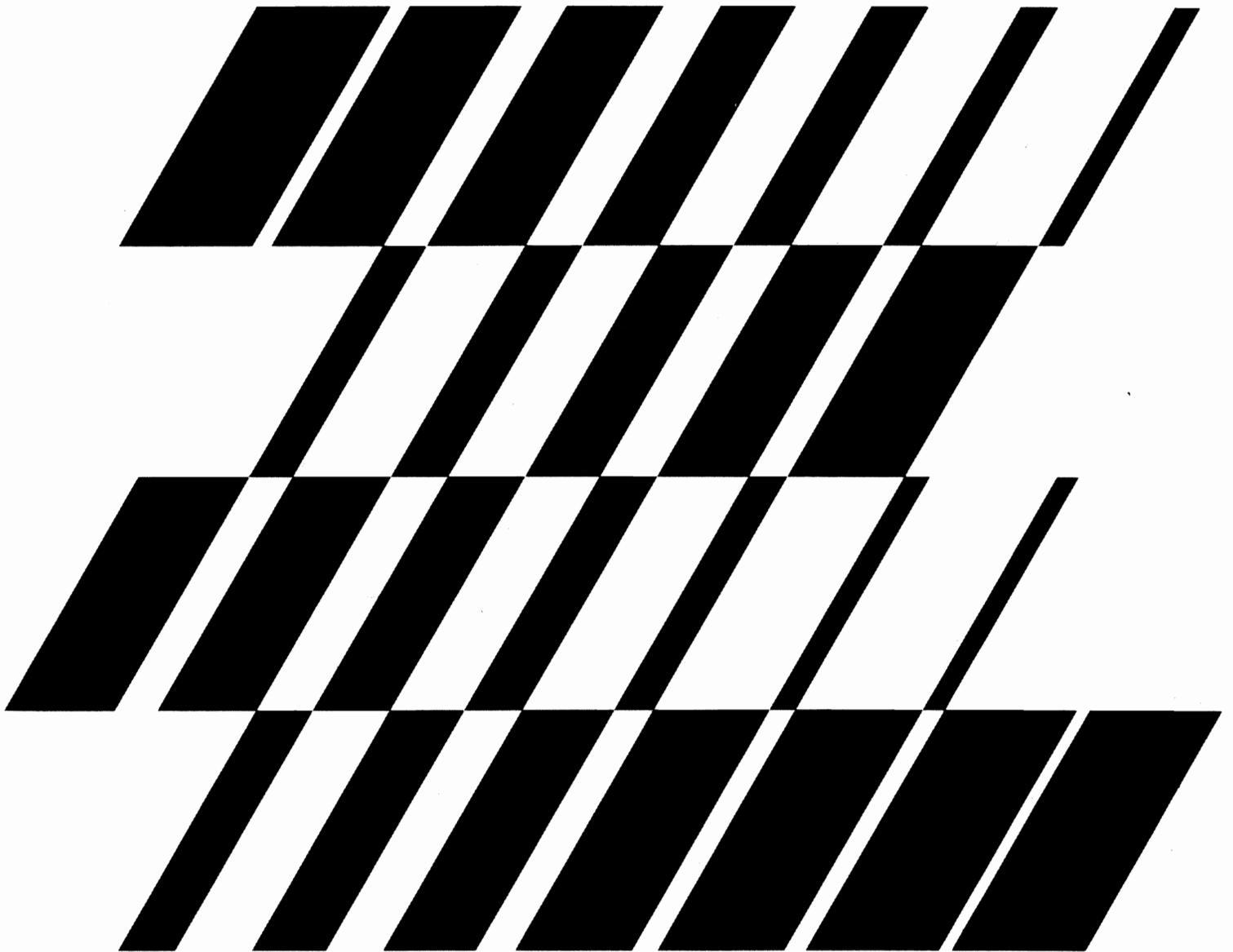


State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota

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Paul V. Ellefson
Frederick W. Cabbage



Authors:

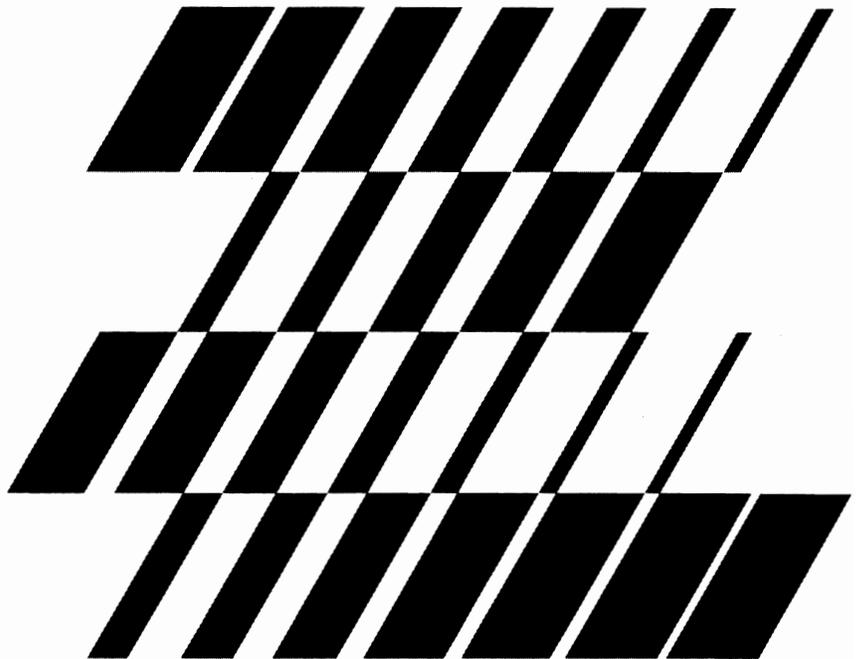
Paul V. Ellefson is an associate professor of forest economics and policy and Frederick W. Cubbage is a research assistant in the Department of Forest Resources, College of Forestry, University of Minnesota, St. Paul, Minnesota 55108.

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Introduction

Natural resource programs involving public regulation of forestry practices prescribed by private owners of forest land have received substantial attention by the forestry community in recent years. In fact, this interest is a direct consequence of nationwide concern over maintaining and enhancing the quality of forest environments and their ability to produce a wide variety of forest outputs. Among the many factors triggering interest in public regulation as a tool of forest policy has been the 1972 amendments to the Federal Water Pollution Control Act (United States Statutes at Large, 1972).

At the state level, public regulation of private forest practices has resulted in enactment of several state forest practice laws regulating private and, in some cases, public landowner activities. The laws attempt not only to protect natural environments, but also to insure continuous productivity of forest lands, to maintain or enhance aesthetic values, and to serve as an implementing mechanism to control water pollution.

The increased impetus for public regulation of private landowners raises several questions. Does regulation of private landowners stand on firm legal and constitutional bases? What is the historical background of regulation, particularly of state forest practice laws? In those states which have state forest practice laws, what are the contents of such laws and how effective have they been? What criteria should be used to evaluate a competent state forest practice law? What are the possibilities for enactment of state forest practice laws in other states? And, from a Minnesota perspective, is a state forest practice law appropriate either to implement water quality goals or for any other reason? If so, what objectives should it focus on? What provisions should it include? Who should administer it? To whom should it apply? And how should it be funded? Difficult as these questions may be, they must be addressed if knowledgeable decisions regarding the efficiency and effectiveness of state forest practice laws are to be made.

This report reviews and summarizes existing state forest practice laws, inspects their legality and history, identifies criteria which can be used to evaluate a state forest practice law, and uses the criteria to identify provisions that may be desirable or undesirable to include in a state forest practice law. A case study approach is used to examine state forest practice laws in light of Minnesota's unique geographic, social, economic, and political environment. The case study uses the criteria identified by the study and the opinions of Minnesota natural resource leaders to select provisions which might be appropriate if Minnesota were to enact forest practice regulations. Opinions of Minnesota natural resource leaders were obtained in personal interviews using a short-answer questionnaire.

To discuss forest practice regulations, one must begin with a rudimentary definition of forest practices. From a timber management perspective, forest practices may be defined as any activity or operation performed in the establishment, development, reproduction, care, or removal of forest trees. Timber logging, site preparing, tree planting, stand thinning, application

of fertilizers and chemicals, fire control measures, and construction of transportation networks are examples of timber management practices (Society of American Foresters, 1975). In a broader sense, forest practices may be any activity or operation which takes place within a forested area. Examples include silvicultural prescriptions for timber management purposes; removal of certain forest vegetation to enhance the forest's aesthetic characteristics; construction of hiking trails for forest recreational use; planting selected forest vegetation to improve wildlife habitat; and application of herbicides to foster improved forage production in forested areas. Any forest practice can affect many different forest outputs, including timber, water, fish and wildlife, recreation, aesthetics, and forage. Forest practices performed to produce one forest output may create either positive or negative effects on that or other forest outputs, for other landowners, or for future generations of forest landowners or users.

Means of Directing Private Forestry Activities

The selection and design of public programs that will encourage prescription of forest practices which favorably impact the quantity and quality of outputs flowing from private forests can be a complex and involved task. A first and prime prerequisite is accurate identification of the forest practices which can have an impact on such outputs. For example, are private forest landowners designing, constructing, and maintaining forest roads in manners that are causing unacceptable levels of sediment in streams? If this is the case, what road standards are conducive to production of quality water and what government programs might one devise for compelling landowners to follow such standards? Might we inform them of a better road design via some government educational program? Would we be better off to pay the owners a subsidy so they become financially capable of building better roads? Or might we require them by force of law to build roads of the type which are less water polluting? These alternatives must be carefully assessed, and only that program—or combination of programs—found to be efficient, effective, and politically acceptable should be selected for implementation.

There are many government programs that can be looked to as means of encouraging or "delivering" to the private landowner the forest practices thought important to producing forest outputs. Three categories stand out (Ellefson, 1979; and Skok and Gregersen, 1975):

Educational programs (*e.g.*, extension forestry programs and service forestry programs).

Subsidy programs (*e.g.*, incentive payments and tax relief).

Regulatory programs (*e.g.*, state forest practice laws).

Educational Programs

Educational programs come immediately to mind as a viable means of encouraging application of sound forest practices. Such programs operate on the assumption

that limited or improper application of forest practices stems from forestry ignorance on the part of the landowner, and that an effective educational program aimed at identifying appropriate forest practices and the proper means of applying them will lead to greater quantities of higher quality forest outputs. A number of forestry programs designed with such a purpose in mind are already in existence. For example, the new Renewable Resources Extension Act (United States Statutes at Large, 1978a) authorizes trained foresters to provide a wide range of educational material regarding management of forest resources. Likewise, the Cooperative Forestry Assistance Act (United States Statutes at Large, 1978b) consolidates a number of older laws which enable service foresters to furnish private landowners with on-the-ground technical forestry assistance. Programs of this type are capable of delivering advice and assistance on matters such as planning the location of roads, preparation of timber harvesting and regeneration plans, the use of logging equipment least likely to cause erosion, and the judicious use of chemicals (Ellefson, 1979).

Subsidy Programs

Subsidy or incentive payments form the core of yet another program type that can be used to encourage application of sound forest practices. Prime targets for subsidy programs are private landowners having knowledge about forest practices and their proper application, yet, for financial reasons, find themselves unable to adopt such practices. Currently two forms of forestry subsidy programs exist. One is essentially a direct payment to private landowners for undertaking the desired practice (Skok and Gregersen, 1975). It assumes that the landowner cannot bear the full burden of paying for a forest practice and, therefore, must be reimbursed for the unpaid portion. The second form of subsidy is an indirect payment, (*e.g.*, tax relief) which encourages the landowner to perform desired forest practices (Ellefson, 1979). Private, non-industrial owners of forest land are the primary recipients of direct subsidy payments authorized by the Forestry Incentives Program (United States Statutes at Large, 1973). The forest industry receives most of the benefits of tax relief as indirect subsidy under the capital gains treatment of timber (United States Code, 1946).

Regulatory Programs

Requiring forest landowners—by force of law and fear of penalty—to carry out sound forest practices, or, conversely, prohibiting them from applying practices considered undesirable, is a third program available to government. Regulatory programs to compel landowners to manage their forest in a desirable fashion are usually set forth in the form of a state forest practice law (Ellefson, 1974). Alternately, they may be enacted as piecemeal measures, such as separate regulatory laws to protect water quality. In either case, they address the same problems and would likely be treated in a similar manner.

There are a number of persuasive arguments for employing public regulation as a program for guiding private forestry activities. Public regulation is often suggested as an effective means of curtailing the negative impacts on natural and human environments that may result when forest practices are poorly or inappropriately prescribed. Forest practice laws attempt to curtail practices that damage soil, water, air, and related resources. The effect of forest practices on water quality is most commonly controlled by the newer forest practice laws. Another major argument for regulation focuses on the need to insure forest land productivity for future generations. To do so is thought to require public laws which prevent needlessly destructive or consumptive uses of forest by present owners. Many forest practice laws attempt to guarantee productivity by setting regeneration and stocking standards for harvested forest lands. Regeneration standards have their historic basis in fears of timber famine and forest devastation. Such fears prompted most of the forest practice laws enacted from 1940 to 1950.

Legal Basis for Public Regulation of Private Forestry Practices

State forest practice laws and the regulations which result from such laws have a strong legal foundation. In fact, this foundation has developed from legal reviews of public regulation of private landowner activities in general. Land ownership has traditionally been considered a bundle of rights regarding the exclusive use, acquisition, and disposal of land. A private owner holds exclusive, not absolute rights. Ownership rights are always limited and conditioned by the overall interests of society administered by the state (Barlowe, 1972). Society can restrict the freedom with which the owner may use his land when necessary to protect and promote public health, safety, morals, and general welfare. State governments traditionally have the police power to restrict or regulate the actions of private individuals and groups for the public welfare (Bosselman, *et al.*, 1973). Generally the state's legal use of the police power to restrict private actions has stemmed from the law of private nuisances or, less frequently, the doctrine of waste (Carmichael, 1975).

