopted in this region were intended to protect forested systems from erosion and sedimentation, as well as, to protect

aesthetic and amenity values associated with forestry operations. These regulations usually require permits for tree removals and forestry operations; harvest plans, buffer requirements and the use of water pollution abatement techniques were all common regulatory provisions. Three of the local laws in this region were adopted to protect public roads, bridges and rights-of-way. These ordinances generally require notification of local officials, haul permits, and performance bonds to haul forest products on county roads, bridges and structures. Restricting the use of unimproved roads during periods of inclement weather is a common provision of these types of regulations. Two of the ordinances identified in this study were adopted to protect trees in urban and suburban settings. They were enacted to restrict tree harvesting and tree removal associated with development in suburban areas in Michigan. Common regulatory provisions include licenses, performance bonds and erosion and sedimentation control plans. One ordinance identified in the Forest Service study was adopted to protect special environmental features. The City of Southfield, Michigan requires a permit and a forest plan for forestry operations in wetland areas of the city (Hickman and Martus 1991). Counties and municipalities have been equally active in the central region in adopting local forest regulatory ordinances which account for half of the ordinances identified (Hickman and Martus 1991). By all accounts, the central region shows the least amount of local government regulation of forestry activities.

Western Region

California, Oregon and Washington have generally been the only western states in which local regulation of forestry practices has been seriously considered (Salazar 1985, Anonymous 1984d). Western states have been buffered to some extent from local forestry laws by comprehensive state forest practice legislation (Anonymous 1984c). Forest practice acts in western states have, however, limited local forest discretionary authority by different degrees. Washington, for example, explicitly prohibits local jurisdictions from restricting forestry operations, except those associated with the conversion of forestland for residential development (Anonymous 1984c), effectively eliminating local governments from the forest regulatory process. The local forest regulatory climate in the western region can best be described by examining the recent legislative history of local forest regulation in California and Oregon.

Local regulation of forest practices has existed in California throughout the 1950's (Arvola 1970). In 1957, however, the California Board of Forestry convinced the state legislature to amend the California Forest Practice Act to preempt local governments from regulating forestry operations. This preemption held until 1969, when San Mateo County denied Bayside Timber Company a permit for logging and road construction (Salazar 1985). Bayside timber appealed this decision arguing that the state forest practice act preempted the San Mateo county's authority. The state court upheld the county's permit system, arguing that the California Forest Practice Act unconstitutionally

delegated authority to individuals with a pecuniary (financial) interest in logging (Lundmark 1975). This decision ultimately culminated in the Z'berg-Nejedly Forest Practice Act in 1973. The Z'berg-Nejedly Forest Practice Act allows counties to adopt forest practice rules, which are more stringent than state requirements. California has currently approved special forest rules for five counties: Marin, Monterey, San Mateo, Santa Clara and Santa Cruz. In addition, Mendocino and Trinity counties were allowed to adopt herbicide restrictions (Salazar 1985).

In Oregon, forest practices are regulated by the state's forest practice act. Counties and municipalities are empowered to regulate forest practices within urban growth boundaries. This bill allows local governments to regulate or even prohibit forest practices in acknowledged urban growth boundaries or within the city limits of municipalities having populations of 100,000 or more. In addition, counties can prohibit forest practices on land where forestry and agricultural uses are not acknowledged land use goals (Senate Bill 125, State of Oregon 1991). Several municipal governments have implemented regulations to restrict forestry operations within urban growth boundaries. Since urban growth boundaries can represent zones of urban growth ten or more years in the future, local regulations can represent a potentially important source of forest regulation.

Special governments have also been active in regulating forestry activities in the West. The Tahoe Regional Planning Agency, a bi-state agency of California and Nevada, was created in 1970 to manage land use in the Tahoe region. The Tahoe Regional Planning Agency was authorized

to create forest regulation in the entire Lake Tahoe watershed; which includes, parts of Washoe and Douglas counties in Nevada and sections of El Dorado and Placer Counties in California (Tahoe Regional Planning Agency Code, Chapter 71, amended September 27, 1989).

Local regulations in the western United States have generally been created to regulate timber harvesting activities, so as to protect against degradations to water, air and aesthetic quality. In most cases, local forest practice laws have been created to augment state forest practice regulations. Cities, towns and counties have all attempted to expand the provisions of state forest laws in order to protect environmental features and amenities associated with forestland. Local governments have required specific regulatory provision which have included additional county permits and licenses to harvest timber. Restrictions on the hours in which forest operations can be conducted and when forest products can be transported have been implemented. In addition, requirements for more notice to adjacent landowners, performance bonds for log road construction and locally imposed weight limits for log trucks are all common provisions. In California, counties have also petitioned the state forestry board for controls on cutting in scenic areas and watersheds (Anonymous 1984c).

Characteristics of Local Forest Regulatory Ordinances

It is important to understand the factors which have aided in the proliferation of local forest ordinances and the arguments used for and against their adoption. Local forest ordinances have often resulted

from a lack of communication between local official and forest landowners and professionals (Goodfellow and Lea 1985). Landowners, loggers and foresters contend that many local laws are unreasonably burdensome and silviculturally unsound. Local laws, they argue, have been created without regard to the silvicultural and economic considerations of loggers or landowners (Hogan 1983, Goodfellow and Lea 1985). In many instances, however, local laws and regulations have been created to account for specific problems brought about by abusive logging practices and the careless use of local roads and structures (Cubbage and Raney 1987, Hill 1990a, Hill 1990b, Pollack 1978, Wolfgram 1984). To participate effectively in this debate, one must consider both points of view; this is accomplished by examining the advantages and disadvantages associated with local forest ordinances.

Pros and Cons of Local Regulatory Ordinances

Silviculturally sound and economically equitable local ordinances have several important attributes. First, they allow local governments to keep a complete record of logging activities within their boundaries, which aides in the short and long term management of forest resources (Provencher and Lassoie 1982). Second, local ordinances developed to foster sound forest management may recognize the value of harvesting for silvicultural purposes (Sheay 1985, Smith 1990). Forest ordinances which regulate forest activities are preferred to ones which prohibit them. Finally, local ordinances provide their citizens the opportunity to create environmental regulations specifically tailored for their own

needs. Local forest laws can be implemented in a flexible and innovative manner, which may be impossible for state-wide regulations. Local forest regulations do, however, have several important drawbacks.

To many loggers, foresters and landowners, local regulation represents one more layer of governmental "red tape" (Provencher and Lassoie 1982 and Sheay 1985). Several authors have suggested that local regulations can be unnecessary burdensome on landowners and loggers, by increasing the costs of preparation work and lead time associated with harvests and by reducing stumpage values (Provencher and Lassoie 1982, Smith 1990). Another problem associated with local regulations is that the task of developing and enforcing local laws is often delegated to individuals lacking any forestry expertise. In many cases, laws developed by inexperienced local officials have created burdensome restrictions, which have, failed to solve the problem (Smith 1990, Hogan 1983, Hogan 1984). A similar problem involves the enforcement of local forest laws, which is usually delegated to a local code enforcement official or the building inspector, who lacks the expertise to evaluate logging activities or to provide forest management advice (Sheay 1985). In many cases, local governments may not have the financial resources or the personnel to draft or implement an silviculturally sound forest law.

Finally, as more ordinances are adopted, loggers and landowners could be faced with a checkerboard of local forest laws. Loggers or truckers operating within a given geographic area would be forced to comply with a hodgepodge of laws, each with unique restrictions, permit

systems and locations in the laws books (Provencher and Lassoie 1982). A mosaic of local forest regulatory laws would not only be a regulatory nightmare for loggers, but it could also greatly reduce the economic value of timber resources in regulated areas. The question which has been asked by several authors is whether local regulation is the most effective method of controlling damage from logging activities (Cubbage and Siegel 1988, Provencher and Lassoie 1982).

State Preemptive Measures

The disruptive nature of a mosaic of local laws has prompted several states to limit local regulatory authority regarding forest and silvicultural activities (Siegel and Haines 1990). Massachusetts's 1982 Forest Practice Act and Georgia's 1988 Open Burning Law were enacted, at least in part, to stem a proliferation of diverse local regulations (Salazar and Cubbage 1990). New Hampshire's 1990 right to harvest law was also created to protect the right to utilize forest and agricultural products. This statute, patterned after similar agricultural laws, states: "...forestry activities including the harvest and transport of forest products, shall not be unreasonably limited by the use of municipal planning and zoning powers or by the unreasonable interpretation of such powers" (Anonymous 1990). Several authors have noted that the forestry community would generally prefer a state-wide forest practice law to a large number of diverse and highly restrictive local laws. State laws provide sustainability and tenure of regulation, by insuring more continuity and consistency in the interpretation and

enforcement of regulatory provisions (Arvola 1970, Cabbage and Siegel 1988, Provencher and Lassoie 1982). However, state legislation may be more easily influenced by forestry interests; in these cases, local laws may be a more useful means of achieving local objectives. Despite the emergence of state preemptive measures most researchers who have studied local forestry laws agree that local ordinances will continue to increase in number and importance in the future (Cabbage and Raney 1987, Cabbage and Siegel 1988, Harberger 1986, Hogan 1983, Salazar and Cabbage 1990, Youell 1985).

Proliferation of Local Forest Ordinances

Local regulation of forestry operations are, by most accounts, a relatively recent phenomenon, since the majority of local laws were not adopted until the late 1970's (Cabbage and Siegel 1988, Hogan 1983, Salazar 1985, Wolfgram 1984). In the last ten years, local regulation of forestry practices have become increasingly common in the northeastern United States, as well as, in the southern states of Georgia and Louisiana (Cabbage and Raney 1987, Cabbage and Siegel 1988).

In a survey of local ordinances in the eastern United States, conducted in 1990, it was discovered that seventy-two percent of the local laws had been passed within the last ten years, and forty-eight percent within the last five years (Hickman and Martus 1991). Surveys recently conducted in Georgia and Pennsylvania confirm that the rate of proliferation of local forest regulation continues to increase at an increasing rate (Greene and Jackson 1992). The primary reason given for

the increased prevalence of local forest laws is that many of the factors which contributed to past proliferations continue to exist (Hickman and Martus 1991).

Reasons for Proliferation

Local ordinances are becoming increasingly common in densely populated areas and in states experiencing rapid rural population growth. It has been hypothesized that one key factor in the proliferation of local forest regulatory ordinances has been the shift of urban population to rural forested areas (Cubbage and Raney 1989, Popovich 1984, Sheay 1988, Wolfgram 1984). The social conflict between resource orientated landowners and loggers and environmentally conscious individuals has been used to define many of the issues surrounding the current forest regulatory debate. Economic and biological circumstances have accentuated this conflict and acted to aid in the proliferation of local laws.

Reverse Migration. The last twenty years has witnessed a reversal of the traditional migration pattern, which was characterized by population movement from rural to metropolitan areas in the United States (Frankena 1984, Tucker 1976, Wilkie 1976). Geographic information provided by recent censuses indicate major realignment in the spatial distribution of the American population. Since the late 1960's, the growth rate of non-metropolitan areas has continued to rise and exceed metropolitan growth, even while the national growth rate has

decreased. The non-metropolitan growth, in recent years, has extended to areas far beyond the limits of traditional urban sprawl (Long and DeAre 1982). Between 1970 and 1980 non-metropolitan counties grew at an average rate of 13.4 percent, while counties with large quantities of wilderness grew at a rate of 31.4 percent; furthermore, much of this growth reflects migration of individuals from urban to more rural areas (Shands 1991). Interstate highways and computer and communication technology have enabled many urban residents, fearing drugs, crime and pollution, to escape the congestion of urban and suburban areas for more rural settings (Graber 1974, Shannon 1991, Shands 1991).

Ex-urbanites who move to more rural areas are generally unfamiliar with agricultural land management practices and have fewer economic and social ties to the resource value of the land (Hogan 1984). As a result, these individuals often initiate regulation to protect suburban/rural fringe areas from damage that could result from forestry and agricultural activities (Cubbage 1985). Former urbanites generally relocate to rural settings to achieve a certain lifestyle, which includes aesthetics and high amenity and recreational values (Blahna 1990, Price and Clay 1980, Graber 1974). They will quickly seek a regulatory answer when they feel this lifestyle is jeopardized by unregulated forestry and silvicultural practices (Cubbage 1985, Hickman and Martus 1990, Hogan 1983).

It is important to remember that most urbanites move to rural areas to improve their quality of life not out of economic necessity. The newcomers bring environmental values, lifestyles and attitudes which

can greatly differ from those of long-time rural residents. New-comers generally do not purchase forestland for financial reasons, they often seek physically pleasing, pristine surroundings. Restrictions on forestry activities are a way of maintaining these aesthetic values (Ploch 1978). The infusion of environmental attitudes into local government has also been cited as an important factor contributing to the proliferation of local forest laws.

The idea that people socialized in urban areas view the regulation and use of environmental resources differently than rural individuals has received considerable support (Lowe and Pinhey 1982, Tremblay and Dunlap 1978, Van Liere and Dunlap 1980). Studies on this subject have generally found that rural individuals are less inclined to support regulatory solutions for natural resource use problems. Rural occupations are often environmentally intensive, involving the direct use of natural resources. The land ethic of the rural individual is much more utilitarian than that of an urban individual. Rural residents generally believe that natural resources should be used as well as appreciated. (Van Liere and Dunlap 1980).

It has also been suggested that since urban residents are constantly exposed to pollution by the media and their surroundings, they are much more sensitive to environmental degradation (Tremblay and Dunlap 1978). This sensitivity has been cited as a reason for higher levels of environmental concern among urban dwellers. Individuals socialized in urban areas have also been found to much more likely to seek formal legislative remedies to environmental problems than rural

residents. Urban residents, accustomed to extensive government, are more likely to recognize the role of legislation in correcting perceived environmental conditions. This differences in attitudes and beliefs form the foundation of the urban-rural conflict.

Social Conflict. The social conflict between newcomers and old-timers has frequently been used to describe the current environmental debate in the United States. The core of this conflict is outlined by the following quote from Vaux:

"...most of the new people coming into the more rural areas are ex-urbanites-people whose basic value schemes and perceptions about forestry were formed under urban conditions. This accounts in considerably measure for the fact that political conflict over forestland is moving more and more into local areas. (Vaux 1982)"

An obvious outcome of localizing environmental problems could be a proliferation of local forest practice regulations. For this reason, understanding the factors which contribute to the spread of local forest laws will undoubtedly provide insights into the forest land-use controversy.

The impact of urban migration into rural areas, reverse migration, and the resulting social conflicts have been the subject of several important studies (Blahna 1990, Ploch 1978, Price and Clay 1980, and Graber 1974). New-comers often act as catalysts for change by imparting their needs and ideas into rural communities (Blahna 1990). These individuals generally oppose community expansion and resource development in order to protect the environmental conditions which attracted them in the first place (Graber 1974). This behavior is

referred to as last settler or gangplank syndrome (Wellman and Marans 1982). Many long-term residents, who view expansion and resource development as a traditional avenue of economic growth, will value the benefits of development differently. Not only do ex-urbanites tend to support preservation, they are also likely to instigate regulations to restrict resource development (Blahna 1990, Price and Clay 1980). Hogan reflects this idea in the following quote: "the first time a quiet is shattered by a skidder, these politically active new-comers demand protection" (Hogan 1983).

In many instances, the infusion of new ideals and attitudes can have a positive impact on a rural community. The knowledge and expertise of urban migrants may enable rural residents to achieve previously unattainable political or social objectives. Urban migrants may have experience and political exposure which makes them better able to create regulatory solutions for natural resource problems. These characteristics may also aid in new-comers obtaining positions of local leadership (Shannon 1991). New-comers familiar with sophisticated media and communication techniques can be effective in mobilizing citizens in opposition to logging and forestry operations. New-comers accustomed to working within political systems and complex bureaucracies may also be more inclined to support formal, legal solutions to environmental problems (Lee 1991). This idea is reflected in the following comment from Shannon:

"urban migrants tended to participate at the same rate as rural residents, but their membership was more provisional and formal, and they were more likely to hold leadership positions (Shannon

1991)."

Community Mobilization. The sensitization of a community to an precipitating event, which motivates them to collective action, is known as community or resource mobilization (Bridgeland and Sofranko, McCarthy and Zald 1977). Community mobilization, as cited in most of the literature, has generally taken the form of local clean-up or recycling campaigns, the creation of local environmental lobbies, in the form of local environmental protests or in other displays of environmental activism (Bridgeland and Sofranko, Fortmann 1988). For the purposes of this analysis, it is assumed that the adoption of local environmental legislation constitutes community mobilization.

Studies conducted on community mobilization in response to environmental events show that certain communities mobilize more quickly and more efficiently because of specific socio-demographic, organizational and cultural characteristics of the resident population. Increased levels of concern for environmental issues and increased environmental activism can be related to certain demographic and social factors (Bridgeland and Sofranko 1975, Fortmann 1988, Lowe et. al. 1980, Van Liere and Dunlap 1980). Demographic factors, therefore, could provide useful information on a communities' level of support for environmental issues, and consequently for the adoption of local environmental laws. The demographic and social factors associated with increased environmental activism and community mobilization, in these studies, will now be examined.

An important factor associated with high levels of environmental community mobilization and environmental activism appears to be affluence. Membership in environmental organizations has been found to be positively associated with higher socio-economic status (Morrison and Dunlap 1986). In addition, political participation has also been found to be associated with higher socio-economic classes (Roger et. al. 1975). Higher economic classes would appear to have the time and resources to pursue environmental causes. The degree of urbanization, proximity to urban areas, was also found to be associated with higher levels of mobilization and environmental activism. Urban individuals are more likely to support environmental causes, as compared to rural residents (Lowe and Pinhey 1982, Tremblay and Dunlap 1978, Van Liere and Dunlap 1980). Urbanization has also been found to aid mobilization and organization by providing access to government and to media (Fortmann 1988). Finally, age composition was also found to be an important factor in determining environmental community mobilization (Lowe et al. 1980, Van Liere and Dunlap 1980). Although they are generally the least affluent segment of the population, young individuals have been found to be much more receptive to environmental arguments and more active in environmental activities than older individuals. The primary reason for this appears to be that younger individuals have been socialized into a much more environmentally conscious society as compared to previous generations (Van Liere and Dulap 1980). In addition, communities with large proportions of children appear to be more environmentally conscious. Children seem to have a resocializing effect on their

parents with regards to environmental issues (Bridgeland and Sofranko 1975). Other important factors associated with higher levels of community mobilization over environmental issues appear to be positive population changes, ethnic composition and the presence of a serious environmental incident (Bridgeland and Sofranko 1975, Van Liere and Dunlap 1980). The migration of previously urban individuals into rural areas should influence the manner in which communities mobilize to account for environmental problems. The infusion of environmental attitudes into these areas may also result in increased regulatory action. As these individuals become more influential in local political systems, new laws will be drafted and old laws will be more rigorously enforced (Cubbage and Raney 1987). Social factors have undoubtedly contributed to the proliferation of local forest practice laws.

Contributing Factors. The maturation of previously un-managed woodlots, strong markets for forest products, such as firewood in some regions, have also contributed to the growth of local forest practice regulation (Harberger 1986, Hogan 1983, and Youell 1985). These conditions have exposed a large section of the American public to forestry activities for the first time. Individuals, already sensitized to environmental issues, instigate local laws to curtail unfamiliar land use practices, such as logging. Another factor which contributed to the proliferation of local forest laws was the Reagan administration's "new federalism" policy, which has allowed local governments to legislate in areas previously controlled by state and federal governments (Gold 1983,

Hogan 1983). Many recent local laws have been established to comply with state programs established to protect environmental quality in scenic areas and preservation zones. Connecticut's Housatonic River Corridor, Maryland and Virginia's Chesapeake Bay Critical Area and New Jersey's Pineland Area are all protected by local governments under state direction (Hickman and Martus 1991). Florida's Water Management Districts and California and Nevada's Tahoe Regional Planning Agency represent a additional layer of special government which have been created to protect environmental quality (Cubbage 1989, Arvola 1970). State and federal fiscal cutbacks, recessionary pressures on local highway budgets and changes in forest trucking may have also contributed to the proliferation of local forest regulatory ordinances.

Costs and Benefits of Local Forest Laws

The effects of local forest ordinances have received little formal analysis. Most, if not all, of the information on this subject is anecdotal in nature, providing little empirical insight into the costs and benefits of local forest laws. By all accounts, the cost of local regulation to loggers and landowners can be significant, and in some cases, extremely costly and burdensome to comply with (Salazar 1985, Anonymous 1990). Similarly, the cost of improperly conducted forestry activities can also represent significant costs to society (Hill 1990 a, Wolfgram 1984). The full extent of the costs and benefits of local laws for loggers, landowners, government and society are impossible to determine from the literature.

Several noteworthy studies have determined the cost of compliance with federal environmental legislation and state forest practice regulation. Unfortunately, these studies have very little applicability in determining the cost of compliance with local forest ordinances. First, state regulations are, for the most part, consistent and uniform within geographic regions; where as, local forest regulation implies a large number of dissimilar forest laws. Local laws differ greatly in their regulatory provisions and objectives, as well as, in their tenure. In addition, the level of enforcement, the amount of money required for sureties and bonds, and license fees vary considerably. Finally, the prospect of learning the nuances of dozens of local laws within an operating area imposes costs on loggers and landowners which would not be realized under state regulation. This idea is reflected in the following quote from Youell: "... all are costly in terms of time and money. As one logger put it, 'You have to have a lawyer in your back pocket' just to keep track of them all (Youell 1984)." For these reasons, it is difficult, if not impossible, to translate cost information obtained in state-wide analysis to local regulatory ordinances.

The most common sources of costs associated with local forest harvest laws are those associated with increased paperwork and red tape. The cost of obtaining permits and licenses for hauling and harvesting activities represent a significant regulatory cost. In addition, the lead time and waiting periods, required for some local laws, also represent an important cost. Ordinances containing provisions for

lengthy permit approval periods or large and in depth harvest plans undoubtedly carry costs to loggers and landowners; furthermore, the costs of obtaining licenses, permits, road bonds and sureties also can represent major expenditures. Finally, the expense of complying with specific regulatory provisions can also represent huge financial outlays (Goodfellow and Lea 1985, Harberger 1986, Perschel 1984, Provencher and Lassoie 1982, Sheay 1985, Smith 1991, Youell 1984). Regulatory provisions prohibiting the use of specific types of equipment or harvest methods, for example, can have significant costs to timber harvesters.

Several authors have suggested that the impact of local timber harvesting ordinances will not be borne by the logger but by the landowner in reduced stumpage prices. Higher operating cost to loggers, it is argued, will eventually translate into lower stumpage prices paid to landowners (Anonymous 1990, Hogan 1984, Goodfellow and Lea 1985, Provencher and Lassoie 1982, Smith 1990). This argument assumes certain elasticity conditions. For the landowner to bear the entire burden, stumpage supply must be perfectly inelastic or timber demand must be perfectly elastic in regulated areas.

A community may realize unwanted costs if it does not regulate forestry activities. Improperly conducted forestry operation can result in environmental degradation and the destruction of public property which undoubtedly imposes a burden on society (Brinson 1990, Cabbage 1989, Hill 1990b, Pollack 1987, Wolfgram 1984). The cost to society from these activities can be viewed as an externality, since society's costs are not fully recognized in the market (Pearce and Turner 1990).

It benefits society, therefore, to bring the cost of conducting forestry operations in line with the cost these operations impose on society. Regulation should act to allocate costs as would a well functioning market; in other words, local forest regulation should transfer society's cost to loggers and forest landowners. The cost of local forest laws to loggers and landowners must be examined in the context of the benefits these laws cause to accrue to society. The process of transferring cost is confounded, however, by the problem of determining the full extent of the costs and benefits associated with local forest regulation.

Economic issues are important considerations when evaluating the impact of local forest regulation. Benefits and costs are accrued by individuals, governments and by society when local forest laws are enacted. The question posed by several authors, however, is whether local regulation of forestry activities is the most cost effective and equitable means of limiting damage perceived to local environmental resources and property (Sheay 1985, Smith 1990).

Summary

Environmental quality issues have received unprecedented levels of attention from the American public in the last twenty years. This concern for the natural environment has translated into increased regulatory action by all levels of government. One important regulatory development has been the rapid growth of local forest practice ordinances. The social and economic attributes of local forest

regulation reflect many of the factors surrounding the current, national forest policy debate in the United States.

Hundreds of local laws have been enacted in the last ten years, creating a mosaic of individual forest regulatory laws. The regulatory provisions of these laws vary dramatically. Some forest ordinances simply require governmental notification, while others severely restrict or even prohibit silvicultural activities. An analysis of this subject reveals an obvious need for a more comprehensive examination of the scope and extent of local forest regulatory ordinances. This subject requires a extensive tally of local ordinances and study of the important regulatory provisions of these laws and significant regional differences. In addition, information on the economic and social factors associated with local forest laws would be invaluable to forest resource mangers, landowners and local governments. A firm understanding of the social factors which precipitate regulation and the consequences of these laws are essential to effective local forest policy. A holistic approach is required to determine the causes, the consequences and the extent of local forest regulatory ordinances.

Chapter 3. Methods and Procedures

Local forest regulatory issues are becoming an increasingly important area of public forest policy. A heightened sense of environmental issues by the American public in recent years has had a profound effect on forest and silvicultural activities in the United States. In many ways, local forest regulation reflects the social issues which define many current environmental conflicts. A comprehensive treatment of local forest regulatory issues is essential for understanding this important facet of public forest policy. The objective of this study is to outline the scope and impact of local forest ordinances in the United States.

The Hickman and Martus (1991) survey information represents the foundation of this study. The number of local forest ordinances identified in the Hickman and Martus survey will be greatly expanded in this study. In addition, analysis of the objectives and growth of local forest law, contained in the earlier study, will be augmented. This analysis will include several new areas of study, including examination of regulatory provisions, demographic factors and costs and benefits associated with local forest laws.

This study is separated into six sections: (1) a survey of local forest laws in the United States; (2) an analysis of the pervasiveness of local regulation; (3) an investigation of the legislative history of local ordinances; (4) a study of important regulatory provisions of these laws; (5) an examination of demographic and resource factors

related to regulation; and (6) an analysis of the impacts of local forest laws. The procedures described in this chapter represent a comprehensive treatment of the local forest regulatory issue. This study should also serve as a source of information for future work on this subject.

Survey of Local Forest Practice Ordinances

The principle units of information used in this study were individual local forest ordinances. A comprehensive tally of local forest laws in the United States was, therefore, an important objective of the study. Information on the extent of local forestry practice laws and copies of regulatory articles were collected primarily through mail and telephone inquiries. Authors who had written on this subject, state forestry agencies, state forestry associations, extension foresters, university faculty, loggers, industrial and consulting foresters, local governments and local governmental associations were the primary sources used to compile information. Sources were contacted in all fifty states. Initial inquiries were generally conducted by telephone. The diverse nature of local laws in the United States required a flexible method for identifying and collecting information. Telephone inquiries provided this flexibility. This method of inquiry facilitated the targeting of questions and provided rapid feedback, which was essential for comprehending the nuances of local forest law across the country.

Sources were asked to provide the names of all local governments, and whenever possible copies of forest practice laws. Local governments

were defined as any unit of government below the state level; which includes, counties, townships, cities, villages, towns and boroughs. Laws which regulate forestry practices were described as any ordinance, zoning law or tree protection enactment which has been or could be used to restrict logging and silvicultural practices or the hauling of forest products. These laws include articles which do not explicitly restrict forestry operations such as land disturbance ordinances or strictly interpreted zoning codes. Contacts were also asked to provide the names, addresses and phone numbers of additional sources of information on this subject. This process was continued until all leads and sources were exhausted.

In most cases, contacts were only able to provide the names of local governments. These governments were then contacted either by mail or telephone to obtain a copy of the ordinance. The following information was tabulated for all ordinances collected: the name of the governing body; the legislative citation and date of adoption; the purpose and intent of the ordinance; important regulatory provisions; and the enforcement agents or agencies. Whenever possible, information was also obtained on how rigorously the ordinances were enforced by local officials.

The branching or boundary spanning approach employed in this section was used, primarily, because of the multiplicity of governmental units in the United States. Although a 100 percent tally of local governments may have provided a greater degree of reproducibility, the prospect of surveying 83,000 governmental units was not a viable

alternative. In addition, boundary spanning provided several important informational benefits over a complete tally. First, it yielded insights and attitudes of forest professionals which would not be available through generic surveys of local governments. Foresters and loggers were, in many cases, more aware of the presence of local ordinances than were local officials. Although it was not scientifically sophisticated or elegant, the sampling method used in this study provided the most efficient means of obtaining an exhaustive count of local forestry laws in the United States.

Regional Differences

The data collected from the tally of local ordinances was used to analyze regional differences in the extent and in the regulatory objectives of ordinances as well as the types of governments which have enacted them. The scope, extent and purpose of local forest regulatory laws differ dramatically between regions of the country. It was the purpose of this section to outline these differences. The number of local governments with local forest laws and the number of laws identified by state and by region were examined. The country was divided into the four regions outlined in Chapter Two. Regional and state totals as a percentage of the national count were provided. Regional analyses examined differences in the objectives of local forest regulatory laws. All ordinances tallied were classified into one of the five categories based on their regulatory objective. In many cases, a single ordinance had several objectives; nevertheless, each ordinance

was placed into the category that most nearly described its objective. The categories are: public property and safety ordinances; tree preservation ordinances; timber harvesting ordinances; environmental protection ordinances; and special feature and habitat protection ordinances. The total number and the percentage of ordinances in each category were calculated for each state and region.

The types of governments which enacted local laws were also examined. Governments which regulate forest practices were placed into one of five categories: counties; municipalities; townships; unincorporated towns, villages and boroughs; and special governments. The number of local ordinances enacted by each governmental classification and the percentage of the total number of ordinances was determined for each state and region.

Legislative History

In this section, the legislative history of local forest regulatory laws was investigated. We examined the rate of proliferation of local laws and important evolutionary trends, which characterized their growth. The number of laws enacted annually by each state and region was analyzed. National trends relating to the growth of local forest practice ordinances, as well as factors which contributed to their proliferation, were studied. Social, political and financial characteristics of communities which contributed to the enactment and growth of local forest law were also examined.

Evolutionary changes in the purpose and intent of forest

ordinances were also examined. The number of ordinances enacted in each region per year were separated into the five regulatory objective categories outlined in the previous section. The number of laws enacted annually in each category was examined to identify evolutionary trends in the scope and purpose of forest ordinances over time. The purpose of this section was to provide a sense of the rate of growth of forest ordinances and to outline developmental changes in the objectives of these laws.

Regulatory Provisions

The fourth section of this study involved an examination of the regulatory provisions of forest ordinances. Analysis of the requirements of local laws was conducted primarily to provide a sense of the pervasiveness of certain "common" provisions and to show which of these provisions were contained in ordinances collected in this study. This section also outlined some of the more unique, and in some cases, the peculiar provisions of local regulatory ordinances. The objective of this section was to describe the scope of regulations and restrictions contained in forest practice and hauling laws sampled in this study.

The initial analysis for this section identified many of the "common" regulatory requirements within each geographic region. Ten to twelve of the most prevalent regulatory provisions identified in each region were assembled for this purpose. Provisions which were identified in at least ten percent of the ordinances found within a

region were considered "common". This rule was somewhat arbitrary. It did, however, create a sample of frequently implemented requirements, which was useful in gauging the regional severity of local forest law.

A tabular form was constructed to show which of these provisions were contained in each of the ordinances identified in this study. In some cases, provisions were generalized to aid the analysis; for example, articles requiring permit fees or performance bonds were identified without specific fee or bond schedules. Whenever possible, provisions were cited verbatim; therefore, any ambiguity surrounding these requirements is indicative of the vague and obscure language of many local forest laws. Unique or peculiar requirements were also examined in this section.

Analysis of Demographic and Resource Factors

Examination of the demographic and resource factors associated with the proliferation of local forest laws constituted the fifth section of this study. The objectives of this section were to determine the relationship between localities which regulate forestry activities and the presence of certain socio-economic, resource and population factors using discriminant analysis techniques (Kachigan 1982, Klecka 1980). Discriminant analysis is a statistical procedure for identifying a relationship between qualitative dependant variables and quantitative independent variables. Discriminant analysis involves deriving a linear combination of the independent variables that will best discriminate between several previously defined groups of dependant variables. This

is accomplished by maximizing the between group variance relative to the within group variance. This results in a discriminant function, which is functionally equivalent to a regression equation. The significance of the discriminant function is found by comparing the distribution of the values it produces. If the overlap of these values is small, the discriminant function separates the groups well and it is significant. If the overlap is large, however, the function is a poor discriminator (Hair et al. 1987, Kachigan 1982).

The dependant variable in this analysis was the dichotomy of counties with forest regulatory laws or those counties without them. Counties with forest laws included county forms of government which had enacted local laws or counties which contained townships and municipalities which regulated these activities. The county was chosen as the basic unit of analysis due primarily to the lack of demographic and forest inventory information on the township and municipal level. The techniques used in this study were intended to show the degree of association between the presence of forest ordinances and certain demographic and forest resource characteristics of the counties in question. Cause and effect relationships were not analyzed in this study.

Examination of demographic and resource factors associated with the presence of local forest practice laws was studied in Louisiana, Georgia, Pennsylvania, New York, New Jersey, and Connecticut. These states contained large numbers of laws, providing a larger degree of statistical reliability. States in which the majority of local laws

were enacted in response to state statutes were not included; in these cases, local enactments are not independent. Predictive factors, therefore, would not be expected to be associated with the expansion of local laws. The small number of ordinances in the western and central states eliminated them from this analysis. Louisiana and Georgia were analyzed individually. The contiguous states of Pennsylvania, New York, New Jersey, Connecticut were analyzed as a group. The primary rationale for this was to capture the influence of major regional population centers, such as New York City, and to account for inter state population shifts and variations in regional forest stocks.

The analysis was conducted to determine the relationship between the presence or absence of forest regulations and five demographic and resource variables. The independent variables were factors, cited by authors and by sources contacted in conjunction with this study. The independent variables used in this analysis were: the degree of urbanization; the per capita income in each county; the percentage of forested area; population; and the rate of population growth. Urbanization was the population of the largest city within fifty miles of the geographic center of the county in question. Fifty miles was determined to be maximum extent of socio-demographic influence exerted by metropolitan areas on counties. Population figures were defined as the number of individuals per square mile. Population growth statistics represented the gain or loss in county population experienced since 1970. Urban population figures, county per capita income, population and population growth were determined using current Bureau of Census,

city and county population data (Department of Commerce 1988). County forest statistics for timberland were determined using U.S.D.A. Forest Service and state forest statistics. Positive relationships were assumed between the presence of local forest laws and all of the explanatory variables examined in this study.

Graphic analysis were initially used to show the relationship between the presence of local laws and each of the five independent variables. Analysis of the existence of local forest regulations and the five variables were conducted to identify important spatial relationships. Point-biserial correlation techniques were used to examine bivariate relationships. Separate analyses were conducted in Georgia, Louisiana and in the New York, Connecticut, New Jersey and Pennsylvania grouping. The five independent variables of county per capita income, population density, population growth, forested acreage, and urbanization were mapped along with the location of counties and municipalities which regulate forestry activities. The purpose of this was to study the geographic distribution of ordinances and these explanatory factors. Discriminant analysis techniques were employed to explore multivariate relationships between local laws and the five independent variables. Stepwise discriminant analysis was conducted to assess the relationship between all combinations of the dependant and independent variables. F-statistic values were used to determine the discriminatory power of each relationship and to isolate the explanatory variables which most fully explain the relationships examined. Correlation coefficients and t-statistics were calculated for bivariate

analyses. All information was fully analyzed and interpreted.

Analysis of the Costs of Local Forest Regulatory Ordinances

The final section of this study was conducted to determine how the costs and burdens imposed by local forest practice regulations were perceived by timber harvesters and consulting foresters. A survey was distributed to a sample of timber harvesters and consultants asking them to rank certain, common regulatory provisions on a scale of costliness. Participants were also asked to isolate where they believed the impact of regulation was most apparent. Comments reflecting the attitudes of forest professionals toward local forest laws were collected. Finally, the study also attempted to identify who benefitted from the ordinances identified and to what extent the ordinances accomplished their intended purpose.

Three northern and three southern states were chosen for this analysis: Connecticut, New York, Pennsylvania and Georgia, Louisiana, and Virginia. These states contained a large number of ordinances and were generally representative of other states within their region. States which had extensive state-wide forest practice laws were omitted from this analysis to avoid the problem of requiring participants to separate the provisions and impacts of state and local forest laws.

Participants were chosen on the basis of the ZIP code of their business address. The ZIP codes of all local governments having laws surveyed in this study were collected to create a list of postal delivery zones in which forest practices were restricted. Codes for

governmental offices were determined primarily from the return addresses obtained after requesting copies of regulatory articles. ZIP codes of counties and municipalities with multiple delivery zones were determined using the U.S. Postal Service's National Five-Digit Directory (National Address Information Center 1992). ZIP code information was matched to the addresses listed for "timber harvesters" in the Directory of the Forest Products Industry (DFPI 1990) to create a list of loggers and pulpwood contractors who may have been familiar with forest practice and hauling ordinances. All timber harvest professionals with business ZIP codes matching those of regulated localities were included in the sample. A sample of forest consultants was similarly constructed using lists obtained from state departments of forestry and natural resources (Eastern Connecticut Landowners Association 1991, Pennsylvania Department of Environmental Resources 1991, New York State Department of Conservation 1990, Georgia Forestry Commission 1990, Virginia Department of Forestry 1991).

Surveys were distributed to 254 timber harvesters and 188 forest consultants in the southeastern states and to 191 timber harvesters and 115 consultants in the northeastern United States. The number of surveys distributed to loggers and pulpwood operators in each state was: Virginia, eighty-four; Georgia, eighty-seven; Louisiana, eighty-three; Pennsylvania, sixty-four; New York, ninety-seven; Connecticut, thirty. The number of surveys distributed to consultants by states was: Georgia, eighty; Virginia, sixty; Louisiana, forty-eight; Pennsylvania, sixty-seven; New York, thirty-three; and Connecticut, fifteen.

Separate survey instruments were developed for the northern and southern regions. Both surveys contained four sections, the first was the only part which differed between regions. This section contained a list of the most common regulatory requirements identified in the local laws of both regions. The provisions used for these sections were the requirements outlined in the fourth section of this chapter. In some instances, provisions were made more specific to expand their level of usefulness for the survey. Participants were asked to rank these provisions on how costly or burdensome they have been or would be to comply with or implement. Participants were provided an ordinal scale consisting of: (1) extremely difficult or costly to implement; (2) difficult or costly to implement; (3) moderately difficult or costly to implement; and (4) easily implemented at little cost. A no comment category was also provided.

The second section of the survey asked participants to identify all provisions described in the first section which they had actually encountered in conducting business. Participants were simply asked to place a check mark next to all provisions which they had experienced.

The third section of the survey asked participants to identify any state wide regulation laws which they have had to comply with. This section also solicited comments on their attitudes toward forest and environmental regulations. This section provided participants an opportunity to voice their own comments on state and local forest regulatory issues.

The fourth and final section of the survey asked participants to

rank on a ordinal scale where the impact of state and local forest laws is most obviously felt. The categories provided were: the cost of extra paper work; the cost of waiting periods and non-productive time; the cost of lower yields and higher operating costs per unit of timber harvested; and the direct costs of plan preparation, sureties, fees, licenses and insurance. Participants were asked to rank each of these on a scale of one to four, where one represented the least apparent category and four represented the most apparent category.

The methodology of the mail survey used in this study was based on the principles by D.A. Dillman (Dillman 1978). An initial mailing was sent to each participant, containing a form cover letter and either a southern or a northern survey form. Participants residing in Connecticut, New York and Pennsylvania received northern survey forms, while subjects in Georgia, Louisiana and Virginia received the southern version. One week after the initial mailing, a postcard was mailed to each participant reminding them of the survey and asking them to complete it if they had not yet done so. The final mailing was distributed three weeks after the post card was sent. This mailing consisted of a more adamant cover letter and an additional survey form. The second cover letter informed non-respondents that their questionnaire had not been received and it appealed for the return of the second survey. Copies of the northern and southern survey forms, the post card and both cover letters are included in Appendix A.

The information contained in sections one, two, and four were tabulated and analyzed. Tallies of individual responses in the first

section for each rank category were calculated for each question. Individual tallies were conducted for northern and southern timber harvesters/pulpwood operators and northern and southern forest consultants. Chi-square tests were conducted to evaluate the frequency of rankings for each the provisions.

The Chi-square (χ^2), goodness of fit, test is a statistical test based on the Chi-square distribution. This test is used to determine if the counts obtained in a study differ from an expected outcome. The Chi-square formula is:

$$\chi^2 = \sum \frac{(\text{observed value} - \text{expected value})^2}{\text{expected value}}$$

The Chi-squared distribution allows us to determine the probability of obtaining an outcome as compared to an expected value. Observed values with low probabilities will differ significantly from the expected value. In other words, observed values differs from expected values by more than would be predicted by chance (Howell 1987).

Chi-square tests were conducted on the sum of responses in the first and second categories against the sum of responses in the third and fourth categories for each provision cited in the first section. Ranking categories were combined to create a dichotomy between costless or costly regulatory requirements. The extremely difficult or costly to implement category was combined with the difficult or costly category to form the first ranking. Similarly, the moderately difficult or costly to implement category and the easily implemented at little cost category constituted the second grouping. Chi-square tests were used to judge

differences in responses to these two categories.

Tallies of the number of respondents who had actually encountered these provisions were also compiled. These quantities, as a percentage of the total number of responses for each question, were calculated. The total number of respondents choosing each question/rank combination in the fourth section of the survey was also collected. Separate tallies were made for northern and southern loggers and consultants. Chi-square tests were conducted to determine differences among ranks within a question as well as differences between questions within a given ranking category. All survey results collected in the survey, including statistical tests, were interpreted. Differences in survey results obtained from the northern and southern surveys and between timber harvesters/haulers and consultants were also analyzed.

A survey was also distributed to each of the local governments which were found to have a forest ordinance. Separate survey instruments were developed for governments which regulated forestry and silvicultural activities as well as those which restrict the hauling of logs and pulpwood on local roads and structures. The objectives of this survey were limited. The primary purpose of the survey was to give local officials an opportunity to voice their attitudes toward their local forest law. Respondents were asked to provide the number of logging or hauling permits which have been approved and denied since their law was adopted. They were also asked to comment on how effective their law has been in meeting its desired objectives. A single mailing of a cover letter, single-page survey and a self-addressed envelope was

made to each government. The legislative citation of the local law or laws in question were cited on the cover letter to provide a point of reference. The cover letter and both survey forms are included in Appendix A.

The final segment of this study involved relating some of the insights of the costs and impacts of local forest regulatory ordinances obtained from sources and survey participants. The purpose of this section was to provide insight into the attitudes of forest professionals toward local forest practice laws and to recount antidotes relating to the enforcement, impact and usefulness of local forest regulatory laws. This section documents many of the notable comments and important insights accumulated in this study. It is the purpose of this section to define what is considered costly by timber harvesters and forest consultants and how their attitudes differ. It is important to consider who will benefit and who will eventually bear the cost of increased regulation of logging, silviculture and log hauling in the United States.

Chapter 4. Growth and Distribution of Local Forest Ordinances

The count of local forest practice laws outlined in this section represents the foundation of this study. The distribution and growth of these laws provide useful insights into significance forest ordinances to public forest policy. The proliferation of forest laws and their geographic allocation will be fully examined. The purpose of this chapter is to provide an overview of the scope and extent of local forest regulatory ordinances in the United States. Although the tally of local laws presented in this section is not comprehensive, it does represent the most extensive count of local forest laws taken to date. This tally will be used in all subsequent analyses in this study.

Tally

The tally of local forest laws identified 522 individual forest ordinances in 493 independent governmental bodies, in twenty-four states. The total number of forest ordinances identified by state and region are shown in Figure 4.1. Forest laws were defined as any ordinance, zoning law or tree protection article which has been or could be used to restrict logging, silvicultural activities or the hauling of forest practices. Local government refers to any level of government below the state level. Counties, townships, municipalities and some special governments are defined as local forms of government.

Twenty-nine local governments in eight states were found to have

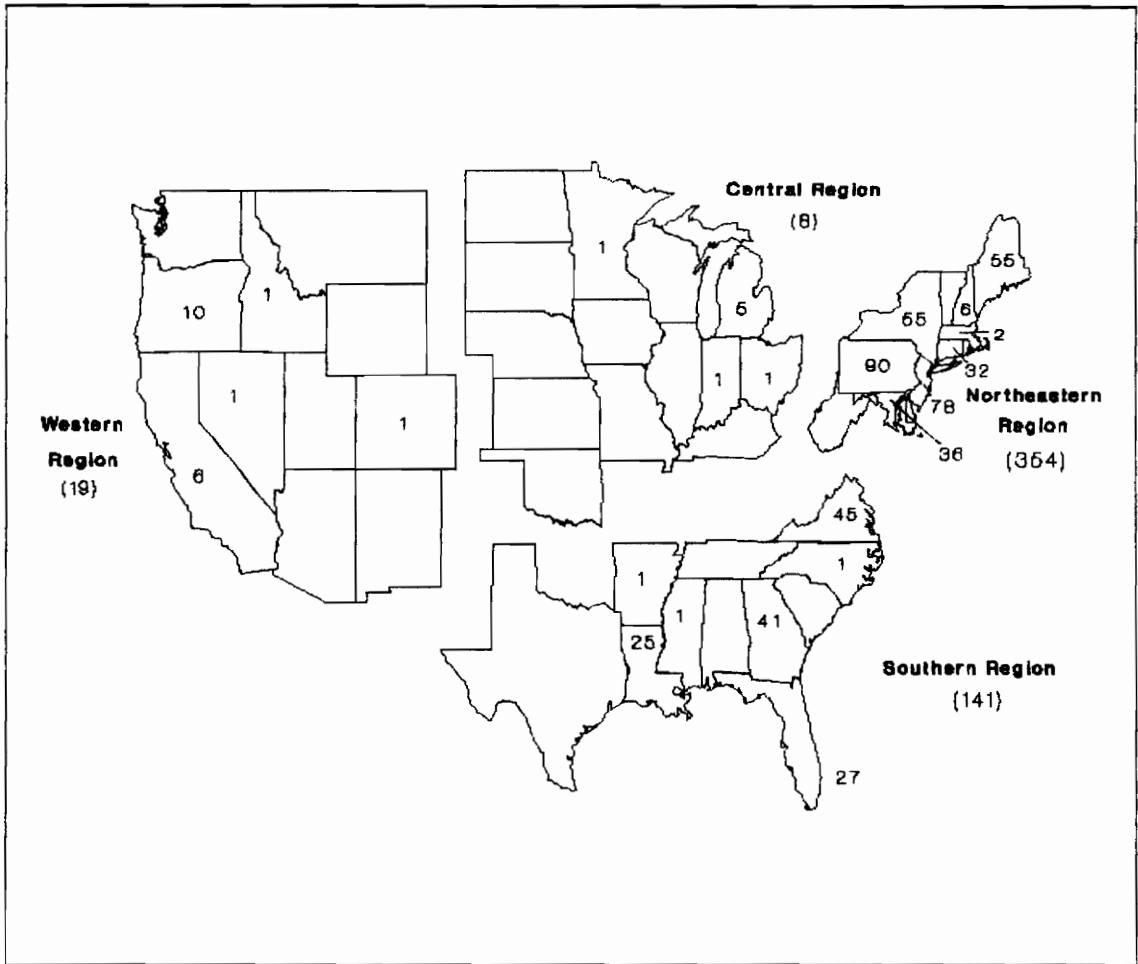


Figure 4.1 Numbers of forest ordinances by state and region

more than one forest law. No government, identified in this study, was found to have more than two forest ordinances. Twenty-one local governments in the Northeast, six governments in the southern region and one in the western region were found to have multiple forest ordinances. (All references to geographic area throughout this study will refer to the regions delineated in Figure 2.1 and 4.1) The total number of individual local governments which regulate forest activities by state

is shown in Table 4.1.