Law of Private Nuisance

One of the maxims of common law and legal doctrine is that individuals may not use their property in such a manner that it will injure the property of others. State law covering such private injuries is classified under the law of private nuisances (Freeman, 1975). Nuisance doctrine casts accountability between property owners substantially in the present tense. If one owner's use of his property is immediately injurious to the use and enjoyment of another's, the injured party may obtain both monetary damages and an injunction against the nuisance (Carmichael, 1975). This principle of nuisance applies not only between private persons, but may also be expanded to protect the rights of the community in cases where it would suffer from the

unrestricted exercise of individual rights (Troup, 1938). Forest practice laws fall within this expanded version of private nuisances, as do most land-use and zoning regulations.

Doctrine of Waste

Doctrines that relate to accountability between property interests over time are a particularly important basis for forest practice regulation. The courts fashioned the doctrine of waste to balance the desires of the life tenant to make productive use of a piece of property against the remainderman's desire to receive the property in substantially unimpaired condition. As a general rule, the doctrine of waste requires that the life tenant not cause or permit material decrease in the value of his property and that he use good husbandry in managing the property.

Expansion of the doctrine of waste means that the long term social interest requires that stocks of natural resources should not be improvidently depleted or destroyed. Profligate, needlessly destructive, or consumptive use by the present owners is thus seen as impermissible destruction of the patrimony of future generations (Carmichael, 1975). The doctrine of waste implies that owners have usufructuary rights; they may use their land as they will, but only so far as they do not damage or destroy it (Spurr, 1976). The first challenge to early state forest practices regulations was denied primarily on the basis of the doctrine of waste (Pacific Reporter 2d., 1947).

The Taking Issue

The crucial question regarding laws to protect against externalities or depletion of natural resources is how far the laws can go without constituting a taking. The Fifth Amendment of the Constitution states, "...nor shall private property be taken for public use without just compensation." If the courts find that land use controls or regulations are so severe that they constitute a taking without compensation, then those regulations will collapse. Oliver Wendell Holmes (United States Reports, 1922) stated, "...that while property may be regulated to a certain extent, if the regulation goes too far it will be recognized as taking." This has led to a balancing test; a weighing of the public benefits of regulation against the extent of loss of property values.

State v. Dexter (Pacific Reporter 2d., 1947) is the classic test case concerning public regulation of private forestry activities to protect the rights of future generations. Avery Dexter's cutting operations on his 320 acres were stopped by the state forester in 1947 for failure to comply with the state's forest practice law. Dexter refused to apply for a cutting permit and refused to leave uncut all ponderosa pine less than 16 inches in diameter. In the ensuing lawsuit, he maintained that the law permitted the equivalent of taking of private property without compensation, thus destroying private property rights (Arvola, 1969, and Siegal, 1974).

The Washington state Supreme Court upheld the constitutionality of the law and denied Dexter's claim that the law constituted a taking without compensation. The court wrote:

"Edmund Burke once said that a great unwritten compact exists between the dead, the living, and the unborn. We leave to the unborn a colossal financial debt, perhaps inescapable, but incurred, nonetheless, in our time and for our immediate benefit. Such an unwritten compact requires that we leave the unborn something more than debts and depleted natural resources. Surely, where natural resources can be utilized and at the same time perpetuated for future generations, what has been called 'constitutional morality' requires that we do so."

The decision of the Washington court was upheld without comment by the United States Supreme Court (United States Reports, 1947).

In recent years, increasing knowledge of the environmental damage caused by some patterns of land use and management makes many public purposes weigh so heavily that they can virtually never be outbalanced by an individual's loss of property values (Bosselman, *et al.*, 1973). The decreasing importance of the taking issue combined with the strong legal bases for governing forest practices demonstrate that forest practices regulation has solid constitutional foundations.

The Debate Over Public Regulation of Private Forestry

Historic Perspective

National debate over public regulation of private forestry began in the early 1900's. Separate but similar drives to bring about public regulation of cutting on privately owned lands were started by the United States Forest Service and the Society of American Foresters. Forest Service Chief Henry S. Graves called for state regulation early in 1919. At the same time the Society of American Foresters appointed a committee for the application of forestry, chaired by Gifford Pinchot. The committee was charged with recommending action for prevention of forest devastation on privately owned timberland in the United States (Dana, 1956).

Among other things, the report of the committee for the application of forestry recommended national legislation to prevent forest devastation on private lands. Legislation was introduced into Congress to regulate private forestry according to the committee's recommendations. Opponents of federal regulation introduced a bill emphasizing fire control and state regulation of forestry activities. Opposing arguments and lack of leadership eventually brought Congressional action on both bills to a halt (Greeley, 1951). However, the impetus generated by the early debates eventually led to further study, compromise, and passage of the Clarke-McNary Act in 1924. The latter fostered federal-state cooperation in fire protection, forestry extension, and tree planting, but avoided regulation.

After 1924 the regulation debate temporarily abated. However, in a 1931 referendum, the membership of the Society of American Foresters reaffirmed that public control of private forestry was necessary to protect the community interests (Hamilton, 1965). The issue arose

continually throughout the New Deal, but no significant action was taken. In 1939, Earle H. Clapp became acting chief of the Forest Service. Greeley (1951) states that Clapp was "...wholly sincere and forthright in wanting forest regulation and single minded in his pursuit of it." Clapp's vigorous efforts for federal regulation prompted action. Several bills were introduced into Congress advocating federal regulation. In response, the forest industry increased its emphasis that if there were to be regulation, it should be by state governments. Between 1940 and 1950, 13 states passed state forest practice laws.

By 1950 interest in the movement toward regulation had come to a complete standstill (Society of American Foresters, 1956). A 1945 forest survey indicated that forest lands owned by private industry were better managed than Forest Service lands. Suddenly the spotlight of regulation, long aimed at forest industry, shifted to private owners of small woodlots (Greeley, 1951). Also important was a 1950 Society of American Forester's referendum which strongly opposed regulation. The referendum, coupled with the rising strength of industrial forestry, halted serious consideration of federal regulation (Society of American Foresters, 1956).

Lawrence Hamilton (1965) concluded his history of federal forest regulation with the following prophetic remarks: "...it is doubtful that federal regulation will ever become an issue again. State regulation will be the central theme of any future public regulation controversy." Current debate regarding state forest practice laws has confirmed his foresight.

Since the early 1970's scrutiny and regulation of private forestry activities have increased dramatically. Several states have passed new state forest practices laws or strongly revised old laws and regulations. This resumption of interest in public regulation of private forest practices has been prompted by environmental issues concerning water and air pollution, soil erosion, and herbicide and pesticide use. This contrasts with the earlier focus on laws to prevent timber famine or forest devastation.

Water Pollution Control Amendments

Efforts to improve water quality have formed the cutting edge of the drive for regulation of private landowner's forestry activities. Concern stems in part from the more widespread and more intensive application of forest practices which can lead to water quality problems, *e.g.*, pesticides, fertilizers, fire retardants, site preparation, and logging road construction (Environmental Protection Agency, 1973). The 1972 amendments to the Federal Water Pollution Control Act (United States Statutes at Large, 1972) is Congress's effort to legislate a cure for water pollution in general. The law is one of the most complicated measures ever passed by Congress, containing a plethora of regulations, required administrative actions, and relatively inflexible guidelines (Grefrath, 1974). The United States Environmental Protection Agency (EPA) perceives degradation of water quality carried by nonpoint

sources to be a major obstacle to achieving the water quality goals stated in the amendments. To overcome this obstacle, the EPA plans to identify and enact to the degree possible the necessary legislation to enhance institutional arrangements to control water quality (Pisano, 1977). In fact, the EPA argues that some type of regulatory program will be a necessary condition for achieving legislatively mandated water quality goals (Agee, 1976). The agency's aggressive efforts to implement the 1972 amendments have included suggestions for public regulation of private forestry activities via a state forest practice law (Agee, 1975). A suggested state forest practice law released by the EPA in 1974 spawned much of the current debate regarding forest practices regulation. The recently enacted 1977 Clean Water Act (United States Statutes at Large, 1977) provides a mid-course correction to the 1972 act and is likely to place even more importance on the role of state forest practice laws as a means of controlling nonpoint source pollution from forestry activities (Popovich, 1978).

Section 208 of the 1972 amendments to the Federal Water Pollution Control Act provides the legal foundation for addressing problems of nonpoint source pollution. Most forestry activities fall under this section with the exception of some point sources such as gravel crushing and log sorting. Section 208 requires governors to designate a state agency to develop areawide and statewide water quality management plans to control nonpoint source pollution. In Minnesota the agency designated to do so is the Minnesota Pollution Control Agency. One of the agency's objectives is "...to put forth legislation which will assist in the abatement of nonpoint source pollution" (Minnesota Pollution Control Agency, 1977).

Debate Over Modern Forest Practice Laws

While the 1972 Amendments to the Federal Water Pollution Control Act are fomenting much of the debate over state forest practices laws, it is not the only reason for forestry interest in such laws. Other events prompted passage of the modern regulations in Oregon, Nevada, and New Hampshire. Regulation to prevent environmental damage and protect future productivity fostered these laws and contributed significantly to the goals of the state forest practices laws enacted in Washington, California, and Idaho. Conservationists looked to regulation as a means of improving forest practices on private lands and insuring a more balanced use of forest lands. They wanted stringent laws at the state level with strict enforcement that would lead to good land stewardship and protection of present and future generations (Pardo, 1973).

The National Forest Products Association, which traditionally opposed any form of forest practice regulation, entered the fray by introducing a suggested model act in 1973 (National Forest Products Association, 1973). Shortly thereafter, controversy over state forest practice laws peaked with release of the Environmental Protection Agency's suggested state forest practice law (Environmental Protection Agency, 1974, 1975). The law was proposed as a mechanism for implementing

control of nonpoint source pollution resulting from forestry activities (Agee, 1975). However, the scope of the suggested law was not limited strictly to water quality protection. It also included regulations to insure forest productivity and to maintain aesthetic and other forest values. The proposed law triggered strong opposition and stimulated discussion regarding appropriate forest regulations.

The controversy initiated by the Environmental Protection Agency's suggested law led to seven American Forestry Association workshops which were designed to provide opportunity for an exchange of information and ideas between the EPA and those at the state level who would be involved in developing programs to identify and control forestry nonpoint source pollution. The workshops attempted to examine all alternatives for controlling nonpoint source pollution, but often focused excessively on criticisms of forest practice regulations (American Forestry Association, 1976).

In response to increased calls for regulation of private forestry activities, forestry interests in several states drafted voluntary forest practice guidelines to improve private forest management activities. The guidelines concentrated on controlling nonpoint source pollution and insuring adequate natural regeneration. Here are the states with some form of voluntary guidelines, along with original dates of publication, authoring agency, and title:

State	Year	Author and Title
Alabama	1977	Alabama Forestry Commission— <i>Recommended Forest Management Guidelines to Control Non-Point Pollution from Silvicultural Practices</i>
Kentucky	1978	Kentucky Department of Natural Resources and Environmental Protection, Divisions of Water Quality and Forestry— <i>Kentucky Forest Practice Guidelines for Water Quality Management</i>
Mississippi	1973	Mississippi Manufacturers Association and Mississippi Forestry Association— <i>Forestry Practices in Mississippi: An Outline of Industry Guidelines</i>
New York	1975	Empire State Forest Products Association and New York State Department of Environmental Conservation— <i>Timber Harvesting Guidelines for New York</i>
Oklahoma	1977	Oklahoma Select Forestry Committee— <i>Guidelines for Best Management Practices Concerning Forestry and Water Quality in Oklahoma</i>
South Carolina	1976	South Carolina Forestry Association— <i>Voluntary Forest Practice Guidelines for South Carolina</i>
West Virginia	1972	West Virginia Forest Practice Standards Committee— <i>West Virginia Forest Practice Standards</i>

The guidelines describe methods of performing forest practices in order to minimize environmental damage. The Kentucky, Alabama, and Oklahoma guidelines cover nonpoint source pollution specifically. The recommended practices and means to control pollution are quite similar to those contained in state forest practice laws. The guidelines have received extensive publicity in their respective states. Their educational values are being promoted by both state natural resource agencies and private forest industries as being the best means to achieve environmental quality goals, including prevention of nonpoint source pollution.

Publicity given state forest practice laws has diminished somewhat, but they have not vanished as an important forestry issue. A number of forest practice laws were introduced into state legislatures from 1975 to the present without being passed. Many are still being considered. Impetus generated by states' Section 208 planning agencies may trigger a new round of forest practices legislation after submittal of water quality management plans. Forestry interests may push for state forest practice laws as a means of consolidating and localizing regulation. They may also welcome forest practice laws as insurance that the states will administer Section 208 planning, as opposed to Environmental Protection Agency administration in states deemed to have unsatisfactory Section 208 areawide and statewide water quality management plans. Much of the future of state forest practice laws will depend on the aggressiveness taken by the state water quality planning agencies in pursuing a regulatory approach to implement the 1972 amendments to the Federal Water Pollution Control Act and the 1977 Clean Water Act.

Issues Raised by State Forest Practice Laws

The enactment of state forest practice laws raises a number of issues. A crucial one is whether or not such laws are the most effective means to accomplish the goal of maintaining a quality environment, or if greater effectiveness and efficiency might be achieved by some other public policy tool such as education, voluntary guidelines, or incentives (American Forestry Association, 1976). Many advocate education and voluntary guidelines as being more effective than regulation (Nelson, 1976; Nyland, 1978).

Forest practices regulation also raises the issue of whether benefits of regulation exceed administrative, political, and financial costs. Is high-level water quality and the benefits that result worth more than the costs of increased timber prices or reduced capital in the often marginal forest investment picture (Le Master, 1975; Winkworth, 1975; Fraser, 1976)?

What are the costs of regulation? Duerr and Jones (1976) mention two general categories—political penalties such as loss of freedom and an enlarged bureaucracy, and financial penalties such as increased harvest costs or delayed harvest revenues. Regulations may cause marginal forestry operations and, in some cases, even profitable operations to cease (Ellefson and Weible, 1980; Jones, 1977, and Weible, 1978). Regulations may

increase risk and uncertainty, causing capital transfers out of the forestry sector (Smart, 1977). Generally, consumers bear the increased costs of production, but in this case timber owners may well bear the brunt of the costs (Duerr and Jones, 1976). If American timber costs increase, they may become less competitive in world trade which would be detrimental to the already unfavorable balance of trade (Smart, 1977). The costs of administering programs can also pose a major difficulty for state agencies in terms of manpower and funding (Ellefson, 1979). If they do not consolidate existing laws, state forest practice laws can create additional regulations which may already require up to eight separate landowner notifications or permits before a forest practice can begin (Fraser, 1976). In addition, most foresters do not like to be policemen in the woods, as Greeley (1951) stated. Such a role leads to job dissatisfaction, high employee turnover rates, a poor agency image, and even occasional personal threats to employees.

Provisions of State Forest Practice Laws

Important to the development of an effective state forest practice law is careful review of the provisions of existing laws. What purpose do such laws serve, how are forest practice standards established, who administers the law, what forest practices are regulated, and to whom do such laws apply? To answer questions of this nature, existing state forest practice laws have been examined. A complete digest of state laws regulating forest practices is contained in Appendix A.

Older Forest Practice Laws

Most pre-1969 forest practice laws approached regulation in a narrow sense, addressing only timber harvesting practices. Their stated purpose was primarily to ensure future productivity of forest lands and to prevent forest devastation. Usually the laws mandated that a specific number of desirable trees be left for regeneration purposes—consequently they were labeled “seed tree laws.” Most older forest practice laws are still in effect. Some have been slightly modified, six have been strongly revised or superseded, and one has been repealed. Enacted in 1943, Minnesota’s seed tree law was repealed in 1967 (Minnesota Laws, 1943). Following is a list of states which still have older laws, the year in which those laws were passed, and the pertinent state statutes. Since many of the older laws are similar in content and intent, only the significant features of selected laws will be reviewed here.

Cutting regulations in older laws are minimal. Where they exist, they are designed to provide reasonably prompt establishment of at least a minimum stand of desirable tree species on the area being harvested. Most prescribe minimum cutting diameters or a minimum number of seed trees to be left per acre. Seed tree requirements are usually spelled out in detail, specifying the species size, number, and distribution of trees to be left, and the period for which the trees must remain uncut (Society of American Foresters, 1956).

State	Year	Name and Statute
Florida	1943	Seed Tree Law (Fla. Stat. Ann. secs. 591.27 to -.34)
Louisiana	1922	Turpentine Seed Tree Law (La. Rev. Stat. Ann. secs. 56:1493 & 56:1494)
Maryland	1943	Forest Conservancy Law (Ann. Code Md. Nat. Res. Art. secs. 5-388 to -400)
	1977	Pine Reforestation Law (Ann. Code Md. Nat. Res. Art. secs. 5-501 to -509)
Massachusetts	1943	Forest Cutting Practices (Ann. Laws Mass. ch. 132 secs. 40-46)
Mississippi	1944	Forest Harvesting Law (Miss. Code. Ann. secs. 49-19-51 to 49-19-77)
Missouri	1945	State Forestry Act (Ann. Mo. Stat. secs. 254.010 to -.300)
New Mexico	1939	Act For Protection of Growing Timber (N.M. Stat. Ann. secs. 62-1-1 to -5 and 62-3-3 and -11)
New York	1946	New York Forest Practice Act (N.Y. Conserv. Law secs. 3-1101 to -1151)
Vermont	1945	Conservation and Management of Forest Land Law (Vt. Stat. Ann. tit. 10 secs. 2051 - 2055)
Virginia	1950	Seed Tree Law (Va. Code Ann. secs. 10-74.1 to -83.01)

Maryland’s 1943 Forest Conservancy District law is potentially one of the strongest of the older laws that remain in effect. It allows district forest practice boards to construct forest practices guidelines which all landowners and operators must obey. The boards have, however, minimized their regulatory role and instead have favored an educational approach to guiding private forest practices. In addition to the 1943 law, in 1977 Maryland enacted a new pine tree reforestation law (Annotated Code of Maryland, 1977). The law is modeled after the 1950 Virginia seed tree law. Like Virginia, the law provides significant penalties for noncompliance.

The 1943 Massachusetts law requires owners to notify the state forester before beginning timber harvesting operations. The state forester must then inspect the forest areas to be harvested and write a management plan for the landowners. Inadequate funding has prevented full implementation of the law (Massachusetts Forestry Program Review Board, 1977).

Missouri possesses a voluntary forest tax law that affects only lands for which an application is made by the landowner and accepted by the Conservation Commission. After enrolling under the law, landowners must follow the forest practices recommended by the state cooperative forest management foresters. New Mexico regulates forest practices with a seed tree law and with slash disposal rules promulgated by the State Forestry Conservation Commission (New Mexico Status Annotated, 1959).

Some of the strongest of the older forest practice laws have been amended or superseded by new laws. The states having such laws, the enactment date of their original legislation, and the former statutes are listed here:

State	Year	Statute
California	1945	Cal. Pub. Res. Code secs. 4521-4618
Idaho	1937	Idaho Code secs. 38-301 to -312
Nevada	1903	Statutes of Nevada (1903) ch. 93
	1955	Nev. Rev. Stat. secs. 528.010 to .090
New Hampshire	1949	N.H. Rev. Stat. secs. 79.3, :10-:12, :19
Oregon	1941	Ore. Rev. Stat. secs. 527.610 to .990
Washington	1945	Wash. Rev. Code Ann. secs. 76.08.010 to .090

Of the six states listed, only the 1903 Nevada law and the 1949 New Hampshire law were relatively weak laws. In all the remaining laws, operators were required to register or to obtain permits to harvest. All six states authorized inspection of forest areas being harvested either during or after the harvest. Each state's law had moderately restrictive cutting practices guidelines to insure future productivity. Both Oregon and Washington required a performance bond to guarantee restocking when operations were found in violation. If natural restocking did not occur within five years, the bond was forfeited and the proceeds were to be used to replant the area. In Washington, forest lands cleared under agricultural permits were inspected after five years. If the area was not in agricultural use, the area could be reforested by the state forester. The cost of doing so constituted a lien against the property.

Newer Forest Practice Laws

Since 1969, seven states have substantially revised or replaced their old forest practice laws. The states, the year their laws were enacted or revised, and the relevant statutes are listed here:

State	Year	Name and Statute
Oregon	1971	Oregon Forest Practice Act (Ore. Rev. Stat. secs. 527.610 to -.990)
California	1973	Z'Berg-Nejedly Forest Practice Act (Cal. Pub. Res. Code Div. 4, chap. 8, secs. 4511-4628, and Cal. Adm. Code tit. 14 subchap. 4.1 chap. 2 div. 2)
Washington	1974	Washington Forest Practice Act (Rev. Code Wash. Ann. secs. 76.09.010 to .935 and Wash. Adm. Code secs. 222-08 to -50)
Nevada	1971	Nevada Forest Practice Act (Nev. Rev. Stat. secs. 528.010 to -.090)
Idaho	1974	Idaho Forest Practices Act (Idaho Code secs. 38-1301 to -1312)
New Hampshire	1971	Forest Conservation and Taxation; Pollution of Waters and Care of Timber Slash Law (N.H. Rev. Stat. secs. 79:3, :10 to:12, and :19 and secs. 149:8 and 149:19 and 224:44)
Maine	1969	Maine Land Use Regulation Law (Me. Rev. Stat. Ann. tit. 12 secs. 681-689)

Oregon Forest Practices Act of 1971

Surfacing in the late 1960's, concern over provisions of the Oregon Conservation Act of 1941 led to a special study committee which in 1970 proposed a new forest practice law for the state (Anderson, 1977a and Schroeder, 1972). After wide review by interested groups and by the Oregon State Legislature, the proposal was enacted into law in 1971. It became effective on July 1, 1972 (Schroeder, 1972).

Title, purpose, and outputs addressed. The Oregon Forest Practices Act of 1971 recognizes the social, economic, environmental, and wildlife benefits that forests contribute to Oregon, and declares as public policy the encouragement of forest practices that maintain and enhance such benefits. The law vests in a State Board of Forestry authority to develop and enforce regional rules that:

"...assure the continuous growing and harvesting of forest tree species and to protect the soil, air, and water resources, including but not limited to streams, lakes, and estuaries;" and

"...achieve coordination among state agencies which are concerned with the forest environment."

Method of establishing forestry standards. The law is an enabling act requiring the State Board of Forestry to establish at least three forest regions and a concomitant nine member forest practices committee for each region. The committees are to recommend appropriate regional forest practices to the State Board of Forestry, which is responsible for promulgating appropriate rules and regulations.

The 16 member State Board of Forestry has 13 voting members, including the dean of the School of Forest Resources at Oregon State University and 12 other members appointed by the governor with Senate confirmation. Six members must work in the administration or production of forest products, one must be from the Association of Oregon Counties, one from a farm association, one from a range association, one from a conservation or labor group, and two from the public at large. The regional forester of the United States Forest Service, the state director of the Bureau of Land Management, and the president of the Oregon Forest Protection Association serve as advisory, nonvoting members.

Responsible agency and method of administration. The law is administered and enforced by the Oregon Department of Forestry. Any appeals to actions taken by the state forester in enforcing the law must be made to the State Board of Forestry. Operators, timber owners, or landowners must notify the state forester on forms provided by the Department before commencing operations. Alternate plans to the rules are acceptable if they propose equivalent or better forest practices and receive the written approval of the state forester.

Applicability and exemptions. The Oregon law applies to all nonfederal public lands and to all private lands. Notification is required for harvesting of forest crops, road construction or reconstruction, site preparation, application of chemicals, conversion of forest lands, treatment of slash, and pre-commercial thinning. Noti-

fication is not required for routine road maintenance, recreational uses, grazing, tree planting and direct seeding, Christmas tree culture, or harvesting of minor forest products. Waiver of notification does not relieve the owners or operators from the responsibility of complying with all applicable forest practice rules.

Violations and penalties. When violations are identified, the state forester may encourage compliance via informal conferences with the violators, or may order the violator to cease the illegal activity. Where practical and economically feasible, the state forester may direct the operator to cease all work in the area where the violation is occurring. If the operator refuses to repair the damage, the state may take corrective action and bill the operator accordingly. If not reimbursed, the state may attach a lien to the operator's, timber owner's, and landowner's property.

Failure to give notice or to follow the rules established by the board is a misdemeanor. Each day in violation after receiving a stop work order is considered a separate offense. Misdemeanor penalties consist of fines of not more than \$1,000 or imprisonment in the county jail for not more than one year, or both.

Forest practices covered.¹ The law requires the State Board of Forestry to establish minimum practices for each region relating to reforestation, road construction and maintenance, timber harvesting, application of chemicals, and slash disposal. The subsequent regulations promulgated by the board require reforestation of at least 100 desirable seedlings per acre after harvest, or a basal area exceeding 80 square feet per acre of trees greater than 11 inches in diameter. The board also established regulations regarding road location, road specification, road construction, and road maintenance. Harvesting rules cover the quality of the residual stand, soil protection, location of landings, skid trails, fire trails, drainage systems, treatment of waste materials, and stream protection. The regulations also control surface mining practices, protection of water quality during mixing and application of chemicals, and maintenance of productivity by proper disposal of slash.

Effectiveness of law. Most industrial foresters consider the Oregon Forest Practices Act of 1971 as the most workable of the three Pacific Coast states' laws [Cornelius, 1975; and Wallinger, 1975]. The enabling legislation is by far the shortest of the three states. The administration of the law is the least complicated, both in terms of landowner and agency actions required and the number of agencies involved in the administration. The application of the law to both public and private lands was a unique feature of the law when it was passed.

The Oregon Department of Forestry considers the law to have been effective in reducing debris and sedimentation in streams and increasing land reforestation. The law is flexible and receives considerable intera-

gency cooperation. Prevention of problems is stressed. If such an approach fails, citations are issued and fines are levied (Oregon Department of Forestry, 1976).

Each year, about 9,000 active forest operations occur on lands protected by the department. During 1975, about half of the harvesting operations received on-site evaluations and inspections. The department would like to evaluate about 60 percent of operations in the future, concentrating on those that would be most likely to cause environmental damage. Of the operations inspected, 93 percent were in compliance with the law. Informal conferences with forest practices officers led to correction of five of the remaining 7 percent. About 130 citations are issued annually, 70 percent of which relate to road construction activities or harvest activities which result in stream sedimentation. The department has also initiated a training program for forest practice officers to help pinpoint and prevent environmental problems, especially regarding water quality (Oregon Department of Forestry, 1978). An improved training program, along with increased career opportunities, technical support, and inspections could improve the administration of the law (Brown, 1978).