Table 4.1 Number of governments with forest laws identified by state

Alabama	0	Montana	0
Alaska	0	Nebraska	0
Arizona	0	Nevada	1
Arkansas	1	New Hampshire	5
California	6	New Jersey	78
Colorado	1	New Mexico	0
Connecticut	29	New York	53
Delaware	0	North Carolina	1
Florida	25	North Dakota	0
Georgia	41	Ohio	1
Hawaii	0	Oklahoma	0
Idaho	1	Oregon	9
Illinois	0	Pennsylvania	87
Indiana	1	Rhode Island	0
Iowa	0	South Carolina	0
Kansas	0	South Dakota	0
Kentucky	0	Tennessee	0
Louisiana	22	Texas	0
Maine	55	Utah	0
Maryland	23	Vermont	0
Massachusetts	2	Virginia	44
Michigan	5	Washington	0
Minnesota	1	West Virginia	0
Mississippi	1	Wisconsin	0
Missouri	0	Wyoming	0

The largest number of forest laws was identified in the northeastern region, which contained sixty-eight percent of all ordinances. The southern region contributed twenty-seven percent of the ordinance total, while the western and central regions accounted for four and two percent, respectively (Figure 4.2).

The northeastern region contained 354 ordinances, from 332 communities in eight states. The total number of laws identified by

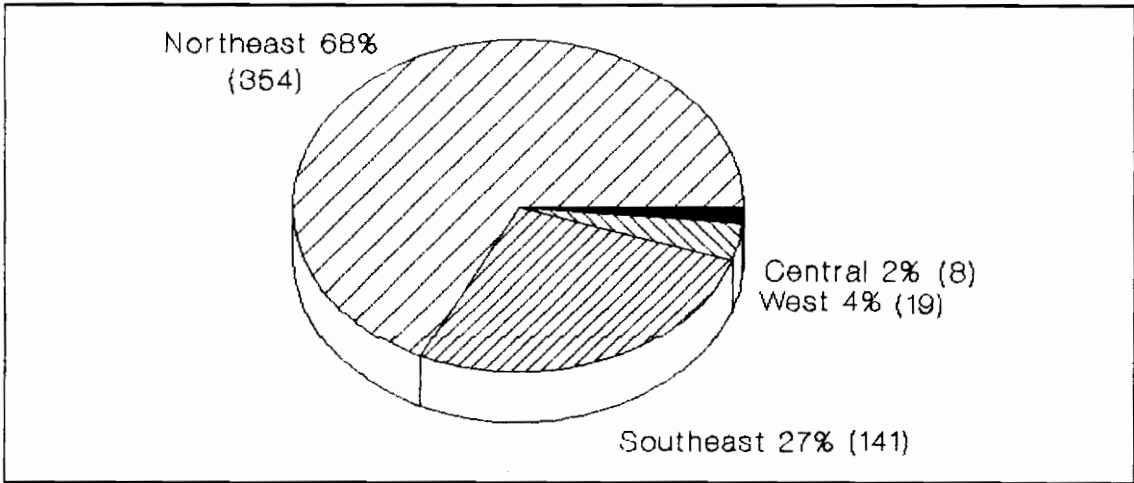


Figure 4.2 Percentage of ordinances by geographic region

state as a percentage of the regional total is shown in Figure 4.3. Ordinance totals are shown in parentheses. The northeastern region contained, by far the largest number of ordinances identified in any region. The four states of Pennsylvania, New York, New Jersey and Maine contain over half of all ordinances identified in the entire United States.

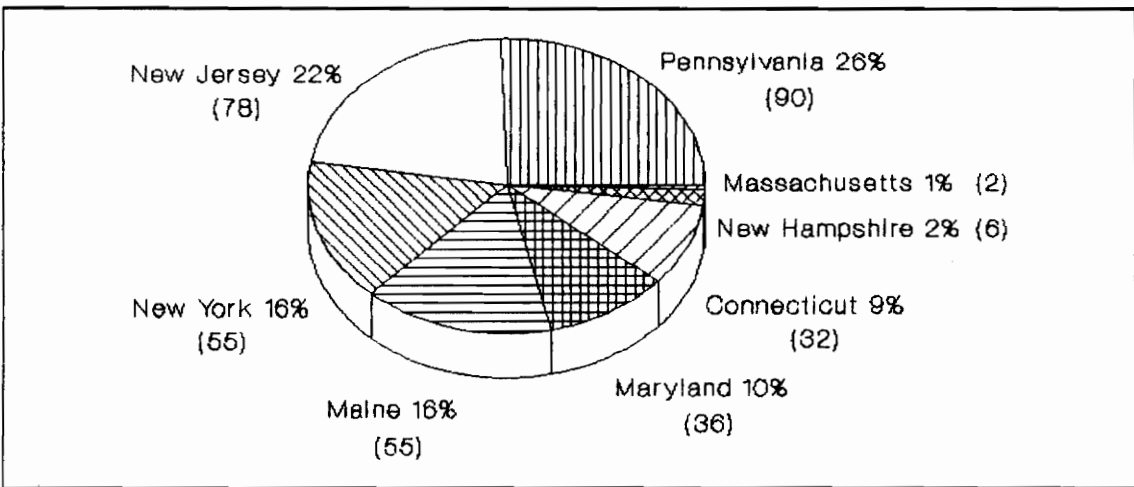


Figure 4.3 Percentage of ordinances by state, northeastern region

The 141 local forest laws identified in the southern region are distributed among 135 individual governments in seven states. The number of ordinances identified by state as a percentage of the regional total is shown in Figure 4.4. Virginia and Georgia each comprise approximately thirty percent of the southern total, with Florida and Louisiana accounting for roughly twenty percent, apiece. Arkansas, Mississippi and North Carolina each represent less than one percent of the southern total.

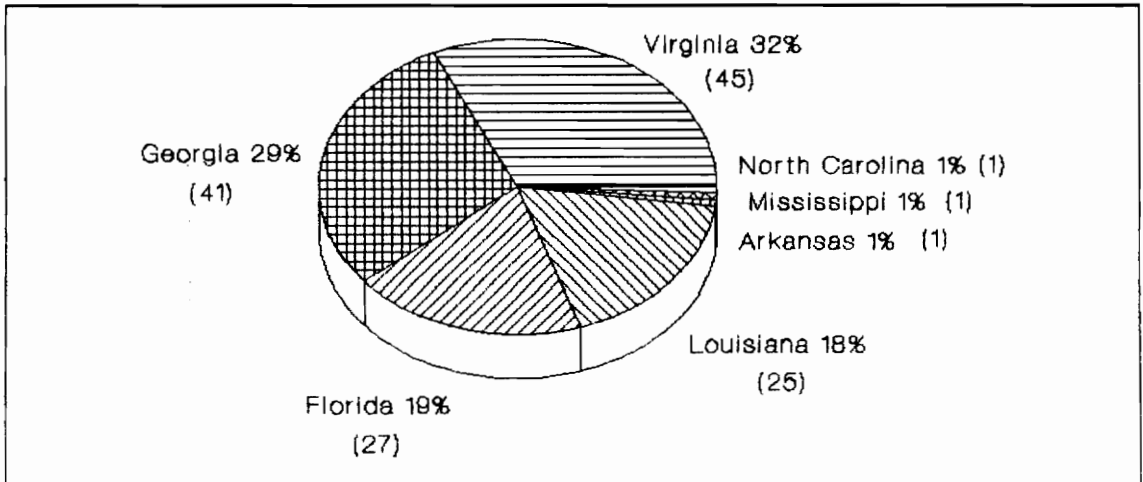


Figure 4.4 Percentage of ordinances by state, southern region

Nineteen ordinances were collected from eighteen governments in five western states (Figure 4.5). Oregon and California represent fifty-three and thirty-two percent of the western total, respectively. Colorado, Idaho and Nevada each contribute a single local law. Central region ordinances constitute only two percent of the national total. Of the eight ordinances found in this region, sixty percent, five

ordinances, are from Michigan. The remaining ordinances are found in Indiana, Minnesota, and Ohio, which each contribute a single ordinance (Figure 4.6).

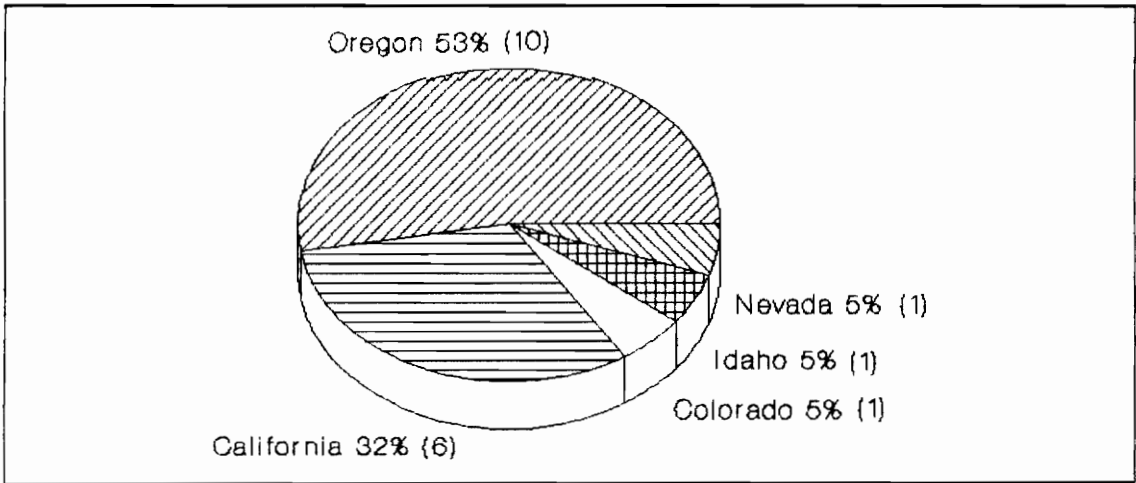


Figure 4.5 Percentage of ordinance by state, western region

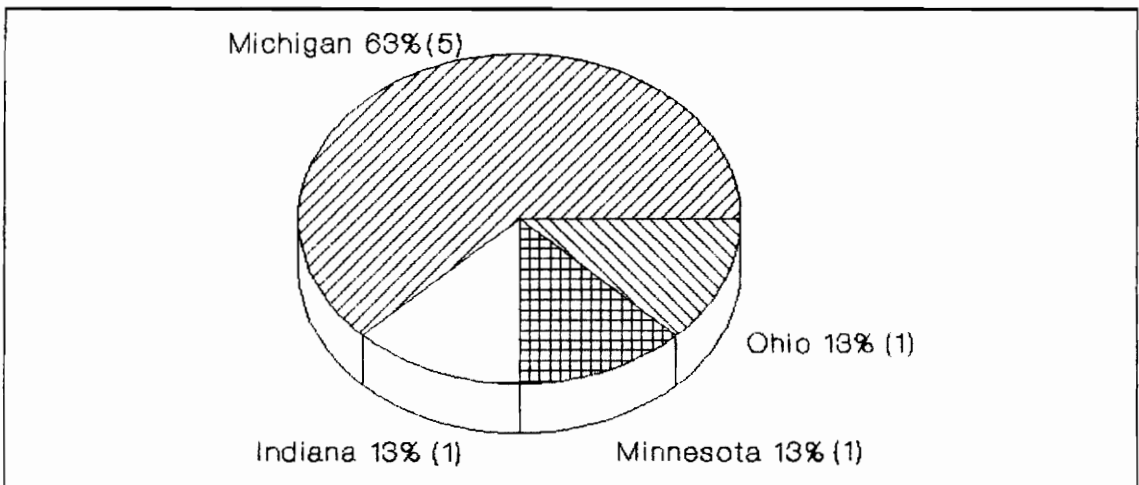


Figure 4.6 Percentage of ordinances by state, central region

Proliferation of Local Forest Ordinances

Of the 522 local laws identified in this study, 493 (ninety-five percent of the ordinances collected) were found to have identifiable dates of adoption. The remaining twenty-nine ordinances (five percent) had indeterminate adoption dates. These dates will be used to relate trends in the growth of local forest ordinances.

Local forest regulatory ordinances are a relatively recent phenomenon. Of the 493 laws with identifiable adoption dates, over seventy percent were adopted in the last ten years, with forty-five percent having been enacted in the last five years. The oldest ordinance which is still in effect was enacted in 1951. This was not the earliest local forest ordinance; however, a San Mateo County, California law, which was subsequently repealed², was adopted as early as 1937. Despite the emergence of local laws in the fifties and sixties, local ordinances did not begin to proliferate rapidly until the 1970's.

Figure 4.7 shows the total number of forest laws enacted in five year intervals starting from 1950 to the present. The number of ordinances adopted per year are grouped to better isolate trends in the growth of local forest laws. The number of ordinances identified between 1960 and 1989 have more than doubled each period.

It is important to note that the last time period shown in Figure

²Amendments to California's 1945 Forest Practice Act (Chapter 8, Part 2, Division 4, Public Resources Code) in 1957 preempted local governments from restricting all forestry operations

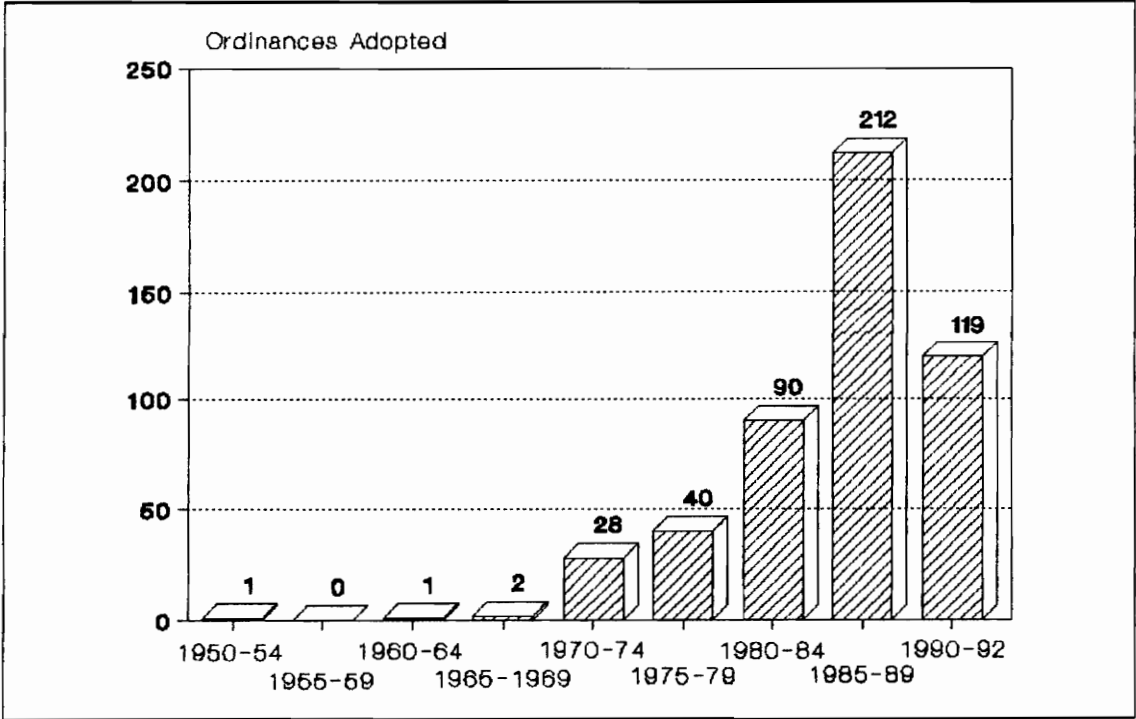


Figure 4.7 Total number of ordinance adopted per period

4.7 represents only two and a half years, while all other time periods represent five year intervals. To account for this, ordinance totals were divided by the number of years in each period; Figure 4.8 shows the average number of ordinances adopted per year in each time period. The average number of ordinances adopted per year in each time period has increased in every period since 1959.

The total number of ordinances adopted in each time period in the northeastern region is shown in Figure 4.9. Although the overall trend since 1964 has been one of growth, the number of laws identified between the 1985-1989 and 1990-1992 time periods decreased. The average number of ordinances enacted per year also dropped between these two periods.

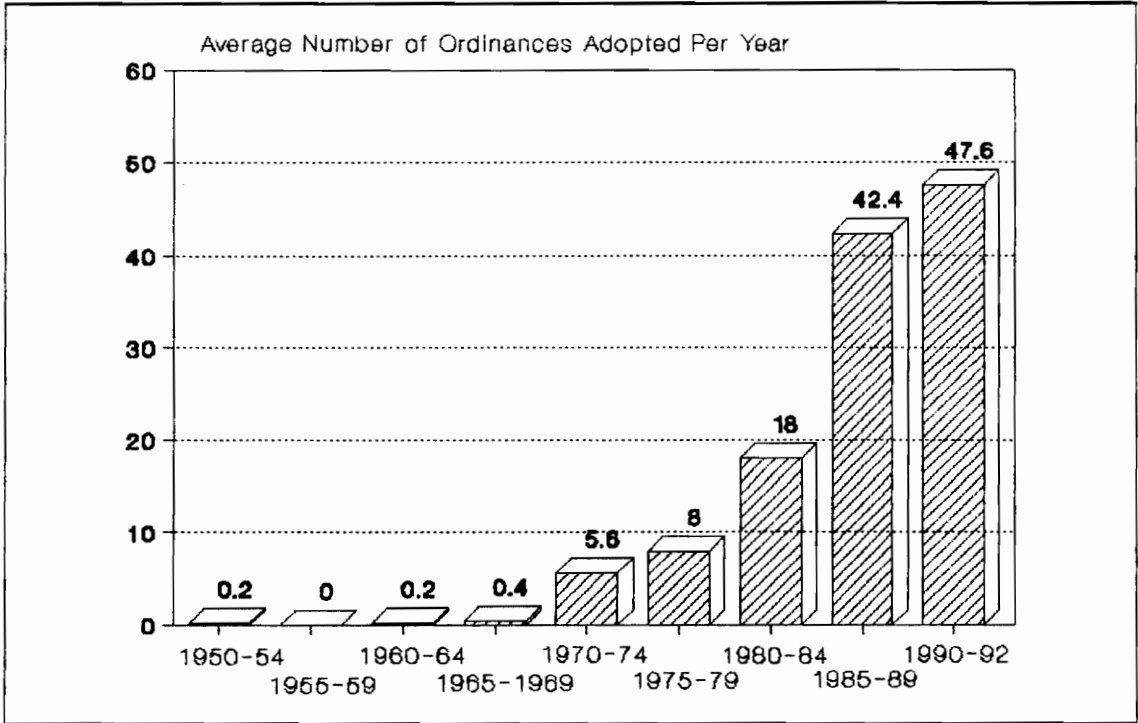


Figure 4.8. Average number of ordinances per year by period

This reduction is most likely attributable to sampling errors rather than to a reduction in the rate at which ordinances are adopted. New ordinances, especially those which have not yet been codified, were particularly difficult to sample. Ordinances will generally go unnoticed by government officials, landowners and loggers until they are enforced. In most cases, very little time and effort is spent publicizing local laws to the public and to the forestry community.

The South has witnessed a large increase in the number of ordinances in all time periods since the mid 1970's (Figure 4.10). The average number of ordinances adopted has more than doubled in each period since 1975. Unlike the northeastern region, the number of

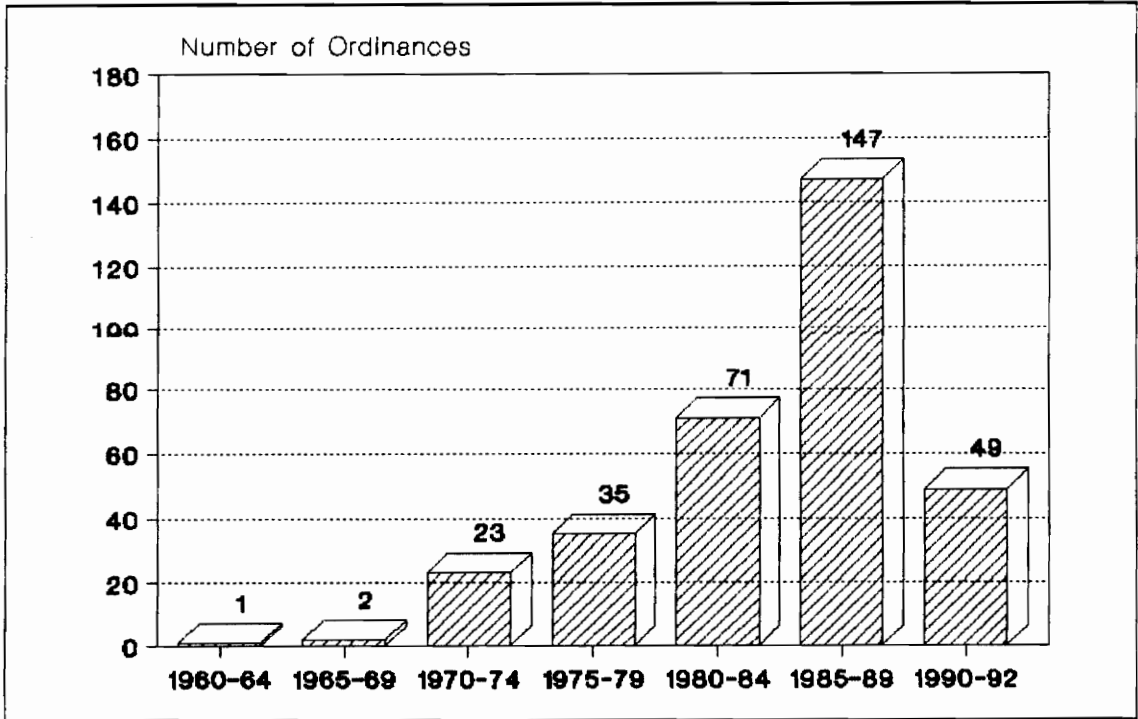


Figure 4.9 Total number of ordinances per period, northeastern region

ordinances increased over the last two time periods. A large portion of the southern laws identified in the last time period were adopted pursuant to state programs, which allowed them to be much more easily identified. The influence of state programs on the growth of forest ordinances will be examined in the next chapter.

The small number of ordinances identified in the central and western regions do not require graphical representation. The distribution of local ordinances in the west is basically bi-modal. Approximately half were adopted in the early 1980's in conjunction with California's State Forest Practice Act, while the other half were

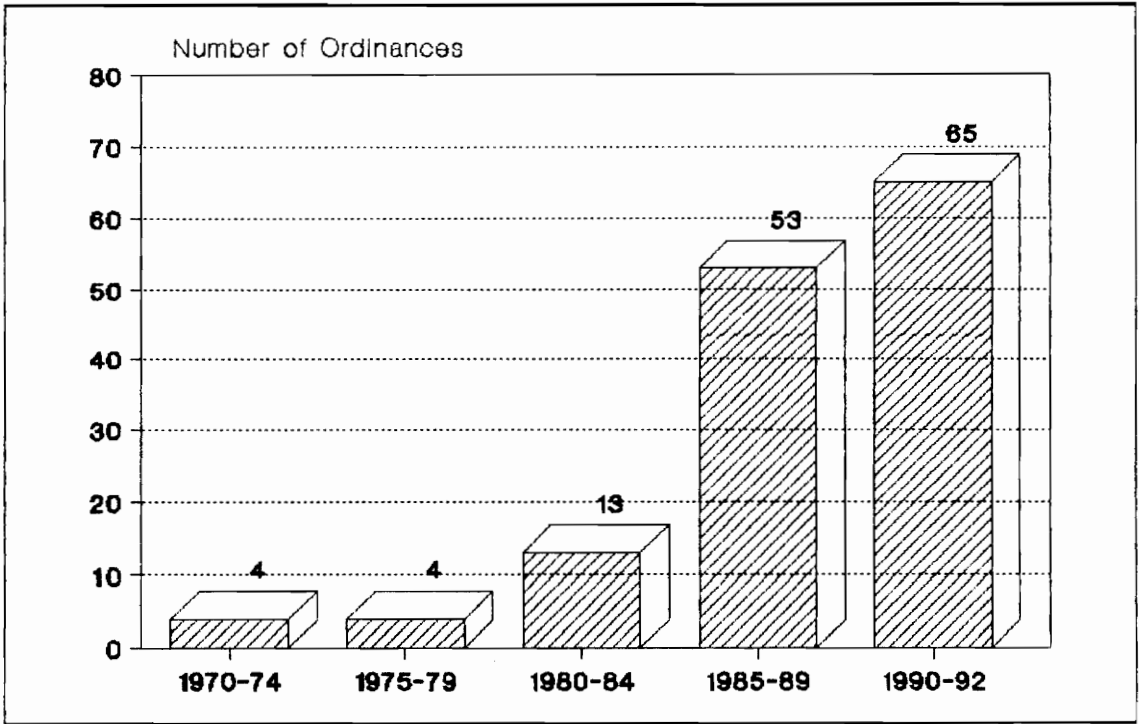


Figure 4.10 Total number of ordinances per period, southern region

adopted in the late eighties and early nineties pursuant to Oregon's Forest Practice Act. The existence of state forest practice laws in the western United States has, to a large extent, contained the growth of forest ordinances in this region. Ninety percent of the local laws identified in the central state were adopted between 1980 and 1989. This region has not witnessed a significant growth of forest ordinances. The legislative citations and the dates of adoption for each law identified in this study are contained Appendix B.

Sources of Variation

The objective of this section is to provide an explanation for the growth and expansion of local forest regulatory laws in the United States. Growth trends, however, cannot be fully explained without recognizing the differences in the objectives of individual local forest ordinances. As will be outlined in Chapter 5, local forest regulatory laws have been enacted to achieve a wide range of objectives. For this reason, many of the relationships examined in this chapter will be expanded upon in subsequent chapters of this study.

The number of local forest laws varies considerably between states and regions of the country. This variation is largely attributable to social differences which characterize these areas. The allocation of forest ordinances is largely a factor of the structure of local governments and the degree of discretionary authority afforded by state governments to them. The purpose of the following section is to outline some of the factors which have contributed to the growth of local forestry laws in general. Factors which have precipitated the growth of specific types of local forest laws will be examined in the next chapter.

Home Rule

The number of forest ordinances in various regions of the country is associated with the level of local authority or "home rule" enjoyed by local units of governments. Possessing the authority to act is unquestionably a requisite condition for any governments wishing to

control forestry activities. Levels of local autonomy differ dramatically among states and regions of the country; therefore, interstate comparisons of "home rule" are difficult, if not impossible, to make. Each state has a unique relationship with its local governments. Constitutional and statutory grants of authority vary from state-to-state, as do levels of fiscal and legislative autonomy. Although it is difficult to compare levels of "home rule" between states, it is possible to make several regional generalizations.

As was outlined previously, state-wide forest practice acts, in the many western states have largely prohibited local governments from restricted forest activities. Consequently, a small number of local laws were identified in the western region. Similarly, a very small sample of ordinances were found in the central states. For this reason, the following discussion of local discretionary authority will be largely limited to the northeastern and southern regions.

Local governments in the Northeast have traditionally exhibited a larger level of local autonomy as compared with other regions of country. The northeastern states and in particular the New England states have a long tradition of strong localized government, that dates back to colonial times. The South has had an equally long tradition of centralized state government (Elazar 1972). Unlike most other sections of the country, the Northeast was founded on the idea that states exist as a union of local governments. The legacy of decentralized government has resulted in a stronger tradition of "home rule" for localities in this region. In the South, however, states have historically been the

principle unit of governance, which has resulted in less autonomy.

Local governments in the Northeast have traditionally enjoyed strong "home rule" regardless of its states legislative grant of authority. Of the twelve states identified in the northeastern region, nine have constitutional provisions (Table 2.1). Many of these were patterned under the devolution of powers approach, which provides extensive fiscal and legislative authority to local governments. Unlike most other states in the region, New Jersey's grant of local authority involves a statutory *Imperium in Imperio*. Although statutory grants are usually associated with relatively weak local governments, New Jersey's municipalities enjoy a considerable degree of autonomy. This is reflected in the following quote:

"The home rule act of 1917 (Chapter 152) gave all municipal corporations (all 507 of New Jersey municipalities are public corporations) a long laundry list of functional powers. This act as amended and supplemented is very generous (ACIR 1981).

The northeastern region has a traditional pattern of greater "home rule" status to local governments; therefore, constitutional and statutory grants of authority have traditionally resulted in more local power in the Northeast as compared to other regions of the country.

State-local relationships defined by Dillon's Rule (the rule of strict constructionism) usually provide local governments with the smallest amount of local discretionary authority. Dillon's Rule powers must be expressly granted to local governments by the state. Grants of authority under this type relationship are usually quite narrow and therefore provide little opportunity for governments to actively

restrict land uses. Nevertheless, three states defined by Dillon's Rule (Mississippi, Indiana and Arkansas) contain local forest laws. As will be outlined in the next chapter, all of these ordinances, as well as many laws in the South, pertain to the hauling of forest products on local roads. In contrast, the majority of ordinances identified in the more "home rule" orientated northeastern United States have enacted comprehensive forest laws impacting a wide range of silvicultural activities. Whereas local governments in the Northeast generally have broad executive powers, the jurisdiction of localities in the South is much more limited. The responsibility for local road and highway construction and maintenance have enabled many local governments in this region to enact local forestry laws.

State and Local Highway Responsibility

The legal responsibility for the construction and maintenance of roads, highways and structures varies dramatically from state-to-state. Highway programs have traditionally been the responsibility of local governments. Usually, the responsibility is divided by statute between the state and its counties or town, or between all three (Grant and Omdahl 1989, Snider 1950). North Carolina, Delaware, Virginia and West Virginia are the only states which exercise full control over all roads. Twenty-seven states divide responsibility between states and counties. Four states divide highway duties between states and towns or townships and thirteen states divide responsibility between all three levels of government (Table 4.2).

Over the last fifty years, there has been a shift in highway responsibility from small to larger units of local government. This trend has been particularly evident in the Northeast. In this region, roads were traditionally the responsibility of towns and townships; however, in practice highway administration is more efficient and economical at the county level. Counties are generally the least influential unit of local government in the Northeast; for this reason, log hauling restrictions are relatively uncommon.

Counties in the South have become very active in regulating the use of local roads. In general, local governments have the authority to restrict hauling on local roads and structures which they maintain. It is common, therefore, for local governments, even states with Dillon's Rule, to regulate the use of local roads. As construction and maintenance costs have increased, local governments have attempted to limit hauling of timber products to minimize financial losses. To many local governments, the loading and hauling of forest products have resulted in significant costs, in terms of damage to local roads, bridges, ditches and rights-of-way (Hill 1990).

Size of Government

The large number of ordinances identified in the northeastern region is attributable, at least in part, to the traditional structures of local government in this region. The northeastern regions has a long history of strong "home rule" for small units of local government. The northeastern region has traditionally relegated more authority to

smaller units of government, such as townships, towns or boroughs, as compared to other regions of the country. In the Northeast, townships, towns and municipalities serve as the fundamental forms of local government, with the county serving only an auxiliary function. The tradition of relegating authority to geographically compact units of

Table 4.2 Governmental responsibility for highway programs by state

State	Responsible Government	State	Responsible Government
Alabama	State,County	Montana	State,County
Alaska	State,County	Nebraska	State,County,Town
Arizona	State,County	Nevada	State,County
Arkansas	State,County	New Hampshire	State,Town
California	State,County	New Jersey	State,County
Colorado	State,County	New Mexico	State,County
Connecticut	State,Town	New York	State,County,Town
Delaware	State	North Carolina	State
Florida	State,County	North Dakota	State,County,Town
Georgia	State,County	Ohio	State,County,Town
Hawaii	State,County	Oklahoma	State,County
Idaho	State,County	Oregon	State,County
Illinois	State,County,Town	Pennsylvania	State,County,Town
Indiana	State,County	Rhode Island	State,Town
Iowa	State,County	South Carolina	State,County
Kansas	State,County,Town	South Dakota	State,County,Town
Kentucky	State,County	Tennessee	State,County
Louisiana	State,County	Texas	State,County
Maine	State,County,Town	Utah	State,County
Maryland	State,County	Vermont	State,Town
Massachusetts	State,County,Town	Virginia	State
Michigan	State,County	Washington	State,County
Minnesota	State,County,Town	West Virginia	State
Mississippi	State,County	Wisconsin	State,County,Town
Missouri	State,County,Town	Wyoming	State,County

local government in this region is shown in the following quote from Grant and Omdahl:

"...in New England where the natives, land and climate were all hostile, fearful immigrants huddled together and used the town as the basic unit of governance. In the more friendly environs of the South people could safely separate themselves by larger cuts of land and used the larger county as the basic unit of self government" (Grant and Omdahl 1989).

Having small, autonomous units of local government results in a larger number of jurisdictions as compared to other regions of the country.

The prevalence of small units of local government in the northeastern region is shown in Figure 4.11. Of the 332 northeastern governments, identified as having a forest ordinance, over ninety percent, were cities, townships, towns or boroughs. The county form of government accounted for less than ten percent of the northeastern total. By contrast, approximately eighty-five percent of the ordinances identified in the southern region were from counties (Figure 4.12).

Although counties are the principle units of local government in the central and western states, the majority of laws identified were adopted by municipalities, principally cities. In the western states, ordinances were identified in seven counties, nine cities and within the jurisdiction of one special government. All of the municipal regulations identified in the western states are from Oregon. As was outlined in Chapter Two, Oregon's Forest Practice Act preempts county governments from restricting forest activities, but municipal governments are allowed to limit harvesting and development in urban growth zones. The result has been municipal forest practice regulation.

All county regulations in California are associated with that state's forest practice law.

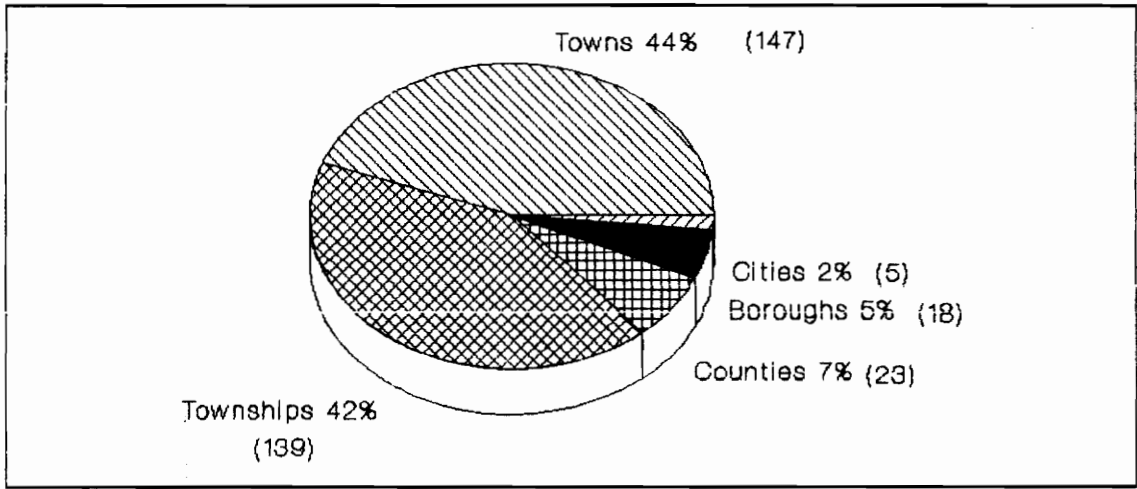


Figure 4.11 Number of laws by government type, northeastern region

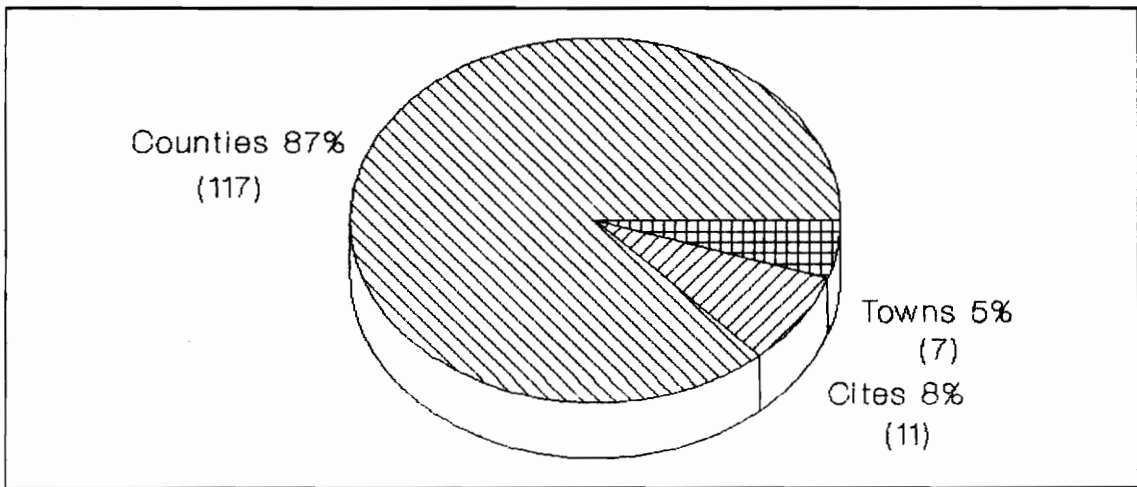


Figure 4.12 Number of laws by government type, southern region

Of the eight local laws identified in the central region, five were adopted by municipal forms of government and three were adopted by counties. It is difficult to make generalizations about the central region since so few ordinances were identified. It is interesting to note that the states of the central region have traditionally shown little desire to regulate any type of forestry activity. Of the fourteen states in the central region only one, Missouri, has any type of state-wide forest practice law (Cubbage and Siegel 1985). The local forest practice ordinances identified in the western and central United States are for the most part aberrations. Unlike the Northeast and South, the political and legislative climate of the central and western regions do not lend themselves to the adoption of local forest laws. The presence of state-wide forest laws in the west and the importance of agriculture in the central region may limit the number of ordinances in these regions. For this reason, the Northeast and southern region will receive the majority of attention in subsequent sections of this analysis.

State Mandates

State government policy has been an important impetus for the creation of local forest laws. One important consequence of Reagan era "new federalism" is the use of local governmental units to achieve state and federal policy objectives. States commonly use local governments to implement a wide variety of state environmental programs. The use of local government as a policy instrument has had an important influence

on the growth of local forest practice laws, and this trend is expected to increase in the future.

In Maine, all organized towns are required to comply with the provisions of the "Mandatory Shoreland Zoning Act" (38 M.R.S.A. Section 435-449). This law requires that all organized towns must adopt environmental standards consistent with but no less stringent than state imposed precepts for land uses within shoreland zones. Shoreland zones are defined as any parcel of land within 250 feet of great ponds, rivers, wetlands or within seventy-five feet of any stream. State standards outlined in the Shoreland Act include performance criteria for timber harvesting activities and silvicultural activities. Many towns have used this authority to adopt timber harvest regulations for shoreland zones and, in some cases, for the entire municipality. At this time approximately a tenth of Maine's five hundred municipalities have adopted forest harvest ordinances. The vast majority of towns apply slightly modified state standards to regulate land uses in shoreland zones.

Maryland's twenty-three counties were mandated by the state to adopt sediment and erosion control ordinances under the authority of Title 8, Subtitle 11 of the Natural Resources Article of the Annotated Code of Maryland. The purpose of this legislation was to control non-point erosion and sedimentation resulting from any soil disturbing activity. County erosion and sedimentation control ordinances generally require management plans and harvest permits for all timber harvest activities.

Maryland also requires counties adjacent to the Chesapeake Bay and its tributaries to regulate land uses within 1000 feet of all tidal waters and wetlands. Maryland's Chesapeake Bay Act (Chesapeake Bay Critical Area, of the laws of 1984 of the state of Maryland) establishes extensive requirements for conducting timber harvesting activities within protected areas. In a manner similar to Maine's Shoreland Ordinance, counties are allowed to enact restrictions which are more stringent than state standards.

In Virginia, local governments bordering the Chesapeake Bay are empowered to regulate land uses. Twenty-nine counties, seventeen independent cities and forty-three towns were directed to restrict certain activities adjacent to the bay, its tributaries, wetlands and watercourses (Chesapeake Bay Preservation Act (section 10.1-2103 and 10.1-2107 of Chapter 21, Title 10.1 of the Code of Virginia)) Unlike the Maryland law, however, Virginia's standards do not place restrictions on timber harvesting. Silvicultural activities are exempt from the provisions of Virginia's Chesapeake Bay Act, provided they adhere to "Best Management Practices" outlined by the Virginia Department of Forestry. At this time, all twenty-nine counties as well as several cities and towns have adopted silvicultural exemptions.

Local regulations for the "Pinelands Area" of New Jersey were adopted by local governments under the direction of state and federal government. The Pineland Protection Act (New Jersey Statute N.J.S.A. 13:18 A-6j) was adopted in 1981 to establish minimum standards for municipal master plans and land use ordinances in the "Pinelands Area".

Extensive requirements for timber harvesting activities are included in this law. Like other state programs, local governments may adopt more restrictive regulations as long as they are compatible with the goals and objectives of the Pinelands Act. Forestry standards for over twenty Pinelands communities have been established under the authority of this law.

Florida's 1985 Growth Management Act (Local Government Comprehensive Planning and Land Development Regulation Act, Florida Statute 1985) requires all counties to enact a comprehensive plan to manage land uses, especially those associated with growth and development. These plans must include a "conservation element" which outlines procedures for preserving native vegetation. Several progressive counties have implemented "conservation elements" which regulate forestry and silvicultural activities. In most cases, logging requires a harvest permit, a management plan and adherence to best management practices.

As these examples suggest, the preservation of local autonomy is becoming increasingly difficult in our rapidly nationalizing society. In response to public demands, many states are mandating more programs in an attempt to create greater uniformity of services; therefore, state mandates are expected to continue to increase in the future (Grant and Omdahl 1987).

Preemptive Measures

Several states have taken steps to limit the growth of local

forest ordinances. Massachusetts's Forest Practice Act and New Hampshire "right to harvest law" are two previously cited examples of states limiting the ability of local governments to restrict forestry, through legislative means. In addition, state forest practice acts in California and Oregon also limit the number of local forest regulatory laws.

Recently several northeastern states, motivated by a large number of local forest laws, have attempted to contain the growth of forest ordinances. A bill currently under review by the General Assembly of Pennsylvania attempts to restrain local governments from unreasonably restricting forestry practices. This bill reads in part:

"the General Assembly recognizes the rights and obligation of private landowners to exercise forestry, an activity that predates zoning, and declares that it is in the public interest to encourage preservation of open space by conserving forest and other natural resources. Forestry activities, including, but not limited to, the harvest and transport of forest products, when practices in accordance with applicable laws and regulations, are traditional, fundamental and accessory used of land throughout this Commonwealth and as such shall not be unreasonably limited by the use of municipal planning and zoning powers or by the unreasonable interpretation of such powers" (General Assembly of Pennsylvania, Senate Bill No. 1505 or 1991, December 19, 1991).

Although this bill would not preempt local laws which are currently in effect, it would severely limit the ability of governments to enact forest regulatory ordinances in the future. This law would recognize the right to harvest forest products in Pennsylvania.

Connecticut's Forest Practice Act (Public Act 91-335) which was ratified in June of 1991 does not limit the authority of local governments to restrict forestry activities. It does, however, require

all municipal ordinances to be consistent with the Forest Act and must be approved by the State Commissioner of Environmental Protection.

Section six of this Act reads in part:

"No municipal ordinance or regulation governing commercial forest practices which is in effect on the effective date of regulations adopted pursuant to Section five of this act shall be valid after the expiration of one year unless such an ordinance or regulation has been submitted to the commissioner for approval, and the commissioner has approved such ordinance or regulation as consistent with the purposes of this act..."

Connecticut's Forest Practice Act by no means preempts or even limits municipal authority to regulate forest activities. It limits these governments from enacting laws which circumvent state environmental policy.

Summary

This study identified 522 individual local forest laws regulations from 493 independent governments in the United States. The northeastern region contained the largest number of ordinances, with over sixty-eight percent of the ordinance total. The southern region contributed twenty-seven percent and the west and central regions contributed four and two percent of the national total, respectively. Forest ordinances have been enacted by all levels of local governments. Northeastern laws were generally adopted by geographically small units of government, such as towns, townships and boroughs; whereas, local laws in the South are usually enacted by larger forms of local government, such counties or parishes.