Conservationists have criticized several perceived weaknesses of the law. Some view the State Board of Forestry as dominated by timber interests and having excessive discretion in writing forest practice standards. Conservationists generally agree that enforcement of the law is not sufficiently funded and that there should be better cooperation and communication with other state agencies (Anderson, 1977b).

California Forest Practice Act of 1973

From 1945 to 1971, California operated under the California Forest Practice Act of 1945. Numerous amendments and rule revisions had greatly expanded the scope of the 1945 act. In general, the law was well enforced, with about 2,000 inspections of harvesting practices being made each year (Arvola, 1976). Despite constant modernization and increasing enforcement of the law, it had many detractors. As a result, a 1971 court decision declared important provisions of the 1945 act to be unconstitutional (California Appeals 3d., 1971). One of the court's major findings was that authority to develop forest practices rules for State Board of Forestry approval and adoption had been unlawfully delegated to local committees dominated by timber owners and operators. As a replacement, the California legislature enacted the Z'berg-Nejedly Forest Practice Act of 1973. The new law actually took effect in November, 1974, when forest practice rules were adopted. Consequently, the state operated with temporary forest practices rules from 1972 until 1974 (California Division of Forestry, 1973; and Jones, 1977).

Numerous amendments and emergency actions have been required by subsequent interpretations of the 1973 Forest Practice Act and other California laws. The most significant amendment to the 1973 California law was enacted in 1977 after three years of controversy. A 1975 court ruling (California Appeals 3d., 1975) found

¹In this and subsequent sections devoted to coverage of forest practices, forest practices primarily addressed by the enabling law in question are reviewed. Additional forest practice standards promulgated by state forestry boards or similar administrative units may exist.

that the California Forest Practice Act did not exempt timber harvesting operations from the provisions of the California Environmental Quality Act, including the necessity of preparing environmental impact reports. Emergency administrative measures were taken to make timber harvesting plans a functional equivalent to environmental impact reports. This action has since received legislative approval.

Title, purpose, and outputs addressed. The Z'berg-Nejedly Forest Practice Act of 1973 states that the forest resources and timberlands of the state furnish high-quality timber, recreational opportunities, and aesthetic enjoyment while providing watershed protection and maintaining fisheries and wildlife. The law declares:

"...that it is the policy of (the) state to encourage prudent and responsible forest resource management calculated to serve the public's need for timber and other forest products, while giving consideration to the public's need for watershed protection, fisheries and wildlife, and recreational opportunities alike in this and future generations."

The law intends to protect a number of forest resources or outputs including the previously mentioned high quality timber products, recreation, watersheds, wildlife, fisheries, and aesthetic values as well as range and forage resources. Despite its broad policy statement and intent, the present forest practice rules focus almost exclusively on regulating timber harvesting activities. Other forest management and forest based practices that affect forest outputs are not controlled by the law at this time.

Method of establishing forestry standards. The California law is a combination of enabling legislation and legislation specifying minimum forest practice standards. A nine member State Board of Forestry has authority to adopt forest practices rules and regulations for each district. These rules must meet or exceed stocking standards stated in the law. In response to the 1971 court ruling, the new board has five members representing the general public. Three of the remaining four members are from forest products industries. One is from the range livestock industry.

The State Board of Forestry divided the state into three forest practice districts, each with a nine member district technical advisory committee charged with advising the board about district rules governing timber operations. Assistance and recommendations from the Department of Fish and Game, State Water Resources Control Board, California Regional Water Quality Boards, State Air Resources Board, and local Air Pollution Control Districts were required in drafting the rules. The Lake Tahoe Regional Planning Agency and the counties of the state have the right to adopt rules and regulations which are stronger than those promulgated by the board. Three local governmental units have exercised their rights.

Responsible agency and method of administration. The law is administered by the director of the California Department of Forestry. Proposed timber harvesting op-

erations require submission of a timber harvesting plan which must include the name and address of the owner and operator, a description of the land, a description of the silvicultural methods to be used, methods to avoid soil erosion, special provisions to protect unique areas during timber operations, and any other information the board might require. Timber harvesting plans must be prepared by registered foresters licensed by the Board of Forestry.

The director of the department must determine if an area scheduled for harvest is in need of a pre-harvest inspection. If such is deemed to be the case, the inspection must occur within 10 days of receipt of the timber harvesting plan which has been prepared for the area. The director has 15 days after a plan is submitted or 15 days after a preharvest inspection, to determine if the plan conforms to the rules established by the board. If the director does not respond within this or a mutually agreed to period of time, the plan becomes effective automatically and operations may commence. The director must inspect operations at the beginning of harvest operations, after operations are well underway, and upon completion of operations. A stocking report must be submitted within five years after harvesting, at which time the director must reinspect the area to insure compliance with minimum stocking standards. The director may also inspect at any other time deemed necessary for enforcement of the law.

Applicability and exemptions. The law applies to all nonfederal public and private forest lands. Constructing or maintaining rights-of-way, Christmas tree culture, fuelwood cutting, or removal of dead, dying, or diseased trees is exempt from the law.

Private timberland owners must apply for a permit to convert timberland to nontimber uses when such land lies within a timberland preserve zone. These applications can only be approved if the board makes written findings that:

- the conversion would be in the public interest.
- the conversion would not have an adverse effect on timber-growing or open space land.
- the soils, slopes, and watershed conditions would be suitable for the proposed converted use.

Violations and penalties. If a timber operator violates or threatens to violate any provisions of the rules and regulations, the Department of Forestry may initiate court action to issue a temporary restraining order or order the operator to take appropriate corrective action. The court may also authorize the department to incur expenses to take corrective action. Any expenses incurred by the department constitute a lien on the landowner's property unless paid for by the timber operator or owner. If the timber operator does not comply with a restraining order, he may be ordered to stop all work on the operation. He may also be prohibited from performing any harvesting operations in the state.

No person can engage in timber operations until a timber operator license has been obtained from the director of the Department of Forestry. To engage in timber operations without a license is a misdemeanor. A

timber operator license may be suspended or revoked for violations of rules established by the board.

Any person who violates provisions of the law or rules established by the board can be charged with a misdemeanor. Violations are punishable by fines up to \$500 or imprisonment in county jail for up to six months, or both.

Forest practices covered. Stocking standards established by the law require at least 300 seedlings per acre or a corresponding number of larger diameter trees which may be substituted proportionately according to a formula written into the law. Restocking must occur within five years of harvest. Alternately, the basal area must be greater than 85 square feet per acre on Site Class I lands or greater than 50 square feet per acre on Site Class II or lower lands. If the stocking before harvest was inadequate, restocking will generally be considered satisfactory if the area contains at least five or ten countable trees for each one harvested, depending on the site and forest district.

The law requires the board to make rules regarding slash and waste disposal, timber operations that may cause significant soil disturbance, and operations that might damage or threaten beneficial uses of the state's waters. Water protection controls must include rules for the following activities:

- disposal of petroleum products, sanitary wastes, and refuse which may enter streams or other waters.

- construction of logging roads and skid trails across streams which may substantially impair water flow and the free passage of fish.

- activities which have potential to damage unmerchantable streamside vegetation, especially hardwood trees.

- activities which have potential to damage streambeds or banks. Such activities include skidding or hauling logs through, across, or into streams; operating tractors or other heavy equipment near streambeds; or constructing log landings or log roads in or near stream channels.

- activities leading to slash, debris, cuts, fills, and side cast earth.

Effectiveness of the law. California enacted the strictest and most far-reaching forest practices law to date. It was enacted during the peak of the environmental movement in a state with many active conservation groups. Despite being the most stringent and comprehensive law passed at the time, the State Fish and Game Department, Regional Water Quality Control Boards, Sierra Club, Planning and Conservation League, and others have charged that the forest practice standards promulgated as a result of the law are not adequate to protect fish and wildlife habitat and water resources (Arvola, 1976). In contrast, some argue that the law and subsequent administrative and court interpretations impose unjustifiable procedural and financial penalties on timber harvesting. In addition to complying with the extensive rules and regulations adopted by the State Board of Forestry, timber operators have had to abide by a number of administrative interpretations of policy

and objectives set forth in the law. This contention led the state legislature to limit the director to only the board's rules when reviewing timber harvesting plans for approval or disapproval. The board is required to establish rules to guide the actions of the director in cases where professional judgment is to be exercised (Sechrist, 1979).

Like many environmental regulations, per-unit cost of compliance are disproportionately high for small landowners. Such regulations may incur time or plan-imposed costs on owners that are almost as high as required for projects many times as large (Raup, 1975). For very small land parcels or harvest of small timber volumes, forest practice regulations may be so severe that they effectively eliminate forest management activities. The California State Board of Forestry has recognized this problem by requesting that operations harvesting less than 75,000 board feet of timber be exempt from filing timber harvesting plans (California State Board of Forestry, 1976).

The California Department of Forestry is of the opinion that the forest practice law is meeting the intended goals of providing environmental protection while encouraging sustained production of timber products. The department processed 2,231 timber harvesting plans in 1976 and made a total of 9,380 inspections that year. Although 2,460 separate rules were violated, the statewide compliance rate with all the applicable regulations was 96 percent (California Department of Forestry, 1977). The board has had to take some legal actions each year to enforce the regulations.

Washington Forest Practice Act of 1974

The Washington Forest Practice Act of 1974 replaced the state's 1945 forest practice law. The rules and regulations authorized by the 1974 law became effective in 1976 after two years of debate regarding their coverage.

Title, purpose, and outputs addressed. The Washington Forest Practices Act of 1974 requires adoption of a comprehensive, statewide system of laws and forest practice regulations which will achieve a number of objectives, including the following:

- encourage timber growth and require a minimum level of reforestation.

- afford protection to forest soils.

- recognize the public and private interest in the profitable growing and harvesting of timber.

- promote efficiency by allowing maximum operating freedom.

- avoid unnecessary duplication of forest practices regulation.

- provide for interagency input and intergovernmental coordination and cooperation.

- achieve compliance with all applicable federal and state laws regarding nonpoint source pollution.

- consider reasonable land use planning goals contained in local comprehensive plans and zoning regulations.

The law recognizes forest practice regulations as an important means of protecting forest soils, fisheries, wildlife habitat, water quantity and quality, air quality, recreation, and scenic beauty.

Method of establishing forestry standards. The Washington law is an enabling law, delegating authority for promulgation of rules and regulations to a Forest Practices Board. The board is required to prepare forest practice regulations, except for water quality regulations which are prepared by the State Department of Ecology. Draft regulations are submitted for review to county governments and the Department of Fisheries and Game. Prior to final adoption, the law directs the board and the Department of Ecology to jointly hold one or more additional hearings on the proposed rules.

The Forest Practices Board must also determine which forest practices are to be included in one of four environmental and administrative classes. Class I includes minimal or specific forest practices that have no direct potential for damaging a public resource (*e.g.*, tree planting). Class II forest practices have less than ordinary potential for damaging a public resource (*e.g.*, construction of 600 or more feet of road). Class III forest practices are those not included in Classes I, II, or IV (*e.g.*, aerial application of insecticides). Class IV forest practices include those which have a potential for substantial impact on the environment and may also require a state environmental impact report (*e.g.*, DDT application). The Departments of Natural Resources, Ecology, Fisheries and Game must classify waters of the state into one of five classes. The classification along with the administrative classes is used to determine the forestry practice regulations that apply.

Responsible agency and method of administration. Depending on the administrative class within which a forest practice falls, the forestry activity may require only compliance with standards, or it may require a notification or a permit. Class I forest practices require no notification, only compliance with pertinent rules and regulations. Class II actions require notification of the Department of Natural Resources. If no reply is received within five days, the operation may then begin. Class III actions require an application to the department which must be approved or disapproved within 14 calendar days. Class IV practices require an application to the department which must be acted on within 30 calendar days unless the department decides an environmental impact report is necessary, in which case a decision must be made in 60 days. Local, county, or regional governments may also require a detailed impact statement.

While the Department of Natural Resources is the primary administering and enforcing agency, the Department of Ecology may also make field inspections to insure compliance with water quality rules. Forest practices are still required to meet all the pertinent rules and regulations of any other government body in the state. Inspections must be made before, during, and after operations to check compliance with the law. Landowners are required to submit a notification when reforestation has taken place, at which time the department must make an inspection.

Applicability and exemptions. The law applies to all forest landowners or persons owning forest land. The term person may mean any individual, partnership, private, public, or municipal corporation, county, the Department of Natural Resources, or any other state or local government entity. Practices exempted from regulation include tree marking, surveying, and road flagging, and removal of ferns, berries, mushrooms or other minor forest products.

Violations and penalties. Violators of the law may be dealt with in several ways. Department officials may hold informal conferences with the violators, or may order them to take corrective action or to cease operations. If the operator, timber owner, or forest landowner does not take corrective action, the Department of Natural Resources may do so. If the landowner fails to reimburse the department for infractions, the cost of the action becomes a lien on the landowner's title. If operators fail to obey department stop work orders, they may be prohibited from all operations in the state for up to one year. Counties may also bring suits for enforcement of forest practices against the Departments of Natural Resources or Ecology, the forest landowner, the timber owner, or the operator.

Violations of forest practices regulations are subject to a \$500 fine per violation. Each and every violation is a separate offense. Failure to comply with a stop work order is subject to a separate violation for each day. Penalties cannot be placed on individual government officials or employees, but may be made on government units. All fines initiated by state agency action go to the state's general fund. However, if local governments initiate action, the funds go to the local government general fund.

Any person who knowingly violates any forest practice rule or knowingly aids another to do so is guilty of a gross misdemeanor and shall be punished by a fine not less than \$100 or more than \$1,000, or imprisonment for not more than one year, or both. Each day the violation occurs will constitute a separate offense.