Local forest laws are a relatively recent occurrence. Over

seventy percent of the local laws identified in this study have been enacted in the last ten years, with almost fifty percent in the last five. The northeastern and southern regions have both witnessed rapid growth in the number of ordinances in the last two decades. Several important factors have influenced the proliferation of ordinances. Strong traditions of local "home rule" and small units of government have contributed to the growth of forest ordinances in the Northeast. Local responsibilities for road and highway programs has empowered many localities to restrict hauling activities in the South.

State programs have had varying impacts on the proliferation of local forest laws. State mandates have resulted in increased local regulation in several states. For example, Chesapeake Bay legislation in Maryland and Virginia have resulted in many forest ordinances, as have environmental laws in Florida and Maine. Although several states have acted to limit the ability of local governments to restrict forestry operations, they have done little to curb the growth of local laws. Since many of the factors which contributed to past proliferation continue to exist, ordinances would be expected to increase in the future.

Not all local forest laws are equivalent in scope and impact. Local laws contained under the generic heading of "forestry ordinance" contain a wide range of laws, which impact many different types of forest activities. The purpose of this chapter was to provide a sense of the overall scope of local forest practice laws in the United States. In Chapter Five, the intent of local ordinances and the factors which

have aided to their proliferation will be examined.

Chapter 5. Regulatory Objectives

Local laws are distinguished largely by their regulatory intent. Objective statements of local ordinances not only outline the purposes for enactment, also provide useful insights into the attitudes and motivations of the government and the citizenry which enacted it. The legislative intent of local forest laws identified in this study differ dramatically in scope and perspective between states and regions of the country. This variation reflects differing attitudes and differing methods of implementation of local forest regulations. The purpose of this chapter is threefold: (1) to outline the similarities and differences in the intent of local forest laws; (2) to provide a sense of the regulatory trends in the objective of local forest laws; and (3) to provide insights in to attitudes of local communities which have enacted these laws.

Categories of Objectives

In most cases, local forest laws have several objectives; however, every ordinance can be placed into one of five categories which most nearly describes its objective. The five categories of ordinances are: timber harvesting; environmental protection; special feature; tree protection and public property. Although the objectives of the over five hundred local forest laws sampled in this study vary widely, each law can be placed into one of these categories. Definitions of each category are outlines below.

Timber Harvesting Ordinances

Local forest laws categorized as "timber harvesting ordinances" were adopted explicitly to restrict forestry and silvicultural activities. All ordinances adopted for the purpose of regulating timber harvesting, forest road construction, harvest methods and equipment or any other silvicultural activity on private property were included in this category. These laws are generally enacted to limit site degradation and environmental damage associated with commercial forestry operations. The protection of environmental resources and the conservation of aesthetic values and wildlife habitat were the primary concerns voiced by governments enacting these types of laws. Common requirements for timber harvesting ordinances include: forest harvest permits; management plans; and buffer zones. Restrictions on silvicultural methods and requirements for forest road construction are also common.

Public Property Ordinances

Public property ordinances were generally enacted to accomplish several objectives. Most laws of this type are adopted to protect the public investment in roads, bridges, ditches and rights-of-way, by placing restrictions on the use of logging and pulpwood vehicles. A secondary objective of many of these laws is to protect motorists from potentially hazardous driving conditions. Damage to roads and bridges, mud and logging debris on or near public roadway and interference with traffic flows are commonly cited forest related traffic hazards. Public

property ordinances generally regulate the transport and loading of roundwood products on or near public roads and structures. The removal of debris and mud from local roads, the use of gravel mats at entrances and restrictions during certain times and weather conditions are common provisions of these ordinances.

Tree Protection Ordinances

Local forest ordinances categorized as tree protection laws were primarily associated with the preservation of wooded plots in urban and suburban settings. To be included in this study, ordinances had to apply to the removal of plots of trees on commercial land. This is not to be confused with urban or municipal street or shade tree ordinances, which generally refer to the removal of individual or small groups of trees.

Unlike timber harvesting ordinances, tree protection ordinances were generally not enacted to restrict commercial forestry operations, per se. These laws were, for the most part, adopted to regulate tree removals associated with land clearing and development activities. Many municipal development and landscape ordinances exempt tree removals for purposes other than construction or development; local laws of this category restricted the removal of large groups of forest trees for any purpose. Aesthetics, noise reduction, water and air quality are common reasons given by local governments for enacting this type of local law. Permits for tree removals, site plans and replanting provisions are all common requirements of tree protection ordinances.

Environmental Protection Ordinances

The primary intent of most environmental protection ordinances is to protect environmental features from "land disturbing activities". These laws are usually worded such that tree removal, site preparation or road construction were considered "land disturbing" activities. Environmental protection laws were commonly erosion and sedimentation ordinances, stormwater drainage laws or zoning codes written to encompass forestry and silvicultural activities. Air and water quality, soil productivity and wildlife habitat are common concerns voiced by governments enacting these types of laws. Harvest permits, erosion control plans, buffer zones and restrictions on harvest methods are all common regulatory provisions. Laws of this type are also used to restrict the use of prescribed fire and forest herbicide.

Special Feature Ordinances

Special feature ordinances are laws adopted for the purpose of protecting a specific area due to its scenic or environmental value. Unlike environmental protection or timber harvesting laws, special feature ordinances rarely pertain to all areas within a local government's jurisdiction. These laws usually apply only to environmentally sensitive or fragile areas which contain unique environmental attributes or resources. Scenic river corridors, shoreline and coastal zones, wetlands, recreational districts, viewsheds and habitats of threatened or endangered species are all examples of zones which have received protection from special feature ordinances.

All ordinances of this type pertain to forestry operations on private land. Common requirements of these ordinances include harvest permits, management plans and buffer zones. Many special feature ordinances severely limit the volume of timber which can be removed from protected areas, while others prohibit forestry activities all together.

Distribution of Categories

Timber harvesting ordinances represent the largest category sampled in this study. Of the 522 local forest practice ordinances identified, 194 (37%) are of this variety. Special feature protection laws were the second most prominent category with twenty-three percent of the national total. Environmental and tree protection ordinances accounted for fifteen and thirteen percent of the national total, respectively. Public property ordinances represented twelve percent (Figure 5.1). A complete list of ordinances identified by legislative citation and regulatory objective is contained in Appendix B (Table B.1).

Only fifty percent of the ordinances identified in this study were adopted for the express purpose of regulating commercial forestry activities. Timber harvesting and public property ordinances are the only objective categories which are created solely for the purpose of restricting forest operations. Although the other categories did include ordinances which were extremely restrictive, they were usually adopted to achieve some other environmental objective. Local forest regulatory laws come in many forms. It is important to recognize that

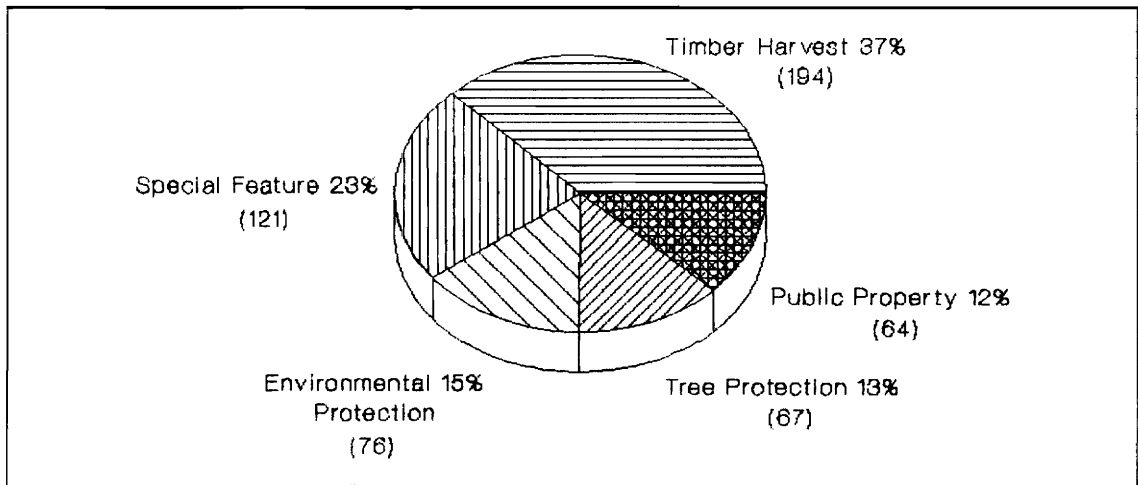


Figure 5.1 Distribution of regulatory objectives

many broadly worded environmental codes, land use laws and zoning ordinances can serve as vehicles for forest restrictions.

The northeastern region, which contained over sixty percent of all ordinances, dominated the counts in most categories (Table 5.1). Northeastern states contained over seventy percent of the ordinances in three objective categories and over sixty percent of a fourth. Interestingly, only five percent of the public property ordinances were identified in the northeastern region. The southern region contained over ninety percent of the public property ordinances. Timber harvesting laws constituted only two and a half percent of the southern total. The differences in the number of timber harvest and public property laws in the Northeast and South underscores regional differences which will be expanded upon later in this chapter. The central and western states contained small numbers of ordinances in all categories. For the most part, the limited number of local laws

identified in these regions does not provide a large enough sample to make a valid comparison among regions.

Table 5.1 Local ordinances by objective categories and region

Region	Environment Protection		Tree Protection		Timber Harvesting		Public Property		Special Feature	
	#	%	#	%	#	%	#	%	#	%
Northeast	59	78	48	72	172	89	3	5	72	60
South	12	15	17	25	5	2.5	59	92	48	39
Central	1	1	1	1.5	5	2.5	1	1.5	0	0
West	4	5	1	1.5	12	6	1	1.5	1	1

The total number of ordinances identified by objective category in each region is shown in Figure 5.2. The large number of ordinances identified in the northeastern region largely obscures the relationships with other regions. The importance of Figure 5.2 is that it shows the magnitude of local laws in the Northeast with respect to other regions of the country. It also serves to place Figure 5.3 in perspective. Figure 5.3 shows the percentage of ordinances in each category of objective by region. The distribution of regulatory objectives contained in this graphic will be examined by region to isolate the inter-regional similarities and differences.

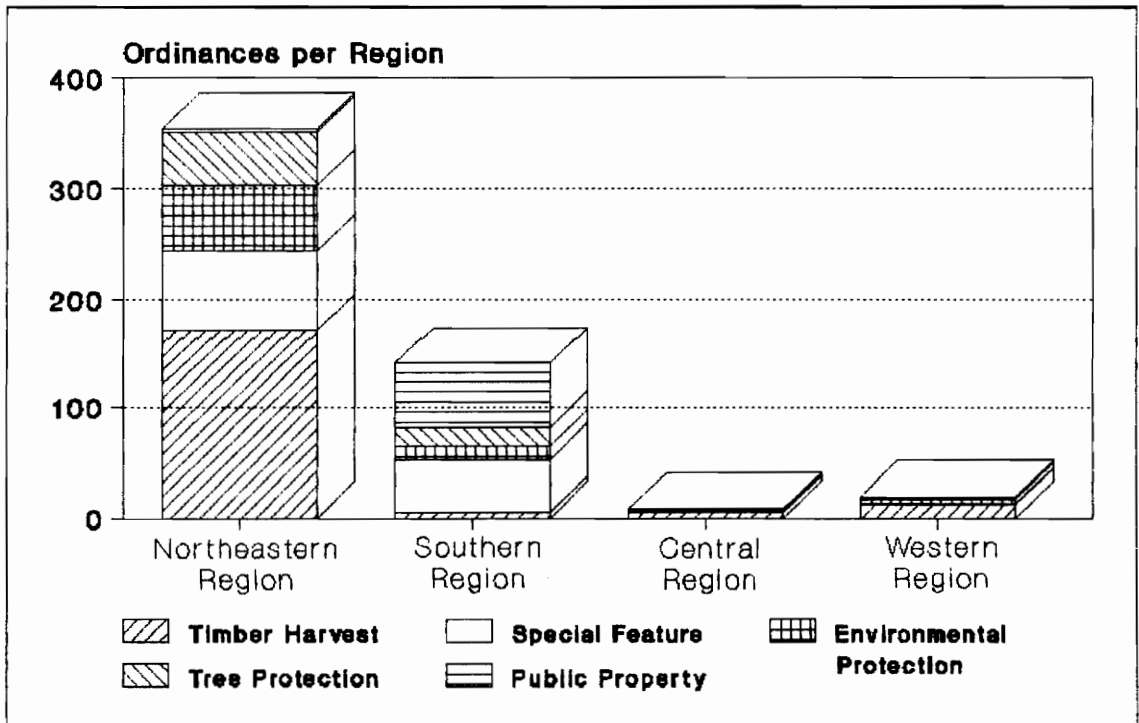


Figure 5.2 Number of ordinances by objective category and region

Northeastern Region

The majority of laws identified in the northeastern region were of the timber harvesting variety. Special feature, environmental protection and tree protection ordinances accounted for twenty, seventeen and fourteen percent of the regional total respectively. By contrast, public property ordinances accounted for less than one percent of the northeastern total.

The number of laws identified by objective category and state in the Northeast is shown in Table 5.2. Approximately ninety percent of the timber harvesting ordinances identified in this region are contained in

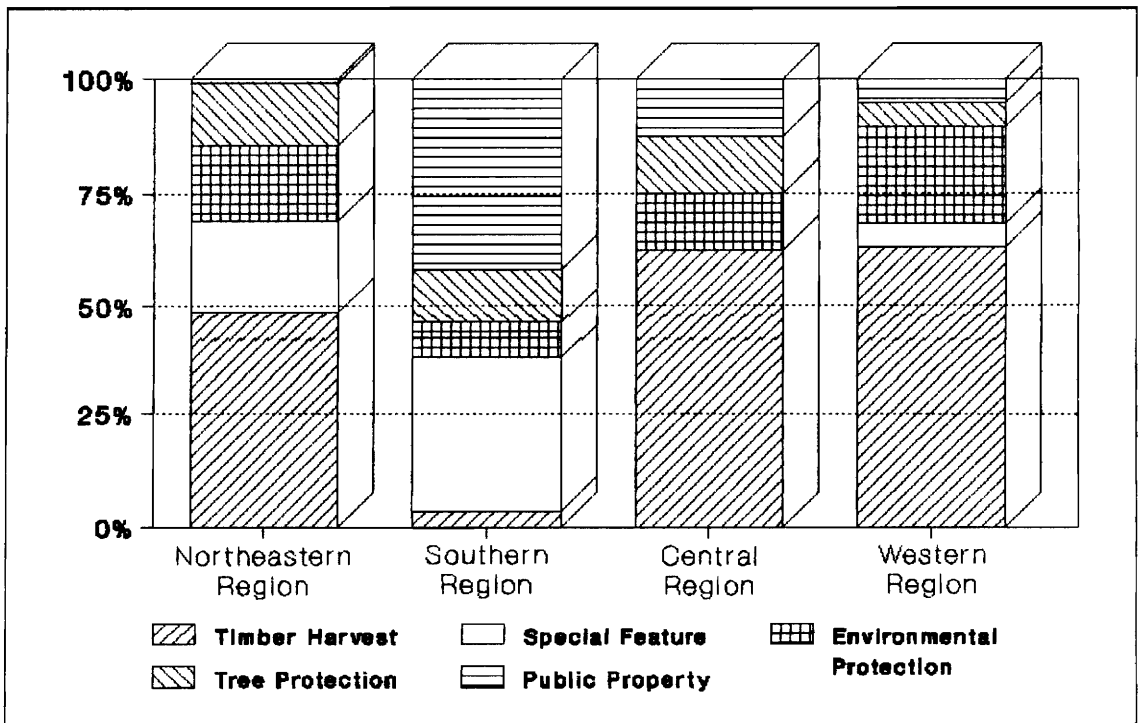


Figure 5.3 Regional ordinance totals by objective

Pennsylvania, New York, New Jersey and Maine. Interestingly, these four states also accounted for over seventy-five percent of the timber harvest ordinances identified nationally.

Of the fifty-nine environmental protection ordinances identified in the northeastern region, virtually all are "erosion and sedimentation" ordinances. Most of the ordinances identified in Pennsylvania in this category are concerned with minimizing soil disturbances from land-clearing activities. All twenty-three Maryland ordinances cited in this category were adopted pursuant to a state mandated program to limit soil erosion and stream sedimentation. State mandated programs were also important in the creation of special feature laws.

Table 5.2 Number of ordinances by objective, northeastern region

State	Environment Protection		Tree Protection		Timber Harvest		Public Safety		Special Feature	
	#	%	#	%	#	%	#	%	#	%
Connecticut	2	3	2	4	16	9	1	33	11	15
Maine	0	0	0	0	26	15	0	0	29	40
Maryland	23	39	0	0	0	0	0	0	13	18
Massachusetts	0	0	0	0	2	1	0	0	0	0
New Hampshire	3	5	0	0	2	1	0	0	1	1
New Jersey	3	5	30	62	33	19	0	0	12	17
New York	9	15	8	17	37	22	0	0	1	1
Pennsylvania	19	32	8	17	56	33	2	66	5	7

The special feature laws in Maine, Maryland and New Jersey were adopted to comply with state programs. Maine's shoreline zones, Maryland's Chesapeake Bay and New Jersey's Pineland area are all examples of areas protected by local governments under the direction of states programs. Local forest ordinances adopted in accordance with state programs accounted for roughly fifty percent of environmental protection ordinances and ninety percent of the special feature ordinances. In total, twenty percent of all ordinances identified in the Northeast are associated with some form of state legislation. State mandated local forest laws represent a significant source of ordinances in the

northeastern region. Not all ordinances are adopted by autonomous local governments. In many cases, environmental regulations are imposed with little or no consultation from the local government which are directed to enacted them. Although the attitudes of the state would be expected to reflect those of its local governments, laws adopted pursuant to state mandates would be expected to be a poorer gauge of local sentiments as compared to a locally generated law. For this reason, discussions of local attitudes toward regulation will generally be limited to those states in which local laws have been generated independently of state programs.

Southern Region

Public property ordinances represent the largest objective category of ordinances identified in the southern region, forty-one percent of the regional total (Figure 5.3). Special feature ordinances represent the second largest category with thirty-three percent of the southern ordinances. Environmental protection and tree protection ordinances each accounted for approximately ten percent of the ordinances identified in this region. Timber harvesting ordinances accounted for less than three percent of the southern total.

The number of ordinances identified by state and objective is shown in Table 5.3. Ninety-seven percent of the public property ordinances identified in southern region were found in two states, Georgia and

Table 5.3 Number of local counts by objective, southern region

State	Environ- ment Protection		Tree Protection		Timber Harvest		Public Safety		Special Feature	
	#	%	#	%	#	%	#	%	#	%
Arkansas	0	0	0	0	0	0	1	2	0	0
Florida	8	66	14	82	1	20	0	0	4	8
Georgia	4	33	2	12	1	20	33	56	1	2
Louisiana	0	0	0	0	1	20	24	40	0	0
Mississ- ippi	0	0	0	0	0	0	1	2	0	0
North Carolina	0	0	0	0	1	20	0	0	0	0
Virginia	0	0	1	6	1	20	0	0	43	90

Louisiana; incidently, these two states also accounted for eighty-nine percent of all public property ordinances. Interestingly, many of the requirements of these laws are similar to state highway regulations in several southern states, including Virginia and North Carolina. The majority of special feature ordinances identified in the southern region were adopted pursuant to state programs. All forty-three laws cited in Virginia are state mandated "Chesapeake Bay" ordinances. In addition, virtually all of the special feature and environmental protection ordinances identified in Florida were adopted in accordance that state's Comprehensive Management Act. The largest, locally enacted category in the South is public property ordinances. Over ninety-five percent of the special feature ordinances and more than sixty percent of the southern

environmental protection ordinances were adopted to comply with a state program. Hauling regulations were, by far, the most common form of local forest ordinances identified in the South.

Western Region

Nineteen forest laws were identified in the western region (Table 5.4). Twelve of the nineteen ordinances identified in the west were timber harvesting laws, adopted pursuant to state forest laws in Oregon and California. The three environmental protection ordinances identified in Oregon were also adopted in accordance with the Forest Practice Act. Unlike Oregon's timber harvesting ordinances, these laws include a much wider range of environmental concerns, such as restrictions on certain silvicultural techniques and the use of forest herbicides. The only public property ordinance identified in the West was a log transport ordinance dating back to the early 1950's. The remaining two western ordinances were land use laws adopted to protect a wildlife area in Idaho and to conserve the natural features of a county in Colorado.

Central Region

The central region contained the smallest number of ordinances identified in any region. Timber harvesting ordinances were found in Michigan, three ordinances, and in Minnesota and Ohio, which each accounted for a single ordinance (Table 5.5). Environmental protection and tree protection ordinances were identified in Michigan. Indiana contained the only public property ordinance identified in this region.

Table 5.4 Number of ordinances by objective category, western region

State	Environ- ment Protection		Tree Protection		Timber Harvest		Public Safety		Special Feature	
	#	%	#	%	#	%	#	%	#	%
California	0	0	0	0	6	50	0	0	0	0
Colorado	1	25	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	1	100
Nevada	0	0	0	0	1	8	0	0	0	0
Oregon	3	75	1	100	5	42	1	100	0	0

Table 5.5 Number of ordinances by objective category, central region

State	Environ- ment Protection		Tree Protection		Timber Harvest		Public Safety		Special Feature	
	#	%	#	%	#	%	#	%	#	%
Indiana	0	0	0	0	0	0	1	100	0	0
Michigan	1	100	1	100	3	60	0	0	0	0
Minnesota	0	0	0	0	1	20	0	0	0	0
Ohio	0	0	0	0	1	20	0	0	0	0

The central and western regions accounted for a very small portion of the local forest laws; in total, these regions accounted for only six percent of all ordinances identified across the country. The small number of ordinances generally does not provide a large enough sample to draw any meaningful conclusions concerning local laws in these regions. For this reason, little emphasis will be placed on the western and central regions in subsequent sections of this analysis.

Regulatory Intent

The differences which exist between local ordinances can be largely explained by social variation among regions. The intent of the local forest law reflects the attitudes and perspectives of the government, community and individuals who enacted it. The following section will examine some of the differences which characterize local regulation in the Northeast and South.

The fundamental difference in regulatory intent of ordinances in the northeastern and southern regions is shown in the proportion of timber harvesting and public property ordinances identified in each region. Forty-nine percent of all ordinances in the northeastern region restrict timber harvesting activities, while public property ordinances represent less than one percent of the regional total. In contrast, forty-one percent of the ordinances identified in the southern region are public property ordinances, and only three percent are timber harvesting laws. If state mandated laws are omitted from the southern total, public property ordinances represent seventy percent of the regional total. Public property ordinances were by far the most common variety adopted by local governments in the southern region, with timber harvesting laws accounting for only a marginal number of ordinances. This is an important distinction, since the majority of laws identified in the South do not restrict forestry activities per se, but are only restrictive to hauling activities. This contrasts sharply with many northeastern ordinances which were adopted for the purpose of regulating forest harvest activities.

Most northeastern ordinances were adopted for the sole purpose of restricting harvest activities. In most cases, timber harvesting is viewed as destructive by these governments. The purpose of their laws is to protect against environmental degradation which could result from unrestricted logging. Environmental protection, tree protection and special feature ordinances are usually enacted to protect environmental features.

Not all ordinances, however, were adopted for this purpose. Public property laws, for example, are used to limit damage to local roads and protect motorists from potential traffic hazards. Most of these laws were enacted for financial and not environmental considerations. It is impossible, of course, to completely separate the objectives of maintaining environmental quality and safeguarding financial interests of local governments and their citizens. These objectives are closely linked. Laws developed to limit environmental damage also protect financial interests. The initial motivation for enacting these laws was generally not to protect financial interests but to provide the more intangible goal of environmental quality. Although several timber harvesting, environmental protection and tree protection ordinances are concerned with limiting financial losses from environmental destruction, the vast majority were adopted to maintain environmental values.

These relationships are shown in the following "statements of regulatory intent" of timber harvest and public property ordinances identified in this study. The objective of most timber harvesting laws is shown in the following excerpt:

"These regulations are intended to protect the rights of the residents of the Township to enjoy clean air, pure water and the natural, scenic, historic and aesthetic values of the environment..."(Ordinance No. 3155, Lower Merion Township, Pennsylvania 5/17/89).

The primary intent of these types of laws is the protection of the natural environment. This contrasts with the intent of most public property ordinances. A Butts County, Georgia hauling ordinance reflects the intent of many ordinances of this type. These laws were generally enacted to:

"protect the county road system, ditches, and bridges from damage and excessive maintenance costs in connection with pulpwood, logging and timber operations" (Pulpwood, logging or timber harvesting operation resolution, Banks County, Georgia 9/12/89).

The purpose of this law, and many others like it, is to safeguard the financial interests, not environmental quality. The objectives of northeastern and southern ordinances are fundamentally different. Whereas, northeastern laws are enacted primarily for environmental concerns, southern ordinance are generally adopted to regulate the use of public property.

Evolution of Forest Ordinances

The scope and objectives of local forest regulatory ordinances differ dramatically between the northeastern and southern regions. This variation is largely attributable to the social, political and economic characteristics of these regions. These same factors have defined the proliferation of local laws within these regions. These differences will be examined to illustrate trends in the growth and intent of forest ordinances.

The total number of ordinances in the Northeast identified by objective category and time period are shown in Figures 5.4. The growth of ordinances in most categories began in the early 1970's. Timber harvesting ordinances are the largest and most rapidly growing category of local forest ordinances in the Northeast. Only small numbers of tree protection and public property were identified in each period. These ordinances show no identifiable trend. The large number of environmental protection ordinances identified in the 1985-1989 time period is largely due to the adoption of state mandated "soil erosion" ordinances in

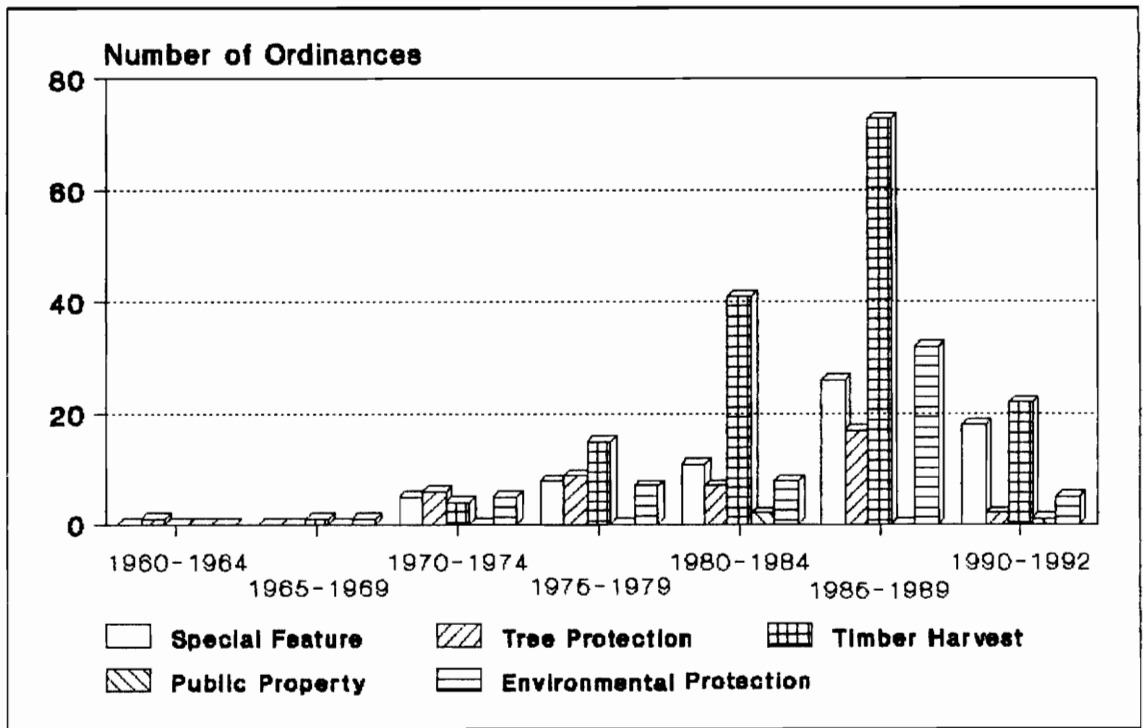


Figure 5.4 Ordinances by objective and time period, northeastern region

Maryland. Similarly, the large numbers of special feature ordinances identified in the late 1980's and early nineties are associated with state programs in Maryland and Maine.

The number of ordinances by objective category in the southern region is shown in Figure 5.5. Only marginal numbers were identified in until the early 1980's. The only category of laws which has exhibited consistent growth are public property ordinances. The large number of special feature ordinances identified in the 1990-1992 time period represents the forty-three "Chesapeake Bay Preservation" laws adopted in Virginia. Small numbers of tree protection, environmental protection and timber harvesting ordinances are scattered among time periods.

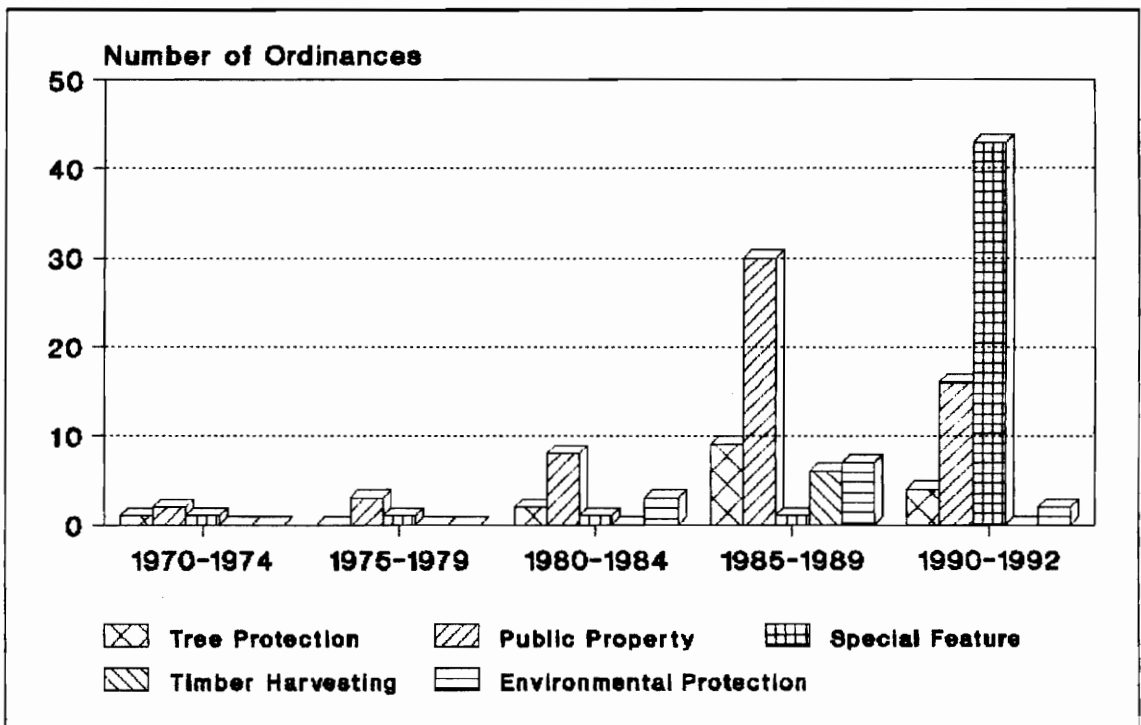


Figure 5.5 Ordinances by objective and time period, southern region

Public property laws are the only category which have exhibited consistent growth. Although large numbers of special feature ordinances were identified, trends in their growth are not apparent from this graphic. The categories of local laws which have shown growth in the North and South are quite different. The factors which have contributed to this variation will be outlined in the following section.

Regional Environmentalism

One possible explanation for the differences in the local regulatory intent of forest laws in the southern and northeastern regions could be the level of environmental concern which characterizes individuals in these regions. This does not mean to imply that all individuals within a given region view environmental issues similarly. It only means that regional culture and tradition shape attitudes and perceptions. These factors have a strong influence on how individuals view the role of government in regulating land use.

The difference between northern and southern attitudes toward land use and the environment has a long history. The Northeast has been industrialized for well over one hundred and fifty years, whereas the South has been dependant on its land and natural resources throughout much of its history. As early as 1890, the entire industrial output of the South was worth less than half that of the state of New York (Roland 1975). The southern economy has a long tradition of reliance on extractive industries such as agriculture, forestry and mining. These relationships have undoubtedly shaped the environmental attitudes of these

regions.

Southerners have traditionally shown less interest in participating in environmental movements as compared to other regions of the country. The conservation movement of the late nineteenth century, for example, was limited primarily to the industrial North and the western United States. Southerners showed little interest in participating in this movement (Cowdrey 1983). Similarly, the modern environmental movement of late 1960's and early 1970's also found little support in the South. Despite the growth of environmental sentiments across the country and the support of a pro-environmental, southern President, Jimmy Carter, this movement had very little grassroots appeal. The unpopularity of environmentalism is primarily due to its opposition to resource use and development. Many southerners view the movement as an attempt to impede economic growth and development in their region and limit private property rights (Cowdrey 1983, Clark 1984).

The idea that support for environmental issues is less prevalent in the South as compared to other regions of the country has received considerable empirical support. A 1980 study conducted by George Lowe and Thomas Pinhey showed that southerners are generally less concerned with environmental issues than are other regions of the country. Approximately 9,000 individuals of varying socio-economic backgrounds were surveyed in all regions of the country. Respondents were asked to rank a list of national problems on a scale of importance. This ranking was then used to compute an "environmental priority" score. Respondents in the South were found to have the lowest "environmental priority" score of any region.

Differences in traditional attitudes toward land uses and variation in the level of ambient environmental quality were cited as the primary reasons for this outcome (Lowe et. al 1980). Industrialized states which have large amounts of water and air pollution would be expected to be more sensitive to environmental quality issues and natural resource degradation; as compared to, the South, which is relatively free of large scale industrial pollution.

An important point that can be drawn from Figure 5.4 and Figure 5.5 is that the proliferation of local forest laws began in the Northeast much earlier than it did in the South. Forest practice ordinances originated in the northeastern region in the early 1970's; however, they were not common in the southern region until the early 1980's. It is also interesting that the initial growth of local laws in the Northeast generally coincides with the growth of the modern environmental movement in the early 1970's. This does not mean to imply a cause and effect relationship between environmentalism and local forest laws. The environmental movement did, however, increase public awareness of environmental problems. It also convinced many people that a role existed for government in the regulation of land use and environmental activities (Morrison and Dunlap 1986, Van Liere and Dunlap 1980). These factors associated with the traditions of self-government and "home rule" have resulted in environmentally motivated local laws in the Northeast. It is also important to point out that large populations shifts from urban to more rural areas in the Northeast began in the early 1970's (Tucker 1976). The infusion of environmental attitudes and perspectives into previously

rural areas has been cited by several authors as a reason the growth of local laws (Hogan 1983, Cabbage 1985).

The situation in the South is different. Large numbers of ordinances were not identified in this region until the early 1980's. The vast majority of these laws were not environmentally motivated, but financially motivated haul restrictions. It has been suggested that new mill openings and "wetter than average" weather conditions have contributed to the growth of local laws in some areas of the South (Greene et al. 1991) It is unlikely that these factors are the primary reasons for the growth of local forest laws in the South. Changes in federal, state and local highway funding and innovations in the manner in which forest products are hauled appear to be more obvious reasons for this proliferation.

State and Federal Highway Aid to Local Governments

Changes in the allocation of state and federal highway aid is an important factor which has contributed to the growth of local forest hauling laws in the South. The 1970's witnessed major increases in state aid to localities for a wide variety of public programs. Since 1980, however, state and federal aid to local governments has shown little growth, in fact, aid to several local government programs has actually declined in this period (Gold 1983, Tax Foundation 1988, ACIR 1991).

Traditionally federal and state highway aid represents a major component of most local highway budgets (ACIR 1980). Local highway budgets generally cover the construction, maintenance and operation of all

highways, roads, streets and bridges. In a study conducted in the early eighties, state highway aid was found to be the slowest growing category of local assistance in the country (Gold 1983). Since 1981, annual growth of state highway aid to local governments has averaged less than five percent per year, in real dollars (ACIR 1991). Over this same period, state highway aid, in real dollars, has actually decreased in the six states: Georgia, Louisiana, Mississippi, New Jersey, South Carolina, and South Dakota (ACIR 1991). Four of the six states found to have decreasing annual levels of state to local highway aid were in the southern region. Figure 5.6 shows the average annual growth rate of highway aid by state in the southern region from 1980 through 1990 (states in which hauling ordinances were identified are cross-hatched). Interestingly, three of the four southern states with hauling regulations were found to have decreasing levels highway aid to local governments in real dollars. This is not a perfect relationship; however, an ordinance was identified in Arkansas which experienced net growth, and no ordinances were identified in South Carolina which observed a sizable reduction in aid.

Another factor which has contributed to the fiscal difficulties of local governments has been decreasing levels of federal highway aid to states. In many states, a large portions of federal highway aid is apportioned directly to local highway programs. Throughout the 1980's and early 1990's, federal highway aid has not experienced any significant annual growth, in fact, federal aid in real dollars has actually decreased in four of the last ten years (ACIR 1991). Reductions in federal aid and recessionary economic trends in the early eighties and nineties have

worsened state and local highway fiscal problems (Tax Foundation 1988).

Sluggish economic conditions have also been extremely restricting to state highway programs. They are particularly income elastic, as compared to other state programs, due to their reliance on state gasoline tax proceeds for revenue. Although local programs, based on property taxes and vehicle registration, are less income elastic than state programs, they have been severely inhibited by recessionary pressures. A large portion of local highway funds are generated from "earmarked" state gasoline tax revenues (Engel 1985).

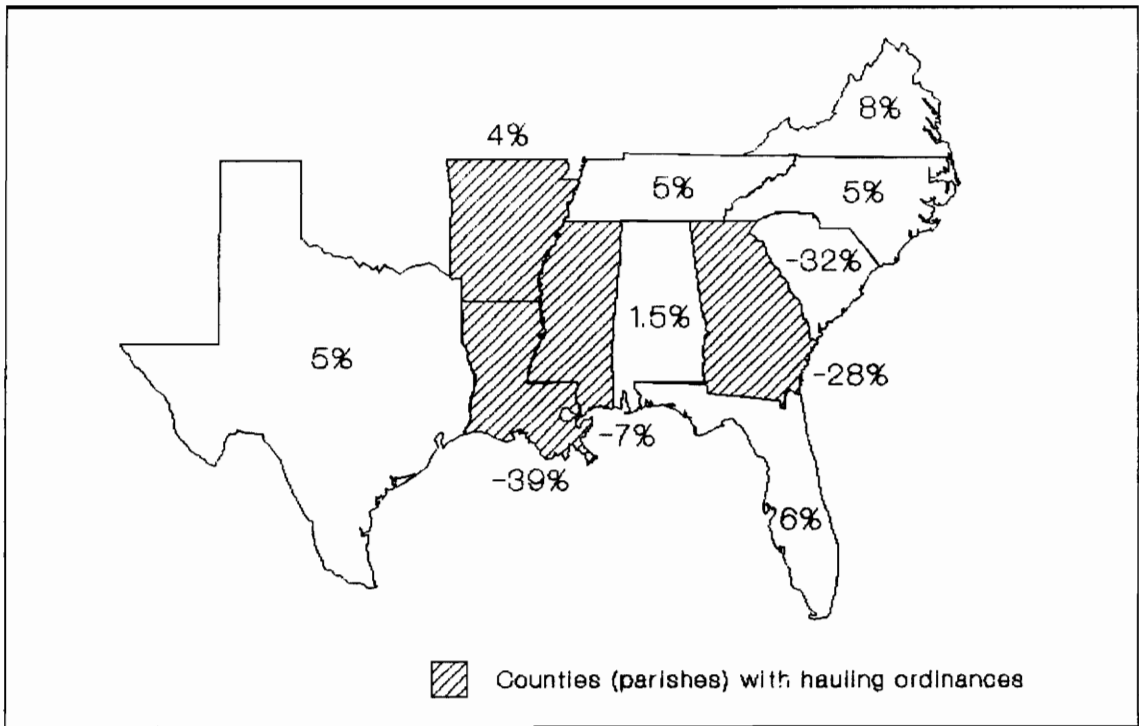


Figure 5.6 Highway aid growth (1980-1990) and local hauling ordinances

Local governments finding themselves with a larger portion of the construction and maintenance cost for local roads, bridges and rights-of-way may attempt to limit activities viewed as destructive. By its nature, logging operations generally require that roads and rights-of-way must be travelled upon at all times of the year in all weather conditions. In addition, log trucks have a greater opportunity to track mud and debris onto local roads as compared to most other hauling vehicles. For these reasons, logging trucks and equipment have been tempting targets for local governments wishing to reduce maintenance costs.

Methods of Trucking

The growth of local forest trucking ordinances in the South is associated with changes in the manner in which pulpwood is transported. The evolution of pulpwood transportation in the South is reflected (if not overstated) by the following quote by Charles Roland:

"Pulpwood trucks with their characteristic three steel stanchions, clanging stick loader cables, and battered bodies long ago replaced farm wagons and mules...Now even the day of the ugly pulpwood truck is numbered by the appearance of the air-conditioned, heavy duty long-log vehicles, which haul astonishingly heavy loads of full-length trees"

Bobtail and tandem-axle trucks which once carried relatively light loads of shortwood have been replaced by tractor and trailers capable of carrying large, heavy loads of tree length material. Tractor and trailers can easily haul loads well in excess of 80,000 pounds, over twice the payload of a double axle truck. This trend is shown by comparing surveys of loggers and pulpwood contractors in the South conducted by the American

Pulpwood Association in 1977 and 1987. These surveys sampled several thousand loggers and pulpwood contractors in nine southern states to compile personal statistics, production information and an inventory of logging equipment (Watson et al. 1977 and 1987). The shift from small to large log and pulpwood hauling equipment is dramatically shown by comparing haul equipment inventories between these surveys. Table 4.3 shows the percentage of log and pulpwood trucks inventoried in the South divided into four size categories: tractor and trailers; tri-axle; tandem axle; and single axle trucks in 1977 and 1987. In 1977, tractor and trailers represented only twelve percent of all vehicles inventoried in the South. By 1987, tractor trailers were the most popular method of transport, accounting for sixty-two percent of all haul vehicles inventoried. Similarly, single-axle trucks which represented the primary transport method in 1977, represented for only seventeen percent of the vehicles sampled in 1987.

Table 5.6 Type of hauling equipment as a percentage of southern equipment inventory total 1977 and 1987

Hauling Equipment	1977 (%)	1987 (%)
Tractor and Trailer (gas and diesel)	12	62
Tri-axle (gas and diesel)	1	5
Tandem-axle (gas and diesel)	23	16
Single-axle (gas and diesel)	64	17

Changes in harvesting technology changes in furnish requirements for mills have prompted logging and pulpwood contractors to move to larger equipment capable of hauling much heavier loads. As the size of equipment and loads has increased, so has the possibility of weight damage and increased local forest regulation.

Summary

The regulatory intent of local laws is important for two reasons: first, it justifies the adoption of local ordinances; and second, it provides insight into the attitudes and perspectives of the government which enacted it. Local forest ordinances have a wide range of diverse objectives. Ordinances identified in this study were separated into five categories based on their regulatory intent. These groupings include: timber harvesting, public property, tree protection, environmental protection and special feature protection ordinances. Timber harvesting ordinances represent thirty-seven percent of the national total. Special feature, environmental protection and tree protection account for twenty, fifteen and thirteen percent, respectively. Public property ordinances represent twelve percent of all sampled ordinances.

The most prominent category of locally generated ordinances in the northeastern region are timber harvesting ordinances, which represent approximately fifty percent of the regional total. Public property laws are the largest category in the South. State programs were important sources of local laws in all regions. Ninety-five percent of the special feature ordinances and over sixty percent of the environmental protection

ordinances in the South were adopted pursuant to a state program. Similarly, ninety percent of the special feature ordinances and fifty percent of the environmental protection ordinances in the Northeast are enacted to comply with a state program. Local regulation in the West is largely defined by state legislation. The Northeast and South are the only regions which have experienced a large number of locally enacted forest laws.

The objectives of forest ordinances in the northeastern and southern regions are fundamentally different. Northeastern ordinances are principally concerned with protecting environmental quality and aesthetics from unregulated harvest activities; by contrast, southern ordinances are generally concerned with protecting local roads and structures from logging trucks and equipment. The proliferation of local laws in the North is associated with the growth of environmental sentiments and strong traditions local government. Spiraling road construction and maintenance costs, decreasing levels of state and federal highway aid and changes in hauling methods contribute to the growth of local laws in the South. Differences between the regulatory objectives and provisions of local laws in the Northeast and South will be more fully outlined in subsequent chapters.

Chapter 6. Regulatory Provisions

The impact of local forest ordinances are determined, in a large part, by the regulatory provisions which are contained within them. The rules, requirements and specifications outlined by these laws will define their stringency and their usefulness as tools of local forest policy. To comprehend the effect of forest ordinances, one must first understand the activities which are regulated by them. As was outlined in the last chapter, the regulatory intent of local forest ordinances differs dramatically among states and regions of the country. The provisions adopted to achieve these objectives show a similar degree of variation. Differences in the requirements and provisions of local forest ordinances will be described in the following chapter.

"Common" Regulatory Provisions

The following section outlines "common" categories of requirements identified by region (Figure 4.1). Common provisions are defined as any requirement which is identified in at least ten percent of all ordinances within a region. The ten percent figure is somewhat arbitrary; however, it creates a sample of the most frequently encountered requirements of local forest ordinances. Examination of common requirements provides useful insights into the local regulatory environment in each region of the country.

Northeastern Region

Eleven categories of common provisions were identified in the Northeast. The large number of categories is representative of the variability in local forest laws. The following section will outline common categories of requirements in the Northeast.

Harvest Permits. Over sixty-nine percent of the forest ordinances in the Northeast require persons wishing to log to obtain a harvest permit. Applicants must submit a completed application for each harvesting operation. Applications generally include: a site description; an explanation of proposed operations; copies of the logging contract; the deed of the forestland; and the names, addresses and phone numbers of all parties. An approved forest management plan and a public hearing may also be required. Local officials are usually responsible for reviewing permit applications; although, local governments may hire a forest consultant (at the expense of the applicant) to review permit applications.