Forest practices covered. The law defines forest practice as any activity conducted on or pertaining to forest land, or activity relating to the growing, harvesting, or processing of timber, including but not limited to road and trail construction, final and intermediate harvesting, pre-commercial thinning, reforestation, fertilization, prevention and suppression of diseases and insects, salvage of trees, and brush control. The rules and regulations promulgated by the Forest Practices Board address road location and design, road construction, water crossing structures, road maintenance, rock quarries, gravel pits, borrow pits, and spoil disposal areas.

Timber harvesting rules include harvest unit planning and design, stream bank integrity, temperature control, felling and bucking, cable yarding, tractor and wheeled skidding systems, landing cleanup, post-harvest site preparation, and slash disposal. Reforestation standards require at least 300 vigorous, well-distributed seedlings of desirable species to be present on the site after harvest. The rules also regulate site preparation

and the handling, storage, and application of forest chemicals.

Effectiveness of the law. The Washington Forest Practices Act was passed at peak of environmental concern and represents a legislated compromise between strong environmental groups, state agencies, and timber interests. The law reflects this controversy by its complexity and its multiple agency approach to regulating forest practices. Although criticism is diminishing as experience in administering the law is gained, the law was criticized along many lines. The Departments of Ecology and Fisheries and Game are thought to be too narrow in their outlook—being concerned only for the resource under their charge. Also, the departments were charged with having little concern for the costs incurred by forest landowners. Some view the Forest Practices Board as having too strong an environmental representation (Cornelius, 1975). These problems and strong forestry community protests led to significant revisions by the legislature in 1975. This summary is based on the revised law. Obtaining quick approval for cutting permits has been a problem, and conflicts between different state and county agencies over who is responsible for drafting various rules and regulations has been noted (Niemi, 1975). In addition, some forest landowners have become perplexed in that they may be subject to environmental regulations made by up to eight different government agencies (Fraser, 1976). Administration and enforcement is considered expensive, costing the state of Washington about \$1.5 million annually and the forest industry about \$2-3 per 1,000 board feet (Hawley, 1977). However, the state's costs are about half those in California.

Nevada Forest Practice Act of 1955 as Amended

The Nevada Forest Practice Act of 1955 established the basic framework for regulation of forest practices in the state. The law received major revision in 1971 and was amended in 1973 to include water quality problems. The purpose of the new law is to establish minimum standards of forest practice, to promote sustained productivity of the forests of the Sierra Nevada, and to preserve the natural water supply of the state. The law is used extensively, especially in the Lake Tahoe area, where it has been effective in preventing the clearing of forest lands for nonforest uses (Smith, 1978).

The Nevada law is administered by the state forester firewarden. Before harvesting, landowners must submit a timber harvesting plan which is to be accompanied by an application for a logging permit. A performance bond based on the contract value of the timber to be cut and conditioned on compliance with all the provisions of the logging permit must be posted. Inspections of the harvest area are made by the state forester before and after harvest.

The law regulates some practices quite severely. Tractor logging is prohibited on slopes greater than 30 percent unless a variance is granted. At least 10 seed trees 18 inches or greater in diameter must be left after

harvest, or at least 420 natural or planted seedlings must be established per acre. The law also regulates the location and construction of skid trails, landings, firebreaks, waterbars, and culverts. It requires seeding of trails, roads, and landings. Its most stringent rule prohibits the felling of trees, skidding of tractors, constructing of landings, or operation of vehicles within 200 feet of any reservoir, stream, or other body of water unless a variance is granted by the state forester, the director of the Nevada Department of Fish and Game, and the state engineer.

The Nevada State Board of Forestry and Fire Control made additional rules governing skid trails, felling techniques, stump heights, slash disposal, and insect and disease protection. The seven member board is appointed by the governor and includes representatives from the wool growers association, cattleman's association, agricultural industries, outdoor sportsmen, forest products industry, the general public, and fire services in the state (Nevada Revised Statutes, 1955).

Permission must also be granted for the conversion of land from forest to non-forest uses—a conversion plan must be submitted with such a request. Penalties for violation of the law are misdemeanors punishable by imprisonment in the county jail for not more than six months, by a fine of \$10 to \$500, or both.

Idaho Forest Practice Act of 1974

The Idaho Forest Practice Act of 1974 became operational in March, 1976, after rules and regulations required by the law were approved by the state legislature. The Idaho law is modeled after the Oregon Forest Practices Act. Administration and enforcement is assigned to the State Board of Land Commissioners which in turn relies on the director, Department of Lands, to conduct field inspection programs.

The law governs operations on both state and private forest lands. Forest practice rules were established by the Board of Land Commissioners after receiving recommendations from a specially appointed seven member forest practices advisory committee. Timber operators must notify the Department of Lands before beginning a forest practice. Forest practices conducted in accordance with the provisions of a woodlot management plan prepared by foresters of the department, or a similar plan approved by the Board of Supervisors of a Soil Conservation District, are exempt from the provisions of the law. Conversion of forest land to other uses is permitted without notification.

Violators of the law's provisions may be ordered to cease violation, to correct the violation, or to stop all work on the operation. The department may take corrective action if the operator fails to do so. If not paid, the expenditures incurred by the department are a general lien on the real and personal property of the operator. If the costs are not recoverable from the operator by this method, the amount remaining due shall become a general lien on the property of the timber owner. Violation of the act constitutes a misdemeanor with fines up to \$300, jail sentences up to six months, or both.

Regulated practices include quality of residual stocking, protection of soil, location of landings, skid trails and fire trails, systems of drainage, treatment of waste materials, protection of streams, and maintenance of productivity and related values. Rules control the construction, planning, specification, and maintenance of forest roads. Reforestation standards require minimum numbers of desirable species of trees, which vary on a sliding scale depending on the size of the trees. The use of chemicals and fertilizers and slashing management is also regulated.

About 1,800 forest operations occur on Idaho's private forest lands each year. Of these, the Department of Lands hopes to inspect about 20 to 25 percent. About 2 to 4 percent of the operations have been found in violation so far. As an external benefit of the law, the department has hired additional foresters which may have broadened and strengthened their Cooperative Forest Management program (Almas, 1977). Strengthening and revising the law is being considered by the Idaho Division of the Environment as the means for implementing Section 208 planning requirements (Almas, 1978).

New Hampshire Forest Practice Regulations

New Hampshire does not have a state forest practices law per se, but does regulate timber harvesting in several ways through modern, piecemeal legislation. The state has a timber yield tax law which requires that landowners file "intent to cut" forms with the local assessing officials before beginning timber operations. They must also report the total volume harvested at the completion of operations (New Hampshire Revised Statutes, 1949). A separate state statute requires timber harvesting plans be sent to the Water Supply and Pollution Control Commission 30 days before commencing operations, and requires that written permission be obtained from the commission before undertaking any activities that might alter the land and create new, unnatural runoff (New Hampshire Revised Statutes, 1971a). Logging and skidding roads are the focus of this requirement. Violators may be fined up to \$25,000 or imprisoned for six months, or both. It is also illegal to dispose of equipment and debris near any stream, lake, or pond. Violation is punishable by fines of up to \$1,000 per day of violation.

Slash and mill waste may not remain within 50 feet of any major pond or river or public highway. Waste must be at least 25 feet away from small streams or adjoining landowner's property. It must also be 60 feet away from a railroad right-of-way and 100 feet from any occupied building other than a logging camp. No more than 50 percent of the basal area of a stand may be harvested within 150 feet of any body of water unless prior written consent of the state forester is given (New Hampshire Revised Statutes, 1971b).

Enforcement of the New Hampshire law has been strict. As a result, the laws have been fairly effective at accomplishing their intent. Implementation of the law is handled primarily by fire control officers (Verrier, 1977).

Maine Forest Practice Regulations

Like New Hampshire, Maine does not possess a comprehensive forest practices law, but does regulate forestry activities in some land use districts, as well as along shorelands and highways. Statewide zoning rules require notification of harvesting on certain classes of land throughout the state. Any forest activities within 50 feet of a stream, river, pond, lake, or salt body of water must follow guidelines regarding slash disposal and harvesting. In scenic river corridors, the distance is expanded to 250 feet and the rules are considerably stricter.

Depending on the land zoning class, landowners may ignore forest practice standards, or must comply with standards made by the Maine Land Use Regulation Commission, or must notify the commission before the start of operations, or must apply to the commission for a permit to conduct operations. The standards for timber harvesting regulate activities in residential or industrial development areas, in fish and wildlife protection zones, near any great ponds, shorelands or wetlands, in recreation areas, in areas with terrain having slopes greater than 30 percent, or in areas with elevation greater than 2,700 feet. In addition to compliance with standards, permits are required in development areas, high elevations, steep slopes, and activities in recreation areas near trails and streams.

There are also statutes administered by the state's Bureau of Forestry which regulate roadside harvesting practices for a 100-foot strip along numbered highways and cutting along railroad rights-of-way (Maine Revised Statutes Annotated, 1954). Because of the ease with which such regulations can be evaded, the statutes are virtually unenforceable (Morse, 1977).

Summary and Discussion

Purpose and Forest Outputs Addressed

Modern forest practice laws such as those enacted in California, Oregon, and Washington usually state a purpose or policy decreed by the state legislature. Most laws are aimed at protecting environmental quality and insuring continuous productivity of forest lands. Most regulate forestry activities so as to protect water, wildlife, fisheries, soil productivity, recreation, and aesthetics. Some recognize the economic contribution of timber harvesting to the economy. Nevada and California laws regulate primarily timber harvesting and reforestation, while Oregon, Idaho, and Washington regulate virtually all forest management activities. None regulate all the activities that may take place within the forest boundaries.

Not all the statements of policy or purpose contained in the laws are totally clear, nor can all the policy statements actually be fulfilled by regulations contained in the laws. The California law, for example, declares numerous broad environmental protection goals but emphasizes only timber harvesting activities. The Washington law lists several goals, not all of which are effected by the law. For example, one of its objec-

tives is to eliminate unnecessary duplication of forest practices regulation, yet the law fails to supersede most existing forestry regulations or eliminate the necessity for landowners to deal with up to eight different agencies when performing a forest practice. Ideally, one would expect a state forest practices law to clearly state its goals and to fulfill those goals in the law.

Method of Establishing Forestry Standards

Forest practices regulations can be established in one of two general methods. They can be specified in the law by the state legislature, or they can be promulgated by some other official body delegated the authority to do so by an enabling law. Regulations were written directly into the law in most of the older forest practices laws. All the modern laws, except New Hampshire, provide for some form of subsequent rule-making. Nevada combines the two methods by having most of the regulations written into the basic law and providing for a few to be promulgated at a later date by the State Board of Forestry and Fire Control. California law combines the two methods by providing for subsequent rule-making, while specifying minimum stocking standards that subsequent rules must meet or exceed.

In an enabling law, the manner in which the rules and regulations are promulgated varies considerably. All the modern state forest practice laws delegate the rule-making authority to an existing or newly created forest practice board. Several of the old forest practice laws delegated the authority to existing state agencies such as a department of natural resources or a division of forestry.

While the actual rule-making authority may be delegated to a board, the boards do not act unilaterally. They may receive technical advice from the state division of forestry, state or regional technical advisory boards, from other state agencies, from public hearings and written testimony, or from all of the above.

Method of Administration and Responsible Agency

The approach to administering a state forest practices law depends on whether the law requires compliance with standards, notifications, or permits to control forestry activities. Modern forest practice laws encompass all three variations. The Maine law covers only special land use zones; consequently some parts of the state are not regulated at all. In the regulated zones, some activities need only comply with standards, while other zones require a permit before operations may begin. The New Hampshire law relies on compliance with forest practice standards except for altering land along streams or other bodies of water, which requires a permit. Oregon and Idaho laws operate exclusively on notification systems. Washington combines standards for Class I actions, notifications for Class II actions, and permits for Class III and IV operations. By requiring submission of a timber harvesting plan prepared by a registered forester and approved by the Department of Forestry, California employs a de facto permit scheme for timber harvesting plans. Nevada possesses the

strictest administrative framework, requiring preparation of timber harvesting plans and posting of a performance bond before a logging permit will be granted.

In administering their law, Oregon and Idaho inspect a percentage of the operations to insure compliance, usually inspecting at the highest rate those operations with the greatest potential for environmental damage. Nevada foresters inspect operations before and after harvest. In Washington and California, the state forester must inspect operations before, during, and after they begin. The state forester must also inspect operations after regeneration has been completed and may inspect at any other time deemed necessary.

Different government agencies may administer the law. Usually the authority is delegated to the state natural resources department or forestry division. Washington's law is administered primarily by the Department of Natural Resources, but the Department of Ecology and the pertinent county must also be consulted before operations begin. The Department of Ecology is also authorized to make field inspections to insure adequate water quality control. Maine's land use law is administered by the Maine Land Use Regulation Commission. Three different New Hampshire agencies administer the tax provisions, water control provisions, and slash and mill waste provisions in the state.

Applicability and Exemptions

Forest practice regulations usually apply to all private landowners and operators, such as the laws in Maine, New Hampshire, and California. In addition, they may also apply to all public, non-federal landowners, such as the laws in Oregon, Idaho, Nevada, Washington, and California. Forest practice laws could regulate all activities that take place within forest boundaries. State legislatures have not, however, seen fit to enact forest practice laws that do so. The California, Nevada, New Hampshire, and Maine laws address primarily timber harvesting and road construction activities.

Most of the laws exempt constructing rights-of-way, firewood cutting for personal use, and harvesting of minor forest products such as fruits, nuts, and berries. Christmas tree culture and salvage of insect and disease damaged trees is also usually exempt. Idaho exempts forest conversion and Oregon allows it for legitimate purposes. Washington, California, and Nevada severely restrict forest conversion.

Violations and Penalties

In Oregon, Washington, California, and Idaho, enforcement authority ranges from personal conferences with violators to the states taking corrective action and placing a lien on the landowner's or timber operator's property. Citations for violations and restraining or stop work orders are the intermediate enforcement tools in the four states. Violation of the law in the states is usually a misdemeanor punishable by fines of up to \$1,000 or jail sentences of up to one year, or both. In addition, Washington may ban loggers from operating

for up to one year after violation and California can deny, suspend, or revoke a timber operator license until the violation is corrected.

Nevada, New Hampshire, and Maine provide penalties of fine or imprisonment as their primary tools of enforcement. Fines in Nevada may range up to \$500 and jail sentences up to six months. Operators may also forfeit their performance bond if they do not comply. The Maine Land Use Regulation Commission may levy fines up to \$500 and also can issue stop work orders and take corrective action. New Hampshire fines may range up to \$1,000 for disposal of waste in waters or up to \$25,000 for illegally altering land near bodies of water.

Forest Practices Covered

A complete listing of all forest practices regulated by law is prohibitively long, but a description of the general categories addressed is feasible. New Hampshire regulates timber harvesting and forest road construction near waters and highways in piecemeal fashion through modern regulations. Maine's land use regulations generally regulate only timber harvesting and road construction in sensitive areas such as recreation sites, steep slopes, high elevation, or near streams and lakes. California's and Nevada's new state forest practice laws address reforestation, timber harvesting, and the concomitant transportation networks required to guarantee restocking and to protect water quality. Oregon, Idaho, and Washington address a broader array of forest management activities including timber harvest, road construction, chemical and fertilizer use, slash management, site preparation, and pre-commercial thinning.

Severity of Forest Practice Regulations

Sabatier (1977) suggests a legal resources scale to give some idea of the severity of regulation or the aggressiveness of the regulator. Determinants of the severity of regulation include direction and clarity of policy objectives, substantive scope of authority, geographic scope of authority, sanctions available, administrative structure, and citizen participation. Other resources which may affect agency regulating policy include technical, monetary, and personnel resources, leadership ability within organizational constraints, attitudes and resources of agency heads, support of constituency groups, and relations with other agencies.

Using Sabatier's framework for analysis, one can conclude that most of the older forest practice laws and the New Hampshire and Maine laws are less severe than the new western forest practice laws. The former are smaller in their substantive and geographical scope of authority and are generally more limited in the range and severity of their sanctions. Of the older laws, Maryland and Massachusetts have the strongest laws due to their statewide applicability and structure allowing for subsequent regulation of all forest management activities. Virginia, New Mexico, and Mississippi are much less aggressive in their regulation, addressing primarily the leaving of seed trees. New Mexico and Mississippi have only nominal enforcement of the laws and token fines. The Missouri, New York, and Vermont laws pro-

vide even smaller penalties, relying primarily on voluntary cooperation. The Florida and Louisiana laws might as well be repealed since they are not used. The modern New Hampshire and Maine laws are rather weak because of their limited geographic application to forestry, although they do carry significant financial penalties for violation.

Of the five western states, Nevada's law is the most limited in its geographic scope since it is currently only being used on the five percent of the state which has commercial forests. However, the law could be expanded to cover 11 million acres of pinyon-juniper lands if fiber demands increase. It also has the strictest administrative requirements since it necessitates performance bonds and timber management plans before operations may begin.

The Oregon and Idaho laws have strict regulations which have a wide substantive and geographic scope. They regulate most forest management activities in states which have large areas of forest land. They also have a considerable range of sanctions and considerable citizen participation in the rule-making process. Oregon's Department of Forestry provides a strong administrative structure, but Idaho's is weaker in terms of personnel and funding. The aggressiveness of the Oregon law may be weakened by the dominance of timber interests on the State Forestry Board, the timber production orientation of the Department of Forestry, and the strong timber interests in the state (Anderson, 1977a). Both Oregon and Idaho operate on a notification system which is less strict than a permit system. These factors combine to make their laws less stringent than the California and Washington laws.

California and Washington possess the most severe state forest practice laws. They have the same wide scope of authority and sanctions available as in the Oregon and Idaho laws. In addition, California requires the submission and approval of a professionally prepared timber harvesting plan, a de facto permit system. Washington requires notification for less significant forest practices and application and approval for more significant forest activities. The two states have large technical and personnel resources and are required to inspect all activities before, during, and after operations. The enforcing agencies are rigorous in review and approval of plans and in inspections. Strong environmental groups and other state agency input into the rule-making process also increases the degree of regulation. The California law does not regulate as many forest activities as the Washington, Oregon, or Idaho laws, but this weakness is outweighed by its zealous application to all pertinent operations.

Criteria for a Competent State Forest Practice Law

The many and varied provisions of existing forest practice laws represent a valuable resource from which to select the provisions of new or revised forest practice laws. To do so, however, implies the availability of standards or criteria for judging the effectiveness of alternative provisions. Obviously such criteria will be

subjective. Nevertheless, it is advisable to review criteria which are being suggested to guide the makeup of a forest practice law.

General Forest Policy Criteria

Worrell (1970) and Clawson (1975) enumerate a number of general criteria which can be used to judge alternative forest policies. Worrell lists four broad classes. Forest policies that maximize economic return, insure economic equity, protect the environment, and serve the whole public rather than a few individuals are preferred. Clawson considers five factors important in evaluating forest policies. First, a policy should be physically and biologically possible to implement. Policies should also be economically efficient, with returns exceeding costs. They should relate in an equitable manner the cost of implementing a policy to those receiving the benefits of the policy. Forest policies should be politically, socially, and culturally acceptable or they will fail, even if they are economically sound. Lastly, forest policies should be operationally and administratively practical if they are to be successful. All five criteria must be integrated and considered in the decision-making process.

Forest Practice Regulation Criteria

Since re-emergence of forest practice regulation as an important forestry issue, numerous individuals and organizations have proposed guidelines or criteria for judging the provisions of a state forest practice law. What follows is a paraphrasing of criteria that have been made by some of these individuals and organizations.

Forestry Profession

The Society of American Foresters has suggested that forest practice laws should (Society of American Foresters, 1978):

- Encourage the application of scientific knowledge and forest management principles so as to obtain the largest sum of net benefits from forest lands.
 - Insure the productivity of forest land and protect the environment, including air and water quality.
 - Provide for regulation at the state level as opposed to national or regional levels, and recognize regional variations within a state.
 - Coordinate and comply with related regulatory programs so as to minimize jurisdictional conflicts and excessive administration costs.
 - Define forest land and any technical terms and standards regarding forest practices, air and water quality, and soil erosion.
 - Establish procedures and guidelines for the development and adoption of regulations, but make no attempt to specify the regulations in the law.
 - Allow forest landowners latitude to apply professional forestry expertise, and refrain from imposing unduly burdensome administrative requirements on landowners and operators.
- Have boards, commissions, or advisory bodies composed of members that represent the broad public interest. A substantial number of the members should be knowledgeable and experienced in the scientific management of forest resources. Where persons of such knowledge and experience do not constitute a majority of a rule-making body, an advisory committee composed of forest resource professionals should be provided.
 - Encourage public hearings to consider the opinions of forest landowners, timber operators, forestry professionals, and the public, and to take into account regional variation in forests and disparities in land ownership patterns.
 - Empower a state forestry agency or board with responsibility for interagency coordination and adoption of regulations. Have regulations administered and enforced by a single state agency with adequate staffing and forestry expertise.
 - Provide for efficient and expeditious administrative and enforcement procedures. Guarantee that forest management operations conducted in accordance with the adopted forest practices regulations meet the requirements of all other laws pertaining to soil sedimentation and air quality. Give preferential consideration to a notification system over a prior approval or permit system.
 - Allow legitimate conversion of forest land to other uses.

Forest Industry

Comprehensive sets of criteria for judging forest practice laws have been suggested by a number of industrial foresters and industrial forestry organizations. Royce Cornelius (1975) suggests that forest practice laws should:

- Provide for state control of private forest practices rather than control by federal or county governments.
- Delegate authority for promulgating forest practice rules to one board or rule-making unit.
- Insure that forest practice boards or committees have an adequate representation of individuals having knowledge of forest resource management.
- Provide opportunity for public involvement in the development of rules and regulations.
- Demand that sound economic principles be considered when developing rules and regulations.
- Empower a single state agency to administer forest practice regulations. The agency should have experience in managing forest resources.
- Minimize delays through use of a notification system.
- Establish procedures for the development of forest practice regulations. Specific forest practice standards should not be included in the law.
- Preclude county and municipal regulations of forest practices.
- Provide reasonable penalties for noncompliance.

Cornelius also considers it desirable to specify clear policies and goals in the law, to allow for regional variations, to provide for regeneration standards and an appeals procedure, and to define commercial forest lands and realistic stream classifications. He considers inspections, stop work orders, agency-made corrective action, and local involvement in conversion decisions to be optional components of a law. Provisions to be avoided include requiring permits, allowing county and municipal governments to adopt different or additional rules and regulations, requiring other agencies to review and approve proposed operations, and requiring performance bonds.

Weyerhaeuser Company has suggested that forest practice laws should (Weyerhaeuser Company, 1975):

- Regulate all forest management activities, including road construction and maintenance, harvesting, reforestation, thinning, fertilizing, and pest and weed control.
- Deal with all environmental issues, including reforestation, erosion and sediment control, water quality, air quality, fish and wild-life protection, noise pollution, or any other issue which might be dealt with in a separate statute.
- Consolidate all federal, local, and state environmental regulations by preempting local government regulation. The law should satisfy the requirements of federal water pollution control laws and the Federal Clean Air Act. It should supersede existing slash and pest control laws, and should supersede any flood control laws or stream channel modification laws which apply to forestry.
- Establish a policy to increase forest productivity and balance economic and environmental considerations.
- Not include authority to allocate land to specific uses nor limit or discourage the landowner's right to prohibit public recreational use of private land.

According to the company, these actions should be accomplished in the following manner:

- Rely on pre-established and uniform state-of-the-art operating rules that reflect variation in timber regions. Case-by-case agency discretion should be minimized.
- Allow applicants to select either a short notification form which leads to compliance with normal regulations or a detailed operating plan which may lead to the superseding of normal regulations.
- Provide for administration by a single agency having forest management experience.
- Provide for adoption of regulations by a board or commission having balanced representation of affected forest landowners, operators, state agencies, and the general public.

Conservation and Environmental Community

A proposed forest practices law and the rationale for its provisions was suggested in 1972 by the University

of California's Institute of Ecology (Institute of Ecology, 1972). Some of the recommendations made by the institute differ significantly from those made by others. For example, the institute suggests that a forest practice law should:

- Establish a forest practices board with the majority of the board's members not being forest resource professionals.
- Address a wide range of activities including restocking, soil erosion, water quality problems, and amenity value protection.
- Require timber harvesting plans before operations can commence. Such plans should be prepared by certified forest planners that are licensed by a forest practices board.

Anderson (1977b), a graduate lawyer, has suggested means by which a forest practice law can be made more effective for environmental purposes. In his opinion, a forest practice law should:

- Contain precise statements about the forestry standards to be met—latitude for rule-making by a forest practice board should be curtailed.
- Establish a forest practice board that has a strong environmental representation. Such a board should not be biased toward timber interests.
- Require pre-operation inspections as well as preventive inspections undertaken during harvesting operations.

Workshops conducted by the American Forestry Association concluded that forest practice laws should be (American Forestry Association, 1976 and Pardo, 1976):

- Understandable and tailored to the resource being protected.
- Administered by a single agency with expertise in forest resource management.
- Compatible with principles of continuous resource management.

The North Carolina Forest Practices Study Committee (1974) recommended that forest practice laws should:

- Be administered by a single agency which coordinates the forest practice interests of various state government agencies.
- Provide flexible forest practice standards consistent with physical and social diversity found within a state.
- Be administered by a system other than one involving rigid permits, inspections, reports, and appeal procedures.

Miscellaneous Organizations and Individuals

The National Association of State Foresters has suggested criteria that refers to the Environmental Protection Agency's suggested state forest practice law. The association recommends that (Fraser, 1976):

- Regulation of recreation or scenic management practices should not be included in a forest practice law.

—Compliance with state forest practice laws should guarantee compliance with all applicable federal laws including the 1972 amendment to the Federal Water Pollution Control Act.

A comprehensive set of guidelines for public regulation of private forest practices have been suggested by John Ayer (1973). The guidelines address four broad topics: forest practice boards, forest practice standards, planning forestry activities, and enforcement. Guidelines for these topics are as follows:

—Forest practice boards should be appointive with the majority of their members not representing the forest products industry. Boards should, with the assistance of regional technical advisory committees, promulgate regulations that are binding on all landowners.

—Forest practice standards should address restocking, forest land amenities, soil erosion, and water quality management. Standards addressing amenities should be very modest, *e.g.*, require scenic strips under limited circumstances. Air pollution, use of chemicals, taxation of forest revenue, or clear cutting should not be addressed by a forest practice law.

—Management and harvesting plans prepared by hired forest planners should exist, for all forest operations. Plans and a performance bond should be submitted before a permit is granted to undertake operations.

—Forest practice boards should be empowered to inspect operations at anytime and to seek injunctions against non-complying landowners. If a board fails to act, citizens should be allowed to bring suit for compliance. Violations should be a misdemeanor. The board should have authority to revoke forester's licenses for negligence.