The average permit fee ranges between twenty-five and fifty dollars. Several ordinances structure fees around the size of the harvest site, charging one to five dollars per acre. In most cases, fees are relatively small. Several local governments do, however, charge large, and in some cases, exorbitant fees for permit applications. Larger fees are generally associated with development orientated ordinances; however, several laws adopted to restrict forest activities also require large fees. For example, the Towns of Carmel

and Mamakating in New York and Upper Yoder Township, Pennsylvania require a fee of \$100 for each harvest operation. Chapman and Noyes Township in Pennsylvania have a \$200 permit fee. The Town of Hillburn, New York charges \$250 to consider a permit application, and the Town of Warwick, New York demands \$500, plus ten dollars per acre for each acre harvested. Permit fees are generally required for "processing" purposes and are non-refundable when applications are denied. Most permit applications are reviewed within thirty days.

Forest Management Plans. Sixty-two percent of the ordinances in the Northeast require forestry activities to comply with a written forest management plan. Plans must include the following: the location of proposed roads, buffers and improvements; descriptions of timber types and natural features; regeneration plans; and explanations of potential environmental impacts. Management plans must be written by a professional consulting forester; in several cases, plans must also be developed by "approved" forest consultants. Several localities also require biologists, hydrologists or archeologist to participate in the review process. The timber harvesting ordinance of Wellington Maine contained the following provision:

"An evaluation, by a biologist chosen by mutual consent of the applicant and the Board, of the extent and presence of plant species and wildlife associated with the area and an analysis of the probable effect of the proposed activity upon these species and indigenous animal life. The applicant shall be responsible for payment to the biologist"

Local laws may also contain special provisions for management

plans. Clearing the site of litter and garbage, and replanting and regeneration provisions are common standards for management plans. For example, Salford Township, Pennsylvania requires the reseeding of denuded areas with "native species, grass seed or wild flower mix". Similarly, McCandless Township in Pennsylvania dictates that management plans must comply with the following provision:

"where a logging operation has been completed, the property shall be replanted with trees of a similar nature measuring a minimum of two feet in height to replace the trees which were cut"

Other criteria are much more peculiar. Salisbury Township in Lehigh County, Pennsylvania requires that "wild grapevines may be cut or removed only to the extent that such cutting or removal does not qualitatively affect wildlife food supply". Unusual standards for management plans are relatively uncommon.

Public Hearing. A public hearing is required for harvest permit approval in eight percent of northeastern localities. The purpose of hearings are to provide the operator and all other interested parties an opportunity to comment on the permit application or management plan. The cost of conducting and publicizing the hearing is usually the responsibility of the applicant. Publicity typically involves announcements in local newspapers and notification of adjacent property owners. Local governments are mandated, in most cases, to render a decision on permit applications within two weeks to a month after the public hearing.

Notification of Local Governments. Many forest laws require loggers to notify local officials before commencing or ceasing operations. Notification provisions are found in twelve percent of the northeastern governments. Applicants must inform officials two to three days before the beginning and end of harvest operations. Notification by phone is usually adequate, although written statements are required by several localities.

Performance Bonds. Performance bonds, surety bonds or irrevocable letters of credit are required in approximately thirty-five percent of northeastern ordinances. In most cases, bonds range from \$200 to \$1,000. A large degree of variation exists in the actual amount of bonds. For example, the Town of Tuxedo New York requires a bond equalling thirty dollars per acre, up to \$5,000. The Town of Mamakating, New York requires a \$25,000 surety for all forest harvest activities. Center Township, Pennsylvania requires a bond for each mile of road travelled by logging equipment. Center requires \$6,000 per mile of unpaved road travelled upon plus \$12,500 per mile of macadam (asphalt) road. Queen Anne's County Maryland requires a surety equal to 125% of the restoration cost of all potential damage. Although extremely large bonds are required in some areas, the average performance bond in the northeastern region is \$500 or less.

Harvest by Selection. Requirements that harvests must be by selection are found in approximately twenty-five percent of regulated

communities. The majority of these ordinances explicitly prohibit clear-cutting. The applicability of these laws is difficult to determine, since very few ordinances actually define the term "clear-cut". When it is defined, its definition varies greatly. For example, the Town of New Castle New York defines clear-cutting as "any cutting of more than ten trees". The Town of Stockholm, Maine defines a clear-cut as the removal of timber from 44,000 square feet (approximately one acre) of forest land.

In most cases, openings are not to exceed a fifth of an acre (approximately 8,700 square feet). Other provisions require fixed percentages of residual forest stock to be maintained after harvest. For example, Coolbaugh Township Pennsylvania demands that no more than thirty percent of the forest cover can be removed within a given time period. Similarly, Nockamixon Township Pennsylvania requires that no more than fifty percent of the trees in a harvest site can be removed in any one year. Financial conditions and regulatory constraints may compel loggers to "high-grade", since loggers may be forced to leave poor quality trees to achieve minimal stocking standards. In several cases, clear-cutting provisions were created to limit aesthetic degradation, not to foster sound silvicultural practices. For example, Bar Harbor Maine "expressly" prohibited "clear-cutting" and the "use of skidders" to protect the environmental resources of the town. The town expressed the opinion that clear-cutting and skidding by definition are environmentally destructive.

Buffer Zones. Buffer zone requirements are found in forty-three percent of northeastern localities. Buffer zones are most commonly required along watercourses, property lines, roads and drainage facilities. In most cases, buffers are to be left in their natural state; however, several ordinances allow limited harvesting within these zones. Buffer widths range between fifty and one hundred feet. Zones adjacent to streams, lakes and wetlands usually require larger widths. Several ordinances in Maine determine buffer widths by the slope of protected areas. Buffer vary from twenty-five feet in relatively flat areas to 165 feet in areas with slopes exceeding seventy percent. Some ordinances prohibit all forestry activities on "steep" slopes. Harmar Township, Pennsylvania, for example, restricts logging on any site with a slope exceeding twenty-five percent.

Logging Slash. Logging slash and debris provisions are found in thirty-one percent of northeastern ordinances. Most provisions require that slash can be placed no closer than fifty feet from any watercourse, road or property line and can lie no higher than four feet off of the ground. These restrictions were generally adopted to protect drainage structures and streams from obstruction and to limit visual degradation. Most requirements of this type are quite reasonable; however, several laws are rather rigorous. For example, Marshall Township, Pennsylvania demands that all logging slash must be chipped and spread across the harvest site. Similarly, Harmar Township in Pennsylvania requires "all logging debris, including small tree tops and branches shall either be

hauled from the site or properly mulched on the site and spread". Provisions requiring the chipping or removal of logging slash are relatively uncommon. It does, however, represent another example of a potentially counter-productive requirement. The benefits of logging slash for wildlife cover, for example, are not addressed by these provisions.

Bridges and Culvert Required. The requirement that stream crossings use a bridge or culvert is identified in thirty-one percent of regulated localities. In several localities, only perennial streams require a bridge or culvert. Most ordinances, however, required structures for all stream crossings, regardless of their size. The design and location of stream crossings is determined by the local code enforcement officer. Most structures are temporary in nature; following harvest, culverts and bridges are to be removed and the site is to be restored to its original condition. The reimbursement of bonds is usually linked to the restoration of stream crossings.

Time and Date Restrictions. Restrictions on forestry operations during certain times and on certain dates and seasons were identified in approximately ten percent of northeastern ordinances. The Town of Fishkill, New York prohibits forest activities between 5:00 pm. and 7:00 am., and on New Years' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas Day. Most laws of this type are identical to Fishkill's law. Many ordinances of this type are much less explicit.

The Towns of Irondequoit and Webster, New York restrict forest activities and skidding during "wet months". The definition of "wet months" is not outlined in either law. Many provisions of this type empower local governments to curtail harvest and hauling activities whenever these operations will result in a traffic hazard, a fire danger or a nuisance to adjacent property owners.

Best Management Practices. Adherence to best management practices is required in seven percent of northeastern ordinances. These provisions usually require forest operations to comply with state timber harvesting guidelines. Local governments are essentially mandating criteria which had previously been voluntary. Provisions for stream crossings, buffers and requirements for forest road construction are common best management practices. Management guidelines in Maine are the only requirements which do not refer to state standards. Forest road construction and maintenance in several localities in Maine must comply with the U.S. Forest Services' road construction criteria, outlined in "Permanent Logging Roads for Better Woodlot Management".

The guidelines specified in state best management practices are very similar to many of the common requirements of local forest laws in the Northeast. Bridges and culverts at stream crossings, buffer zones, management plans and logging slash requirements are all common best management practices. The important distinction is that while state guidelines are relatively uniform, forest ordinances are not.

Distribution of Provisions

The number of localities in the northeastern region which were found to contain common regulatory provisions are shown in Table 6.1. Provisions are separated into three categories based on their level of use or subscription. Common requirements which were identified in over fifty percent of regulated communities are associated with a "high" level of use. Provisions identified in twenty to fifty percent of localities are identified with a "moderate" level of use. Requirements identified in less than twenty percent of regulated governments are cited as "low" levels of use. Although these groupings are arbitrary, they do provide a convenient means of indicating the pervasiveness of certain local regulatory provisions.

Of the 322 localities with local forest laws in the Northeast, over sixty percent require harvest permits and management plans for timber harvesting activities. Permits and management plans were required by a "high" percentage of localities in the Northeast. Provisions for buffer zones, performance bonds, stream crossings, and harvest methods were identified in a "moderate" percentage of northeastern localities. A "low" proportion of governments enacted provisions requiring notification, time and date restrictions, public hearings and the adherence to best management practices.

The overall lack in uniformity of ordinances is shown in the low percentages of governments which have enacted these provisions. Over half of the requirements identified as common are found in less than a third of regulated governments. The only provisions which are truly

Table 6.1 Common regulatory provisions by locality, northeastern region

Common Regulatory Provisions	Number of Northeastern Governments with Provision (Number)	Percentage of Northeastern Governments with Provision (%)	Level of Use
Harvest Permits Required	230	69	High
Forest Management Plan Required	205	62	
Buffer Zones Required	142	43	Moderate
Performance Bond Required	115	35	
Streams Must be Crossed with Culvert	112	34	
Logging Slash Requirements	102	31	
Harvest Must be by Selection	82	25	
Local Notification Required	39	12	Low
Time and Date Restrictions	36	11	
Public Hearing	26	8	
Best Management Practices Required	24	7	

common are harvest permits, management plans and buffer zones, which were identified in approximately fifty percent of regulated governments.

Counts of regulatory provisions by state in the northeastern region is shown in Table 6.2. Harvest permits are required in approximately eighty percent of the localities in New Jersey, New York and Maryland. Seventy percent of Connecticut's localities and sixty percent of Pennsylvania's local governments require harvest permits. Forest management plans are also prevalent requirements in these states.

Table 6.2 Common regulatory provisions by state, northeastern region³

Common Provision	CT	ME	MD	MA	NH	NJ	NY	PA
Harvest Permits Required	20 69%	30 55%	18 78%	0 0%	3 60%	65 83%	42 79%	52 60%
Forest Management Plan Required	16 55%	10 18%	23 100%	1 50%	3 60%	61 78%	34 64%	57 66%
Buffer Zones Required	10 34%	46 84%	14 61%	0 0%	3 60%	28 36%	22 42%	19 22%
Performance Bond Required	10 34%	3 5%	18 78%	0 0%	1 20%	31 40%	26 49%	26 30%
Stream Crossings Must Be Crossed with Bridges or Culvert	2 7%	92 58%	1 4%	0 0%	0 0%	24 31%	21 40%	32 37%
Logging Slash Requirements	3 10%	47 85%	1 4%	0 100%	0 0%	22 28%	14 26%	15 17%
Harvests Must be by Selection	0 0%	47 85%	1 4%	2 100%	0 0%	0 0%	8 15%	24 28%
Local Notification Required	1 3%	8 15%	0 0%	2 50%	0 20%	1 1%	7 13%	9 22%
Time and Date Restrictions on Harvest	8 28%	8 15%	0 0%	1 50%	1 0%	0 0%	11 21%	8 9%
Public Hearing Required	4 14%	10 18%	1 4%	0 0%	0 0%	1 1%	6 11%	4 5%
Best Management Practice Required	0 0%	8 15%	2 8%	0 0%	0 0%	2 2.5%	4 8%	8 9%

Forest harvest permits and management plans are the only requirements in the Northeast which have been adopted by a large percentage of localities in most states. The large proportion of localities in Maryland which require buffer zones and performance bonds and the high

³Percentages represent the proportion of regulated localities which have enacted "common" provisions

percentage of Maine's communities which require slash provisions and harvest methods are attributable largely to state programs. Since these programs specify guidelines, they generally encourage more uniformity of provisions.

Requirements for bridges and culverts at stream crossings are found in approximately thirty percent of regulated localities in New York, Pennsylvania and New Jersey. These requirements are generally enacted to minimize erosion and sedimentation during skidding. Provisions for the disposal of logging slash are found in New Jersey, New York and Pennsylvania but are, by far, most prevalent in Maine, where over eighty-five percent of regulated communities place restrictions on the deposition logging slash. Notification of local officials, date and time restrictions and public hearings are required by small numbers of governments in Connecticut, Maine, New York and Pennsylvania. Adherence to best management practices is the least common category in the Northeast.

The low numbers of local governments identified in each category of common requirements reflects the variation which exists among ordinances. Local forest laws are generally enacted to serve very specific purposes; for this reason, it is difficult to categorize their requirements. This categorization does, however, provide a sense of the scope of local forest laws. The specific provisions identified in each local government in the northeastern region is contained in Appendix C (Table C.1).

Southern Region

Eleven categories of common provisions were identified in the southern region. Like the northeastern region, a considerable amount of variation exists between local requirements. Nevertheless, provisions can be meaningfully grouped into "common" categories of requirements. Trends in the scope and extent of forest regulatory provisions in the South will be outlined in the following section.

Best Management Practices. Adherence to best management practices is a common provision in the southern region. Approximately forty percent of southern localities require harvesting and silvicultural activities to comply with state best management practices. In these cases, previously voluntary guidelines are made compulsory. Provisions for reseeding forest roads, requirements for waterbars, stream management zones and residual stocking standards are all common requirements of best management practices. Best management practices are usually adopted to minimize erosion and sedimentation associated with forest road construction and skidding.

Hauling and Harvest Permits. Hauling and harvest permits are required in thirty-four percent of regulated governments in the South. In contrast to the northeastern region, southern permits usually do not regulate forestry operations per se, but restrict the transport of forest products. Most provisions of this type require a permits for any person wishing to haul forest products over local roads, bridges,

ditches and rights-of-way. Several localities in Florida require permits for harvesting operations. Applicants must submit the name and address of the landowner and logger, information on the objectives of the operation and a description of harvest methods. The City of Gainesville, Florida requires that all adjacent property owners must be notified of the proposed operation. If less than twenty percent of the notified owners file a written objection, the permit is issued. If over twenty percent of the property owners file written objections, a public hearing will be held to evaluate the permit application. Permits for logging operations are relatively uncommon in the South.

In most cases, permits are only required for hauling activities. Hauling permits usually require the following information: the location of the property; the name of the property owner; the name of the logging firm; starting and completion dates; the hauling equipment to be used; and the location of all roads, bridges, ditches and rights-of-way which will be crossed. Permit applications are usually informational and are granted in one day. In several cases, hauling routes must be approved by local officials. Most permit fees are nominal, ranging from ten to twenty five dollars. Several localities do charge substantial fees. Livingston Parish, Louisiana requires a \$100 dollar hauling fee. Permit fees of \$150 are required in DeKalb County, Georgia and St. Tammany Parish, Louisiana. St. Landry Parish, Louisiana requires a \$200 dollar fee for anyone wishing to transport forest products on local roads. In all cases, permit fees are for administrative purposes and are non-refundable if permit applications are denied.

Performance Bonds. Many southern ordinances require the posting of a surety or performance bond to protect local roads and structures. Performance bonds range between \$500 and \$5,000; the average bond rate in the South is approximately \$1,000 dollars. Most performance bonds are flat fees; however, several localities charge for the distance travelled. St. Tammany Parish, Louisiana requires one dollar for each linear foot of Parish road travelled upon plus \$5,000 dollars for each bridge crossed, up to \$25,000. The Town of Grifton, North Carolina, the only southern locality which requires a bond for timber harvesting operations, demands a bond of \$2,500 to \$25,000, depending on the size of the harvest site. In most cases, the bonds are refunded once roads and structures are restored to their original condition and all trash and debris is removed from the harvest site.

Roads and Rights-of-Way Must be Cleared of Debris. Provisions for the removal of mud and logging debris from local roads and rights-of-way are contained in approximately thirty percent of southern ordinances. Requirements of this type are generally enacted to: limit obstruction of drainage facilities; to protect motorists from mud and debris on roads; and to minimize traffic disturbances for school buses and emergency vehicles. Several laws require the use special equipment when clearing roads. For example, Union Parish Louisiana's Ordinance Number 311 requires all "wood hauling" operators using an entrance to a Parish road to station "a rubber tired tractor with a grader blade attached" to remove mud tracked onto local roads. Most ordinances, however, do not

specify the equipment or methods to be used to clear roads of debris.

Gravel Mats and Culvert. Eighteen localities in the southern region require the installation of gravel mats at entrances. In most cases, the length and depth of stone pads are not specified. Laws usually require that operators use "crushed rock or other materials" to limit the amount of mud tracked onto local roads. In many instances, culvert is also required to cross public rights-of-way. The installation of culvert when crossing local rights-of-way and ditches are required by approximately nineteen percent of southern localities. Applicants must install culvert under the supervision of a local governmental official; in several instances, the local government installs culvert at the expense of the logger or landowner. Specifications for sizes and types of culverts are sometimes included. All improvements are temporary, culverts are to be removed and all rights-of-way are to be restored once operations commence.

Notification. Approximately twenty percent of the regulated localities in the South require notification before forest products can be transported. Local officials must be informed of all hauling operations twenty four to forty eight hours before beginning or ending these activities. Notification by phone is usually adequate. In many cases, notification is used to assess the condition of roads prior to and after harvest. The reimbursement of bonds are often linked to this assessment.

Management Plan. Forest management plan are required in approximately fourteen percent of southern laws. Management plans are typically used to outline the activities of a proposed timber harvesting activity. Common specifications include: site maps, statements of intent, erosion and sedimentation provisions; and regeneration plans. Plans must be developed by a professional, consulting forester; in addition, biologists may also be asked to participate in this process. Consultant fees are the responsibility of the applicant.

Road Retirement. The stabilization of forest roads and entrances is mandated in twenty percent of regulated communities. Provisions of this type are designed to restore entrances, ditches and rights-of-way to their original condition. Unlike road retirement provisions in the Northeast, southern requirements usually involve the restoration of public ditches and rights-of-way; whereas, northeastern site retirement provisions require the reseeding of all skid roads and landings.

Buffer Zones. The creation of buffer zones between harvest sites, waterbodies, property lines and thoroughfares are found in nine percent of southern localities. Buffer widths varied between fifteen and one hundred and fifty feet. The average buffer is approximately twenty five feet. Buffer zones are generally required to limit sedimentation and shield logging operations from traffic and public areas.

Hauling Prohibited When Roads are Wet or Muddy. Requirements to

limit hauling operations during periods of rain are found in eight percent of southern laws. The purpose of most of these ordinances are to limit rutting and breakage of road surfaces during inclement weather. Local officials are empowered to stop hauling activities on roads and rights-of-way during "wet" or "muddy" conditions. The definition of "wet" and "muddy" is left to local officials.

Distribution of Provisions

Counts and percentages of common provisions in the South are shown in Table 6.3. An important point which can be drawn from this table is that none of these provisions is found in over forty percent of regulated communities. The level of subscription for all provisions were either "moderate" or "low". Ordinances in the South are generally adopted to achieve several objectives; therefore, they exhibit many different requirements.

Moderate numbers of governments in the South require best management practices, harvest and hauling permits, road clearing and local notification. Of the 135 local governments in the southern region, fifty-one, require adherence to state best management practices for forestry. Hauling and harvest permits are identified in thirty-four percent of southern localities. Twenty-four percent of southern governments with local forest laws require roads and rights-of-way to be cleared of trash and debris daily. Performance bonds are found in approximately twenty percent of regulated communities.

Table 6.3 Common regulatory provisions by localities, southern region

Common Regulatory Provisions	Number of Southern Governments with Provision (Number)	Percentage of Southern Governments with Provision (%)	Level of Use
Best Management Practices Required	51	38	Moderate
Harvest/Hauling Permits Required	46	34	
Roads/Rights-of-Way Must be Cleared of Debris Daily	33	24	
Performance Bonds Required	28	21	
Local Notification Required	26	19	Low
Culvert Required for Crossing Ditches and Rights-of-Way	24	18	
Forest Management Plan Required	19	14	
Gravel Mats Required at Entrances	18	13	
Forest Roads Must be Properly Retired	17	12.5	
Buffer Zones Required	12	9	
Hauling Prohibited When Roads are Wet or Muddy	11	8	

Low numbers of governments in the South enacted the remaining provisions. Local notification and culvert requirements are found in approximately twenty percent of southern localities. Management plans, installation of stone mats and provisions for road retirements are identified in fourteen, thirteen and twelve percent of southern governments, respectively. Buffer zones and prohibitions against hauling during wet and muddy weather were found in less than ten percent of southern ordinances.

The distribution of common requirements by state is shown in Figure 6.4. In states in which state programs influenced the adoption of local laws, such as Virginia and Florida, certain common provisions were adopted in large numbers. Best management practices were mandated in over ninety percent of Virginia's regulated localities; similarly, over seventy-five percent of Florida's governments require harvest permits for forestry activities. By contrast, independently enacted local laws exhibit much less uniformity. The specific categories identified in each local government identified with local regulations in the southern region are contained in Appendix C (Table C.2).

Central Region

Six categories of regulatory provisions were identified as common in the central region. Since a small sample of ordinances was found in this region (eight local laws), provisions identified in at least two localities were considered common. Common categories of local laws are outlined below.

Table 6.4 Common regulatory provisions by state, southern region⁴

Regulatory Provisions	AR	FL	GA	LA	MS	NC	VA
Best Management Practices Required	0 0%	8 32%	2 5%	0 0%	0 0%	0 0%	41 93%
Harvest/Haul Permits Required	1 100%	19 76%	19 46%	5 22%	1 100%	1 100%	1 2%
Debris Must be Cleared From Roads and Ditches	0 0%	0 0%	16 39%	6 27%	0 0%	0 0%	0 0%
Performance Bonds Required	0 0%	0 0%	21 51%	6 27%	1 100%	0 0%	0 0%
Notification Required	0 0%	0 0%	15 37%	10 45%	0 0%	1 100%	0 0%
Culvert Required When Crossing Ditches and Rights of Way	0 0%	0 0%	18 44%	6 27%	0 0%	0 0%	0 0%
Management Plan Required	0 0%	14 56%	0 0%	1 5%	0 0%	0 0%	4 9%
Gravel Mat Required at Entrances	0 0%	0 0%	18 44%	0 0%	0 0%	0 0%	0 0%
Forest Roads Must be Properly Retired	0 0%	0 0%	14 34%	2 9%	0 0%	0 0%	1 2%
Buffer Zones Required	0 0%	5 20%	2 5%	3 14%	0 0%	0 0%	2 5%
Hauling is Prohibited When Roads are Wet or Muddy	0 0%	0 0%	3 7%	8 36%	0 0%	0 0%	0 0%

⁴Percentages represent the proportion of regulated localities which have enacted "common" provisions

Harvest Permits. Forest harvest permits are required in seven of the eight localities which regulate forestry activities. Permit applications must include: the names and addresses of landowners and loggers; time schedules; statements of intent; and proof of ownership of the forest land to be harvested. The Town of West Bloomfield, Michigan also requires a public hearing for any permit application. In most cases, fees are required.

Performance Bonds. Four of the eight localities in the central region require loggers and log truckers to provide a performance bonds, letter of credit or an escrow accounts to insure compliance. For example, the Town of West Bloomfield, Michigan requires a bond equal the greater of \$5,000 or ten percent of the value of the proposed operation. The City of North Royalton, Ohio requires a bond of \$500 dollars per acre, and Winona County Minnesota imposes a bond fee of \$1,500 dollars for each harvest operation.

Regeneration Provisions. Regeneration provisions are found in three central region communities. In most cases, regeneration involves replanting trees and reseeding roads and landings. West Bloomfield Township, Michigan requires that all sites must be restored such that all stumps are cut "flush" with the ground and replanted and reseeded. Several ordinances require a one to one replacement of all trees removed. Replanting provisions are usually prominent components of forest management plans. The return of bonds and sureties is closely

linked to fulfilling these requirements.

Buffer Zones. Two localities in Michigan require buffer zones. The Town of West Bloomfield imposes a 100 foot buffer around the entire harvest area. The City of Southfield requires a buffer, of unspecified width, adjacent to all wetland areas. Buffer zones are used to minimize water pollution and sedimentation and to shield roads and neighboring properties from harvesting operations.

Slash Provisions. Localities in Michigan and Minnesota demand special requirements for the disposal of logging debris. Winona County, Minnesota requires that all slash is disposed in a "safe manner". West Bloomfield Township, Michigan orders all logging slash to be removed from the harvest site, cut to "firewood length" and stacked or chipped. These provisions were primarily enacted to minimize fire danger and to limit aesthetic degradation associated with accumulation of logging slash.

Distribution of Provisions

The number of communities in the central region which were identified with each common category is shown in Table 6.5. Harvest permits and management plans are contained in a "high" percentage of local laws. Requirements for performance bonds, regeneration, buffer zones and logging slash are found in a decreasing numbers of local governments. Common provisions identified by state are contained in

Table 6.5 Common regulatory provisions in the central region

Common Regulatory Provisions	Number of Central Region Governments with Provision (Number)	Percentage of Central Region Governments with Provision (%)	Level of Use
Harvest Permits Required	7	88	High
Management Plans Required	6	75	
Performance Bonds Required	4	50	Moderate
Regeneration Provisions	3	38	
Buffer Zones Required	2	25	
Logging Slash Requirements	2	25	

Table 6.6. Michigan dominates counts of common provisions. Of eight ordinances identified in this region, five are from Michigan. Single ordinances were identified in Indiana, Minnesota and Ohio (Appendix C (Table C.3)).

Western Region

Nine categories of common requirements are found in the western region. Local ordinances show a high degree of uniformity, in the West, primarily due to the influence of state forest practices. Local ordinances in California and Oregon, for example, are largely defined by state laws, which have resulted in relatively homogeneous local forest ordinances.

Table 6.6 Common regulatory provisions by state, central region⁵

Regulatory Provisions	IN	MI	MN	OH
Harvest Permits Required	1 100%	4 80%	1 100%	1 100%
Management Plans Required	0 0%	5 100%	1 100%	0 0%
Performance Bonds Required	1 100%	1 20%	1 100%	1 100%
Regeneration and Stocking Provisions	0 0%	2 40%	0 0%	1 100%
Buffer Zones Required	0 0%	2 4%	0 0%	0 0%
Slash Provisions	0 0%	1 20%	0 0%	0 0%

Harvest Permits. Harvest permits are required in eighty percent of western governments. Most harvest permits must include: a completed application; an approved forest management plan; a statement of intent; and a description of the environmental impacts of the operation. Public hearings are also required for permit approval in several localities. Most permit applications carry a fee ranging from ten to fifty dollars for each harvest. Lake County Colorado requires a seventy-five dollar fee for any forest activity.

Management Plans. Management plans are required in thirteen localities. Common criteria include: descriptions of the harvest site;

⁵Percentages represent the proportion of regulated localities which have enacted "common" provisions

a site map; and a list of all chemicals to be used. Management plans must be developed by a state registered, professional forester. Professional foresters are also required to mark trees and delineate roads, buffer zones and protected areas prior to harvest. A pre-harvest inspection by local officials is also required to determine the feasibility of the management plan. Local government review management plans in all states except California, where the State Department of Forestry has this responsibility. Several ordinances require biologist and hydrologist to participate in the process to insure harvest operations were not harmful to water and wildlife resources. The cost of retaining consults is the responsibility of the applicant.

Buffer Zones. Provisions for buffer zones for watercourses, property lines and roads are found in eight western localities. In most cases, logging activities are prohibited within 100 feet of any road or watercourse; however, the exact width of buffer zones varies considerably. Santa Cruz County California, for example, requires buffers of 200 feet along public roads, 300 feet adjacent to occupied dwellings and 500 feet around the nesting site of any "rare or endangered bird".

Performance Bonds. Six localities require the posting of performance bonds. Monterey, Santa Cruz and San Mateo Counties in California each require a financial surety not to exceed \$50,000 dollars. In California, bonds are posted with the State Department of

Forestry. In all other states, bonds are posted directly to the local government. To limit public liability, Bay City Oregon requires operations to show proof of at least \$50,000 in liability insurance.

Time and Date Restrictions. Restrictions on the time and date of operations are found in six of the eighteen regulated communities. Ordinances of this type generally restrict forest activities during certain hours, on weekends and holidays. Marin, San Mateo and Santa Clara Counties in California prohibit the use of "power" equipment within 300 feet of a residential area between 7:00 pm. and 7:00 am., on Saturday, Sunday and on legal holidays. These counties also have the authority to restrict log hauling during school busing hours and during periods of severe fire danger. Bay City, Oregon restricts all timber harvesting activities to daylight hours or between 8:00 am. and 7:00 pm., whichever is shorter.

Stocking and Replanting Provisions. Six localities in the western region require stocking and replanting provisions. In most cases, specific requirements are not stipulated. Although several ordinances establish levels of residual timber stock, most standards only allude to the structure of the residual stand. Marin County California requires that all harvest and regeneration activities must result in an "acceptable site class and distribution". A similarly ambiguous provision is found in Reedsport, Oregon which requires that regeneration must "improve the structural diversity of the forest".

Forest Herbicide Provisions. Approximately thirty percent of the local governments with forest laws in the West restrict the use forest herbicides. Management plans and permit applications generally require a complete accounting of all herbicides to be used and their method of application. In several cases, localities are empowered to restrict aerial applications of herbicides and to completely prohibit their use in specially protected areas.

Traffic Safety Provision. Marin, San Mateo, Santa Clara and Santa Cruz counties in California require loggers to post warnings, place flagmen at entrances and use pilot cars to protect the public from logging traffic. Requirements for flagmen and pilot cars are determined by the California Department of Forestry. Considerations for traffic safety are prominent features of forest management plans.

Clear-cutting Prohibitions. Marin County California and the City of Springfield in Oregon explicitly prohibit "clear-cutting". Although only two localities expressly forbid clear-cutting, it is unlikely that any local government would permit a sizable clear-cut. The regulatory objectives of ordinances in this region show an obvious orientation toward selection harvest techniques. In addition, several western states forbid clear-cutting in certain regions.

Distribution of Provisions

The number of localities in the western region which exhibit each common requirement is shown in Table 6.7. Harvest permits and management plans are identified in a "high" percentage of western localities. "Moderate" proportions of local governments enacted buffer zone requirements, performance bonds, time and date restrictions, stocking provisions, herbicide provisions and traffic safety requirements. Clear-cutting provisions were identified in a "low" percentage of regulated localities in the West.

Table 6.8 shows the number of local governments which contain each of these common requirements by state. The influence of state law in creating relatively uniform local regulation is shown in counts in California and Oregon. Eighty three percent of California's regulated localities require harvest permits and time and date restrictions on harvest operations. Management plans are required in 100 percent of California's communities. Seventy seven and fifty six percent of Oregon's localities require harvest permits and management plans, respectively. Single ordinances were identified in Colorado, Idaho and Nevada. The small number of ordinances identified in these states largely limit their analysis. Provisions contained in specific local laws are shown in Appendix C (Table C.4).

Table 6.7 Common regulatory provisions by locality, western region

Common Regulatory Provisions	Number of Western Region Governments with Provision (Number)	Number of Western Region Governments with Provision (%)	Level of Use
Harvest Permits Required	14	77	High
Management Plans Required	13	72	
Buffer Zones Required	8	44	Moderate
Performance Bonds Required	6	33	
Time and Date Restrictions	6	33	
Stocking Provisions	6	33	
Herbicide Provisions	5	27	
Traffic Safety Provisions	4	22	
Clear-cutting Provisions	2	11	Low

Penalties

Of the 493 localities identified with ordinances nationwide, only 339, 69%, include penalties in the text of their ordinance. In several instances, violations simply constitute a specific class of misdemeanor, the consequences of which is described elsewhere in the local governmental code. When penalties are explicitly stated they usually involve either a fine, a jail sentence, bond forfeiture, restoration costs, or a combination of all four.

Fines differ significantly in type and amount, most increase for repeated violations. In most cases, fines vary from \$250 to \$5,000

Table 6.8 Common regulatory provisions by state, western region

Regulatory Provision	CA	CO	ID	NV	OR
Harvest Permits Required	5 83%	1 100%	0 0%	0 0%	7 77%
Management Plans Required	6 100%	1 100%	0 0%	1 100%	5 56%
Buffer Zones Required	4 66%	0 0%	0 0%	1 100%	3 33%
Performance Bonds Required	4 66%	0 0%	0 0%	0 0%	2 22%
Time and Date Restrictions	5 83%	0 0%	1 100%	0 0%	1 11%
Regeneration and Stocking Requirements	2 33%	0 0%	0 0%	1 100%	3 33%
Herbicide Provisions	1 17%	0 0%	0 0%	0 0%	4 44%
Traffic Safety Provisions	4 66%	0 0%	0 0%	0 0%	0 0%
Clear-cutting Prohibitions	1 17%	0 0%	0 0%	0 0%	1 11%

dollars for each offense. Many fines are assessed on a daily basis, with amounts ranging from \$250 to \$2000 for each day a violation persists. Fines associated with tree protection ordinances are often charged per illegally cut tree. These fees range from \$100 to \$500 per tree. In most cases, local officials are given a range of penalties. For example, the Town of Carmel New York may impose fines which are "not less than twenty-five dollars and not more than 500 dollars" for each violation.

Imprisonment is available for chronic violators of local forest laws. Imprisonment is usually limited to ninety days or less, but jail sentences of up to year can be imposed. Of the 105 localities which allowed imprisonment, ninety percent could hold violators for a maximum of six months.

Finally, many local laws can require violators to pay restoration costs. Construction of erosion control devices (waterbars and broad based dips) and the replanting of trees and grasses damaged by operations can be imposed. In several cases, violators are directed to pay the total cost of restoration or a multiple of it. Most local governments have the authority to revoke permits and issue "stop work" orders for non-conforming activities; in addition, violation of local laws will generally result in the forfeiture of all bonds and sureties. Violators are responsible for court costs and attorneys fees accrued by the government in prosecuting the case.

Summary

The requirements and provisions of local forest ordinances are striking different in scope and purpose. Much of this variation is associated with differences in the intent of forest laws. Although the language of local regulatory laws differ, provisions can be separated into categories of common requirements. Standards for harvesting and hauling permits and management plans are shared by localities in all regions. Providing for buffers, the posting of bonds and special provisions for stream crossings and road and right-of-way maintenance

are also common. For the most part, the provisions of local laws are reasonable. Examples of peculiar and even deleterious local forest laws exist, although they are relatively uncommon. Many ordinances simply act to make voluntary state standards mandatory. Provisions for buffers, stream crossings, slash disposal and road construction, common to local forest laws, are generally consistent with state best management practices. In many cases, the stringency of local requirements to loggers and forest landowners have been exaggerated. Unfortunately, this analysis provides little insight into the effectiveness of these requirements in implementing local forest policy. This subject will be examined in subsequent chapters.

The burden of local forest laws to forest operators and forest landowners is not determined solely by the standards contained in them. The variation which exists among ordinances also imposes a burden on loggers and landowners. Forest operators must operate within the jurisdictions of many localities. Unlike a state-wide forest practice law, local regulation is far from uniform. Loggers and truckers must know which localities have forest laws and then must comprehend the requirements and nuances of these laws. Although the specific provisions of a local law may not be singularly burdensome, the prospect of complying with dozens of ordinances represents considerable added responsibility. Differing permit procedures, management plan criteria and levels of enforcement are only a few examples of factors which confound the task of complying with a myriad of local forest laws. The impact of forest regulation is determined not only by the provisions of

forest laws, but also by their number and distribution. The allocation and concentration of these laws will be examined in the following chapter.

Chapter 7. Geographic Distribution of Local Forest Laws

In this chapter, the apportionment of forest ordinances by state and region and the factors which have contributed to this distribution will be studied. The first six chapters focused on the regional allocation of local forest laws. To this point, the distribution of ordinances within these regions has received little attention. Study of this subject is essential for comprehending the scope and evaluating the impact of forest ordinances. The spatial allocation of forest laws is strongly related to local characteristics. Social factors such as per capita income, population growth, population, and urbanization have been positively associated with increased levels of local regulation. The social characteristics of local governments will be examined against the distribution of forest laws to examine these relationships.

Distribution of Local Forest Laws

Forest ordinances are an extremely dynamic aspect of public forest policy. For this reason, analysis of the spatial distribution of specific laws would become quickly outdated; therefore, examination of the social factors which characterize this distribution provides more lasting information. In addition, social trends provide important insights into the growth and the impact of local forest ordinances. Many states contain only a small number of local laws; for example, twelve of the twenty-four states, in which local laws were identified, contained five or fewer ordinances (nine states had only a single

ordinance). In these cases, an adequate sample does not exist to generalize spatial relationships.

State forest practice acts define the distribution of local forest laws by excluding them. In California, Oregon and Massachusetts the apportionment of forest ordinances has been severely limited by the presence of state laws. Programs in Florida, Virginia, Maryland and Maine have also restricted the scope and extent of local forest laws. Although local values are reflected in state policy, ordinances adopted under state programs do not accurately gauge local attitudes as do locally motivated forest laws. Therefore, only independently adopted local laws will be examined in this section.

The allocation of ordinances in the Northeast (Connecticut, New Jersey, New York and Pennsylvania) will be examined to show the potential impact from their distribution. In the south, Georgia and Louisiana will be studied. States in both regions were chosen based on the large number of independently enacted local laws. The contiguous northeastern states are examined as a group to capture inter-regional relationships. Georgia and Louisiana are examined separately.

Northeastern Region

Two hundred and fifty-five local forest ordinances (72% of the regional total) are found in Connecticut, New Jersey, New York and Pennsylvania (Figure 7.1). The location of each forest ordinance is shown together with several of the largest cities in these states. The most striking feature of this figure is the large number of local forest

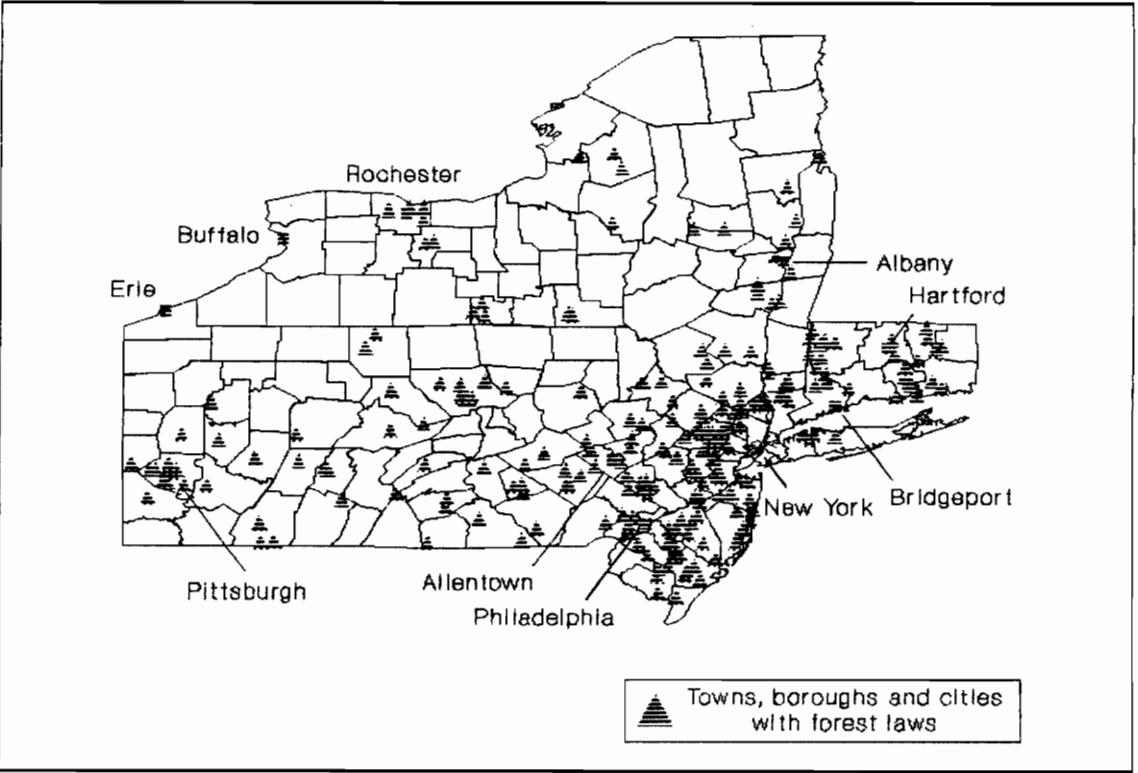
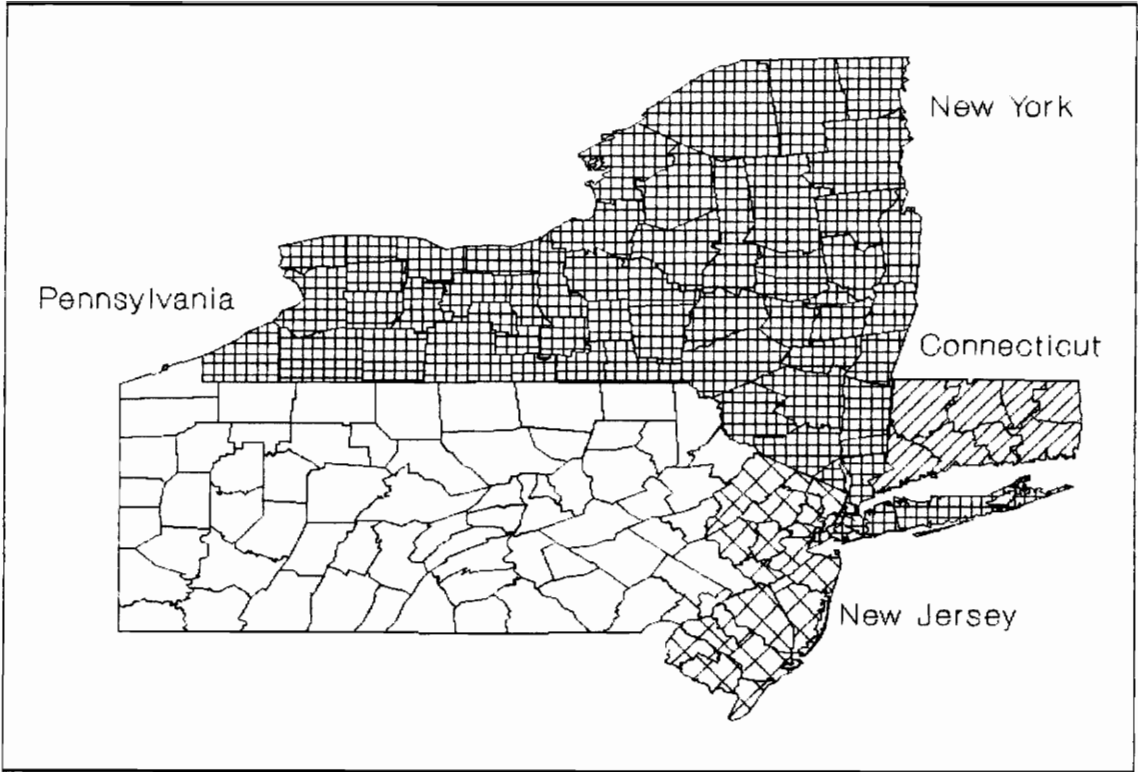


Figure 7.1 Location of regulated towns, cities and boroughs in New York, New Jersey, Pennsylvania and Connecticut

laws. Although these four states account for approximately half of the national total, the large number of regulated communities (Figure 7.1) may exaggerate the prevalence of local laws in this region. The Northeast is characterized by a large number of relatively small governments; therefore, forest ordinances usually apply to a limited geographic area. The average area of a city, township or borough in these states is only twenty-six square miles; by comparison, the average county in the Northeast is over 600 square miles (U.S. Department of Commerce 1990). Similarly, the number of regulated communities with respect to the total number of governments helps put the prevalence of local laws into context. Of the 169 municipalities in Connecticut, twenty-nine (17%) have forest ordinances; in New Jersey, seventy-eight of 567 municipalities (14%) have adopted forest laws; in New York, fifty-three of 929 towns (6%) have laws; and in Pennsylvania, eighty-seven of 1,548 townships (5%) have adopted ordinances⁶. The existence of 255 laws, therefore, may overstate the prevalence and the significance of local forest regulation in the northeastern region.

Local forest laws are not uniformly distributed across the northeastern region. The allocation of these laws and their concentration within certain may areas provide insight into the factors which prompted their creation. The number of local ordinances by county is shown in Figure 7.2. Local forest ordinances are highly concentrated

⁶Numbers of local governments by state are contained in the *Statistical Abstract of the United States* (U.S. Department of Commerce 1990).

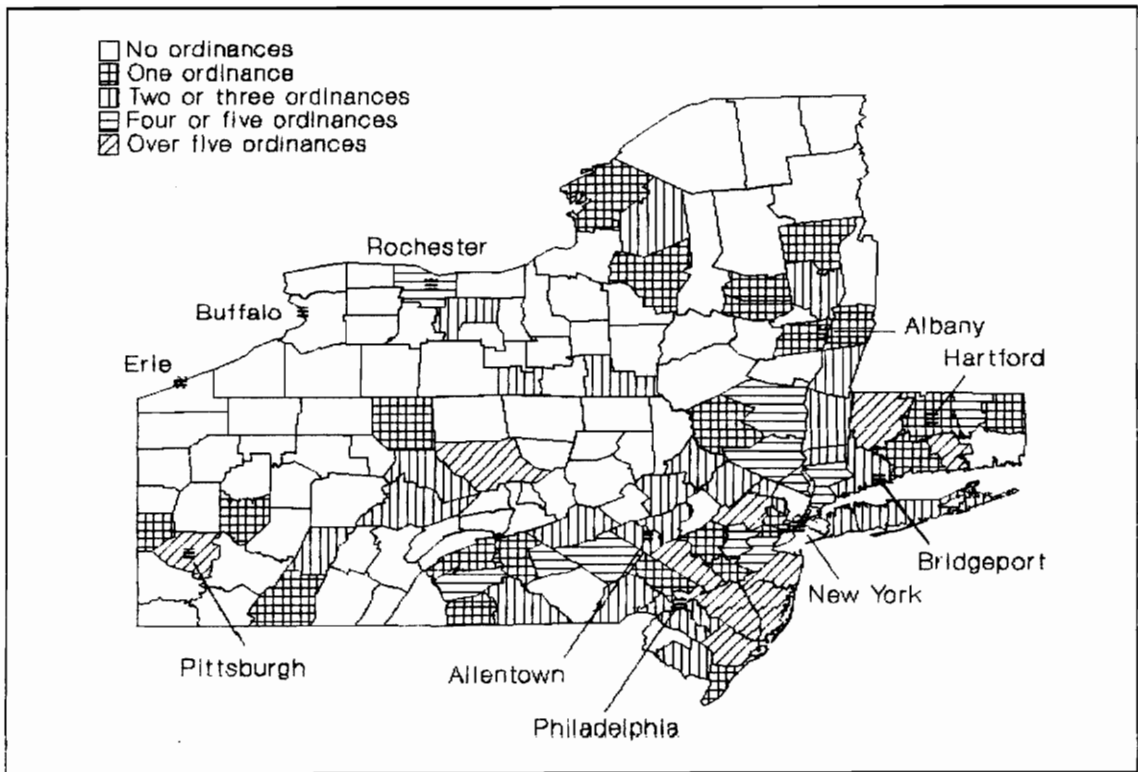


Figure 7.2 Forest laws by county in Connecticut, New Jersey, New York and Pennsylvania

in New Jersey, eastern Pennsylvania, eastern New York and western Connecticut, areas adjacent to large metropolitan centers. The highest concentration of laws is found in counties adjacent to New York City and Philadelphia, Pennsylvania. Large numbers of ordinances are also found in counties adjoining Pittsburgh, Pennsylvania and Rochester and Albany, New York.

The growth and distribution of forest ordinances in the Northeast has been associated with the underlying environmental attitudes of the region. The proliferation of local forest laws has been perceived by many several authors as part of a social movement. The increasing

number of forestry ordinances in the Northeast is simply a reflection of the heightened environmental consciousness of certain segments of the American public (Goodfellow and Lea 1985, Hogan 1984, Provencher and Lassoie 1982, Sheay 1988). Demographic and social factors which characterize "environmentally conscious" communities may, therefore, be positively associated with large numbers of local forest laws. These relationships will be examined in subsequent sections of this chapter.

Southern Region

In the South, counties are the common unit of local government; therefore, larger areas of land, usually, fall under the jurisdiction of individual laws, as compared to the Northeast. For example, the average size of a southern county, 630 square miles, far exceeds the twenty-six square mile area of a typical northeastern township or municipality (U.S. Department of Commerce 1988). Another important distinction between these regions is the prevalence of state mandated environmental programs in the South. Approximately half of all local ordinances in the south are associated with state programs. Spatial analysis will be limited to Georgia and Louisiana. Although Virginia and Florida contain large numbers of ordinances, their laws were adopted pursuant to Virginia's Chesapeake Bay Preservation Act and Florida's Growth Management Act. The distribution of these laws provides little insight into local attitudes and perspectives.

Georgia. Forty-one (25%) of Georgia's 159 counties have adopted forest ordinances (Figure 7.3). A large number of regulated counties are found in relatively close proximity to the larger metropolitan areas of Atlanta, Columbus and Macon. Interestingly, no ordinances exist in counties adjacent to Savannah, Georgia's second largest city. This may be associated with the presence of one of the world's largest pulp mill complexes in this city. Regulated counties are, for the most part, concentrated in the piedmont area of north-central Georgia. In this region, new mill openings (which increases logging traffic), the presence of high clay soils (which are easily tracked onto local roads) and "wetter than average" weather conditions (which exacerbate road problems) have all been cited as possible reasons for the prevalence of ordinances. Differing attitudes toward forestry activities between urban and rural counties have also been mentioned as important factors which contribute to this distribution. Subsequent sections of this chapter will examine the impact of these social influences.

Louisiana. Twenty-two of Louisiana's sixty four parishes (34%) have forest ordinances (Figure 7.4). Several parishes north of New Orleans, the state's largest city, have forest laws, as do many predominately rural parishes in the central portion of the state. Relatively few ordinances were identified in agricultural areas adjacent to the Mississippi River, in eastern Louisiana, or in the "bayou" and marsh areas, in the southern portion of the state. In Louisiana, local fiscal concerns over road and highway budgets, large

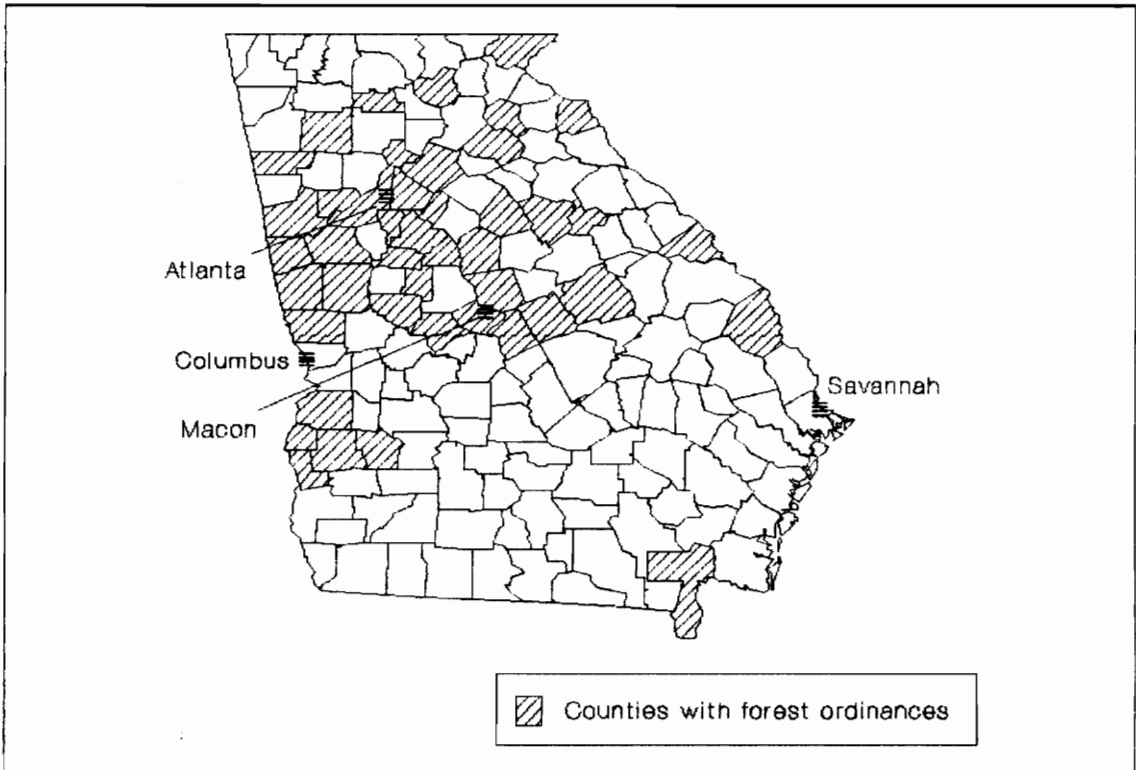


Figure 7.3 Counties with forestry laws in Georgia

numbers of easily damaged dirt roads, timber stock differences and environmental considerations in urban fringe parishes have all been mentioned as factors which determine the allocation of local forest laws.

Examination of all of the variables which define the distribution of forest laws, in Louisiana or any other state, is well beyond the scope of this analysis. In many cases, the allocation of forest ordinances has been attributed, at least in part, to social differences between regulated and non-regulated communities. Local forest regulation, it is argued, simply reflects the local environmental

attitudes. The relationship between the distribution of local forest laws and social and demographic characteristics will be outlined in the following section.

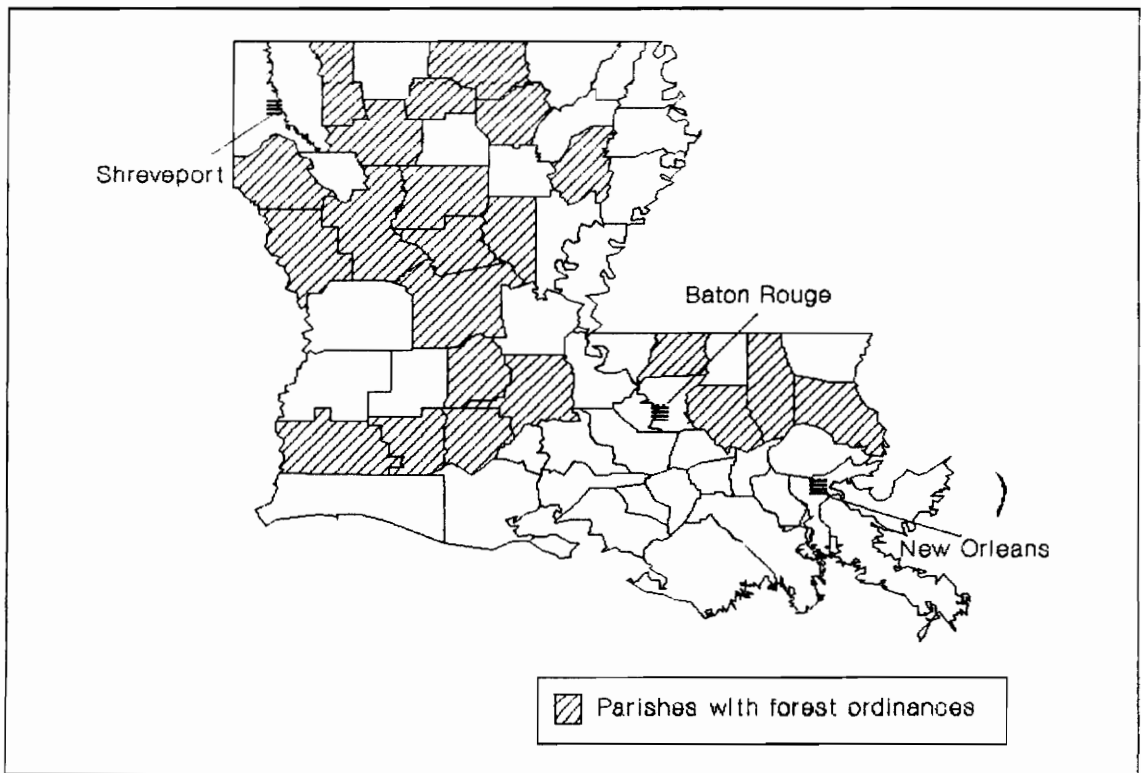


Figure 7.4 Parishes with forest laws in Louisiana

Demographic and Resource Factors

The sociology literature has long held that levels of "environmental" concern and activism are strongly related to certain demographic and social factors (Bridgeland and Sofranko 1985, Lowe and Pinhey 1982, Morrison and Dunlap 1986 and Tremblay and Dunlap 1978).

Population, urbanization (proximity to metropolitan areas) and affluence have all been associated with increased levels environmental awareness. Interestingly, many of these same factors have been associated with the growth of local forest harvest laws in the Northeast and hauling ordinances in the South (Cubbage 1989a, Goodfellow and Lea 1985, Hogan 1983, Sheay 1988, Wolfgram 1984 and Youell 1984a). Analysis of these factors could provide useful insight into the distribution and eventual impact of local forest laws.

Graphical and statistical techniques were employed to study the distribution of local forest laws and five social factors: urbanization; population; population change; per capita income; and the percentage of timberland. The relationship between these factors and allocation of regulated and non-regulated localities was examined in the northeastern and southern regions. Pennsylvania, Connecticut, New York and New Jersey were studied in the Northeast, and Georgia and Louisiana were examined in the South.

The dependant variable used in this study is the dichotomy of counties which have enacted (or contain) forest ordinances and those which do not. Although counties are not the principle unit of government in the Northeast, their use was necessitated by the dearth of demographic information for smaller levels of local government. Two statistical measures of association were used in this study. Bivariate relationships were examined using point-biserial correlation. The point-biserial correlation is equivalent to the Pearson product moment correlation coefficient. It assumes a dichotomous independent variable

and a continuous independent variable and is interpreted the same as the Pearson coefficient (Howell 1987). Discriminant analysis was used to examine multivariate relationships between a categorical dependant variable and two or more continuous independent variables. (Kachigan 1982) This technique was also used to account for the effects of multicolinearity in the independent variables. The variables used in this analysis are examined below.

Urbanization

The relationship between urbanization, proximity to metropolitan areas, and higher levels of local forest laws has received considerable support (Lowe and Pinhey 1982, Tremblay and Dunlap 1978, Hogan 1983, Provencher and Lassoie 1982). Since urban residents are constantly being exposed to pollution in their environment and through the media, they will generally be more sensitive to environmental degradation as compared to more rural individuals (Tremblay and Dunlap 1978). In addition, individuals socialized in urban areas do not maintain economic and social links with the natural resource value of the environment. Rural industries such as logging and farming are generally extractive in nature; whereas, urban service industries are usually far removed from the natural environment. For this reason, rural occupations and attitudes are far more utilitarian than those of urban residents (Lowe and Pinhey 1982, Hogan 1983, Van Liere and Dunlap 1980). Urbanites accustomed to large governmental systems may also be much more comfortable with administrative remedies for environmental problems

(Morrison and Dunlap 1986). Government is a prominent and conspicuous component of urban society, individuals socialized in these areas will usually be more accepting a governmental role in regulating land uses. Larger levels of forest regulation would be expected in urbanized areas as compared to more rural settings.

Urbanization is measured as the population of the largest metropolitan area within fifty miles of the geographic center of each county. Metropolitan areas included in this study did not have to reside in the state in which the county exists. Although fifty miles is somewhat arbitrary, it provides a measure of urban influence, by representing the maximum commuting distance of urban workers and by defining the extent of urban radio and television transmittance (Graber 1974, Fortmann 1988). Measures of urbanization were obtained from the Bureau of Census *County and City Data Book 1988* (U.S. Department of Commerce 1988).

Population

Many of the characteristics of highly urbanized areas can be associated with populated counties. As county population increases, for example, the degradation of the natural environment may be accelerated, increasing exposure to pollution and heightening environmental awareness. The most important factor related to population, however, is associated with "resource mobilization theory" (McCarthy and Zald 1977). Higher populations within a county or region facilitate environmental

action by aiding in the creation of social networks. These networks are essential for mobilizing public support for local environmental movements, such as the adoption of a forest regulatory law. Population assists mobilization by facilitating communication and access to government and media (Fortmann 1988). Whereas urban areas influence attitudes and perceptions, a concentrated population may allow a community to act upon these attitudes. Population data was obtained from United States census information (U.S. Commerce 1988).

Population change

In the last twenty years, the United States has experienced a major realignment in the tradition pattern of population growth. For well over a hundred years population dynamics within the United States, have been characterized by metropolitan growth at the expense of more rural areas (Tucker 1978, Frankena 1984, Wilkie 1976). Since the early 1970's, however, the growth rate of non-metropolitan areas has exceeded urban growth even while the national growth rate has decreased. In addition, recent non-metropolitan growth has extended to areas beyond traditional limits of urban sprawl, much of this growth is associated with the migration of previously urban individuals to more rural settings (Long and DeAre 1982).

Urbanites generally move to rural areas to avoid the crime, congestion and pollution of metropolitan areas (Graber 1974, Shannon 1991). Amenity and aesthetic values are some of the most attractive features of the rural lifestyle (Price and Clay 1980). Migrants will

quickly seek regulatory solutions to control unfamiliar activities such as logging, when they feel this lifestyle is jeopardized. Individuals socialized in urban settings may also have experience in working within governmental bureaucracies or media which enables them to enact local forest regulation.

Localities which have experienced high levels of population growth within the last twenty years would be expected to exhibit more local regulation. The population change between 1970 to the present was calculated using census data for 1970 and 1988 (U.S. Department of Commerce 1972 and 1988). Although population variation is also attributable to inter-state and inter-national transfers, it is assumed that regional migration trends are shown in this data.

Per capita income

The relationship between higher socio-economic class and heightened environmental concern has received considerable support (Morrison and Dunlap 1986, Van Liere and Dunlap 1980, Bridgeland and Sofranko 1975). This may suggest that local forest regulation is more prevalent in affluent areas. The intuition for this is usually based on Maslow's hierarchy of needs (Maslow 1970). Environmental quality is a luxury which can only be indulged after more basic needs of human existence are met; in other words, individuals of higher economic strata have more time and income to devote to environmental causes. These individuals may also be more likely to seek formal political solutions to these problems. Research has consistently shown that governmental

participation is strongly associated with increasing levels of affluence (Roger et al. 1975). Higher levels of income are also positively associated with membership in environmental organizations and environmental activism (Morrison and Dunlap 1986).

Per capita income is expected to be positively associated with the existence of local forestry laws. Per capita income is calculated as total personal income divided by county population. Total income is the current income of all residents from all sources, before income taxes but after deductions for Social Security (U.S. Department of Commerce 1988).

Percentage of timberland

The relationship between timberland and regulation is difficult to assess. Intuitively, the existence of merchantable forestland is a necessary condition for a government wishing to restrict forestry operations. However, the influences of population and urbanization may confound these relationships, since low levels of forestland would be expected in highly populated or urbanized areas. These relationships will be examined in the next section. U.S. Forest Service statistics for Connecticut, Georgia, Louisiana, New Jersey, New York and Pennsylvania are used for this study (Dickinson and McAfee 1986, Thomas 1989, Vissage et al 1991, DiGiovanna and Scott 1986, Frieswyk 1992 and U.S. Forest Service 1989). "Timberland" is defined as "forest land producing or capable of producing crops of industrial wood (more than twenty cubic feet per acre per year) and not withdrawn from timber

utilization"; "industrial wood" are all roundwood products except fuelwood (Dickinson and McAfee 1986).

Analysis of Social Factors

Graphic and statistical analysis of the distribution of forest regulation by county will be examined in the following section. Graphical analysis is provided to obtain an appreciation of the spatial relationships between the distribution of local laws and population, urbanization, population growth, per capita income and the percentage of timberland. Statistics will indicate the strength of these relationships. Statistical analysis will not be used to create a model to predict the incidence of local forest laws, but as measures of association. Correlation coefficients and F and t statistics will be calculated in this analysis. Although function coefficients and discriminate equations will be determined, they will not be provided in this analysis. Analyses will be conducted by region. Connecticut, New Jersey, New York and Pennsylvania will be examined as a group, and Georgia and Louisiana will be examined individually.

Northeastern Region

Of 159 counties in Connecticut, New Jersey, New York and Pennsylvania, seventy (44%) contain at least one local forest law. In bivariate analysis, the dichotomy of counties which contain regulated localities and those counties which do not will be examined against all five demographic factors. In multivariate analysis, the dependant variable will have three parts: counties which contain no regulated

localities; those which contain five or fewer regulated localities; and those which contain over five regulated localities. The purpose of this grouping is to account for varying levels of local regulation by county in the Northeast. Multivariate techniques will be used to expand upon relationships identified in bivariate analyses.

Social Factors. A strong positive relationship exists between county population and the existence of local forest regulation in the Northeast (Figure 7.5). Highly populated counties are generally located in southern New York, eastern Pennsylvania, western Connecticut and northern New Jersey, in areas adjacent to large metropolitan areas such as New York City and Philadelphia. The strength of this relationship is shown in statistical analysis (Table 7.1). A correlation coefficient of .37 and an R^2 of .14 indicate a relatively strong, positive association for cross sectional data. Fourteen percent of the variation between regulated and non-regulated counties in the Northeast is explained by differences in population; therefore, local regulation is generally more prevalent in counties with higher populations. The t-statistic for this relationship (Table 7.1) indicates that the mean population of regulated and non-regulated counties differ significantly.

A strong relationship between high levels of per capita income and local regulation was also identified (Figure 7.6). Higher levels of per capita income and forest regulation are generally found near large metropolitan areas. The power of this relationship is indicated by a biserial correlation of .5192 and an R^2 of .27 (Table 7.1). Twenty-seven

Table 7.1 Bivariate statistics for local regulatory ordinances and social factors, northeastern region

Variable	t-value	R ²	r _{ph}
Per capita income	7.44 [†]	.2695	.5192
Urbanization	5.40 [†]	.1625	.4031
Population	4.95 [†]	.1405	.3749
Population growth	3.02 [†]	.0573	.2395
Percentage of timberland	2.60 [†]	.0429	-.2071

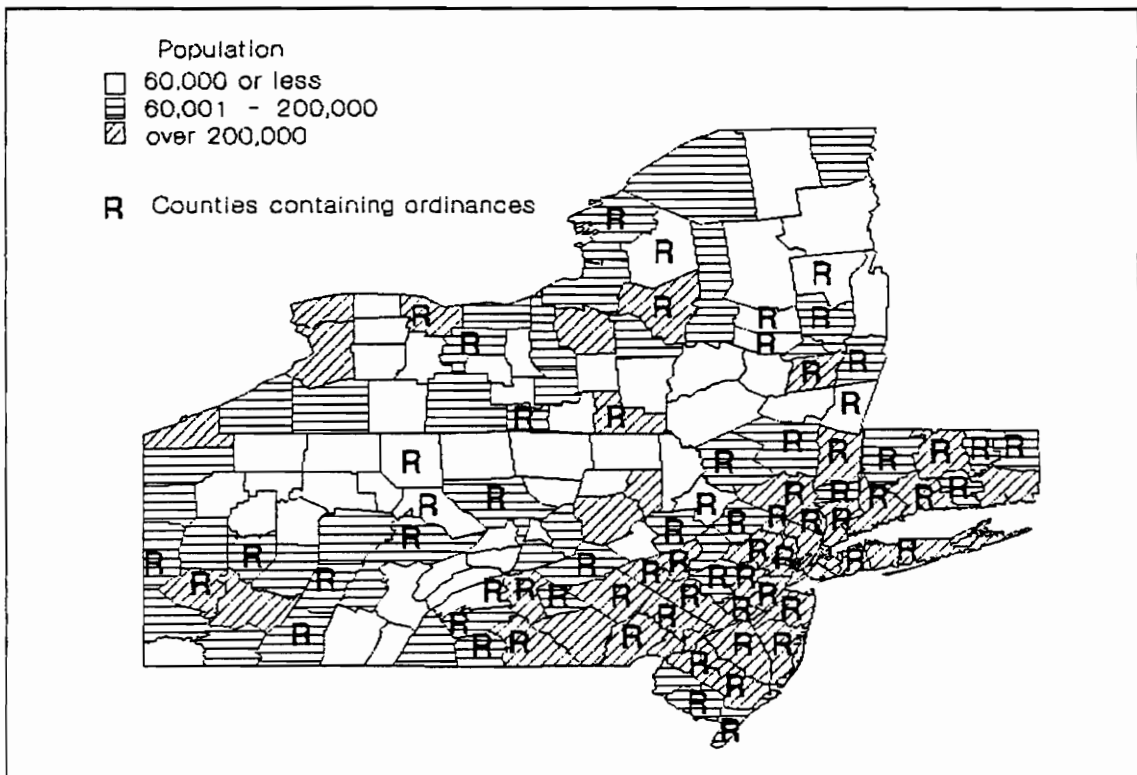


Figure 7.5 Regulation and population by county, northeastern region

* = significant variable
 $(t_{(157, \frac{\alpha}{2})} = 1.9752; \alpha = .05)$

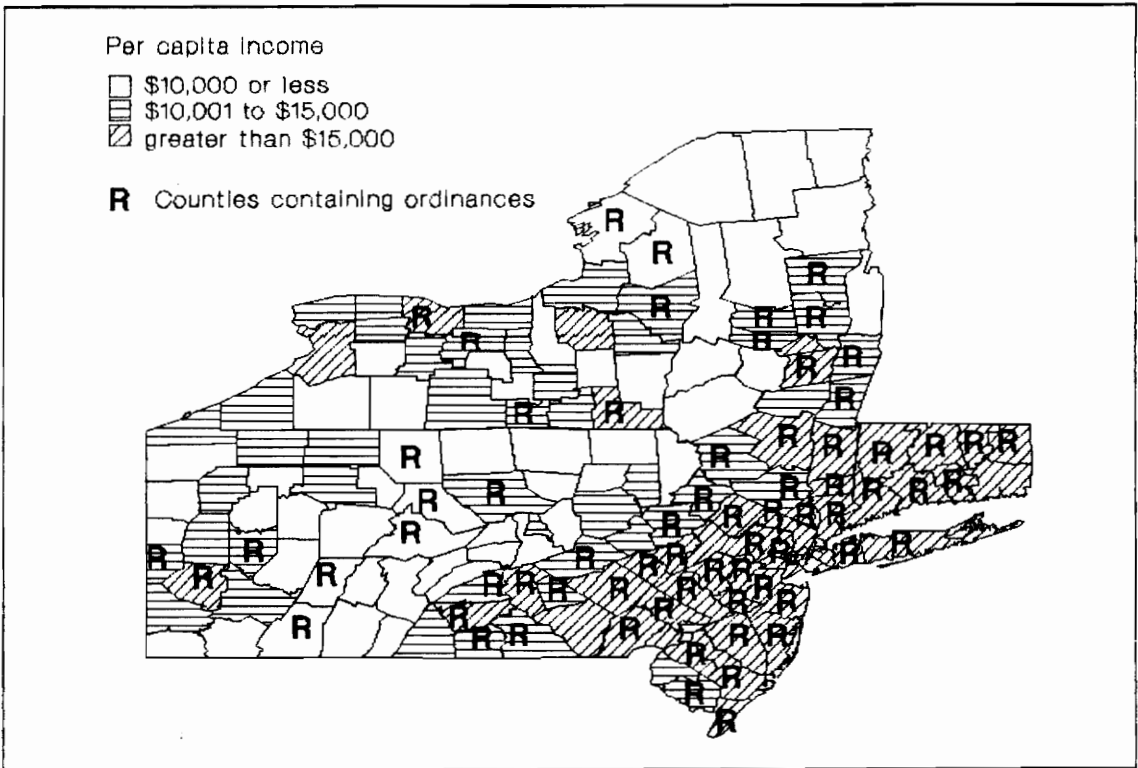


Figure 7.6 Regulation and per capita income by county, northeastern region

percent of the variation in regulation by county is explained by differences in income, representing an extremely strong relationship. The t-value for this variable is significant at the five percent level (Table 7.1).

The relationship between the distribution of local forest laws and population change from 1970 to the present is shown in Figure 7.7. This relationship is much weaker than the previous two variables. A correlation coefficient of .24 and an R^2 of .06 were calculated (Table 7.1), signifying that only six percent of the variation between regulated and non-regulated counties is attributable to population

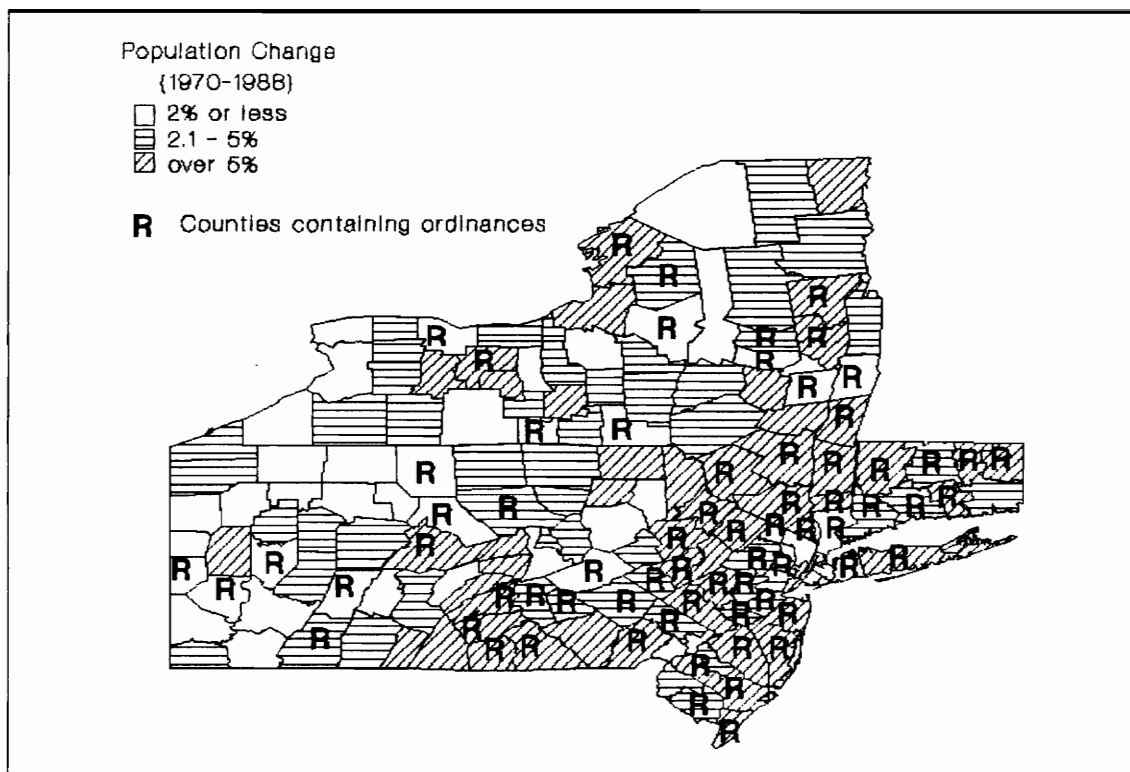


Figure 7.7 Regulation and population change, northeastern region

growth factors. Local regulation is slightly more likely to occur in areas exhibiting high rates of population growth. This relationship is statistically significant at the five percent level (Table 7.1).

A strong relationship was identified between the level of urbanization and the existence of local forest regulation (Figure 7.8). For the most part, ordinances are concentrated in urbanized areas adjacent to New York City and Philadelphia. The strength of this relationship is shown in a point biserial coefficient of .40 and an R^2 of .16 (Table 7.1). The t-value for this variable is significant at the five percent level, indicating that the mean level of urbanization of

regulated counties is significantly larger than that of non-regulated ones (Table 7.1).

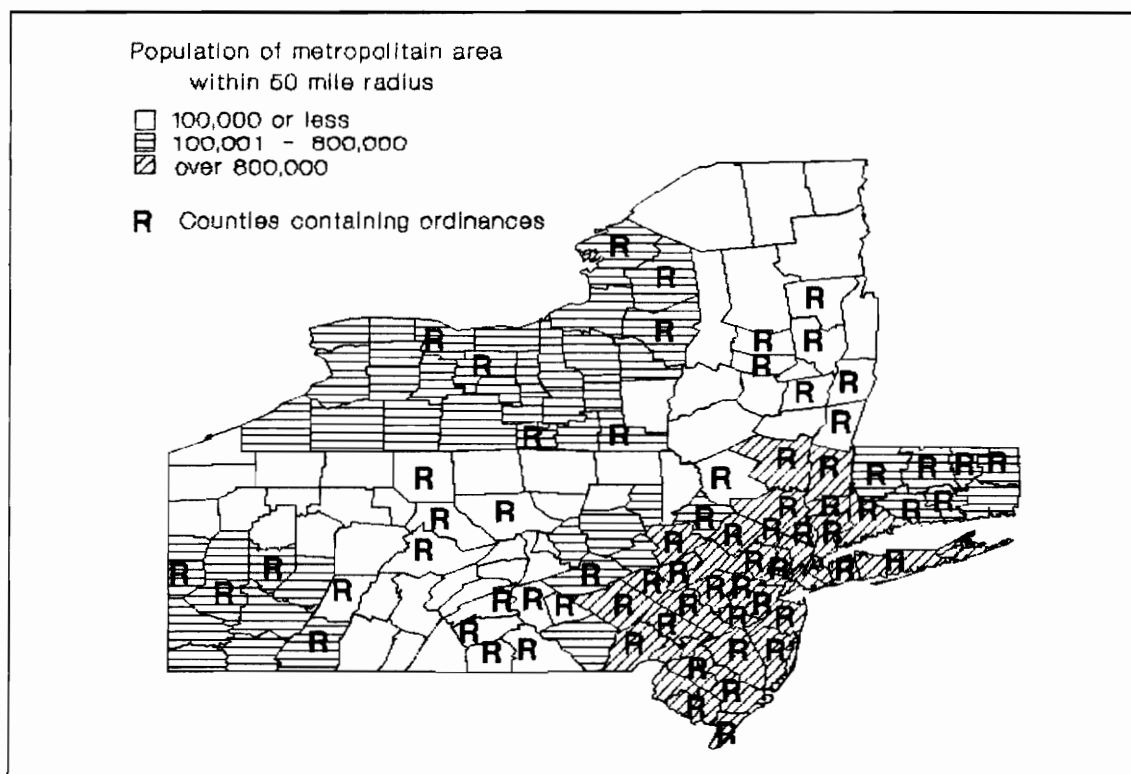


Figure 7.8 Regulation and urbanization by county, northeastern region

A weakly negative relationship exists between the forest regulation and the percentage of timberland by county (Figure 7.9). Local forest laws are more prevalent in counties containing relatively small proportions of timberland. This relationship is shown by a biserial coefficient of -0.21 and an R^2 of $.04$. Although this is a relatively weak relationship, the t-value for this variable is significant at the five percent level (Table 7.1)

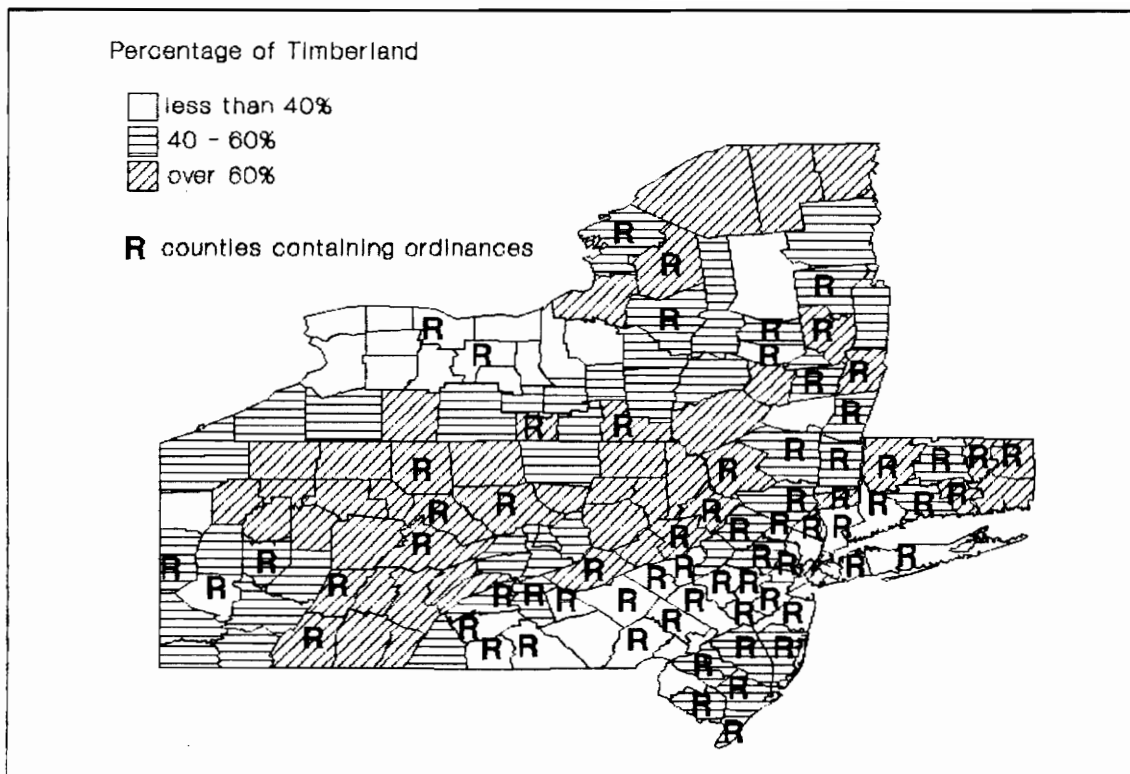


Figure 7.9 Regulation and percent timberland by county, northeastern region

Step-wise discriminant analysis was conducted to describe multi-variate relationships between the level of forest regulation and the five explanatory variables. Variables included in each iteration (step) of this analysis are shown in Table 7.2. F-values indicate whether population means of each variable differ significantly. The Wilk's Λ (lambda), included in this table, is a multi-variate measure of association which reduces to $1-R^2$. The Wilk's lambda varies from one to zero, with values near zero representing high predictability and values near one representing low predictability (Hintze 1990).

The optimal combination of variables identified in the

discriminant analysis process is shown in the second iteration (Table 7.2). Per capita income, population growth and population result in a Wilk's lambda of .5935, indicating that over forty percent of the variation in the number of ordinances identified by county can be explained by these three variables. All of these variables are significant at the five percent level. This is an extremely strong relationship for cross sectional data.

The usefulness of the remaining two variables, percentage of timberland and urbanization are limited largely by multicollinearity between these variables and population. The correlation coefficients between population and percentage of timberland and urbanization are -.53 and .61, respectively, indicating strong linear relationships (Appendix D, Table D.1). Much of the explanatory power of these variables is accounted for by the population variable.

All bivariate relationships identified in the northeastern region were significant at the five percent level (Table 7.1). Local regulation is generally more prevalent in counties exhibiting relatively high levels of per capita income, urbanization, population and population growth and relatively low percentages of timberland. The optimum combination of variables in the discriminant analysis process (per capita income, population growth and population) accounts for a large amount of the difference between the level of forest regulation by county. These findings support the assertion that the distribution of local forest ordinances in the Northeast is related to social factors, associated with increased levels of environmental concern. These

relationships may also reflect the underlying environmental sentiments of many regulated governments in the Northeast. The significance of these findings will be outlined more fully in subsequent sections.

Table 7.2 Discriminant analysis statistics, northeastern region⁸

Iteration	Variable					Wilk's A
1	Per Capita Income	Population Growth				
F-value	32.4 [†]	6.4 [†]				.7080
2	Per Capita Income	Population Growth	Population			.5935
F-value	7.4 [†]	8.5 [†]	6.2 [†]			
3	Per Capita Income	Population Growth	Population	Timberland		.5776
F-value	10.2 [†]	7.7 [†]	8.7 [†]	2		
4	Per Capita Income	Population Growth	Population	Timberland	Urbanization	.5761
F-value	8.2 [†]	6.7 [†]	7.1 [†]	2.2	.2	

* = significant variable
 ($F_{(2,156)} = 3.05425; \alpha = .05$)

Southern Region

Analysis of social factors in the South will involve examination of regulated counties and parishes in Georgia and Louisiana. Of Georgia's 159 counties, forty-one were identified with forestry laws. Twenty-two of Louisiana's sixty four parishes also have local ordinances. Since counties (parishes) are the basic unit of government in the South, the dependant variable in both biseral and discriminant analyses will be the dichotomy of counties which have enacted local laws and those which have not.

Georgia. A weak relationship exists between local forest regulation and county population in Georgia (Figure 7.10). Forest ordinances are slightly more prevalent in highly populated areas adjacent to Atlanta; however, the association between population and forest regulation is much less distinct, in Georgia, than it was in the Northeast. The weakness of this relationship is shown by a biseral coefficient of .184 and an R^2 of .034 (Table 7.3). Less than four percent of the variation in ordinances by county is explained by differences in population. Although a weak relationship was identified, the mean population of regulated counties was significantly higher than that of non-regulated counties at the five percent level (Table 7.3).

The distribution of per capita income and forest regulation by county is shown in Figure 7.11. Higher levels of income are generally concentrated near metropolitan areas such as Atlanta, Macon or Columbus. This relationship is weak, however, evidenced by a biseral coefficient

Table 7.3 Bivariate statistics for forest regulatory ordinances and social factors Georgia

Variable	t-value	R ²	r
Urbanization	4.08 [†]	.096	.31
Per Capita Income	2.53 [†]	.039	.198
Population	2.34 [†]	.034	.184
Percentage of timberland	1.90	.023	.150
Population growth	.847	.005	.068

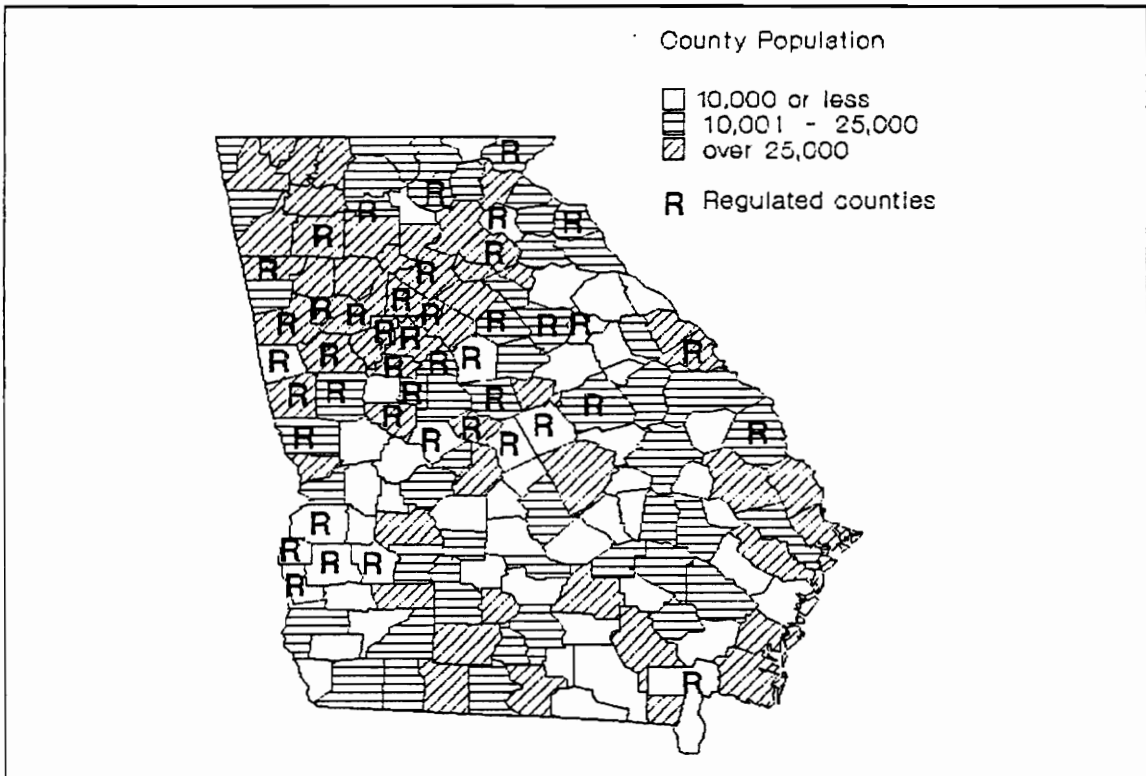


Figure 7.10 Forest ordinances and population by county, Georgia

* = significant variable
 $(t_{(157, \frac{\alpha}{2})} = 1.9752; \alpha = .05)$

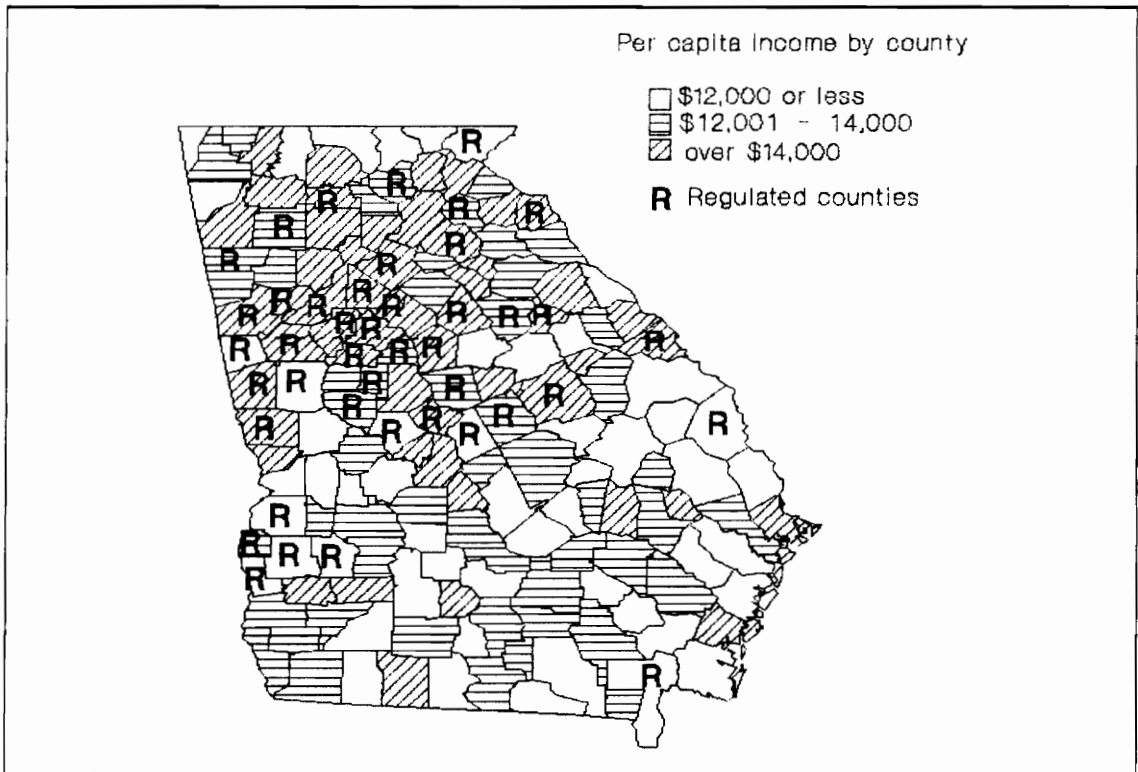


Figure 7.11 Forest ordinances and per capita income by county, Georgia

of .198 and an R^2 of .04 (Table 7.3). The mean income of counties which have enacted local forest laws is slightly larger than the mean level of income in counties which have not adopted an ordinance. This relationship is barely significant at the five percent level (Table 7.3)

An extremely weak relationship exists between the distribution of local forest laws and changes in county population growth (Figure 7.12). Although several counties adjacent to Atlanta have experienced positive growth in the last twenty years, trends between these factors and the distribution of local forest laws are not immediately obvious. The weakness of this relationship is shown by a biserial coefficient of only

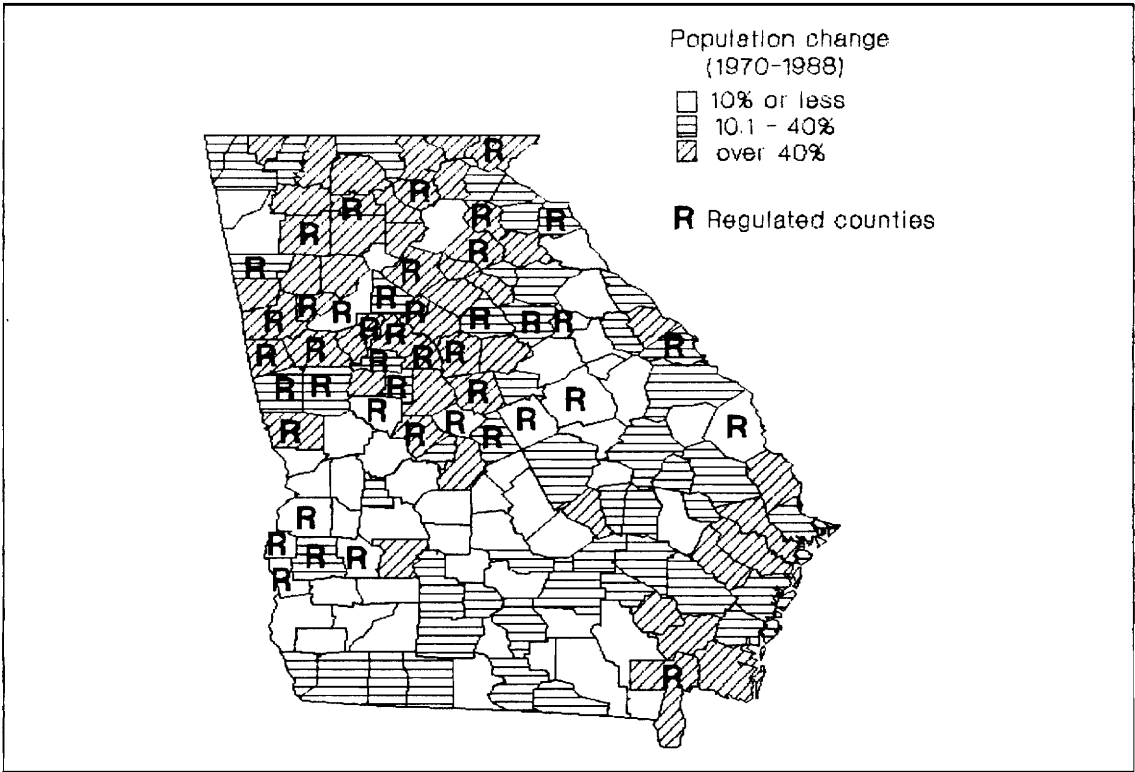


Figure 7.12 Forest ordinances and population change by county, Georgia

.068 and an R^2 of .005 (Table 7.3). Less than one percent of the variation in local forest regulation by county is explained by differences in population growth. The t-value for this variables is insignificant at the five percent level (Table 7.3).