—Forest practice laws should not pre-empt other government agencies' authority to enact stricter regulations within their jurisdiction.

forestry activity or practice should be regulated rather than requiring compliance with some downstream water quality standards.

Whether forest practice regulations should be specified in law or should be developed by some rule-making body, and the degree of latitude that should be granted landowners desiring to apply forest practices, are subjects on which substantially less accord exists. Most foresters favor subsequent rule-making, although Anderson (1977b) suggests that some standards should be stated in the law. The debate regarding a notification versus a permit system is also subject for disagreement. The Society of American Foresters prefers a notification system (Society of American Foresters, 1978), while some environmental organizations prefer permits—not to mention the posting of performance bonds and preparation of management plans by licensed foresters (Institute of Ecology, 1972).

Rule-making by a forest practices board or commission is agreed to by most; however, the composition of the board or commission is moot. As might be expected, some forestry professionals urge that the majority of a board be professionals knowledgeable about the management of forest resources. Others urge a non-forestry professional majority for both legal and public interest reasons. Disagreement also exists over whether county and regional governments should have authority to enact forest practice regulations in addition to those authorized by forest practice law, and whether compliance with such laws should constitute compliance with all other laws regulating forestry.

Criteria guiding judgments as to the number and type of practices to be addressed by a forest practice law are also mixed. Weyerhaeuser Company (1975) recommends that all forest management activities be regulated by one law. The Institute of Ecology (1972) and Ayer (1973) recommend regulation of practices that address primarily timber harvesting, road building, soil erosion, and water quality.

Summary and Discussion

Obviously, the criteria suggested for use in judging provisions of a state forest practice law do not always agree. Furthermore, criteria suggested for judging such laws are not always consistent with the very broad criteria that are often suggested for judging forest policies in general. Are there, however, some general patterns of agreement and disagreement that can be identified?

For the most part, there is agreement that a forest practice law should insure forest productivity, protect the environment, provide for state regulation, be coordinated with related regulatory programs, and define the terms used in the law. Most groups and individuals also agree that public hearings should be held during the adoption of forest practice rules, that a state forestry agency should have administrative responsibility for the law, and that administrative procedures should be expeditious and efficient. Experts also agree that the

Forest Practice Legislation: A Minnesota Case Study

Forest Practice Regulation in Minnesota

Forest practices regulation as an issue in Minnesota may be divided into two time periods. The first period spanned the decade of the 1940's and the second encompasses current debate regarding enactment of a state forest practice law.

A series of timber cutting regulations designed to conserve the state's forest resources were enacted into law in 1943. Focus of the law was on prevention of fires, timber waste, soil erosion, and floods. Forest landowners and timber operators were required to file a notice of intent to harvest timber with the Department of Conservation's director of the Division of Forestry. The director in turn was required to inform the landowner or operator of rules and regulations governing harvesting and slash disposal. Division employees were required to inspect harvest areas upon completion of cutting.

For spruce, balsam fir, jack pine, or tamarack harvests, the law required leaving eight seed trees at least six inches in diameter at the stump and prohibited harvesting any trees which were less than six inches in diameter or that could not make at least two 100-inch sticks. The law prohibited cutting white or red pine with stump diameters less than 10 inches and required leaving eight trees of that diameter on each 40-acre tract. Birch, maple, or oak less than 10 inches in diameter at 16 inches above the ground could not be cut.

The law applied to all cutting operations in the state with the exception of land clearing or fuelwood cutting. Violations constituted a misdemeanor for each 40-acre tract involved and were punishable by a fine of not less than \$50 or more than \$100 or imprisonment for not less than 30 days or more than 90 days. Twenty-three arrests were made between 1944 and 1951. Twenty were given minimum fines and three were judged not guilty (Society of American Foresters, 1956).

The Minnesota law fell into disuse in the 1950's (Dana, *et al.*, 1960). In 1966, the Timber Law Committee (1966) recommended repeal of the law on the grounds that it was no longer in use nor was it applicable given improved forest management techniques. Following the committee's recommendations, the state legislature repealed the law in 1967.

Like many states, Minnesota's forestry community has considered steps that would lead to enactment of a new forest practice law. A major effort in this direction was taken by the Timber Law Committee, which in 1974 developed a proposed Minnesota Forest Practices Act (Timber Law Committee, 1974).

The draft law would establish an 11 member state forestry board appointed by the governor. Seven members would represent the forestry sector as professional foresters or employees of the state forest industries, and one would represent county land commissioners, most of whom are foresters. One would represent an environmental organization, one must be an active farmer, and one may be a member of the general public. The proposed board would also include, as advisory, non-voting members, the United States Forest Service regional forester, the Minnesota state forester, and a representative from the United States Soil Conservation Service.

The proposed law would require the board to divide the state into at least two regions, each with similar physical and ecological characteristics. The board must promulgate rules establishing minimum forest practices for each region. Rules must regulate reforestation, forest road construction, harvest of forest tree species, application of chemicals and fertilizers, forest protection, erosion, and waterfront protection. The proposed law would also require the board to hold public hearings before adopting any rules and regulations. Appointed by the board would be a five member regional Forest Practices Committee in each region to recommend appropriate forest practice rules. Three members of the regional committees would represent the forest products industry and two would be from the general public. The board could establish and delegate to an appeals committee, comprised of four or more members of the

board, the authority to hear appeals made pursuant to the law.

Operators, timber owners, or landowners would have to notify the state forester before beginning operations. The proposed law does not specifically require inspections. Instead, it would require the commissioner of the Department of Natural Resources to assign the necessary powers and duties to administer and enforce the law to the director (state forester) of the Division of Forestry.

Whenever the division director determines that an operator has committed a violation of a rule, a citation would be issued and a notice of violation served to the operator. The operator could also be ordered to cease further violation or make reasonable efforts to repair the damage. If the operator does not cease violation as ordered, the violator could be ordered to stop all work in the area where the violation is occurring. Violation constitutes a misdemeanor and would be punishable by not more than the maximum fine or jail sentence allowed for misdemeanors. Fines would be deposited in the state general fund.

The Timber Law Committee submitted its draft law to the Minnesota Department of Natural Resources, which made one major revision (Minnesota Department of Natural Resources, 1975). It suggested eliminating the Forestry Board and vesting its authority with the commissioner of the Department of Natural Resources. The regional advisory committees would be retained, although the commissioner would actually promulgate the rules. At present, the law has been shelved due to lack of consensus regarding its need.

Personal Interviews of Minnesota Natural Resource Leaders

A series of 25 personal interviews with Minnesota natural resource leaders from a variety of backgrounds and disciplines were conducted in 1977-1978. The purpose of the interviews was to gain further insight to possible provisions of a Minnesota forest practice law given Minnesota's unique forest, economic, and political climates. It should be emphasized that the purpose of the interviews was not to determine whether Minnesota should or should not have a forest practice law. Their purpose was to refine determinations of the form such a law should take if one were in fact established. The organizations represented by the interviewees are listed in Appendix B.

Although the interviews provide useful input concerning the provisions of a forest practices law, they obviously have limitations. Twenty-five persons cannot possibly represent the total opinions of 4 million Minnesotans with varying degrees of knowledge about forestry. The interviews were designed to obtain input from people knowledgeable in natural resources and natural resource management. Statistical analysis of the results was not performed since selection of the interviewees was not random nor necessarily representative of an identifiable population. The comments and input from the interviewees regarding the possible contents of a Minnesota forest practice law follow.

Regulatory Atmosphere

- *Do you believe public efforts to regulate private forest practices in Minnesota will increase, decrease, or stay the same? Why?*

Twenty-four of the 25 persons interviewed agreed that attempts to regulate private forest practices in the state will continue. Primary reasons cited included increasing environmental concerns and heightened interest in public and private forest land management. The attention of conservation groups will turn more toward forest management practices once the Boundary Waters Canoe issue is adequately addressed. Conflicting uses of forest land are also likely to lead to legislated regulation. Nonpoint source pollution is also perceived to be a major influence in increasing regulatory efforts in Minnesota.

Regulatory Needs

- *Does Minnesota need forest practice regulations to restore or maintain the quality of outputs yielded by its forested land (e.g., water, air, recreation, wildlife, aesthetics, timber, site productivity)? Which outputs? Why?*

The specific forest outputs or resources for which regulation might be needed are greeted with considerably less unanimity. The perceived need for water quality regulation is quite limited. Only three people believed that there was any need, and they qualified their statements. They felt that only very hilly or sensitive areas such as southeastern and northeastern Minnesota might need regulation. Most foresters did not believe there was a need for water quality regulation. Their belief was also advocated by the interviewee from the Izaak Walton League of America. Representatives from the Department of Natural Resources, Division of Waters and the Minnesota Pollution Control Agency were uncertain regarding regulatory needs and would remain so until more scientific evidence becomes available.

Air quality was perceived to be the most insignificant problem related to forest practices in Minnesota. Interviewees split about two to one against the need for public regulation of recreation or wildlife management. Those perceiving a need for regulating aesthetics were also in a minority. Curiously, only foresters advocated a need for regulating forest practices that impact aesthetics—other groups were generally opposed or uncertain!

Regulation to protect the residual timber stand was the only activity which a majority of interviewees supported. Most forest industry representatives felt there was a need and so did the two conservation group representatives. The only persons opposing regulations for residual timber stands were those who voted against all forms of regulation. A plurality were uncertain about the need for regulation to insure site productivity, with the answers being evenly divided between yes and no and a large number of interviewees being uncertain.

Voluntary Controls

- *Can voluntary forest practice standards and forest practice guidelines set by the forest industry provide adequate protection for water quality and other forest outputs? Why?*

A majority (13) of the respondents felt that voluntary forest practice standards and industry guidelines could provide adequate protection for water quality and other forest outputs. All but one forester agreed that voluntary control could be adequate. Representatives of the Minnesota Department of Natural Resources's Division of Waters did not feel that voluntary controls would be adequate. Representatives from the Minnesota Pollution Control Agency felt that they might be. Many people said that voluntarism would work with a few exceptions, and that the exceptions probably would not obey a law any more than voluntary controls. One forester suggested that voluntary controls would help, but "when the chips were down, the operator would only do what he had to so he could still maximize his profit."

Regulatory Authority and Landowner Applicability

- *If adopted, regulations regarding forest practices in Minnesota should be enacted at which of the following levels of government: federal, state, county, city, or regional development commission? Why?*
- *Regulations regarding forest practices in Minnesota should be applicable to which of the following classes of land ownership: state, county, city, non-industrial private, industrial private? Why?*

Most interviewees concurred that forest practice regulations should be adopted at the state level and should be applicable to all private forest land and non-federal public forest lands. State adoption was agreed on to maximize the uniformity of the rules. Interviewees observed that any rule enactment below the state level would create too many problems for forest operators working in more than one county or region. People also felt that the law should apply to all ownership classes, *i.e.*, "any problems with forest practices are land problems, not sector or group problems." One person stipulated that the law should have an acreage limitation under which it would not apply. Two interviewees did not feel that the regulations should apply to private lands since they did not need regulation anyway. Several industrial foresters felt that the rules should not apply to industry lands since they were already being managed with desirable forest practices.

Law Drafting and Scope

- *Who should be responsible for drafting Minnesota forest practices legislation (e.g., governor, legislature, attorney general, Department of Natural Resources, Pollution Control Agency, Minnesota Timber Producers Association, environmental groups, committee of foresters)?*
- *If a forest practices law were adopted by the state, which of the following would be the most appropriate form?*

- A specific law setting exact standards within the law for each regulated practice.
- An enabling law that establishes an administrative framework for subsequent formulation of specific standards and regulations.
- A combination of the above.

The number of possible authorities or bodies cited to draft a Minnesota state forest practice law was almost as great as the number of interviewees. Most felt that several agencies should have input in drafting a law, with the Minnesota Department of Natural Resource's Division of Forestry being cited most often. The state legislature, the Timber Producers Association, and the Department of Natural Resources were also frequently mentioned. Accord was reached that the law should be an enabling law allowing for subsequent promulgation of rules and regulations. Two people added that some minimum forest practice standards should be written into the law.

Administrative Responsibility

- If a forest practices law were adopted by the state, which of the following should be responsible for administering the law? Why?
 - Minnesota Pollution Control Agency (MPCA).
 - Minnesota Department of Natural Resources (DNR).
 - Division of Forestry, Minnesota DNR.
 - Division of Waters, Minnesota DNR.
 - Division of Fish and Wildlife, Minnesota DNR.
 - Division of Enforcement, Minnesota DNR.
 - Other (e.g., counties).

The preponderance of respondents stated that the law should be administered by the Department of Natural Resources or specifically the Division of Forestry within the department. The department was recommended rather than individual divisions of the MPCA because it had the best administrative structure, is familiar with forestry in the state, and has offices statewide. The department would also be a better agency than the Division of Forestry to coordinate cooperative efforts with other state agencies and the counties. Only four people suggested alternate methods. One industrial forester suggested county administration since it would be in the best position to make decisions and minimize costs. Interviewees from county governments were not enthused about such a suggestion. To minimize bias toward one ownership class, one person suggested that the law be handled by the Minnesota Department of Natural Resources' Division of Enforcement. In a similar vein, it was suggested that a new administrative body be established as a means of "keeping the politics out of the law's administration."

Regional Regulations

- Some states have statewide forest practice rules and regulations while others divide the state into regions with each region having separate rules

and regulations. Which do you believe would work best in Minnesota? Why?

Regional regulations were strongly favored over regulations that would be applicable statewide. The varied forest types in Minnesota call for separate rules for separate regions. Geographic and political considerations also contribute to the superiority of regional rules.