The level of urbanization in Georgia is shown in Figure 7.13. Due to prevalence of ordinances in counties adjacent to Atlanta, a strong positive relationship would be expected between the level of urbanization and the incidence of local forest laws. The strength of this relationship is indicated by a biserial coefficient of .31 and an R^2 of .096 (Table 7.3). The mean level of urbanization of regulated

counties is significantly larger than that of non-regulated ones (Table 7.3). Urbanization is, by far the best individual explanatory variable identified in Georgia. This relationship is impressive considering the weak explanatory value of all other variables examined in Georgia.

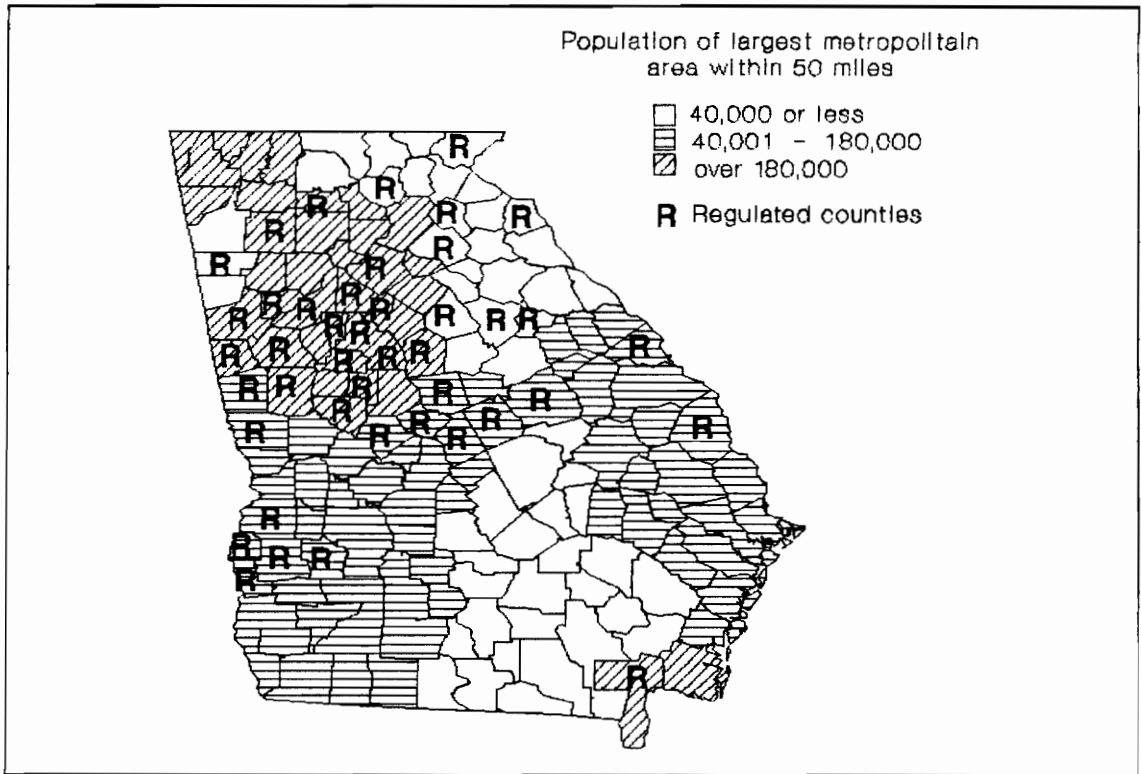


Figure 7.13 Forest ordinances and level of urbanization by county, Georgia

Forest ordinances appear to be more prevalent in highly forested counties (Figure 7.14). This result is shown by a correlation coefficient of .150 and an R^2 of .023, which indicates a weak, positive relationship between timberland and forest regulation in Georgia. Unlike the northeastern region, ordinances are more prevalent in

counties exhibiting higher levels of timberland. This relationship is insignificant at the five percent level (Table 7.3).

Variables in each iteration of the discriminant analysis process for Georgia are contained in Table 7.4. The optimal combination of variables are shown in the second iteration. Urbanization, per capita income and the percentage of timberland result in a Wilk's lambda of .8430, indicating that approximately sixteen percent of the variation between regulated and non-regulated counties is explained by these factors.

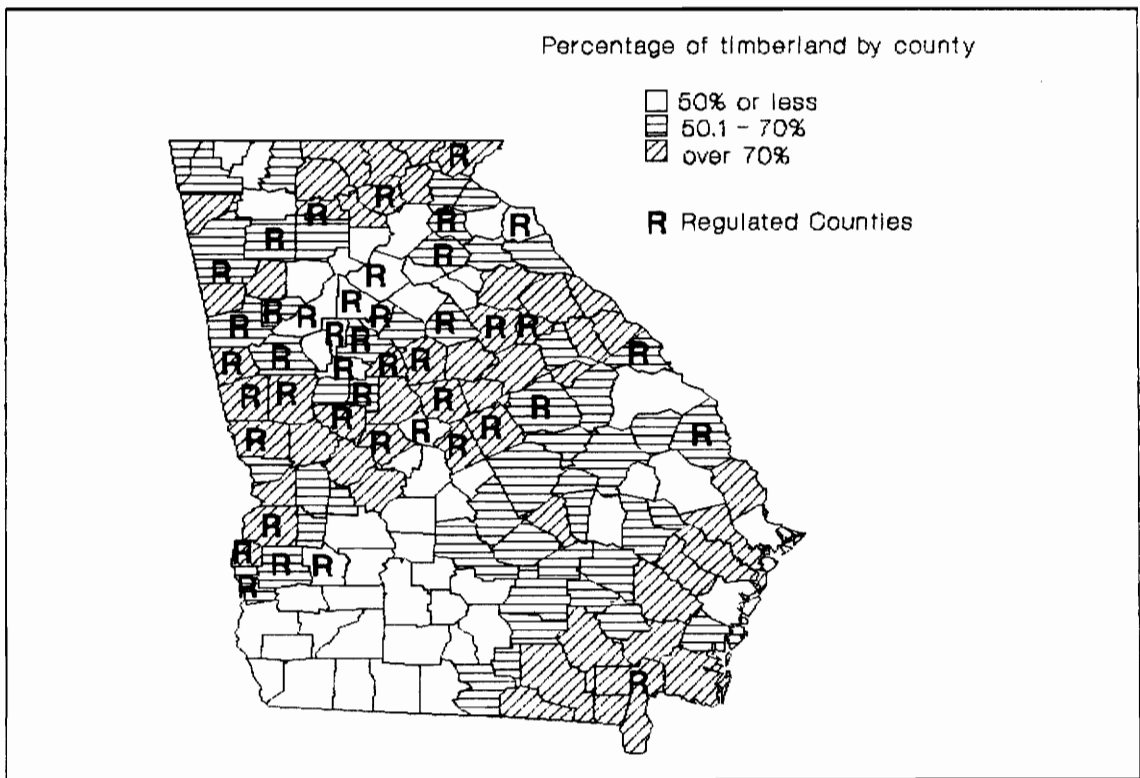


Figure 7.14 Forest ordinances and percentage of timberland by county, Georgia

Table 7.4 Discriminant analysis statistics, Georgia¹⁰

Iteration	Variable					Wilk's Λ
1	Urbanization	Timberland				.8753
F-value	18.2 [†]	5.2 [†]				
2	Urbanization	Timberland	Per Capita Income			.8430
F-value	12.1 [†]	8.9 [†]	5.9 [†]			
3	Urbanization	Timberland	Per Capita Income	Population Growth		.8375
F-value	12.6 [†]	9.7 [†]	6.9 [†]	1.0		
4	Urbanization	Timberland	Per Capita Income	Population Growth	Population	.8357
F-value	12.8 [†]	8.8 [†]	7.1 [†]	.8	.3	

Louisiana

An extremely weak relationship exists between the distribution of forest ordinances and population by parish in Louisiana (Figure 7.15). The weakness of this relationship is shown by a point biserial correlation coefficient of $-.073$ and an R^2 of $.005$ (Table 7.5). Unlike the Northeast, forest ordinances in Louisiana are generally more prevalent in less populated areas. This relationship is insignificant at the five percent level (Table 7.5).

* = significant variable
 $(F_{(1,157)} = 3.90137; \alpha = .05)$

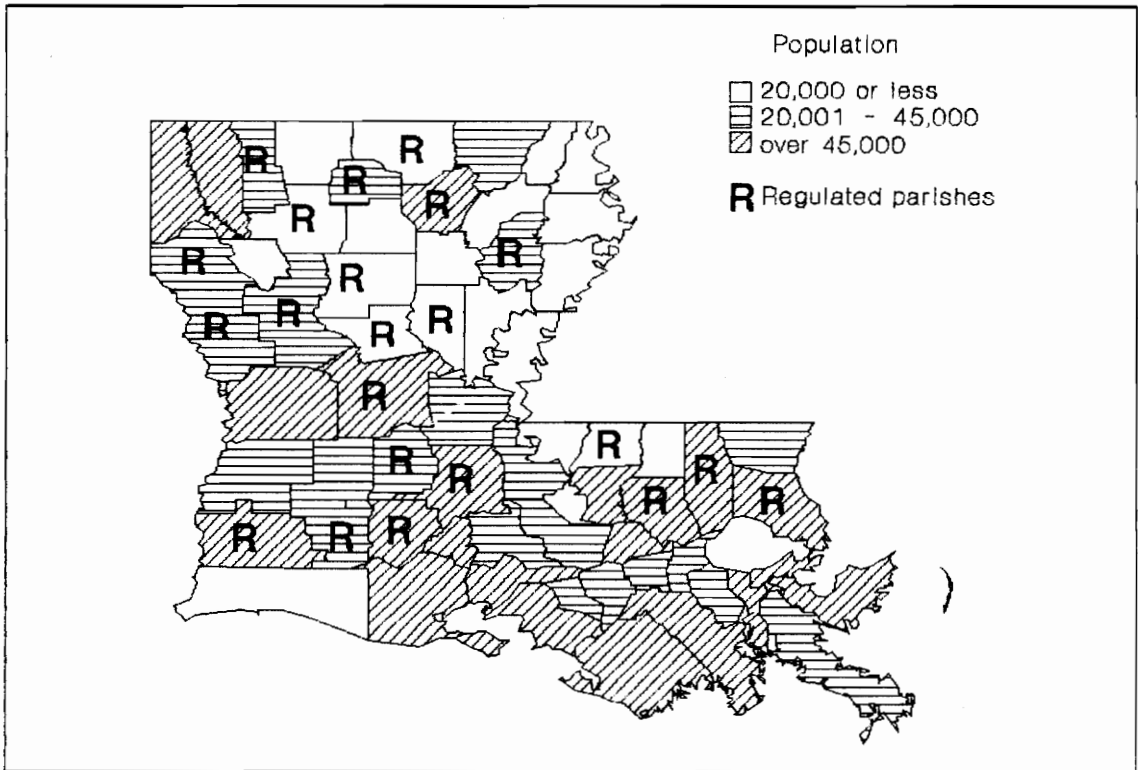


Figure 7.15 Forest ordinances and population by parish, Louisiana

The distribution of per capita income by parish in Louisiana is shown in Figure 7.16. Forest ordinances are more prevalent in less affluent parishes. This relationship is shown in a biserial coefficient of $-.09$, representing a weak negative association between income and local regulation by parish (Table 7.5).

The mean per capita income of regulated and non-regulated parishes does not statistically differ (Table 7.5). Explanations for the negative relationship between the existence of regulation and per capita income and population in Louisiana will be provided in subsequent sections.

Table 7.5 Bivariate statistics of forest ordinances and social factors, Louisiana¹¹

Variable	t-value	R ²	r
Percentage of timberland	3.14 [†]	.137	.371
Urbanization	1.45	.032	-.181
Population growth	1.16	.021	.145
Per capita income	.71	.008	-.09
Population	.57	.005	-.073

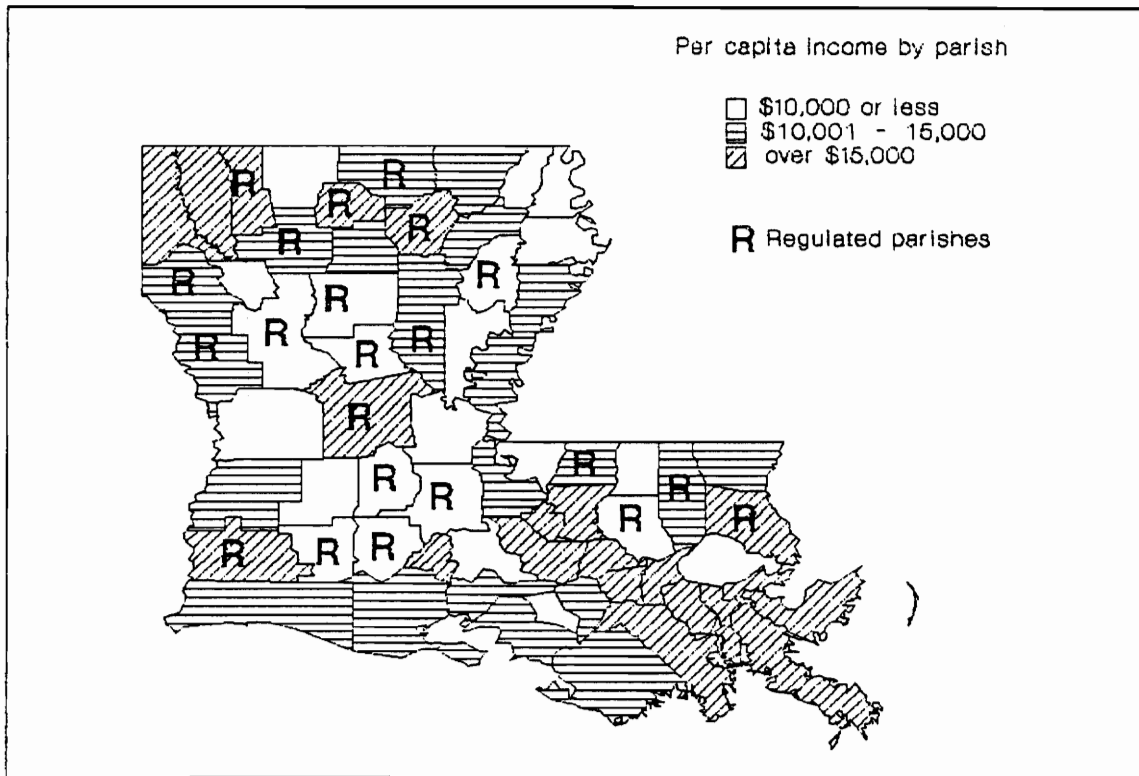


Figure 7.16 Forest ordinances and per capita income by parish, Louisiana

11

* = significant variable
 $(t_{(62, \frac{\alpha}{2})} = 1.999; \alpha = .05)$

The relationship between population change and forest regulation is shown in Figure 7.17. The correlation coefficient for this relationship, .145, indicates that increasing population growth is weakly related to the existence of forest regulation. Only two percent of the variation between regulated and non-regulated parishes, however, can be accounted for by differences in population growth. This variable is insignificant at the five percent level (Table 7.5).

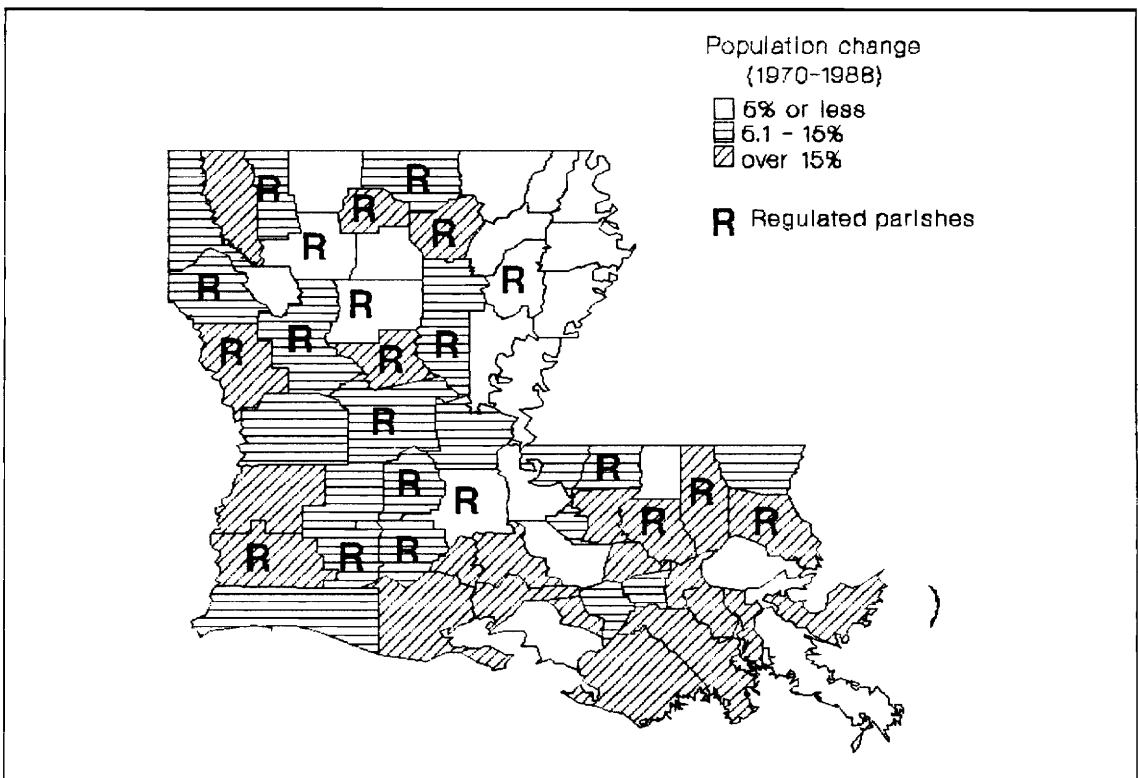


Figure 7.17 Population change by parish, Louisiana

The level of urbanization by parish in Louisiana is shown in Figure 7.18. Forest ordinances are more prevalent in non-urbanized parishes. This relationship is shown in a correlation coefficient of $-.181$ and an R^2 of $.032$ (Table 7.5), which indicates that local forest regulation in Louisiana is more prevalent in rural areas. This relationship is insignificant at the five percent level.

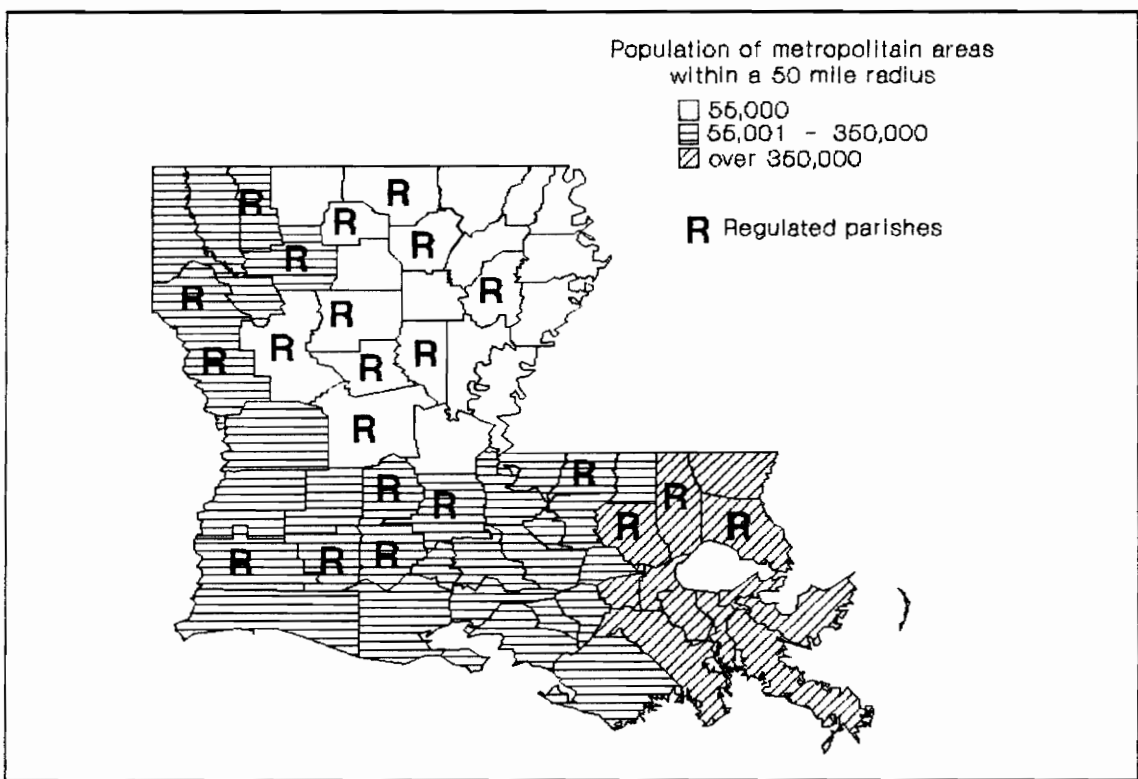


Figure 7.18 Urbanization by parish, Louisiana

Increasing levels of timberland are strongly related to the distribution of forest ordinances by parish (Figure 7.19). The strength of this relationship is shown by a biserial coefficient of $.371$ and an R^2

of .14, indicating that roughly fourteen percent of the variation in regulation can be explained by differences in the level of timberland. This is an extremely strong relationship considering the weak explanatory power of all other variables. This relationship undoubtedly strengthened by the lack of forestland, and forest ordinances, in agricultural and marsh areas of the state. The mean quantity of timberland in regulated and non-regulated parishes in Louisiana differs significantly. This result also differs with findings in the Northeast.

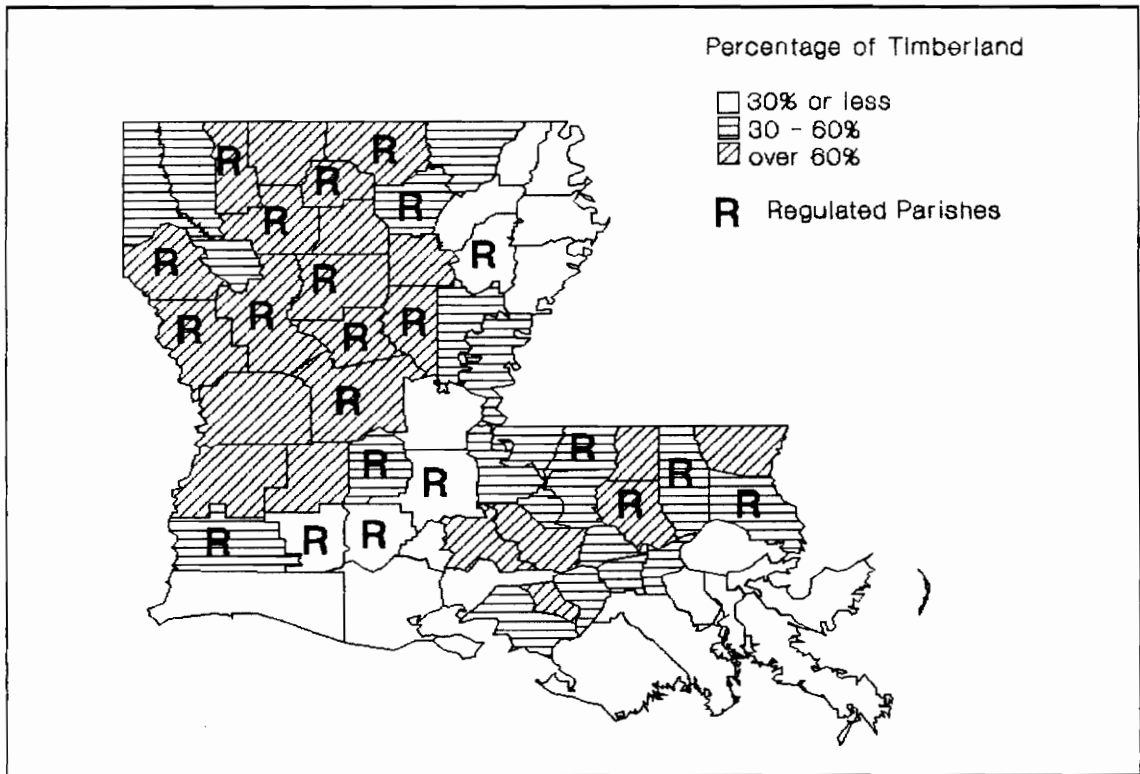


Figure 7.19 Percentage of timberland by parish, Louisiana

The variables included in each step of the discriminant analysis process are shown in Table 7.6. The best combination of variables are shown in the second iteration. Timberland, population and urbanization result in a Wilk's lambda of .7985. Unfortunately, two of the variables included in this iteration are insignificant at the five percent level. Overall, the social factors used to discriminate between regulated and non-regulated parishes in Louisiana are ineffective.

Table 7.6 Discriminant analysis variables, Louisiana¹²

Iteration	Variable					Wilk's Λ
1	Timberland	Population				.8437
F-value	11.1 [†]	1.4				
2	Timberland	Population	Urbanization			.7985
F-value	10.3 [†]	3.6	3.4			
3	Timberland	Population	Urbanization	Population Growth		.7875
F-value	7.2 [†]	1.9	4.2 [†]	.8		
4	Timberland	Population	Urbanization	Population Growth	Per Capita Income	.7853
F-value	6.2 [†]	2.0	3.9	.9	.2	

* = significant variable
 ($F_{(1,62)} = 3.996; \alpha = .05$)

Regional Differences

The allocation of forest ordinances in the Northeast is strongly associated with "environmentally motivated" demographic and social factors. In the South, however, these same factors are much less effective in describing the distribution of forest laws. Forest regulatory ordinances in the Northeast are generally more prevalent in areas exhibiting high levels of per capita income, population and urbanization. For the most part, these variables have little explanatory power in southern states. The level of urbanization in Georgia and the percentage of timberland in Louisiana are the only variables which are even marginally useful in describing the allocation forest laws in the South.

Social and demographic variables used in this analysis are associated with local environmental attributes. Whereas, local forest laws in the Northeast were generally adopted for the sole purpose of protecting local environmental resources from unrestricted forestry activities, ordinances in Georgia and Louisiana are primarily concerned with safeguarding local investments in roads and structures. Therefore, demographic variables associated with "environmental consciousness" or "activism" would be expected to be better predictors of the incidence of local ordinances in the Northeast as compared to the South.

Forest ordinances in the northeastern region are more common in areas exhibiting high population, high population growth, high levels of urbanization and low quantities of timberland. By contrast, southern laws are only weakly associated with these variables. In Louisiana,

forest ordinances are more prevalent in sparsely populated and highly forested areas. The distribution of local forest regulatory laws in the Northeast is strongly related to factors associated with heightened levels of environmentalism. These relationships are not identified in the southern region. These findings support the idea expressed in Chapter Five that the regulatory intent of northeastern and southern laws differ fundamentally.

Summary

The large number of ordinances identified within the northeastern United States have been used as evidence of the importance of local regulation in this region. It is important, however, to keep these numbers in context. Of the 169 municipalities in Connecticut, twenty-nine (17%) have adopted forest ordinances; in New Jersey, seventy-eight of 567 municipalities (14%) have forest laws; in New York, fifty-three of 929 (6%) towns have ordinances; and in Pennsylvania eighty-seven of 1,548 (5%) have adopted ordinances. In addition, the average area of these governments is only twenty-six square miles. For the most part, local regulation in the Northeast is defined by a large number of extremely small units of local governments. The existence of a large number of laws may exaggerate their regional significance. By comparison, the average area a southern county, 630 square miles, far exceeds the area of a typical northern town, city or borough. Although the southern region contains less than a third of the total number of ordinances identified in this study, southern laws pertain to a much

larger geographic area than do northeastern laws.

Several authors have suggested that the allocation of forestry ordinances in the northeastern and southern regions is associated with social and demographic factors. Social characteristics related to higher levels of "environmental" consciousness and activism have been positively associated to the existence of forest laws. Communities which exhibit high levels of population, per capita income, urbanization, population change and timberland are expected to be more likely to enact local forest laws. These variables were examined against the distribution of local forest laws to study these relationships.

Regulated communities in the Northeast generally exhibit higher levels of income, population, population growth and urbanization and lower levels of timberland as compared to non-regulated communities. "Environmentally motivated" demographic factors were strongly associated with the distribution of local laws. These relationships are indicative of the underlying environmental sentiments of many of the local laws of this region.

Demographic variables in Georgia and Louisiana were much less effective in describing the allocation of local forest laws. In Georgia and Louisiana demographic variables were only marginally effective in describing the distribution of local forest laws. In Georgia, local laws are more prevalent in areas exhibiting slightly higher levels of urbanization; in Louisiana, forest ordinances are more common in parishes with high levels of timberland and low levels of urbanization.

Unfortunately, all of these variables have little explanatory power. Whereas, northeastern forest laws are generally enacted to protect environmental quality, southern ordinances have usually been adopted to safeguard local financial interests. Therefore, social factors, associated with environmentalism, would be expected to be more effective in describing the distribution of ordinances in the northeastern region.

For the most part, local forest laws in the Northeast are concentrated in highly populated and urbanized areas which may contain low levels of forest activity and relatively little forestland. By contrast, southern ordinances are generally found in highly forested areas which may containing more active forest markets. The impact of local forest regulation on loggers, landowners and governments is strongly related to the resource and market conditions of regulated communities. These relationships will be examined in the following chapter.

Chapter 8. The Impact of Local Forest Ordinances

Previous chapters have focused on the scope and distribution of local forest laws. The impact of these laws on loggers and forest landowners and the attitudes of local governments toward them were largely overlooked. The benefits and costs of forest ordinances are determined by a large number of factors. The impact of these laws is defined not only by their objectives and requirements, but also by resource and market characteristics of the localities they regulate. Unfortunately, study of the benefits and costs of specific forest ordinances is well beyond the scope of this analysis. The purpose of this chapter is to describe many of the factors which will define the costs and benefits of forest regulatory ordinances to loggers, forest landowners, local governments and their citizens. The attitudes of local governments are examined to gauge the effectiveness of forest laws; similarly, the perspectives of the forestry community are used to assess the burden of these laws.

Surveys

Surveys of forestry professionals (loggers and forest consultants) of and regulated local governments are the primary analytic tools of this chapter. The complete methodology of these surveys was discussed in Chapter Three. A brief explanation of survey procedures and response rates is provided below.

Local Government

The survey of local governments was distributed to the 493 local governments with forestry ordinances. Governments with timber harvesting, environmental protection, tree protection and special feature ordinances and governments with public property ordinances received separate survey forms. The number of surveys distributed and returned are shown in Table 8.1, by region.

Table 8.1 Survey of local governments with forest laws by region, 1992

Region	Forestry Ordinance Surveys		Hauling Ordinance Surveys	
	Mailed	Received	Mailed	Received
Northeastern	329	93 (28%)	3	0 (0%)
Southern	76	31 (41%)	59	15 (25%)
Western	17	2 (11%)	1	0 (0%)
Central	7	0 (0%)	1	0 (0%)

The government survey asked respondents for the number of logging or hauling permit applications which have been made in their jurisdiction since their ordinance became effective. Harvest permits, a relatively common requirement of many local laws, provide a convenient means of measuring the level of forest activity in regulated areas. This is important because many governments who do not require permits, are unaware of number of forestry activities conducted within their jurisdiction. Respondents were asked to estimate the average length of

the time required for permit approval and the acreage of forestland regulated by their ordinance. Governments were also asked to list their law's objectives and to comment on its effectiveness in meeting these objectives.

Survey of loggers, pulpwood operators and forest consultants

The survey of loggers, pulpwood operators and forest consultants was distributed to 748 individuals in three northeastern and three southern states. Respondents in the southern and northeastern region received separate surveys. Surveys from Georgia, Louisiana and Virginia were analyzed in the South and responses from Pennsylvania, New York and Connecticut were examined in the Northeast. Surveys distributed and returned by region is shown in Table 8.2.

Table 8.2 Surveys of the impact of local regulation on loggers and forest consultants by region, 1991

Region	Loggers and pulpwood operators		Consultants	
	Mailed	Returned	Mailed	Returned
Northeastern	191	75 (39%)	115	74 (64%)
Southern	254	75 (30%)	188	119 (63%)

The survey of loggers and forest consultants contained four segments. The first section asked participants to rank "common" regulatory provisions on an ordinal scale of "costliness". These

provisions were, for the most part, identical to those outlined in Chapter Six, but several provisions had to be made more specific to facilitate their use in this survey. A different set of requirements was created for each region to account for varying regulatory conditions.

Participants estimated the costliness of complying with each of these requirements. The scale of "costliness" ranged from one to four, as follows: (1) extremely difficult or costly to implement; (2) difficult or costly to implement; (3) moderately difficult or costly to implement; and (4) easily implemented at little cost. A fifth category permitted responses of no opinion or no comment. The number of responses by rank were collapsed to two rankings to facilitate analysis. Categories (1) and (2) were combined to create a category of "high" cost or difficulty of compliance. Categories (3) and (4) were combined to indicate a "low" cost or difficulty of compliance. No opinion rankings were omitted from this analysis. This dichotomy is used to determine whether a significant number of respondents view each common requirement as "costly" or "not costly" to comply with. These rankings were not meant to signify financial costs, per se, but are used to reflect the relative burden of having to comply with these provisions. The original, four ranking, scale provides little additional information over the two category grouping, since rankings are largely subjective. The two group case is much more easily interpreted.

In the second section, loggers and forest consultants were asked if they had actually encountered each common requirement. The purpose

of this question is to measure the level of exposure of respondents to the requirements of local laws. In the third section, participants were requested to comment on the scope and importance of state and local forest regulatory laws. The fourth section was used to determine the most apparent category of cost associated with local forest ordinances, as follows: (1) the cost of extra paperwork; (2) cost of waiting periods and non-productive time associated with compliance; (3) the cost of lower yields, higher operating costs and decreased productivity; and (4) the direct cost of bonds, sureties, fees, licenses and insurance required by regulation. Participants were asked to indicate which of these costs is the most important additional expense associated with local forest laws.

Survey of Local Governments

Local governments with forest regulations were asked their opinions about forest ordinances and were requested to reveal attributes of their localities. The usefulness of forest ordinances in achieving local environmental objectives was examined. Surveys were used to estimate forested acreages and levels of forest activity in regulated communities. Surveys will be examined by region.

Northeastern Region

Surveys were distributed to 329 northeastern governments which restrict forest activities and three which regulate log hauling (Table 8.1). Ninety-three and zero responses were received from these

governments, respectively. Three-fourths of respondents in the Northeast require a harvest permit. Although the total number of applications received by these governments was 2,092, they averaged only 2.1 permit applications per year. In addition, this may overstate the level of forest activity within these areas. Although several counties in Maryland receive over thirty permit applications per year, most governments have received low numbers of applications. Twenty-seven governments (which require forest permits) have not received a single application since adopting their law; although, over half of these localities have had ordinances for over five years. The median number of applications submitted to sampled governments is only .3 applications per year.

Approximately ninety-nine percent of all forest permits applied for in the sample population were granted (2,069 of 2,092 applications). However, the review periods for these permits could be rather lengthy, ranging from two to 120 days. On average, the review process of the seventy-four respondents took approximately one month (27.74 days).

The average acreage of a responding governments was 34,505 acres (53.9 square miles). If the seven Maryland counties, sampled in this study, are omitted, the average acreage of forestland regulated under local laws in the Northeast is reduced to 11,422 acres (17 square miles). This reinforces the idea that most ordinances in this region have been adopted by geographically compact units of government. For this reason, the existence of several hundred ordinances in the northeastern region may overstate the geographic importance of local

forest laws.

The small number of permit applications received by government respondents may reflect the limited nature of timber activity in many regulated communities. This could be used to support the idea that local forest laws in the Northeast may be concentrated in areas of relatively little importance to industrial forestry operations. Spatial analyses presented in the last chapter indicated that forest ordinances are generally more prevalent in densely populated and highly urbanized areas. These areas will usually contain lower quantities of timberland and less well defined resource markets as compared to more rural areas. The regional importance of local forest laws in the Northeast may be limited by the low levels of forestry activity within regulated areas.

The lack of forest permit applications may result from regulation. Loggers may simply choose to avoid governments which have forest ordinances; in other words, the presence of local laws may limit their number. It seems unlikely, however, that this would account for the total lack of permit applications in this region. Unfortunately, the survey instrument used in this study was much too crude to determine this with certainty. The importance of local forest ordinances in the Northeast may be minimized by the fact that many of these laws are clustered in areas exhibiting low levels of forest activity.

Why are forest and logging ordinances adopted by governments containing low quantities of timberland and little forest activity? In many governments in the northeastern region, aesthetics, wildlife and amenity values are more important forestry outputs than are roundwood

products. Many laws were created to protect these resources. The environmental sentiments of many local governments are shown in their comments to the survey. For example, two respondents stated that their intent was, "to stop the raping of wooded areas" and "to prevent clear-cutting and save the environment". It is important to note that only three or four of the ordinances identified in this study were adopted as a result of abusive forest operations. Many laws were enacted to limit potentially destructive activities. Driven by a desire to protect environmental resources, governments have enacted local laws even though they may not contain large quantities of merchantable timber.

Many local forest ordinances have been adopted to regulate activities other than logging. For example, logging ordinances have been used by local governments to restrict land clearing associated with development. In these cases, governments have little or no forestry activity within their jurisdiction, but the logging ordinance is a convenient means of restricting certain land uses. This is shown in the following comment from a township in western Pennsylvania:

"The law is used as a 'threat' to developers that commence clearing or earthmoving prior to obtaining municipal approval and all applicable governmental permits - that is, it is a check on compliance with land development ordinances in general. For example, if development activities proceed without approval or permits, then the Township will contend that the Logging ordinance has been violated, for failure to obtain a logging permit, and that the developer is subject to the fines and penalties of the Logging ordinance."

Although most ordinances in the Northeast were created specially to restrict forestry operations, it is difficult to assess the importance of these laws, since the quantity and quality of the forest

resource in regulated areas differs dramatically. Local resource conditions will largely define the impact of local forest laws on loggers and forest landowners. For this reason, the presence of large numbers of forest ordinances may not, necessarily, suggest a serious regulatory burden.

Environmental damage imposes significant costs to society; therefore, regulation which limits this damage benefits society. Local regulation is justified as long as private costs (of loggers and landowners) are outweighed by public benefits. Analysis of the costs and benefits of local laws is well beyond the scope of this study. It is important to remember, however, that the cost of local regulation must be examined with respect to the benefits these laws accrue to society.

Virtually all local governments noted that their forest law was effective (beneficial) in implementing the objectives of their law. Without exception, respondents commented that they were pleased with the results of their forestry laws. Forest ordinances are used by governments to take a more active role in local environmental policy. The following comment from a government in Pennsylvania reflects the sentiments of most respondents:

"It has been successful in providing a means for local municipal control and knowledge of logging operations. Prior to the implementation of this ordinance the Township had no way to monitor what logging operations were taking place within the Township."

Southern Region

Two surveys were distributed to governments in the South. Many of the governments in the South which regulate forestry activities, such as those in Florida and Virginia, only require adherence to silvicultural best management practices. In most cases, these localities require neither local notification nor harvest permits for forestry activities. None of the respondents in these areas provided a useful estimate of the number of forest activities, perhaps because the laws are relatively new. Of the thirty-one respondents identified with forest ordinances, only two localities provided the number of forest activities which had been conducted. In the South, the majority of attention is paid to restrictions on hauling of forest products on local roads and bridges.

Fifteen surveys were received from respondents who required permits for hauling activities, representing twenty-five percent of regulated communities. In total, 3,323 hauling permit applications were received from these governments; on average, these localities reviewed 97.22 permits per year. This value may be somewhat misleading, however, since several localities have received a large number of permit applications. For example, Tangipahoa and Natchitoches Parish, Louisiana, for example, each average over 300 hauling permits applications per year. The median number of permit applications received in sampled governments was 33.25 per year. Of 3,323 permit applications, 3,311 (99.6%) were approved. Most permit applications could be approved in one day. The average area of regulated counties and parishes in the South was approximately 630 square miles.

The responses of local governments in the South contrast sharply with those of northeastern region. The level of forest activity is the most obvious example. Forestry activities are much more prevalent in regulated areas of the South. Although the larger amount of forest activity in the South could be attributed to larger units of government, it does not account for the lack of forest operations within certain northeastern localities. Most forest ordinances in the South were adopted to limit damage which has actually been suffered by local governments. In many cases, local governments cited damage to roads, bridges and rights-of-way from log and pulpwood trucks as the motivation for adopting their local ordinances.

Respondents were generally pleased with the effectiveness of their laws. Local ordinances provide a means of holding loggers and pulpwood operators accountable for damage. This is shown in the following comment from Georgia, which reflects the sentiments of many respondents:

"We were having a lot of damage at the taxpayers expense to our roads. This way timber-cutters have to put up a bond if there is any damage. It has been very effective, because the loggers are careful not to damage or create any traffic hazards because they know they have to pay for it"

Central and Western Region

The survey of local government had little use in the central and western regions. Of the eight surveys distributed in the central region, no completed responses were obtained. In the west, only two of eighteen survey forms were returned. Both western surveys were from cities in Oregon, which had granted approximately ten forest permits per

year. The forest land within these areas averaged approximately 5,000 acres (8 square miles). The small number of surveys in these areas limits analysis in these regions. For the most part, analysis in this chapter will focus on the northeastern and southern regions.

Survey of Loggers, Pulpwood Operators and Forest Consultants

Loggers, pulpwood operators and forest consultants were surveyed to sample the attitudes of the forestry community toward local forest regulation. This survey was designed to obtain an estimate of the "perceived" cost of the most common regulatory provisions as well as to determine the most apparent sources of this cost. Results are used to assess the burden of local forest laws on loggers, pulpwood operators and forest landowners, by region.

Northeastern Region

Survey results for loggers and pulpwood operators in the northeastern region is shown in Table 8.3. The frequency of response to common provisions in each ranking category are identified. The Chi-square (χ^2), goodness-of-fit statistic is shown in the fourth column. The fourth column arranges responses into three categories: requirements are ranked as "high" cost by a significant number of respondents; requirements are ranked as "low" cost by a significant number of respondents; and requirements are indeterminate in which case counts of

Table 8.3 Survey results for loggers by rank category, northeastern region¹³

Common Provision	"High" cost rankings (#)	"Low" cost rankings (#)	Chi-square (χ^2)	Rank category
Harvesting permits required, approval of which can take up to 30 days	61	12	32.89	"High" Cost
Forest activities cannot be conducted between 5 p.m. and 7 a.m.	53	18	17.25	
Stream can only be crossed with culvert	49	24	8.56	
Local officials must be notified 48 hours before operations begin or end	40	31	1.14	indeterminate
Performance bonds required	40	35	.33	
Buffers of 100 feet required along roads, streams, lakes and property lines	40	35	.33	
Management plans approved by a professional forester required	39	35	.22	
Harvesting must be by selection, openings cannot exceed 7500 square feet	38	27	1.86	
Roads and rights-of-way must be cleared of debris daily	29	46	3.85	"Low" Cost
Best management practices required	15	50	18.85	
Forest roads must be properly retired	7	68	49.61	

$$\chi^2_{df=1} = 3.838379; \alpha = .05$$

rankings did not differ significantly. The purpose of the last column is to show trends in the attitudes of loggers toward the relative cost of these common provisions.

Requirements for harvesting permits, restrictions on the time of operations and guidelines for the use of culvert and bridges were viewed as "high" cost provisions by a significant number of respondents. Local notification, requirements for performance bonds, buffer standards and management plans were ranked as "high" cost provisions a majority of respondents; however, these relationships were not statistically significant. Similarly, requirements for road clearing, best management practices and road retirements were viewed as "low" cost provisions by a significant number of respondents.

Of the eleven common provisions identified (Table 8.3), only three were ranked in the "high" cost category by a significant number of respondents. For the most part, common requirements in the Northeast are not viewed as overly burdensome by a majority of loggers and pulpwood operators. A reason for this may be that many of the provisions of local laws are consistent with common operating procedures. Loggers who adhere to best management practices, clear roads of debris and retire forest roads as a matter of practice will not view ordinances, which impose these requirements, as costly. Although unreasonable and costly provisions do exist, many requirements simply reinforce common practices. The most "costly" provisions are those which are peculiar; such as, harvesting permits which can take up to thirty days to be approved or restrictions on operations during certain

times of the day.

The percentage of respondents who have actually encountered each common provision is shown in Table 8.4. Requirements for the posting of performance bonds, the retirement of forest roads and the use of culvert were the most frequently encountered provisions. Time restrictions, best management practice, harvest permits and local notification were experienced by less than half of all respondents surveyed.

Table 8.4 Loggers who have encountered "common" provisions, northeastern region

Common Provision	Percentage of loggers which have encountered each provision (%)
Forest roads must be properly retired	72
Stream can only be crossed with culvert	67
Performance bonds required	64
Roads and rights-of-way must be cleared of debris daily	53
Harvesting must be by selection, openings cannot exceed 7500 square feet	49
Buffers of 100 feet required along roads, streams, lakes and property lines	48
Management plan approved by professional forester required	48
Best management practices required	44
Forest activities cannot be conducted between 5 p.m. and 7 a.m.	41
Harvesting permits required, approval of which can take up to 30 days	36
Local officials must be notified 48 hours before operations begin or end	29

The number of respondents who ranked each category as the most apparent source of cost are shown in Table 8.5. A significant number of loggers identified "the cost of extra paperwork" as the most obvious source of cost. The Chi-square value of 15.24 was larger than the five percent critical value of 7.82. The term "paperwork" may impose bias into this question, since many individuals attach an extremely negative connotation to the term. Respondents may be predisposed to choose this category of cost, thus results of this section of the survey for loggers and consultants in all regions must be interpreted with caution.

Table 8.5 Logger rankings of cost categories, northeastern region

Source of cost from regulation	Number of loggers ranking each category as the most apparent source of cost from regulation
Cost of extra paperwork	24
Cost associated with waiting periods and nonproductive time	7
Cost of lower yields, higher operating costs and decreased productivity	9
Direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by region	9

The total cost of local forest regulation is not determined solely by the stringency of the provisions of these laws. The administrative costs associated with paperwork, the expense of non-productive time and

the added cost of filing permits and management plans, for example, may be just as important in determining the overall impact of local forest laws. In addition, the nuisance of complying with a large number of forest laws within a given area may also represent an important cost of local forest regulation.

Rankings for forest consultant in the northeastern region are shown in Table 8.6. Six categories of provisions were viewed as "low" cost requirements by a significant number of forest consultants. Permit requirements and harvest selection guidelines were the only provisions associated with a "high" cost of compliance by a majority of consultants.

However, neither of these relationships were statistically significant. Consultants generally view the provisions of local laws as being much less burdensome than do loggers. This is a fairly intuitive result, since they generally do not have to adhere to these provisions. Forest consultants have a vested interest in the local regulation when forest management plans and permits developed by professional foresters are required. Local laws create business opportunities for private forest consultants. Similar results have been identified in California. California's Z'berg-Nejedly Forest Practice Act requires the participation of consultants in all stages of the management process (Shaffer 1991). Forest consultants benefit from the adoption of these types of laws. This idea is reflected in the following comment of a consultant from New York, "...regulation helps the private consultants, but will be the end of the mom and pop logging operation".

Table 8.6 Survey results for consultants by rank category, northeastern region¹⁴

Common Provision	"High" cost rankings (#)	"Low" cost rankings (#)	Chi-square (χ^2)	Rank category
Harvesting permits required, approval of which can take up to 30 days	40	27	2.52	indeterminate
Harvest must be by selection, openings cannot exceed 7500 square feet	31	35	.24	
Stream can only be crossed with culvert	28	44	3.56	
Buffers of 100 feet required along roads, streams, lakes and property lines	25	46	6.21	"Low" Cost
Forest activities cannot be conducted between 5 p.m. and 7 a.m.	22	40	5.23	
Roads and rights-of-way must be cleared of debris daily	15	58	25.33	
Performance bonds required	14	59	27.74	
Local officials must be notified 48 hours before operations begin or end	13	56	26.8	
Best management practices required	6	62	46.12	
Management plans approved by a professional forester required	6	65	49.03	
Forest roads must be properly retired	3	70	61.49	

$$\chi^2_{df=1} = 3.838379; \alpha = .05$$

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Forest consultants who have actually encountered each common regulatory provision are shown in Table 8.7. The proportion of loggers and forest consultants who have experienced these provisions is similar. Requirements for performance bonds, forest road retirement and the use of culvert were cited by both groups as the most frequently encountered local requirements.

Table 8.7 Consultants who have encountered "common" regulatory provisions, northeastern region

Common Provision	Percentage of consultants which have encountered each provision (%)
Performance bonds required	81
Forest roads must be properly retired	78
Stream can only be crossed with culvert	69
Management plans approved by a professional forester required	57
Buffers of 100 feet required along roads, streams, lakes and property lines	55
Roads and rights-of-way must be cleared of debris daily	54
Best management practices required	50
Harvesting permits required, approval of which can take up to 30 days	43
Forest activities cannot be conducted between 5 p.m. and 7 a.m.	34
Harvesting must be by selection, openings cannot exceed 7500 square feet	34
Local officials must be notified 48 hours before operations begin or end	30

The consultants who ranked each category of cost as the most apparent is shown in Table 8.8. The "cost of extra paperwork" was cited as the most obvious source of cost by a significant number of respondents. The Chi-square (χ^2) statistic for these rankings equalled 8.72, which is slightly larger than the five percent critical value of 7.82, for three degrees of freedom.

Table 8.8 Consultant rankings of cost categories, northeastern region

Source of cost from regulation	Number of consultants ranking each category as the most apparent source of cost from regulation
Cost of extra paperwork	21
Cost associated with waiting periods and nonproductive time	10
Cost of lower yields, higher operating costs and decreased productivity	12
Direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by region	7

Southern Region

Logger and pulpwood operator rankings for each local requirement in the southern region is shown in Table 8.9. Six categories of common requirements in the South were ranked as "high" cost provisions by a significant number of southern loggers. These included harvesting permits, performance bonds, local notification and management plans.

Table 8.9 Survey results for loggers by rank category, southern region¹⁵

Common Provision	"High" cost rankings (#)	"Low" cost rankings (#)	Chi-square (χ^2)	Rank category
Harvesting permits required, approval of which can take up to 30 days	62	6	46.12	"High" Cost
Performance bonds required	51	21	12.5	
Local officials must be notified 48 hours before operations begin or end	51	23	10.59	
Management plan approved by a professional forester required	50	22	10.89	
Hauling is prohibited when roads are muddy	49	26	7.05	
Culverts must be used to cross streams and ditches	47	26	6.04	
Roads and rights-of-way must be cleared of debris daily	42	33	1.08	indeterminate
Gravel must be installed on haul roads 15 to 25 feet before the intersection with any public road	39	33	.5	
Forest roads must be properly retired	38	37	.013	
Buffers of 25 and 50 feet required along roads, streams, lakes and property lines	31	41	1.39	
Best management practices required	30	45	3.0	

$$\chi^2_{df=1} = 3.838379; \alpha = .05$$

Only requirements for buffer zones and best management practices were ranked as "low cost" requirements by a majority of respondents. Neither of these rankings, however, were statistically significant.

The percentage of southern loggers and pulpwood operators who have actually encountered these requirements is contained in Table 8.10. Several of the most commonly encountered local provisions such as adherence to best management practices, road retirement and buffers requirements were ranked as "low cost" provisions by a majority of respondents. Presumably, these requirements are familiar and consistent with common operating procedure; therefore, they can be implemented at relatively little cost.

Interesting conclusions can be drawn by comparing responses of loggers in the Northeast and in the South. For the provisions which are common to both regions (best management practices, performance bonds, permits and management plans), the responses showed that larger proportions of loggers in the South ranked them as "high" cost requirements than loggers in the Northeast. This is most likely due to the traditional attitudes toward land use and regulation in these regions. As was shown in Chapter Five, the northern United States has a much longer tradition of environmental activism and regulation as compared to southern states (Roland 1975). This tradition has undoubtedly shaped attitudes in both regions. Northern loggers accustomed to higher levels of environmental regulation will generally perceive local forest laws as less burdensome than southern loggers who have typically experienced little regulation. Differences in income levels between

Table 8.10 Loggers who have encountered "common" regulatory provisions, southern region

Common Provision	Percentage of loggers which have encountered each provision (%)
Best management practices required	73.3
Forest roads must be properly retired	66.7
Hauling is prohibited when roads are muddy	65.3
Buffers of 25 to 50 feet required along roads, streams, lakes and property lines	64
Gravel must be installed on haul roads 15 to 25 feet before the intersection with any public road	60
Performance bonds required	56
Culverts must be used to cross streams and ditches	54.7
Roads and rights-of-way must be cleared of debris daily	53.3
Local officials must be notified 48 hours before operations begin or end	34.7
Management plans approved by a professional forester required	28
Harvesting permits required, approval of which can take up to 30 days	16

these regions may also be a contributing factor.

A significant number of loggers in the southern region cited "extra paperwork" as the most apparent expense associated with local forest laws (Table 8.11). The "cost of extra paperwork" was by far the most commonly cited category. The Chi-square value of 20.66 for this

relationship is much greater than the five percent critical value of 7.82.

The cost rankings for common provisions for forest consultants in the southern region is shown in Table 8.12. Requirements for management plans, performance bonds, the installation of culvert and the notification of local governments of operations were viewed as "low" cost provisions by a significant number of forest consultants. These same provisions were ranked as "high" cost requirements by a significant number of loggers and pulpwood operators. In addition, the requirement of a management plan, approved by a professional consultant forester, was viewed as a "high" cost provision by sixty-nine percent of loggers surveyed. This same provision was ranked in the "low" cost category by sixty-four percent of forest consultants. These differences in valuation are apparently the result of different business objectives.

Table 8.11 Logger rankings of cost categories, southern region

Source of cost from regulation	Number of loggers ranking each category as the most apparent source of cost from regulation
Cost of extra paperwork	25
Cost associated with waiting periods and nonproductive time	8
Cost of lower yields, higher operating costs and decreased productivity	9
Direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by region	5

Forest consultants who have encountered each "common" local provision are shown in Table 8.13. Provisions for adherence to best management practices, prohibitions against hauling and requirements for stream crossings are the most commonly encountered provisions reported by southern consultants. In most cases, equal percentages of southern loggers and consultants have experienced these provisions.

Consultants who ranked each category of cost as the most apparent is shown in Table 8.14. The largest number of rankings was obtained in the "cost of extra paperwork" category. Thirty-seven respondents ranked this category as the most apparent source of cost. The number of ranks for this category was significantly larger than other categories, indicated by a Chi-square (X^2) value of 25.2 and a five percent critical value of 7.82 for three degrees of freedom.

The comments of loggers and forest consultants regarding the perceived cost of local forest laws offer several important insights. Most noted that the cost of forest regulation will eventually be borne by landowners in reduced stumpage values. For example, a logger from New York noted: "The ultimate result of all this (local regulation) is that the landowner pays for it". Similarly, a forest consultant from Georgia commented that "All added cost to the logging industry will not be absorbed by them (forest industry), but will be passes on to the landowners through lower stumpage values".

The assertion that the cost of local regulation will be borne by landowners is based on certain elasticity and timber supply assumptions. Assuming a similar resource, loggers would not be expected to operate

Table 8.12 Survey results for consultants by rank category, southern region¹⁶

Common Provision	"High" cost rankings (#)	"Low" cost rankings (#)	Chi-square (X ²)	Rank category
Harvesting permits required, approval of which can take up to 30 days	89	21	42.04	"High" Cost
Hauling is prohibited when roads are muddy	63	50	1.45	indeterminate
Buffers of 25 and 50 feet required along roads, streams, lakes and property lines	51	67	2.17	
Roads and rights-of-way must be cleared of debris daily	45	70	5.43	"Low" Cost
Performance bonds required	44	71	6.34	
Local officials must be notified 48 hours before operations begin or end	42	69	6.57	
Forest roads must be properly retired	41	74	9.47	
Culverts must be used to cross streams and ditches	41	77	10.98	
Management plan approved by a professional forester required	41	77	10.98	
Gravel must be installed on haul roads 15 to 25 feet before the intersection with any public road	36	75	13.7	
Best management practices required	14	102	66.76	

$$\chi^2_{df-1} = 3.838379; \alpha = .05$$

Table 8.13 Consultants who have encountered "common" regulatory provisions, southern region

Common Provision	Percentage of consultants which have encountered each provision (%)
Best management practices required	66.4
Culverts must be used to cross streams and ditches	63
Hauling is prohibited when roads are muddy	58.8
Buffers of 25 to 50 feet required along roads, streams, lakes and property lines	58.8
Forest roads must be properly retired	58.8
Gravel must be installed on haul roads 15 to 25 feet before the intersection with any public road	52.1
Performance bonds required	47.9
Roads and rights-of-way must be cleared of debris daily	46.2
Management plans approved by a professional forester required	30.3
Local officials must be notified 48 hours before operations begin or end	25.2
Harvesting permits required, approval of which can take up to 30 days	19.3

within a regulated community, if other areas within the vicinity, are not regulated. The demand for regulated stumpage is relatively elastic in these areas. Loggers can simply choose not to operate in areas which have local laws since a large number of unregulated areas (substitutes) also exist within these regions. The validity of these assumptions cannot be determined without examining local resource and regulatory conditions.

Table 8.14 Consultant rankings of cost categories, southern region

Source of cost from regulation	Number of consultants ranking each category as the most apparent source of cost from regulation
Cost of extra paperwork	37
Cost associated with waiting periods and nonproductive time	17
Cost of lower yields, higher operating costs and decreased productivity	11
Direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by region	10

Many loggers expressed apprehension over the growth and prevalence of regulation by all levels of government. The respondents viewed local forest laws as an additional layer of regulation confounding an already stringent regulatory situation. The frustration voiced by many loggers is shown in the following quote from Georgia:

"If the Feds add their two cents worth to already extremely restrictive local ordinances, I'll have to start pumping gas to make a living... I'm neither a strict 'no government at all' believer or a militant environmentalist. I believe people are fully capable of making rational decisions concerning their property without constantly having to refer to some tax-paid government bureaucrat."

Summary

The impact of local forest laws on loggers and forest landowners are determined by a large number of factors, including the stringency of regulatory provisions and by local resource and market conditions. This

impact, however, can only be evaluated in context to the benefits these laws accrue to society. Regulatory costs to loggers and forest landowners are justified, economically, if they are outweighed by marginal benefits to society. Forest ordinances should act to internalize social costs which are not accounted for by the market (negative externalities); unfortunately, estimating these values is well beyond the scope of this analysis. This study examines many of the factors which define these relationships. Surveys of local governments, loggers and forest consultants were conducted to accomplish this objective.

The survey of governments was developed to sample the attitudes of regulated governments. Although virtually all respondents felt that their ordinance was effective in achieving local objectives, surveys provided little insight into the actual benefits gained from local regulation. The usefulness of these surveys was in describing local market and resource factors.

The importance of local forest regulation in the Northeast may be limited by low levels of forest activity and small quantities of forestland in regulated communities. Governments in these areas receive only a small number of permit applications each year, which indicates relatively low levels of forest activity. In addition, the average area of forestland in surveyed governments was under twenty square miles. For the most part, northeastern ordinances are concentrated in areas containing small quantities of timber and weak resource markets, which minimizes their influence. By contrast, southern laws are usually found

in counties exhibiting large areas of forestland and high levels of forest activity. Regulated governments in the South receive in excess of ninety permit applications per year and average over 600 square miles in area. These factors may act to magnify the importance of forest ordinances in the South.

The survey of loggers and forest consultants was developed to examine the costliness of certain common local regulatory provisions. Most common requirements of local laws were not viewed as costly by a significant number of respondents. Requirements for forest road retirement, adherence to best management practices and buffer zones were not viewed as overly burdensome by a majority of respondents. Many of these requirements simply reinforce commonly conducted practices. Although examples of costly requirements do exist, most provisions are not singularly burdensome.

Perceptions of costliness of loggers and forest consultants differ dramatically. Loggers consistently ranked common requirements as more costly to comply with than did forest consultants. This is most likely due to the fact that consultants generally do not have to adhere to the requirements of local laws. In addition, consultants may actually benefit from local laws which require their participation in management plan or harvest permit review processes. Attitudes of respondents in the northeastern and southern regions were also found to differ. Southern respondents consistently ranked common requirements as more costly than did their northern counterparts. Differing traditions of environmental regulation and contrasting methods of production are the

primary reasons for this variation.

The cost of local forest regulation is not determined solely by the stringency of individual provisions. Administrative costs, the nuisance of complying with dozens of ordinances, local market and resource factors and the benefits these laws accrue to society must also be examined. This study provides little insight into the magnitude of these values. An important topic of future research would be the empirical study of many of these factors.

Chapter 9. Summary

Five hundred and twenty-two local forest regulatory ordinances are found in 493 independent governments in the United States. The northeastern region contains the largest percentage of ordinances, with over sixty percent of the national total. The southern region contributes twenty-seven percent and the western and central regions contain four and two percent, respectively. Forest ordinances are adopted by all levels of local government. Northeastern laws are generally enacted by small units governments, such as, towns, townships, cities and boroughs. Southern ordinances are usually adopted by counties or parishes. The Northeast and South are the only regions of the country which have experienced consistent growth in local laws. Ordinances in the West have been limited by the presence of state forest practice laws. The central region has exhibited little local forest regulation.

Local forest ordinances are a relatively recent occurrence. Over seventy percent have been enacted in the last ten years, with almost fifty percent having been adopted in the last five. The northeastern and southern regions have witnessed rapid growth in the number of local forest laws in the last two decades. Strong traditions of "home rule" and small units of government have contributed to the growth of laws in the Northeast. Local responsibilities for road and highway programs, changes in methods of log hauling and state mandated programs have encouraged proliferation in the South.

Local forest laws have been adopted for a wide variety of diverse objectives. Ordinances identified in this study were separated into five categories based on their regulatory intent. These groupings include: timber harvesting; public property; tree protection; environmental protection; and special feature protection ordinances. Northeastern ordinances are principally concerned with protecting environmental quality and aesthetics from unrestricted timber harvesting activities (timber harvesting ordinances). Southern ordinances, however, are generally concerned with safeguarding local investments in roads and structures (public property ordinances). State programs are also an important source of local laws. Ninety-five percent of the special feature ordinances and over sixty percent of the environmental protection ordinances in the South were adopted pursuant to state programs. Similarly, ninety percent of the special feature ordinances and fifty percent of the environmental protection ordinances in the Northeast were enacted to comply with a state legislation.

The requirements used to achieve the objectives of forest ordinances show a similar degree of variation. Standards for harvesting and hauling permits and management plans are the most frequently adopted requirements; similarly, provisions for buffer zones, stream crossings, slash disposal, road construction and harvesting methods are also common. Although examples of restrictive provisions do exist, the requirements of most laws are not singularly burdensome.

Common provisions of local forest laws are generally not viewed as costly by a large proportion of loggers, pulpwood operators and forest

consultants. In addition, many frequently encountered requirements are associated with low costs of compliance. This is attributable, at least in part, to the fact that many of these requirements simply reinforce commonly conducted procedures. The impact of local forest laws, however, is not determined solely by their provisions. Whereas, the specific provisions of local laws may not be burdensome, the prospect of complying with dozens of ordinances could result in a substantial burden; in addition, market and resource factors also help to determine the cost of local forest laws.

The importance of local forest laws in the Northeast may be limited by low levels of forest activity and small quantities of forestland in regulated communities. By contrast, southern laws are usually found in counties exhibiting large areas of forestland and high levels of forest activities. Local forest laws will have a greater impact, if they exist in areas containing large quantities of merchantable timber and active forest markets. These ideas are reinforced by examining the social characteristics of regulated communities.

The distribution of local forest laws in the Northeast is strongly related to social characteristics associated with increased levels of environmental concern and activism. Forest ordinances in this region are more prevalent in areas exhibiting high levels of income, population and urbanization and low levels of forestland. These same demographic factors are ineffective in describing the allocation of forest laws in the South. Northeastern and southern governments exhibit vastly

different levels of environmentalism and forest activity. Unlike the northeastern region, the importance of forest ordinances to loggers and forest landowners in the South is augmented by local resource and market factors.

Finally, the cost or impact of local forest regulatory laws to loggers and landowners cannot be adequately examined without considering the benefits local laws produce for society. Regulatory costs are justified if they are offset by society's benefits. Unfortunately, this study provides little insight into the value of the actual benefits and their comparison to the cost of regulation. More in-depth analysis of this subject is an important source for future research.

Conclusions

The objectives of local forest regulations differ dramatically by region. Ordinances in the Northeast are primarily environmental in scope and purpose. By contrast, southern laws are most often associated with safeguarding local investments in roads and bridges, when local governments have responsibilities for road maintenance. Local laws in the western region are associated with state forest practice legislation. The central region has experienced little local forest regulation.

The impact of local forest laws is determined by a large numbers of factors. Administrative costs, the stringency of regulatory provisions and social and market conditions all help to determine the cost of local forest laws to loggers and forest landowners. In

addition, the cost of regulation must be examined in context to society's benefits. A holistic approach is required to study this subject.

Most requirements of local forest ordinances are not viewed as onerous by a majority of loggers and forest consultants. Many provisions simply reinforce commonly conducted practices. Loggers consistently associate higher costs of compliance with these provisions as compared to forest consultants. In many cases, consultants benefit from the existence of local forest laws

Over five hundred local forest ordinances were identified in the United States. The influence of local forest laws, however, cannot be determined simply by examining their number. For example, an extremely small percentage of local governments have local forest laws in the Northeast (8%). In addition, many of these laws are also concentrated in areas containing relatively little forestland and little forest activity. Local market and resource factors may limit the influence of local forest laws.

Overall, the impact of local forest regulation has been small. In many cases, the stringency and prevalence of forestry ordinances have been exaggerated. To this point, local laws have had little effect on the level of forest activity or the supply of timber in the United States.

Topics of Further Research

Additional tallies of local forest laws are required. Local forest regulation is an extremely dynamic aspect of public forest policy. Local laws are constantly being adopted, amended and repealed; therefore, surveys of local forest laws must be monitored.

Case study analyses of the motivation and intent of specific local laws would be helpful. A study of the specific socio-demographic attributes of regulated communities would be useful for understanding the relationship between social factors and the growth of individual local forest laws. This would facilitate an analysis of social factors which have motivated the adoption of forest regulation at all levels of government.

The most obvious need for future research is the need for a study comparing the benefits with the costs of local forest ordinances. The costs of local ordinances to loggers and forest landowners can only be examined in relation to the benefits these laws accrue to society. Future research should study the benefit/cost relationships of individual local laws. Marginal analysis of these factors would be extremely useful in evaluating the effectiveness and burden of local forest regulatory ordinances.

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Appendix A. Cover Letters and Survey Forms

Appendix A



Department of Forestry

School of Forestry and Wildlife Resources
Blacksburg, Virginia 24061-0324 USA
(703) 231-5482 FAX (703) 231-3330

August 15, 1992

(ADDRESS)

Dear (LOCAL OFFICIAL):

Virginia Polytechnic Institute and State University in conjunction with the USDA Forest Service is conducting a survey of local forest practice laws in the United States. We are interested in determining the scope and impact of local forest harvest and hauling laws in the United States. (LEGISLATIVE CITATION) was cited in our data base as just such a local forest law. In an attempt to better understand the scope and prevalence of local forest regulatory law, we have developed a simple one page survey of governments which regulate forest activities.

The enclosed survey consists of five questions all of which can be easily answered in five minutes. Your responses are very important to help to define the prevalence of local forest laws as well as a gauge of their effectiveness.

Your participation is greatly appreciated. A self-addressed stamped envelop is enclosed for your convenience. If you have any questions please feel free to call me at (703) 231-7265. Thank you.

Sincerely,

Chris Martus
Graduate Research Assistant
Virginia Polytechnic Institute
and State University

Appendix A

Survey of Local Governments

1) What was the date of adoption of the local ordinance cited in the cover letter accompanying this survey? _____

2) Does this law require loggers or pulpwood operators to notify your government prior to hauling or loading forest products on public roads, bridges or rights of way?
YES NO

If Yes, approximately how many loggers or pulpwood operators have conducted forest operations in your jurisdiction since this law was adopted? _____

3) Does this law require loggers or pulpwood operators to obtain harvest or hauling permits before commencing forest activities?

YES NO

If Yes, approximately how many applications for logging or hauling permits have been granted since the adoption of your local forest law? _____

How many permit applications have been denied? _____

How long does it generally take to obtain a permit? _____

_____ days

4) Why was this ordinance originally drafted, what were its objectives? Briefly explain.

5) How effective has this law been in meeting these objectives? Please explain and include any additional comments.

Appendix A

Survey of Local Governments

1) What was the date of adoption of the local ordinance cited in the cover letter accompanying this survey? _____

2) Does this law require loggers or pulpwood operators to notify your government before forest harvest operations commence?

YES

NO

If Yes, approximately how many loggers or pulpwood operators have conducted forest operations in your jurisdiction since this law was adopted?

3) Does this law require loggers or pulpwood operators to obtain harvest permits before commencing forest activities?

YES

NO

If Yes, approximately how many applications for logging or hauling permits have been granted since the adoption of your local forest law?

How many permit applications have been denied? _____

How long does it generally take to obtain a permit? _____

4) Approximately how many acres of forest land fall under the purview of this law? _____ days

5) Why was this ordinance originally drafted, what were its objectives? Briefly explain.

How effective has this law been in meeting these objectives? Please explain and include any additional comments.

Appendix A



Department of Forestry

School of Forestry and Wildlife Resources
Blacksburg, Virginia 24061-0324 USA
(703) 231-5482 FAX (703) 231-3330

December 16, 1991

Dear Survey Recipient:

You should have recently received a survey regarding the impacts of forest regulation. Your participation is essential if the results of this study are to be useful in determining the possible effects of state and local regulation on harvesting and forest management.

As I am sure you know, the proliferation of forest regulation is becoming increasingly important to anyone employed in a forest related industry. This questionnaire is your opportunity to express your views on the effects of these regulations.

Presently, we have not received your completed survey. I hope that it is in the mail or that you will take the time to complete the enclosed copy. Thank you for your cooperation.

Sincerely,

Chris Martus
Graduate Research Assistant
Virginia Polytechnic Institute
and State University

Appendix A

Survey of Forest Practice Regulation

(1) The following provisions were taken from actual local government forest harvest regulatory ordinances in the southeastern United States. Please indicate how costly or burdensome they have been or would be to comply with, based on your experience.

- 1 - extremely difficult or costly to implement
- 2 - difficult or costly to implement
- 3 - moderately difficult or costly to implement
- 4 - easily implemented at little cost
- 5 - no opinion, do not know

CIRCLE ONE

- | | | | | | | |
|---|---|---|---|---|--|--------------------------|
| 1 | 2 | 3 | 4 | 5 | Best Management Practices (BMPs) must be employed for all harvesting operations | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Harvesting operations require a management plan developed or approved by a professional forester | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Performance bonds are required to insure roads, rights-of way and ditches are kept clear of slash and debris | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Culverts must be used to cross streams and ditches | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Local officials must be notified 48 hours before operations begin or end | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Harvest operations require a harvesting permit, approval of which can take up to 30 days | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Hauling is prohibited when roads are muddy | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Roads and rights-of-way must be cleared of slash, mud and debris daily | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Buffers of 25 to 50 feet must be provided along public roads, streams, lakes and property lines | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Forest roads and skid trails must be properly retired | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Gravel must be installed on haul roads 15 to 25 feet before the intersection with any public road | <input type="checkbox"/> |

Appendix A

(2) Please indicate all provisions above which you have actually encountered in conducting your operations or business by placing a check mark (✓) in the appropriate box in the right hand column.

(3) Have you had to comply with any state-wide regulatory laws in conducting forestry or harvesting operations, as opposed to local government ordinances?

(Circle one)

Yes

No

If yes, please briefly describe the provisions of the laws and in what state they occur.

Appendix A

(4) In your opinion, where is the impact of state and local regulation on overall costs most apparent? (Please rank the following from 1 to 4, where 1 is least apparent and 4 the most apparent)

- _____ The cost of extra paperwork
- _____ The cost associated with waiting periods and nonproductive time
- _____ The cost of lower yields, higher operating costs and decreased productivity associated with regulation
- _____ The direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by regulation

Appendix A

Survey of Forest Practice Regulation

(1) The following provisions were taken from actual local government forest harvest regulatory ordinances in the northeastern United States. Please indicate how costly or burdensome they have been or would be to comply with, based on your experience.

- 1 - extremely difficult or costly to implement
- 2 - difficult or costly to implement
- 3 - moderately difficult or costly to implement
- 4 - easily implemented at little cost
- 5 - no opinion, do not know

CIRCLE ONE

- | | | | | | | |
|---|---|---|---|---|--|--------------------------|
| 1 | 2 | 3 | 4 | 5 | Best Management Practices (BMPs) must be employed for all harvesting operations | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Harvesting operations require a management plan developed or approved by a professional forester | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Harvesting must be by selection, openings in the forest canopy cannot exceed 7500 square feet (approx. 1/5 acre) | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Operators must post performance bonds or sureties to insure compliance | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Local officials must be notified 48 hours before operations begin or end | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Harvest operations require a harvesting permit, approval of which can take up to 30 days | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Logging and hauling cannot be conducted between 5 pm. and 7 am. | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Roads and rights-of-way must be cleared of slash, mud and debris daily | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Buffers of 100 feet must be provided along all public roads, streams, lakes and property lines | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Forest roads and skid trails must be properly retired | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | Streams can only be crossed with a culvert | <input type="checkbox"/> |

Appendix A

(2) Please indicate all provisions above which you have actually encountered in conducting your operations or business by placing a check mark (✓) in the appropriate box in the right hand column.

(3) Have you had to comply with any state-wide regulatory laws in conducting forestry or harvesting operations, as opposed to local government ordinances?

(Circle one)

Yes

No

If yes, please briefly describe the provisions of the laws and in what state they occur.

Appendix A

(4) In your opinion, where is the impact of state and local regulation on overall costs most apparent? (Please rank the following from 1 to 4, where 1 is least apparent and 4 the most apparent)

- _____ The cost of extra paperwork
- _____ The cost associated with waiting periods and nonproductive time
- _____ The cost of lower yields, higher operating costs and decreased productivity associated with regulation
- _____ The direct cost of plan preparation, bonds, sureties, fees, licenses and insurance required by regulation

Appendix A



Department of Forestry
School of Forestry and Wildlife Resources
Blacksburg, Virginia 24061-0324 USA

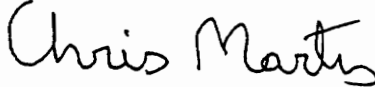
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Permit No. 28

Dear Survey Recipient,

Your participation in our survey of forest practice regulation is very important. If you have not already returned the questionnaire we sent you recently, we would appreciate your doing so as soon as possible.

Thank you for your cooperation.

SINCERELY,



Chris Martus
Graduate Research Assistant
Virginia Polytechnic Institute and State University

Appendix A



Department of Forestry

School of Forestry and Wildlife Resources
Blacksburg, Virginia 24061-0324 USA
(703) 231-5482 FAX (703) 231-3330

November 18, 1991

Dear Survey Recipient:

Virginia Polytechnic Institute and State University in conjunction with the U.S.D.A. Forest Service is conducting a survey to determine the potential impact of state and local forest practice regulation. As I am sure you know, regulation is becoming increasingly important to logging and forest management. This survey attempts to determine the scope and impact of regulation on logging and forest management costs.

The enclosed survey consists of four sections, all of which can be easily completed within five minutes. This survey does not require that you have actually encountered any regulation in conducting your business. It only requires that you are able to rank restrictions on how costly or burdensome they would be to comply with.

Your participation will be greatly appreciated. A self-addressed stamped envelope is enclosed for your convenience. If you have any questions please feel free to call me at (703) 231-7265. Thank you.

Sincerely,

Chris Martus
Graduate Research Assistant
Virginia Polytechnic Institute
and State University

Appendix B. Legislative Citations and Regulatory Objectives

Objective Codes:

- TH - Timber Harvesting Ordinances
- SP - Special Feature Ordinances
- EP - Environmental Protection Ordinances
- TP - Tree Protection Ordinances
- PP - Public Property Ordinances

Appendix B. Legislative citations, regulatory objectives and dates of adoption of local forest ordinances by government and state

State (local government)	Citation	Objective	Date
ARKANSAS			
Pulaski County	Executive Order Regarding the Access to Pulaski County Roads	PS	2/20/81
CALIFORNIA			
Marin County	California Administrative Code, Title 14, Chap. 4 Sub-Chapter 4, Art. 13 Section 927	TH	3/2/84
Monterey County	California Administrative Code, Title 14, Chap. 4 Sub-Chapter 6, Art. 13 Section 965	TH	9/19/83
San Mateo County	California Administrative Code, Title 14, Chap. 4 Sub-Chapter 4, Art. 13 Section 928	TH	1/30/84
Santa Clara County	California Administrative Code, Title 14, Chap. 4 Sub-Chapter 4, Art. 13 Section 925	TH	10/30/83
Santa Cruz County	California Administrative Code, Title 14, Chap. 4 Sub-Chapter 4, Art. 13 Section 926	TH	3/7/84
Tahoe Regional Planning Agency	Tahoe Regional Planning Agency Code Chap. 71. Section 71.0-71.5	TH	9/27/89
COLORADO			
Lake County	Lake County Zoning Section 3.03	EP	8/7/89
CONNECTICUT			
Ansonia, Town of	Regulations for Inland Wetlands and Watercourses	EP	1976
Brookfield, Town of	Woodcutting, Lumber and Forestry Ordinance	TP	1980
Chaplin, Town of	Logging Operations	TH	1980
Chester, Town of	Gateway Conservation District	SP	1979
Colebrook, Town of	Providing for a Permit and Bond For Heavy Vehicles and Equipment	PS	1983

State (local government)	Citation	Objective	Date
CONNECTICUT (CONT.)			
Cornwall, Town of	Housatonic River Overlay Zone	SP	1982
Coventry, Town of	Site Development Principle	EP	1979
Deep River, Town of	Minimum Standards for Cutting Timber	TH	1979
East Haddam, Town of	Comercial Cutting of Timber	SP	1977
East Hampton, Town of	Inland Wetland and Water Course Regulations	SP	6/30/90
	Zoning Regulations Sec. 24	TH	8/15/90
East Windsor, Town of	Ordinance for Controlled Wood Cutting on Town Land	TP	1977
Essex, Town of	Gateway Conservation District	SP	1979
Glastonbury, Town of	Forest Products, Commerce Including on Premises Sawmills	TH	1973
Haddam, Town of	Timber Cutting Regulations	TH	1983
Hebron, Town of	Zoning Regulations Sec. 5.10	TH	9/14/86
Kent, Town of	Housatonic River District Timber Harvesting	SP TH	1983 1983
Killingworth, Town of	Timber Cutting Regulations Section 116	TH	1988
Lyme, Town of	Minimum Standards for the Cutting of Timber	TH	1977
New Milford, Town of	Housatonic River District	SP	1983
Newtown, Town of	Forest Practice Regulations	TH	1/84
Old Lyme, Town of	Cutting and Removal of Forest Tree Species	SP	1974
Old Saybrook, Town of	Zoning Regulations Gateway Zone	SP	1975
Redding, Town of	Timber Harvesting	TH	1983
Salisbury, Town of	Housatonic River District	SP	1981
Sharon, Town of	Permitted Used in Rural Residential Zone	EP	1980
	Woodland Controls	TH	1980
Stafford, Town of	Forestry	TH	1978
Warren, Town of	Timber Harvesting	TH	1982
Washington, Town of	Timber Harvesting Ordinances	TH	1983
Willington, Town of	Logging Operations	TH	1981
FLORIDA			
Alachua County	Ordinance No. 17	TP	5/9/72
Bradford County	Ordinance No. 84-1	EP	5/5/84
Brevard County	Ordinance No. 89-14	EP	3/30/89
Charlotte County			
Collier County			

State (local government)	Citation	Objective	Date
FLORIDA (CONT.)			
Gainesville, City of Herando County Hillsborough County Indian River County Lake County Lee County Leon County Manatee County	Ordinance No. 34-30	TH	1/11/88
Marion County	Ordinance No. 89-44	EP	12/12/89
	County Land Development Code Sec. 714	TP	10/15/90
Orange County	Ordinance No. 90-24	TP	9/21/90
	An Ordinance Relating to Protection and Removal of Trees	TP	12/9/85
	Ordinance No. 89-8	EP	7/3/89
Osceola County	Ordinance No. 89-8	TP	7/21/86
Palm Beach County	Ordinance No. 86-2	EP	7/28/86
Pasco County	Ordinance No. 87-02	TP	1987
Pinellas County	Ordinance No. 90-16	EP	2/90
Seminole County	County Land Development Code Chap. 8 Sec. 6	EP	2/10/87
Volusia County	Land Development Code Art. X	TP	6/1/89
	Ordinance No. 89-52	EP	12/7/89
GEORGIA			
✓ Banks County	Pulpwood, logging or timber harvesting operation resolution	PS	9/12/89
✓ Bartow County	Bartow County Pulpwood Operations Permit Ordinance	PS	2/7/90
✓ Bibb County	County Code Chap. 31 Sec. 31.01-31.11	EP	5/80
✓ Butts County	An Ordinance to Establish Regulations to Protect the County's Bridges, Ditches and Road Systems	PS	4/4/84
✓ Carroll County	Carroll County Road Bridge Ordinance	PS	1/86
✓ Charlton County	An Ordinance Prohibiting the Placement of Debris in County Drainage Ditches and Canals	PS	12/6/84
✓ Clayton County	Ordinance No. 89-70	EP	12/5/89
✓ Coweta County	Soil Erosion and Sediment Control Ordinance Section 16.5-10	EP	4/2/91
✓ Crawford County	Ordinance No. 87-07-04	PS	7/21/87

State (local government)	Citation	Objective	Date
GEORGIA (CONT.)			
DeKalb County	County Code Sec. 11-2291	TP	12/83
Douglas County	County Code Sec. 79	SP	7/2/91
Fulton County	Resolution: Notification Prior to Commencement of Commercial Timbering Activities	PS	12/86
Greene County	County Code Sec. 22-103	PS	5/9/85
Gwinnett County	Tree Protection Ordinance	TP	11/4/86
Harris County	An Ordinance Regulating Logging and Pulpwood Harvesting	PS	4/28/86
Heard County	An Ordinance to Regulate Use of Heard County Roads by Logging Trucks	PS	3/13/90
Henry County	Ordinance No. 83-09	TH	4/83
Jackson County	Resolution	PS	1/2/90
Jasper County	Jasper County Road Bridges and Right of Way for Hauling of Materials	PS	8/6/90
Jones County	An Ordinance of Jones County, Georgia to Regulate the Use of Heavy Equipment Machinery and Vehicles	PS	9/3/91
Lamar County	An Ordinance Regulating County Right-of-Way Use	PS	1985
Morgan County	Morgan County Road Use and Logging Control Ordinance	PS	4/9/90
Pickens County	A Resolution to Adopt Rules and Regulations to Control Timber Cutters	PS	2/6/89
Polk County	Ordinance No. 413-3	PS	12/2/86
Randolph County	Resolution for the Board of Commissioners	PS	9/83
Rockdale County	Planning Development Section 6-1009	TH	2/25/86
Screven County	Ordinance No. 92-02	PS	11/12/91
Spalding County	County Code Sec. 6-2006	PS	12/15/87
Terrell County	Resolution for the Board of Commissioners	PS	1980
Troup County	County Code Article II Section 12	PS	9/6/77
Twiggs County	An Ordinance of Twiggs County, Georgia to Regulate the Use of County Roads and Rights of way	PS	2/19/91
Washington County	WC-50	PS	2/27/86

State (local government)	Citation	Objective	Date
GEORGIA (CONT.)			
Wilkenson County	An Ordinance of Wilkinson County Georgia to Regulate the Use of Heavy Equipment	PS	1/20/87
IDAHO			
Benewah County	Ordinance No. 70	EP	2/26/90
INDIANA			
Monroe County	Zoning Ordinance 813-2(b)	PS	10/23/83
LOUISIANA			
Acadia Parish	Ordinance No. 487	PS	3/10/87
Bienville Parish	Ordinance No. 3 of 1989	PS	6/14/89
Calcasieu Parish	Parish Code Sec. 21.11	TH	3/5/90
Desoto Parish	Ordinance No. 7 of 1986	PS	9/6/86
	Ordinance No. 8 of 1987	PS	9/4/87
East Feliciana Parish	Road Ordinance	PS	6/6/89
Evangeline Parish	Project Ordinance	PS	2/9/70
Franklin Parish	Ordinance No. 3296	PS	1/4/83
Grant Parish	Ordinance to Prohibit the Use of Vehices Used In Commerce	PS	3/12/87
Jefferson Davis Parish	Ordinance No. 832	PS	9/26/90
La Salle Parish	Ordinance No. 774	PS	5/8/89
Lincoln Parish	Ordinance No. 98-90-1	PS	6/12/90
Livingston Parish	Parish Code Sec. 10-1.1	PS	9/27/88
Natchitoches Parish	Ordinance No. 59	PS	11/20/85
	Ordinance No. 60	PS	11/20/85
Ouachita Parish	Parish Code Sec. 19-6-12	PS	1977
Rapides Parish	Rapides Parish Code Section 20-2	PS	11/12/86
Sabine Parish	Ordinance No. 1-85	PS	3/28/85
St. Landry Parish	Ordinance No. 7 of 1987	PS	9/14/87
St. Tammany Parish	Parish Zoning Ordinance Section 5.17	TH	1989
Tangipahoa Parish	Ordinance No. 8 of 1990	PS	3/3/90
Union Parish	Ordinance No. 291	PS	1/15/77
	Ordinance No. 311	PS	1/8/80
Webster Parish	Ordinance No. 849	PS	11/7/89
Winn Parish	Parish Code Art. 1 Sec. 11-5	PS	12/15/74
MAINE			
Action, Town of	Zoning Ordinance Section 5.18 Timber Harvesting	TH	
Albion, Town of	Town Code Section VI Tree Harvesting	TH	
Alfred, Town of	Shoreline Zoning Ordinance		

State (local government)	Citation	Objective	Date
MAINE (CONT.)			
	Section 5.26	SP	11/1/88
Allagash, Town of	Zoning Ordinance Sec. 4.8	TH	
Amherst, Town of	Zoning Ordinance	TH	3/8/88
Bar Harbor, Town of	Zoning Ordinance	TH	5/2/88
Buxton, Town of	Buxton Land Use and Zoning Ordinance Section 11.8		
	Timber Harvesting	SP	
Camden, Town of	Zoning Ordinance		
	Sec. 12 Timber Harvesting	SP	11/5/91
Cape Elizabeth, Town of	Zoning Ordinance Chap. 19		
	Sec. 19-3-9-07	SP	5/9/91
Carrabassett Valley, Town of	Timber Harvesting Standards	SP	3/24/86
Casco, Town of	Timber Cutting Ordinance	TH	3/1/89
China, Town of	Land Use Ordinance Section 10.0 Timber Harvesting	TH	5/20/92
Dayton, Town of	Zoning Ordinance	SP	3/11/78
	Section 5.2-7		
Great Pond, Town of	Zoning Ordinance	SP	3/31/81
Greenville, Town of	Land Use Ordinance	SP	1992
Howland, Town of	Land Use Ordinance to Regulate Timber Harvesting	SP	3/6/82
Industry, Town of	Shoreland Zoning Ordinance	SP	12/31/91
Kingfield, Town of	Land Use Ordinance	TH	3/5/88
Lewiston, City of	Lewiston Code Sec. 31-143	SP	1/9/88
Linneus, Town of	An Ordinance to Regulate Timber Harvesting	TH	1983
Lyman, Town of	Lyman Zoning Ordinance	TH	
New Sweden	Land Ordinance Pertaining to the Practice of Timber Harvesting	TH	2/26/87
New Vineyard	Logging Practices Ordinance	TH	
Nobleboro, Town of	Land Ordinance Pertaining to the Practice of Timber Harvesting"	TH	3/30/85
North Haven, Town of	Land Use and Subdivision Control Ordinance for North Haven	SP	3/4/74
Northfield, Town of	Forest Practice Ordinance	TH	6/87
Parkman, Town of	Parkman Land Use Zoning Ordinance	TH	4/30/79
Presque Isle, Town of	Shoreland Zoning Ordinance	SP	12/4/91
Rangeley, Town of	Zoning Ordinance	SP	1991
Raymond, Town of	Zoning Ordinance	TH	12/86

State (local government)	Citation	Objective	Date
MAINE (CONT.)			
Rockport, Town of	Rockport Land Use Ordinance	TH	6/11/74
South Berwick, Town of	Zoning Ordinance Section 4.42	SP	1990
Standish, Town of	Zoning Ordinance	TH	1989
Stockholm, Town of	Stockholm Land Use Ordinance	TH	4/29/87
Stockton Springs, Town of	Zoning Ordinance Code Timber Harvesting	TH	
Vienna, Town of	Resource Protection and Timber Harvesting Ordinance for the Town of Vienna	TH	3/4/89
Vinalhaven, Town of	Zoning Ordinance Sec. 18	SP	6/88
Westmanland, Town of	Land Use Ordinance	SP	2/1/92
Wilton, Town of	Zoning Ordinance	TH	1974
Woodland, Town of	Ordinance to Regulate Timber Harvesting	TH	5/29/87
York, Town of	Town Zoning Ordinance Shoreland Overlay District Section 8.3.12	SP	3/18/92
MARYLAND			
Allegheny County	Sediment And Erosion Control Ordinance	EP	3/85
Anne Arundel County	Bill No. 49-88	SP	7/8/88
	Bill No. 90-89	EP	2/16/90
Baltimore County	County Code Art. II Section 38	EP	3/21/88
	County Code Art. II Section 38-19	SP	3/21/88
Calvert County	Erosion and Sediment Control Ordinance	EP	5/7/85
	Zoning Ordinance Section 3-3.01	SP	11/3/88
Caroline County	Erosion and Sediment Control Act	EP	5/3/87
	Ordinance No. 89-010	SP	12/19/89
Carroll County	Ordinance No. 5	EP	6/3/89
Cecil County	Cecil County Chesapeake Bay Critical Area	SP	8/5/88
	Cecil County Erosion and Sedimentation Ordinance	EP	11/30/90
Charles County	Charles County Erosion/Sediment Control Ordinance	EP	5/1/86
Dorchester County	County Code Chapter 100 Section 1	EP	4/2/85
	County Code Chapter 155 Section 47.1	SP	4/6/90

State (local government)	Citation	Objective	Date	
MARYLAND (CONT.)				
Frederick County	County Code Chapter 1-10 Article 1	EP	4/8/85	
Garrett County	Ordinance 70-71	EP	5/3/71	
Hartford County	County Code Article 1 Section 214.1	EP	1985	
	County Code Article 1 Section 267-41.1	SP	9/25/88	
Howard County	Building Code Subtitle 4 Section 3.4	EP	1984	
Kent County	Public Local Laws of Kent County Art. II Chap. 6	EP	4/12/88	
	Zoning Ordinance Sec. 2	SP	8/1/89	
Mongomery County	County Code Chapter 19 Section 19-3A	EP	10/30/81	
Prince George's County	CB-72-1907	SP	11/17/89	
	County Code Subtitle 4 Division 3	EP	10/3/89	
Queen Anne County	An Ordinance for Erosion and Sediment Control	EP	2/19/85	
	County Code Article VI Section 6000-6004	SP	6/29/88	
St. Mary's County	Ordinance No. 79-08	EP	1/83	
	Chesapeake Bay Critical Area Program	SP	3/27/90	
Somerset County	Chesapeake Bay Program Section 5	SP	3/90	
Talbot County	An Ordinance to Control Erosion and the Deposit of Sediment	EP	4/20/71	
	County Code Sec. 19-1	SP	6/13/89	
Washington County	An Ordinance for Erosion and Sediment Control	EP	10/29/89	
Wicomico County	County Code Chap. 125	SP	9/6/89	
	Ordinance No. 1989-15	EP	10/13/89	
Worchester County	County Code Subtitle 2 Section 2-201	EP	12/88	
MASSACHUSETTS				
Brookfield, Town of	Town By-laws Sec. 6(A)	TH	5/90	
Leicester, Town of	Town of Leicester Forest Cutting By-law	TH	1983	
MICHIGAN				
Farmington Hills, City of	Ordinance No. HC-1-89	TP	2/13/89	
Novi, City of	Novi Codes Chap. 37 Art. II Sec. 37-26	TH	12/15/86	276

State (local government)	Citation	Objective	Date
MICHIGAN (CONT.)			
Southfield, City of	Zoning and Planning Code Sec. 5.55	EP	10/10/89
West Bloomfield, Town of	Ordinance No. C-232	TH	10/18/89
Wixom, City of	Ordinance No. 138	TH	12/2/87
MINNESOTA			
Winona County	Winona County Zoning Ordinance Sec. 709.2	TH	2/8/89
MISSISSIPPI			
Madison County	Resolution of the Board of Supervisors of Madison County	PS	1/12/89
NEVADA			
Tahoe Regional Planning Agency	Tahoe Regional Planning Agency Code Chap. 71.		
NEW HAMPSHIRE			
Exeter, Town of	Town Ordinances Chap. 20 Section 2000-2010	TH	12/7/87
	Zoning Code Sec. 6.9	SP	2/89
Franklin, City of	Zoning Ordinance Art. III Section 302-19	TH	9/9/87
Marlboro, Town of	Zoning Ordinance	EP	1991
Newbury, Town of	Zoning Ordinance Art. IV	EP	11/6/90
Sunapee, Town of	Zoning Ordinance Art. V	EP	3/12/91
NEW JERSEY			
Allentown Borough	Zoning Code Chap. 115 Section 4.8	EP	11/26/79
Barnegat Township	Ordinance No. 1981-42	TP	1/23/81
Bass River Township	Ordinance No. 89-11	TH	4/20/89
Berkeley Heights Township	Ordinance No. 17-76	TP	7/6/76
Berkeley Township	Code Chapter 124	TP	2/2/82
Berlin Township	Code Chap. 129-19E	TH	11/28/88
Bernards Township	Township Code Chap. XVI	TP	1988
Branchburg Township	Ordinance No. 76-294	TP	1976
Brielle Borough	Code Chap. XVII	SP	1972
Buena Borough	Code Chap. 234	TH	9/19/89
Buena Vista Township	Developmental Code Section 49-49	TH	1991
Dennis Township	Land Development Ordinance Sec. 185-52	TH	12/10/90
Dover Township	Ordinance No. 32-80	TP	10/14/90

State (local government)	Citation	Objective	Date
NEW JERSEY (CONT.)			
Eaglewood Township	Ordinance No. 103-67	TH	3/8/83
East Brunswick Township	Ordinance No. 89-35	TP	6/12/89
East Windsor Township	Ordinance No. 1990-12	SP	9/25/90
Edison Township	Ordinance No. 462-89	TH	5/24/89
Egg Harbor Township	Ordinance No. 25	TH	7/27/87
Egg Harbor, City of	Developmental Ordinance 31-6. Note 8	TH	4/6/89
Estell Manor, City of	City of Estell Manor Ordinances 4.4	TH	5/87
Evesham Township	Ordinance No. 43-10-79	TP	2/5/80
Folsom Borough	Borough Code 701.14	EP	10/27/88
Franklin Township	Ordinance No. 0-18-82	TH	8/10/82
Freehold Township	Ordinance No. 0-89-21	TH	6/13/89
Galloway Township	Galloway Code Sec. 54-70	TH	11/9/88
Greenbrook Township	Code Chap. XVI	TP	
Hamilton Township (Atlantic)	Hamilton Code Section 78A-171	TH	8/25/89
Hamilton Township (Mercer)	Ordinance No. 730-79	TH	2/5/79
Hammonton, Town of	Ordinance No. 7-1989	TH	4/4/89
Hampton Township	Township Code Chap. 95	TH	5/25/76
Hanover Township	Ordinance No. 13-74	TP	11/2/74
Harding Township	Ordinance No. 13-87	TP	11/9/87
Hazlet Township	Township Code Chap. XV	TP	12/81
Higalnd Park Borough	Ordinance No. 1157	TP	10/4/88
Hillsborough Township	Hillsborough Code Chap. Chap. 77, Sec. 77-60	SP	8/25/83
Howell Township	Ordinance No. 0-87-13	TH	4/20/87
Jackson Township	Jackson Code Chap. 100	TP	10/25/82
Jefferson Township	Ordinance No. 9-82	TH	6/2/82
Lebanon Township	Ordinance to Regulate the Removal of Trees	TP	
Manalpan Township	Code Art. 1 Sec. 210.9	TP	
Manchester Township	Ordinance No. 90-108	TP	1990
Marlboro Township	Ordinance No. 128-89	TP	7/20/89
Maurice River Township	Ordinance No. 339	TH	3/12/89
Medford Township	Ordinance No. 1977-22	TP	11/2/77
Millburn Township	Ordinance No. 13-88	TP	10/5/88
Millville, City of	City of Millville Code Chapter XXIV	TH	1988
Monroe Township	Ordinance No. 0-21-88	TH	10/3/88
Montville Township	Ordinance No. 477	TP	10/25/74
Morris Plains Borough	Revised Ordinances Chapter 23A	TP	1974
Morristown, Town of	Ordinance No. 0-22-75	EP	6/24/75
Mount Arlington Borough	Borough Ordinances Chapter XV	TH	1987

State (local government)	Citation	Objective	Date
NEW JERSEY (CONT.)			
Mount Olive Township	Ordinance No. 8-80	TH	6/30/80
Mullica Township	Developmental Ordinances Note 20	TH	1989
North Haledon Borough	North Haledon Code Chapter 164	TH	8/11/82
Ocean Township	Township of Ocean Ordinances Chap. XIVA	TH	6/86
Old Bridge Township	Zoning Ordinance Sec. 13	EP	1980
Parsippany-Troy Hills Township	Code Chap. XXIII	TP	1973
Pemberton Township	Pemberton Code Sec. 190	TH	
Piscataway Township	Ordinances of the Township Sec. 5-9	TP	11/16/87
Randolph Township	Ordinance No. 12-80	TH	1980
Ringwood Borough	Revised Ordinances Chapter 26	TP	8/25/85
Riverdale Borough	Riverdale Code Chap. 157	TP	8/7/79
Rockaway Township	Rockaway Code Sec. 54	TH	12/27/84
Roxbury Township	Township Code Chap. XVI	TH	
Shamong Township	Land Development Ordinance Section 129	TH	10/89
South Brunswick Township	Ordinance No. 15-75	TH	5/6/75
Stillwater Township	Ordinance No. 80-13	TH	7/1/80
Tabernacle Township	Ordinance No. 1985-7	TH	1985
Vineland, City of	Ordinance No. 86-38	TH	1989
Wall Township	Township Ordinance Sec. 15	SP	11/81
Washington Township	Ordinance No. 84-10	TP	6/11/84
Watchung Borough	Watchung Code Chap. 126	TP	3/13/89
Waterford Township	Waterford Code 122-41	EP	1988
West Milford Township	West Milford Ordinances Chapter 5-10	TP	1/76
Wharton Borough	Borough Code Chap. XVI	TP	1985
Winslow Township	Winslow Code Chap. 296 Art. XV Sec. 296	TH	8/23/82
Woodland Township	Ordinance No. 1983-7	TH	8/26/83
Wrightstown Borough	Borough Code 13-8.10	SP	1977
NEW YORK			
Barker, Town of	Local Law 1 of 1987	TH	1987
Bedford, Town of	Bedford Code Chap. 122	EP	2/20/73
	Bedford Code Chap. 112	TH	8/13/86
Big Flats, Town of	Local Law 2 of 1980	TH	1980
Bolton, Town of	Code Sec. 7.120	TH	1989
Brighton, Town of	Town Code Sec. 14-1	TP	10/30/89
Brookhaven, Town of	Local Law 7 of 1977	TP	12/12/77
Canadice, Town of	Town Code Chap. 7	EP	
Carmel, Town of	Local Law 2 of 1982	TH	8/24/82

State (local government)	Citation	Objective	Date
NEW YORK (CONT.)			
Chifton Park, Town of	Local Law 3 of 1982	EP	1982
Chili, Town of	Zoning Code Chap. 115	TP	1980
Colonie, Town of	Town Code Chap. 193	TH	1989
Denning, Town of	Code Section 4.2.6.4	TH	
Elmira, Town of	Logging Ordinance	TH	1987
Fishkill, Town of	Local Law 1 of 1984	TH	1984
Florence, Town of	Rural Development Code Article C	TH	1983
Gallatin, Town of	Local Law 1 of 1983	TH	1983
Greenfield, Town of	Greenfield Code Sec. 105	TH	5/25/91
Haverstraw, Town of	Local Law 2 of 1974	TH	1974
Hillburn, Town of	Timber Harvesting	TH	2/27/85
Huntington, Town of	Code Chap 186, Sec 1	TP	1/8/74
Irondequoit, Town of	Town Code Sec. 13-40	TH	1987
Mamkating, Town of	Code Chap. 181	TH	5/2/85
Martinsburg, Town of	Rural Development Code Article C	TH	1/85
Monroe, Town of	Local Law 2 of 1989	TH	4/17/89
Mount Hope, Town of	Zoning Ordinance Art. 4 Section 4.9	TH	8/8/83
New Castle, Town of	Local Law 34 of 1990	EP	8/11/90
Northampton, Town of	Town Code Forestry Uses	TH	
North Castle, Town of	Zoning Code Chap. 102	TP	11/11/62
Orangetown, Town of	Zoning Code Sec. 3.11	EP	8/15/83
Oyster Bay, Town of	Code Chapter 8	TP	11/27/73
Penfield, Town of	Zoning Ordinance 3-13	TH	1978
Putnam, Town of	Code Chapter 33	TH	1980
Ramapo, Town of	Local Law 4 of 1968	EP	2/12/68
Rochester, Town of	Local Law 6 of 1984	TH	1984
Schodack, Town of	Zoning Ordinance Sec. K	TH	1986
Shandaken, Town of	Town Code Sec. 480-A	TH	1974
Smithtown, Town of	Local Law No. 12	TP	11/12/84
Somers, Town of	Code Chapter 167	EP	2/10/77
South Bristol, Town of	Local Law 1 of 1984	TH	1984
St. Johnsville, Town of	Ordinance for Regulating Private Logging Operations with St. Johnsville	TH	
Stony Point, Town of	Code Sec. 33.1-8	TH	1/8/69
Taghkanic, Town of	Zoning Ordinance Sec. 7	TH	1/4/88
Tuxedo, Town of	Local Law 6 of 1980	TH	1980
Vestal, Town of	Town Code Art. V Section 6-151	TH	1980
Wappinger, Town of	Local Law 17 of 1987	TH	1987
Warwick, Town of	Warwick Code Chap 150	TH	5/2/75
Wawarsing, Town of	Zoning Ordinance Art. II Section 339.08	TH	5/23/85
Webster, Town of	Zoning Ordinance Sec. 5.9	EP	7/2/89

State (local government)	Citation	Objective	Date
NEW YORK (CONT.)			
West Turin, Town of	Rural Development Code Article C	TH	4/7/86
Woodbury, Town of	Local Law of 1977 for the Protection, Regualtion, and Cutting of Trees	TP	2/3/77
Woodstock, Town of	Zoning Code Sec. VI	TH	
Worth, Town of	Rural Development Code Article C	TH	5/78
Yorktown, Town of	Yorktown Code Chap 80	EP	5/1/87
	Local Law 30 of 1987	SP	1987
	Section 71.0-71.5	TH	9/27/89
NORTH CAROLINA			
Grifton, Town of	Ordinance No. 84-85-2	TH	3/27/85
OHIO			
North Royalton, City of	City Code Chap. 818	TH	6/4/75
OREGON			
Astoria, City of	Zoning Ordinance ZO.185	EP	6/18/90
Bay City, City of	Ordinance No. 25	PS	2/8/51
	Ordinance No. 470	TH	6/9/87
Eugene, City of	Ordinance No. 17072	TH	5/20/74
Gresham, City of	Ordinance No. CD 12-92	TP	1992
Oakridge, City of	Ordinance No. 747	TH	
Portland, City of	City Code Title 33 Chap. 33.299	EP	12/19/90
Reedsport, City of	Ordinance No. 710-A	TH	8/13/90
Springfield, City of	Zoning Ordinance Art. 38 Sec. 38.010	EP	10/19/87
Sutherlin, City of	Ordinance No. 766	TP	8/7/89
PENNSYLVANIA			
Bridgeton Township	Zoning Code Section 404	TH	10/80
Buckingham Township	Zoninnng Code Article XX	SP	8/87
Butler Township	Ordinance No. 7-19-90	TH	7/19/90
Carroll Valley Borough	Code of Ordinances Chap. 2 Sec. 5-2002	TH	2/8/88
Cascade Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Center Township	Ordinance No. 83-7	TH	5/27/87
Chapman Township	Ordinance No. 2-89	TH	5/1/89

State (local government)	Citation	Objective	Date
PENNSYLVANIA (CONT.)			
Clinton Township	Zoning Ordinance Sec. 416	TH	2/17/87
Cogan House Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Concord Township	Ordinance No. 146	TH	12/3/85
Conemaugh Township	Code Section 1412	TH	4/23/84
Coolbaugh Township	Ordinance No. 64	TH	5/1/85
Coudersport Borough	Zoning Ordinance Part 6	SP	6/1/83
Delaware Township	Zoning Ordinance	EP	1988
Dickinson Township	An Ordinance Amending the Township Zoning Ordinance	EP	1/78
Dingman Township	Zoning Ordinance Sec. 305	EP	1973
Dover Township	Zoning Ordinance Sec. 203.1		SP5/23/88
Exeter Township	Ordinance No. 212	TH	8/26/85
Fountain Hill Borough	Zoning Ordinance Part 3 Section 312	TH	8/1/77
Harmar Township	Ordinance No. 293	TH	12/10/90
Haverford Township	Ordinance No. P22A-77	TP	1977
Haycock Township	Quakertown Area Zoning Ordinance Sec. A6	TH	1975
Heidelberg Township	Zoning Ordinance Art. 12A	EP	1976
Hepburn Township	Ordinance No. 1986-1	TH	5/20/86
Hilltown Township	Zoning Ordinance Sec. 509	EP	1983
Indiana Township	Ordinance No. 231	TH	4/12/83
Jackson Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Jordan Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Lewis Township	Ordinance No. 1-1985 Lycoming County Zoning Ordinance Article 3	TH	11/5/85
Longswamp Township	Land Development Ordinance	TH	12/31/91
Lower Heidelberg Township	Ordinance No. 106	TP	1986
Lower Makefield Township	Ordinance No. 243	PS	7/18/83
Lower Merion Township	Ordinance No. 3155	EP	9/11/89
Lower Paxton Township	Ordinance No. 90-14	TP	5/17/89
Lower Saucon Township	Ordinance No. 90-14	TH	10/7/91
Marshall Township	Zoning Ordinance 1605.04	EP	2/10/88
Marysville Borough	Ordinance No. 169	TH	11/7/84
McCandless Township	Ordinance No. 427	SP	7/2/90
	Ordinance No. 879	TH	4/23/84

State (local government)	Citation	Objective	Date
PENNSYLVANIA (CONT.)			
McIntyre Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
McNett Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Mifflin Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Milford Township	Quakertown Area Zoning Ordinance	TH	7/5/89
Millcreek Township	Zoning Ordinance Art. 13	SP	3/8/89
Monroe Township	Zoning Ordinance of Monroe Township Forest Production Ordinance No. 266	EP TH	3/21/88 12/10/86
Moon Township	Zoning Code Art. 3 Section 3.13	EP	
Moore Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Moreland Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Muncy Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Muncy Creek Township	An Ordinance Regulating the Use of Roads	PS	1991
New Britain Township	Ordinance No. 89-07-04	TP	7/24/89
Newtown Borough	Joint Municipal Code Chapter 8	TH	1989
Newtown Township	Joint Municipal Code Chapter 8	TH	1989
Nockamixon Township	Zoning Ordinance Art. 4	EP	1990
Norwegian Township	Zoning Ordinance Art. V	TH	9/4/84
Noyes Township	Ordinance No. 21	EP	2/11/80
	Ordinance No. 22	TH	6/26/80
O'Hara Township	Ordinance No. 850	EP	4/14/87
Paradise Township	Code Chapter 9 Section 105	EP EP	12/6/88 12/6/88
Penn Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Pine Township	Ordinance No. 153	TH	5/4/87
Potter Township	Zoning Ordinance Sec. 427	TH	10/9/89
Price Township	Natural Features Conservation Ordinance	EP	12/17/87
Salford Township	Ordinance No. 92	TH	3/8/90
Salisbury Township (Somerset County)	Zoning Ordinance Chap. 27	TH	6/8/89

State (local government)	Citation	Objective	Date
PENNSYLVANIA (CONT.)			
Salisbury Township (Lehigh County)	Ordinance No. 7-89-313	TH	7/27/89
Shaler Township	Ordinance No. 1612	TH	4/14/87
Silver Spring Township	Zoning Ordinance Art. 160.1		TH12/27/89
South Annville Township	South Annville Code Part 4	TH	7/8/78
South Middleton Township	South Middleton Zoning Ordinance Art. 6V	EP	1988
Springfield Township	Zoning Code Art. III	TP	
Stonycreek Township	Ordinance No. 361	TH	10/4/84
Sugarcreek Township	Ordinance No. 1987-001	TH	2/20/87
Swamp Township	Zoning Code Sec. 420	TH	
Tinicum Township	Zoning Code A6	TH	12/71
Union Township	Zoning Ordinance Art. V	EP	6/88
Upper Makefield Borough	Joint Municipal Code Chapter 8	TH	1989
	Ordinance No. 147	TP	1/18/89
Upper Saucon Township	Ordinance No. 79-E	TH	3/13/89
Upper Yoder Township	Ordinacne No. 190	TP	6/5/84
Wallace Township	Ordinance No. 39-89	EP	6/21/89
Warrington Township	Ordinance No. 88-8	EP	7/5/88
Washington Township	Lycoming County Zoning Ordinance Article 3	TH	12/31/91
Wayne Township	Ordinance No. 1982-1	TH	6/16/82
West Brunswick Township	Zoning Ordinance Sec. 632	TH	7/88
West Cornwall Township	Ordinance No. 37	EP	12/10/73
West Goshen Township	Ordinance No. 3-1987	TP	3/24/87
Westfall Township	Zoning Ordinance Section 6.15	TH	
Williams Townships	Code Sec. 14-7.19	TH	5/4/90
Wrightstown Borough	Joint Municipal Code Chapter 8	TH	1989
VIRGINIA			
Accomack County	Zoning Ordinance 21.13.2	SP	12/30/91
Albemarle County	Zoning Ordinance Sec. 5.1	EP	12/10/80
Ashland, Town of	Code of Ashland Chap. 4.1 Article II	SP	9/17/90
Charles City County	Chesapeake Bay Preservation Ordinance Sec 115B	SP	11/26/91

State (local government)	Citation	Objective	Date
VIRGINIA (CONT.)			
Chesapeake, City of	City Code Chap 29		
	Section 4-8.11	SP	10/22/91
Chesterfield County	County Code 21-224	SP	2/13/91
Colonial Beach, Town of	Zoning Ordinance Art. 1	SP	11/8/90
Colonial Heights, City of	Ordinance No. 90-27	SP	9/12/90
Essex County	Zoning Ordinance Art. XVI-1		SP10/22/91
Fairfax County	Zoning Ordinance Chap 112		
	Part 4, Art. 12	TH	1/1/85
	Chap. 118	SP	5/20/91
Fairfax, City of	Ordinance No. 1990-28	TH	10/9/90
Gloucester County	Chesapeake Bay Preservation Ordinance Sec. 5.5	SP	12/5/91
Hampton, City of	Ordinances of Hampton Chap. 17.3 Art. X	SP	11/14/90
Hanover County	Ordinance No. 91-34	SP	4/25/92
Henrico County	Code Chap. 22	SP	11/31/91
Hopewell, City of	Ordinance No. 90-22	SP	10/6/90
Isle of Wight County	Chesapeake Bay Preservation Area Ordinance	SP	11/15/90
James City County	Ordinance No. 183	SP	8/6/90
Kilmarnack, Town of	Chesapeake Bay Preservation	SP	10/15/90
King George County	Zoning Ordinance Sec. 801	SP	4/1/91
King William County	Zoning Code Chap. 10 Art. III	SP	3/28/91
King and Queen County	Chesapeake Bay Preservation Ordinance	SP	11/4/91
Lancaster County	Zoning Ordinance Art. 21	SP	6/1/75
Mathews County	Zoning Ordinance Art. 22 Sec. 22.48	SP	11/14/91
Middlesex County	Zoning Ordinance Art. J	SP	1/16/92
Montross, Town of	Zoning Ordinance Sec. 19.1	SP	3/26/91
New Kent County	County Code Art. VI Sec. 9-473	SP	11/25/91
Newport News, City of	Ordinance No. 4225-91	SP	6/25/91
Norfolk, City of	Chesapeake Bay Preservation Ordinance	PS	8/28/90
Northampton County	Chesapeake Bay/Atlantic Ocean Preservation Area Overlay District	SP	10/9/90
Petersburg, City of	Code of City Chap. 9.5	SP	9/18/90
Portsmouth, City of	Code Chap. 9.1-12b	SP	9/1/90
Prince George County	Ordinance No. 0-91-007	SP	11/19/91
Prince William County	Chesapeake Bay Preservation Area Overlay District Sec. 32-504	SP	11/27/90

State (local government)	Citation	Objective	Date
VIRGINIA (CONT.)			
Richmond County	Chesapeake Bay Preservation Area Ordinance	SP	9/13/90
Smithfield, Town of	Chesapeake Bay Preservation Area Ordinance	SP	9/4/90
Spotsylvania County	Code Chap 6A-17b	SP	11/26/90
Stafford County	Chesapeake Bay Preservation Area Overlay	SP	5/21/91
Suffolk, City of	County Code Chap. 31	SP	9/19/90
Surry County	Zoning Ordinance Art. 4A	SP	12/19/91
Warsaw, Town of	Chesapeake Bay Preservation Area Overlay District	SP	6/5/91
Westmoreland County	County Code Art. VII	SP	9/12/90
York County	County Code Chap. 24 Art. 1	SP	5/18/89

Appendix C. Regulatory provisions of individual local forest regulatory laws

Table C.1 Regulatory provisions of local ordinances in the northeastern region

	Harvest Activities Must Adhere to Best Management Practices	Management/Erosion Sedimentation Plan Required	Harvest Must be by Selection	Performance/Surety Bond Acquired	Local Officials Must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Lossing Slash Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
CONNECTICUT											
Ansonia, Town of	X			X		X					
Brookfield, Town of	X			X		X					
Chaplin, Town of	X			X		X					
Chester, Town of									X		
Colebrook, Town of				X		X			X		
Cornwall, Town of	X					X					
Coventry, Town of	X					X					
Deep River, Town of	X					X					
East Haddam, Town of	X							X	X		
East Hampton, Town of	X			X		X		X		X	
East Windsor, Town of	X					X					
Essex, Town of									X		
Glastonbury, Town of	X							X	X		
Haddam, Town of	X					X					
Hebron, Town of	X					X					
Kent, Town of				X		X				X	
Killingworth, Town of	X			X	X	X					X
Lyme, Town of	X					X					
New Milford, Town of						X					
Newtown, Town of	X					X		X			
Old Lyme, Town of	X					X					
Old Saybrook, Town of									X		
Redding, Town of							X				
Salisbury, Town of	X								X		

MAINE (CONT.)
York, Town of

MARYLAND

Allegheny County
Anne Arundel County
Baltimore County
Calvert County
Caroline County
Carroll County
Cecil County
Charles County
Dorchester County
Frederick County
Garrett County
Hartford County
Howard County
Kent County
Montgomery County
Prince George's
County
Queen Anne County
St. Mary's County
Somerset County
Talbot County
Washington County
Wicomico County
Worcester County

MASSACHUSETTS

Brookfield, Town of
Leicester, Town of

NEW HAMPSHIRE

Exeter, Town of
Franklin, City of

	Harvest Must be by selection	Performance/Surety Bond Required	Local Officials must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Logging Slash Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
York, Town of	X						X		X
Allegheny County	X	X		X			X		
Anne Arundel County	X	X		X			X		
Baltimore County	X	X				X	X		
Calvert County	X	X					X		
Caroline County	X	X					X		
Carroll County	X	X		X			X		X
Cecil County	X	X		X			X		
Charles County	X	X		X			X	X	
Dorchester County	X	X		X			X		
Frederick County	X	X		X					
Garrett County	X			X					
Hartford County	X			X			X		
Howard County	X	X		X					
Kent County	X	X		X			X		
Montgomery County	X	X		X					
Prince George's County	X			X			X		
Queen Anne County	X	X		X			X		
St. Mary's County	X	X		X			X		
Somerset County	X			X			X		
Talbot County	X	X		X			X		
Washington County	X			X					
Wicomico County	X	X		X			X		
Worcester County	X	X		X					
Brookfield, Town of		X		X					
Leicester, Town of	X	X		X		X			
Exeter, Town of	X	X	X	X			X		
Franklin, City of	X								

	Harvest Activities Must Adhere to Best Management Practices	Harvest Must be by Selection	Performance/Surety Bond Required	Local Officials Must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Lowering Slab Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
NEW JERSEY (CONT.)										
Hamilton Township (Atlantic)	X		X		X			X	X	X
Hamilton Township (Mercer)	X				X			X	X	X
Hammonton, Town of	X		X		X			X	X	X
Hampton Township	X				X					
Hanover Township	X		X		X					
Harding Township	X				X					
Hazlet Township	X				X					
Higalnd Park Borough	X				X					
Hillsborough Township								X		
Howell Township	X				X				X	
Jackson Township	X									
Jefferson Township	X		X		X					
Lebanon Township					X					
Manalpan Township	X				X					
Manchester Township	X				X					
Marlboro Township					X					
Maurice River Township					X			X		X
Medford Township	X									
Millburn Township	X									
Millville, City of	X		X		X			X	X	X
Monroe Township	X		X		X			X	X	X
Montville Township	X									
Morris Plains Borough	X				X					
Morristown, Town of	X				X					
Mount Arlington Borough					X					
Mount Olive Township	X									X
Mullica Township	X		X		X			X		
North Haledon Borough	X		X		X			X		

NEW JERSEY (CONT.)

Ocean Township
 Old Bridge Township
 Parsippany-Troy Hills Township
 Pemberton Township
 Piscataway Township
 Randolph Township
 Ringwood Borough
 Riverdale Borough
 Rockaway Township
 Roxbury Township
 Shamong Township
 South Brunswick Township
 Stillwater Township
 Tabernacle Township
 Vineland, City of
 Wall Township
 Washington Township
 Watchung Borough
 Waterford Township
 West Milford Township
 Wharton Borough
 Winslow Township
 Woodland Township
 Wrightstown Borough

NEW YORK

Barker, Town of
 Bedford, Town of
 Big Flats, Town of
 Bolton, Town of
 Brighton, Town of
 Brookhaven, Town of
 Canadice, Town of

	Drillers or Culvert Required at Stream Crossings	Logging Stacks Piled, Chipped or Removed from the Logging Site	Buffer Zones Required	Public Hearing Required for Permit Approval	Time and Date Restrictions on Harvesting Activities	Harvest Permits Required	Local Officials Must be Notified Before Operations Commence	Performance/Surety Bond Required	Harvest Must be by Selection	Management/Erosion Sedimentation Plan Required	Harvest Activities Must Adhere to Best Management Practices
Ocean Township						X					
Old Bridge Township						X					
Parsippany-Troy Hills Township						X					
Pemberton Township	X		X			X					
Piscataway Township						X					
Randolph Township	X	X				X					
Ringwood Borough						X					
Riverdale Borough						X					
Rockaway Township						X					
Roxbury Township						X					
Shamong Township	X	X				X					
South Brunswick Township						X					
Stillwater Township				X		X					
Tabernacle Township		X	X			X	X				
Vineland, City of		X	X			X		X			
Wall Township		X	X			X	X				
Washington Township						X					
Watchung Borough						X					
Waterford Township						X					
West Milford Township						X					
Wharton Borough						X					
Winslow Township						X					
Woodland Township		X				X					
Wrightstown Borough		X				X					
Barker, Town of	X										
Bedford, Town of						X					
Big Flats, Town of						X					
Bolton, Town of						X		X			
Brighton, Town of						X					
Brookhaven, Town of						X					
Canadice, Town of						X					

NEW YORK (CONT.)

Carmel, Town of
 Chifton Park,
 Town of
 Chili, Town of
 Colonie, Town of
 Denning, Town of
 Elmira, Town of
 Fishkill, Town of
 Florence, Town of
 Gallatin, Town of
 Greenfield, Town of
 Haverstraw, Town of
 Hillburn, Town of
 Huntington, Town of
 Irondequoit, Town of
 Mamkating, Town of
 Martinsburg, Town of
 Monroe, Town of
 Mount Hope, Town of
 New Castle, Town of
 Northampton, Town of
 North Castle, Town of
 Orangetown, Town of
 Oyster Bay, Town of
 Penfield, Town of
 Putnam, Town of
 Ramapo, Town of
 Rochester, Town of
 Schodack, Town of
 Shandaken, Town of
 Smithtown, Town of
 Somers, Town of
 South Bristol,
 Town of

	Management/Territorial Sedimentation Plan Required	Harvest Activities Must Adhere to Best Management Practices	Harvest Must be by Selection	Performance/Surety Bond Required	Local Officials Must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Logging Slash Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
Carmel, Town of	X			X		X			X		
Chifton Park, Town of											
Chili, Town of	X					X					
Colonie, Town of	X			X		X				X	
Denning, Town of	X			X	X	X	X				
Elmira, Town of	X			X	X	X	X	X	X	X	
Fishkill, Town of	X			X		X					
Florence, Town of			X								
Gallatin, Town of	X		X		X	X			X		
Greenfield, Town of			X		X	X			X		
Haverstraw, Town of	X					X			X		
Hillburn, Town of	X			X		X	X		X		
Huntington, Town of	X					X			X		
Irondequoit, Town of	X			X		X			X		
Mamkating, Town of	X			X		X			X	X	
Martinsburg, Town of			X			X		X	X		
Monroe, Town of	X	X									
Mount Hope, Town of						X		X			
New Castle, Town of	X					X					
Northampton, Town of						X					
North Castle, Town of				X		X					
Orangetown, Town of		X				X					
Oyster Bay, Town of						X					
Penfield, Town of	X			X		X					X
Putnam, Town of				X		X	X		X		
Ramapo, Town of	X			X		X					X
Rochester, Town of				X		X					X
Schodack, Town of	X			X		X			X	X	
Shandaken, Town of	X					X					
Smithtown, Town of	X					X			X		
Somers, Town of	X			X		X			X		
South Bristol, Town of	X			X	X	X		X	X		X

NEW YORK (CONT.)

St. Johnsville,
Town of
Stonypoint, Town of
Taghkanic, Town of
Tuxedo, Town of
Vestal, Town of
Wappinger, Town of
Warwick, Town of
Wawarsing, Town of
Webster, Town of
West Turin, Town of
Woodbury, Town of
Woodstock, Town of
Worth, Town of
Yorktown, Town of

PENNSYLVANIA

Bridgeton Township
Buckingham Township
Butler Township
Carroll Valley
Borough
Cascade Township
Center Township
Chapman Township
Clinton Township
Cogan House Township
Concord Township
Conemaugh Township
Coolbaugh Township
Coudersport Borough
Delaware Township
Dickinson Township
Dingman Township
Dover Township

	Harvest Activities Must Adhere to Best Management Practices	Management/Erosion Sedimentation Plan Required	Harvest Must be by Selection	Performance/Surety Bond Required	Local Officials Must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Lossing Slash Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
St. Johnsville, Town of				X	X	X					
Stonypoint, Town of	X	X		X	X	X					
Taghkanic, Town of	X	X	X	X	X	X	X		X	X	X
Tuxedo, Town of		X		X		X	X		X	X	X
Vestal, Town of		X		X		X	X		X	X	X
Wappinger, Town of		X		X	X	X	X	X	X	X	X
Warwick, Town of		X		X		X	X		X	X	X
Wawarsing, Town of		X		X	X	X	X		X	X	X
Webster, Town of		X	X	X		X	X		X	X	X
West Turin, Town of		X	X	X		X	X		X	X	X
Woodbury, Town of		X	X	X		X	X		X	X	X
Woodstock, Town of		X	X	X		X	X		X	X	X
Worth, Town of		X	X	X		X	X		X	X	X
Yorktown, Town of		X		X		X	X		X	X	X
Bridgeton Township		X		X							X
Buckingham Township		X							X		X
Butler Township	X	X			X	X				X	
Carroll Valley Borough		X				X					
Cascade Township		X			X	X					X
Center Township		X		X		X	X				X
Chapman Township		X				X			X	X	X
Clinton Township		X		X					X	X	X
Cogan House Township						X	X				X
Concord Township			X						X		X
Conemaugh Township		X				X					X
Coolbaugh Township	X	X	X								
Coudersport Borough		X							X		
Delaware Township						X					
Dickinson Township		X									
Dingman Township		X				X					
Dover Township		X				X					

PENNSYLVANIA (CONT.)

Muncy Creek
Township
New Britain Township
Newtown Borough
Newtown Township
Nockamixon Township
Norwegian Township
Noyes Township
O'Hara Township
Paradise Township
Penn Township
Pine Township
Potter Township
Price Township
Salford Township
Salisbury Township
(Lehigh County)
Salisbury Township
(Somerset County)
Shaler Township
Silver Spring
Township
South Annville
Township
South Middleton
Township
Springfield Township
Stonycreek Township
Sugarcreek Township
Swamp Township
Tinicum Township
Union Township
Upper Makefield
Borough

	Harvest Activities Must Adhere to Best Management Practices	Management/Erosion Sedimentation Plan Required	Harvest Must be by Selection	Performance/Surety Bond Required	Local Officials must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Leaving Stacks Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
Muncy Creek Township						X					
New Britain Township		X				X					X
Newtown Borough		X		X		X					X
Newtown Township		X		X		X					X
Nockamixon Township		X	X								X
Norwegian Township		X	X		X				X	X	X
Noyes Township		X				X			X		X
O'Hara Township		X									X
Paradise Township			X			X			X		
Penn Township					X	X					
Pine Township		X		X		X	X		X		
Potter Township		X		X		X	X		X		
Price Township		X	X			X			X		
Salford Township		X	X			X	X		X	X	X
Salisbury Township (Lehigh County)	X	X	X		X	X		X	X	X	X
Salisbury Township (Somerset County)		X	X		X	X		X	X	X	X
Shaler Township		X	X	X		X				X	
Silver Spring Township		X									
South Annville Township		X									X
South Middleton Township		X									
Springfield Township				X							
Stonycreek Township	X	X		X		X					
Sugarcreek Township		X		X							
Swamp Township			X								
Tinicum Township		X		X							
Union Township						X		X			
Upper Makefield Borough		X		X		X					X

PENNSYLVANIA (CONT.)

Upper Saucon
Township
Upper Yoder
Township
Wallace Township
Warrington Township
Washington Township
Wayne Township
West Brunswick
Township
West Cornwall
Township
West Goshen
Township
Westfall Township
Williams Townships
Wrightstown Borough

	Harvest Must be by Selection	Performance/Surety Bond Required	Local Officials must be Notified Before Operations Commence	Harvest Permits Required	Time and Date Restrictions on Harvesting Activities	Public Hearing Required for Permit Approval	Buffer Zones Required	Leaving Slash Piled, Chipped or Removed from the Logging Site	Bridges or Culvert Required at Stream Crossings
Upper Saucon Township	X	X	X	X			X	X	X
Upper Yoder Township	X	X		X			X		
Wallace Township	X	X		X			X		
Warrington Township				X					
Washington Township			X	X					
Wayne Township		X							X
West Brunswick Township		X							
West Cornwall Township		X							
West Goshen Township		X							X
Westfall Township		X					X		
Williams Townships	X	X						X	
Wrightstown Borough		X							X

Table C.2. Regulatory provisions of local forest ordinances in the southern region

	Harvest Activities Must Adhere to Best Management Practices	Management/Erosion Sedimentation Plan Required	Culvert or Bridges Required to Cross Streams or Ditching	Performance/Surety Bond Required	Local Officials Must be Notified Before Operations Commence	Harvest/Hauling Permits Required	Hauling is Prohibited When Roads are Wet or Muddy	Roads and Rights-of-Way Must be Cleared of Debris Daily	Buffer Zones Required	Forest Roads and Skid Trails Must Be Properly Retired	Gravel Mats Required at Entrances
ARKANSAS											
Pulaski County						X					
FLORIDA											
Alachua County						X					
Bradford County	X										
Brevard County	X										
Charlotte County	X										
Collier County		X				X			X		
Dixie County						X					
Flagler County	X										
Gainesville, City of	X	X				X			X		
Herando County	X										
Hillsborough County						X					
Indian River County		X				X					
Lake County						X					
Lee County		X				X					
Leon County		X				X					
Manatee County		X				X					
Marion County		X				X					
Orange County		X				X					
Osceola County		X				X					
Palm Beach County		X				X					
Pasco County		X				X					
Pinellas County		X				X			X		
Seminole County		X				X			X		
St. John's County	X								X		
St. Lucie County						X					
Volusia County	X	X				X					
GEORGIA											
Banks County				X		X			X		
Bartow County						X					X

	Gravel Hubs Required at Entrances	
	Forest Roads and Skid Trails Must Be Properly Retired	
	Buffer Zones Required	
	Roads and Right-of-Way Must be Cleared of Debris Daily	
	Hauling is Prohibited When Roads are Wet or Muddy	
	Harvest/Hauling Permits Required	
	Local Officials Must be Notified Before Operations Commence	
	Performance/Surety Bond Required	
	Culvert or Bridges Required to Cross Streams or Ditches	
	Management/Erosion Sedimentation Plan Required	X
	Harvest Activities Must Adhere to Best Management Practices	X

VIRGINIA (CONT.)

City of	X
Norfolk, City of	X
Northampton County	X
Petersburg, City of	X
Portsmouth, City of	X
Prince George County	X
Prince William County	X
Richmond County	X
Smithfield, Town of	X
Spotsylvania County	X
Stafford County	X
Suffolk, City of	X
Surry County	X
Warsaw, Town of	X
Westmoreland County	X
York County	

Table C.3. Regulatory provisions of local forest ordinances in the central region

	Harvest Permits Required	Buffers Zones Required	Performance/Surety Bond Required	Site Must be Replanted After Harvest	Erosion/Forest Management Plan Required	Logging Slash Must be Chipped or Removed from the Site
INDIANA						
Monroe County	X		X			
MICHIGAN						
Southfield, City of	X	X			X	
Farmington Hills, City of	X				X	
West Bloomfield Town of	X	X	X	X	X	X
Wixom, City of	X			X	X	
Novi, City of	X					
MINNESOTA						
Winona County	X		X		X	X
OHIO						
North Royalton, City of	X		X	X		

Table C.4. Regulatory provisions of local forest ordinances in the western region

	Management Plan Required	Clear-cutting Is Prohibited	Performance/Surety Bonds Required	Harvesting Permits Required	Time and Date Restrictions on Harvesting Activities	Flagman and Posted Warnings Required at Harvest Site Entrances	Buffer Zones Required	Restrictions on the Use of Forest Herbicide	Stocking/Replanting of the Harvest Site Required
CALIFORNIA									
Marin County	x	x		x	x	x			x
Monterey County	x		x	x	x		x		
San Mateo County	x		x	x	x	x			
Santa Clara County	x		x	x	x	x	x	x	
Santa Cruz County	x		x	x	x	x	x		
Tahoe Regional Planning Agency	x						x		x
COLORADO									
Lake County	x			x					
IDAHO									
Benewah County									
NEVADA									
Tahoe Regional Planning Agency	x						x		x
OREGON									
Astoria, City of							x	x	x
Bay City, City of				x	x		x	x	
Eugene, City of	x			x					x
Gresham, City of				x					
Oakridge, City of	x		x	x					
Portland, City of								x	
Reedsport, City of	x			x				x	x
Springfield, City of	x	x	x	x			x		
Sutherlin, City of	x			x					

Appendix D. Correlation matrices of coefficients used in the discriminant analysis process by state and region

Table D.1. Correlation matrix for coefficients in the northeastern region

Variables	Population	Urbaniza- tion	Percentage of Forest	Population Growth	Per Capita Income
Population	1.00	.61	-.53	-.08	.62
Urbaniza- tion	.61	1.00	-.50	.14	.62
Percentage of Forest	-.53	-.50	1.00	.12	-.45
Population Growth	-.08	.14	.12	1.00	.02
Per Capita Income	.62	.62	-.45	.02	1.00

Table D.2. Correlation matrix for coefficients in Georgia

Variables	Population	Urbaniza- tion	Percentage of Forest	Population Growth	Per Capita Income
Population	1.00	.23	-.29	.33	.53
Urbaniza- tion	.23	1.00	-.07	.19	.29
Percentage of Forest	-.29	-.07	1.00	.02	-.33
Population Growth	.33	.19	.02	1.00	.40
Per Capita Income	.53	.29	-.33	.40	1.00

Table D.3. Correlation matrix for coefficients in Louisiana

Variables	Population	Urbaniza- tion	Percentage of Forest	Population Growth	Per Capita Income
Population	1.00	.47	-.22	.48	.48
Urbaniza- tion	.47	1.00	-.18	.48	.40
Percentage of Forest	-.22	-.18	1.00	.15	-.25
Population Growth	.48	.48	.15	1.00	.41
Per Capita Income	.48	.40	-.25	.41	1.00

Vita

The author, son of Francis and Anna Martus, was born August 2, 1968 in Fairfax, Virginia. He graduated from West Springfield High School in Springfield, Virginia in 1986 and entered the forestry program at Virginia Tech in the fall of the same year. While pursuing his bachelor's degree, he worked as a forest technician and became a member of the Society of American Foresters and Xi Sigma Pi. He completed his Bachelor's of Science degree in Forestry Business in May of 1990.

After spending eight months with the U.S. Forest Service Southern Forest Experiment Station in New Orleans, Louisiana, he entered Virginia Tech's masters program in Forest Management and Economics in January of 1991. He completed the degree of Master of Science in Forest Economics in December of 1992. The author was married to Elizabeth Ribar in May of 1991.

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