State Forestry Board

- Some states with a forest practice law have a state board appointed to make rules which are in turn carried out by administering agencies. Other states with enabling legislation have forest practices advisory boards which suggest forest practice standards to administering agencies. Which would be preferable in Minnesota—a rule-making board, an advisory board, or no board? Why?
- What qualifications would be necessary for membership on a state forest practices board (e.g., owner of forest land, trained forester, employee of forest industry, employee of a government forestry organization, member of a citizen conservation group, College of Forestry faculty member)? Why?
- How many members should a state board contain (e.g., 3, 5, 7, 9, 9+)? Why?
- How long a term should state board members serve (e.g., 1 year, 2 years, 3 years, 4 years, 4+ years)? Why?
- How should state board members be chosen? Why?
 - Appointment by governor.
 - Appointment by governor with legislative approval.
 - Appointment by regional development commission boards.
 - Elected by citizens.

A majority of the interviewees preferred advisory boards with subsequent rule-making by the Department of Natural Resources, as opposed to the rule-making boards used in most of the modern state forest practice laws. Opponents of the rule-making board felt that it might be politically captured and might promulgate unworkable or impractical rules. Allowing Department of Natural Resources rule approval could avoid this problem. Proponents of rule-making boards thought it best to make the boards completely responsible for all rules and regulations. They questioned the wisdom and legality of the department both making and administering the rules.

Proposals for the qualifications for members of the state board varied widely. Everyone agreed that diverse board membership was necessary. Most foresters felt that a majority should be forest resource professionals. Some forest industry employees felt that a board should have at least three or four industrial forest employees, including one or two from a large paper company, one from a small company, and one or more independent loggers. On the other hand, one respondent felt that the

forest industry should not be represented on the board since it was a poor idea to have the regulated sector being the decision-maker. Almost everyone agreed that forest landowners, trained foresters, citizen conservationists, and College of Forestry faculty members should be included on the board.

Most people compromised between needing a large board for diverse representation and having a board that was so large that it was unwieldy. Seven to nine board members seemed to be the preferred size. A majority of the interviewees felt that board members should serve alternating three year terms—one year to become familiar with the procedures and two years to contribute before becoming disinterested. One person suggested having four year terms with appointees serving the same term as the appointing governor.

Some form of appointment by the governor was seen as the best method of choosing board members. Election by citizens was viewed as too cumbersome, and the Regional Development Commissions were thought of as too geographically restricted to make statewide appointments.

Regional Advisory Boards

- *Some states with a forest practices law have regional advisory boards which suggest forest practice standards to state forestry boards. What qualifications would be necessary for membership on a regional advisory board (e.g., owner of forest land, trained forester, employee of forest industry, employee of a government forestry organization, member of a citizen conservation group, College of Forestry faculty member)? Why?*
- *How many members should a regional board contain (e.g., 3, 5, 7, 9, 9+)? Why?*
- *How long a term should regional advisory board members serve (e.g., 1 year, 2 years, 3 years, 4 years, 4+ years)? Why?*
- *How should regional advisory board members be chosen? Why?*
 - Appointment by governor.
 - Appointment by governor with legislative approval.
 - Appointment by regional development commission boards.
 - Appointment by state forestry board.
 - Elected by citizens.

The persons interviewed generally concurred that regional advisory boards should be smaller than the state board, consisting of five to seven members. Many foresters felt that the regional advisory boards would be a good place for conservationist input. Conversely, a member of the citizen conservation community felt that the advisory board would be the best place for forest industry input. The desirable term of appointment for advisory board members varied from two to four years. Appointment of regional members by the state board was chosen most often, since the state board would have to work with the regional boards. The Regional

Development Commissions were recognized as having more value in appointing members to regional boards than to the state board. One critic of the Regional Development Commissions stated that they were not uniformly strong enough throughout the state to be depended upon to appoint members.

Funding a Forest Practice Law

- *How should a state forest practice law be funded (e.g., legislative appropriation, fines from violations, timber sales tax)? Why?*

Virtually all the interviewees believed that a state forest practice law should be funded by legislative appropriation. Funding by fines was ruled out since it would provide inadequate funding and would amount to policemen being paid by the number of tickets that were issued. Timber taxes were also opposed since the resources being protected included more than just timber. Therefore, it would be inequitable to place the entire administrative costs on timber growers. Also, since the entire state would theoretically benefit from regulation, the entire state should bear the costs of the regulation. One person suggested that the amount of the appropriations should be written into the law so there would be no doubt about adequate funding levels.

Administrative System

- *State forest practice laws are usually administered by either a permit or a notification system. Under the permit system, the landowner or operator must receive a permit from the administering agency before he can perform the desired forest practice. Under the notification system, he notifies the administering agency of his intention to perform the practice a specified number of days in advance. Which scheme would work better in Minnesota? Why?*

Of the persons interviewed, those favoring a notification system outnumbered those favoring permits by about two to one. Least costly, easiest to administer, and least burdensome on landowners were major arguments stated in favor of the notification approach. Representatives from the Minnesota Department of Natural Resource's Division of Forestry pointed out that with about 150,000 private forest landowners in the state and approximately 10,000 operations each year, the paperwork and inspections required under a permit scheme would be excessive. Also cited was the fact that a permit-inspection scheme would require about 40 to 50 more Division of Forestry employees, and would be harder to administer than the analogous water permit program because the inspections would involve large land areas rather than specific locations. In the opinion of one interviewee, forest practices are not a major problem in Minnesota so any control measures would probably not require the urgency of a permit system.

Several forest industry representatives felt that a notification system would cause less delay. They felt that they already had excessive waits for water crossing

permits and were not optimistic that it would be different for forest operations. They concurred that notification could be just as effective as a permit system and would probably be more efficient since it eliminates one administrative step. One individual added that the system should operate under a delayed notification system. If the agency did not respond within a specified time period, the operator could proceed. Several people agreed that it would be best to start with a notification system and change to a permit system if the notification approach proved to be inadequate.

Interviewees from the Minnesota Department of Natural Resources' Division of Waters and the Minnesota Pollution Control Agency representatives felt that permits were the best approach to regulation. They conceded that paperwork could be a problem, but felt that the stronger permit system outweighed the disadvantage. Permits put the operators and owners on notice and give them a definite schedule toward meeting water quality goals. A suggestion was made that the system would not need to require inspection of every operation, but could identify and monitor significant dischargers and spot check on potential problems, especially in sensitive areas. The Division of Waters estimated that it adequately handled approximately 5,000 permits in 1977.

Management and Harvesting Plan

- *Some states with a forest practices law require that a timber management and harvesting plan be submitted with notifications or with requests for permits. Do you believe Minnesota should require such a plan? Why or why not?*
- *If a timber management and harvesting plan were to be required, who should prepare the plan and why?*
 - Any forester.
 - Registered or licensed foresters.
 - Employees of a government forestry organization or forest industry.
 - State service foresters.
 - Timber operators.
 - Forest landowners.

A management and harvesting plan would not be necessary in the opinion of most interviewees. Opponents of the plan cited two primary reasons. First, the plan would be a tremendous burden on large landowners and would be even worse for small owners. Second, if a plan had to be prepared by foresters, there would not be enough people to prepare all the plans that would be required. Two persons suggested that the notification contain some of the type of information that might be contained in a plan, only in less detailed form.

Proponents of the management and harvesting plan felt that if there were a state forest practice law, it should definitely require a plan to insure good results. One person stated "if it takes 50 or more years to grow a stand of trees, the owner should spend a couple of days planning the harvest and management of the stand."

Answers to the question of who should prepare a management and harvesting plan were more inconclusive. Most people felt that the landowner should have the ultimate responsibility. A plurality felt that any forester should be able to prepare a plan for landowners and many felt that landowners could prepare satisfactory plans themselves. Only two respondents would require plan preparation by registered or licensed foresters as is done in California.

Enforcement and Penalties

- *Which of the following enforcement measures should forest practices legislation contain? Why?*
 - Informal conferences between violators and enforcement personnel.
 - Notices to comply.
 - Stop work orders.
 - Agency authority to take corrective action at the violator's expense.

The administering agency should have a broad range of enforcement authority according to the persons interviewed. They felt that the agency should be able to hold informal conferences with violators, to issue notices to comply, to issue stop work orders, and to order or take corrective action when a violation occurs. Forest industry representatives emphasized, however, that the agency should start with informal conferences.

Most respondents felt that violations of the law or any of the rules promulgated under the law should be classified as civil violations and punished as misdemeanors as opposed to criminal violations or felonies. They also concurred that fines would be the best penalty, although a few thought jail sentences might be necessary for incorrigible violators.

Forest Practices to Be Regulated

- *If enactment of forest practices legislation were imminent, what practices should be regulated? Why?*

If forest practices regulation were imminent, many interviewees felt that harvesting or logging practices, especially near bodies of water, should be regulated. Also, roads, transportation networks, and landings associated with harvesting should be controlled. Most people felt that regeneration and stocking standards should be included in the law.

A number of other forest practices were mentioned less frequently as warranting control. These included site preparation, chemical use, slash disposal and burning, large clear cuts, wasteful wood utilization, aesthetics, and recreation. As one respondent noted, anything that falls under the aegis of protecting the public health, safety, or welfare should be considered. But as one industry representative conditioned his list, practices should be regulated only after they are determined to be specific problems; regulation should not be enacted merely for regulation's sake.

Prescribing specific silvicultural or forest management systems headed the list of items that should not be

regulated. A number of interviewees subscribed to the belief that you cannot legislate good forest practices and that any attempt to do so would be disastrous. Others added that utilization standards should not be prescribed since operators should not be forced to remove wood if there is no market for the fiber.

Other practices mentioned which should not be regulated included aesthetics, air quality, and specific stocking levels. Answering the question of what forest practices should not be regulated, one forester facetiously replied: "Mine." Several persons voiced concerns that a law should provide broad standards or guidelines and not be so specific that it would prohibit forest management or become outdated by changing economic and technical conditions.

Value of Forest Practices Law

- *Do you believe a forest practices law in Minnesota could play a worthwhile role in alleviating water quality and other related problems in the state? Why?*

Responses to the question asking for a value judgment regarding the worth of a forest practices law were inconclusive. Interviewees were split almost equally between would be, would not be, or might be worthwhile. The ayes generally believed that if there were a biological problem, a forest practices law could be a useful way to alleviate the problem. However, they all qualified their statements by stating that the existence of problem areas must first be proven.

The nays doubted the value of a law, mostly because they did not feel that significant water quality or other forestry problems existed in the state. They felt that problems were so insignificant that a forest practices law would not bring a noticeable change in present conditions. Many people specifically opposed regulation for water quality protection, although they felt it might be worthwhile for other forestry problems in the state. The two conservation group representatives felt that a law would probably not play that valuable a role in alleviating water quality and other forestry related problems in the state.

Undecided respondents said that a law's value would depend on the severity of the problems and whether the benefits would outweigh the costs. One also said that the same objectives might be accomplished by modification of some of the present procedures.

General Provisions of a Forest Practice Law

Using the review of forest practice laws, the assessment of criteria for judging the provisions of such laws, and the knowledgeable opinions of Minnesota's natural resource leaders, the possible content of a forest practice law for Minnesota can be formulated.

Purpose and Forest Outputs Addressed

In general, there is substantial agreement that a state forest practice law should include a statement of purpose or policy. The responses in the personal interviews

indicate the most important reason for a law in Minnesota would be to insure adequate regeneration and stocking of desirable species. The literature criteria calling for sustained productivity also support the need for such regulations. Most of the literature criteria state that a law should protect water quality, but the interviewees questioned the need for such legislation in Minnesota.

Criteria also state that a law should address site productivity and soil erosion. This was neither affirmed nor negated by the interviewees, who were evenly split on the issue. Aesthetics is not favored to be regulated, either by the criteria stated by foresters or by a plurality of Minnesota natural resources leaders. The majority of persons interviewed do not feel that a law should address wildlife management or air quality problems.

Method of Establishing Forestry Standards

A law establishing the general framework for subsequent promulgation of rules is by far the preferred method of regulation. A few environmentalists feel that an enabling law has weaknesses, but they are clearly outvoted. Whether the rules should actually be formulated by a board or by the administering agency is moot. Criteria suggest rule-making boards, but a majority of the interviewees in Minnesota favor vesting final rule-making authority with the Department of Natural Resources. The Timber Law Committee proposed a board to make rules, but the Department of Natural Resources revision eliminated the board and authorized the department to make the rules after holding public hearings. To comply with local opinions, the Department of Natural Resources should probably have final rule-making authority, either with or without advice from a state board.

Both the various state forest practice law criteria and the opinions of Minnesota natural resources leaders support regional regulations and advisory boards to allow for diversity in forest types and economic and political climates. Both also subscribe to holding hearings before adoption of rules. In Minnesota, board members should be appointed by the governor for three-year terms. Experts generally agree that a state board should consist of about nine members and that regional boards should contain only five to seven members. Regional advisory board members might be appointed by the state board or by the Regional Development Commissions.

The makeup of any forest practices board is more tenuous. Older forestry sector criteria state that it should contain a majority of forest resource professionals, but more recent forestry sector criteria suggest changing this to a majority of non-foresters. Environmentalists also favor a non-forester majority on the board. Opinions expressed by Minnesota natural resource leaders also split along conservation groups and forestry sector lines. For legality and legitimacy with the public, preference should probably be given to having a board whose majority is not forestry professionals or forest industry representatives. Board members

should range in background from foresters and forest industry personnel to farmers and members of citizen conservation groups or the general public.

Responsible Agency and Method of Administration

The Society of American Foresters' criteria, among others, state that administrative powers should be given to an agency with forestry expertise. Minnesota interviewees concur, stipulating that the Department of Natural Resources should be given broad authority to administer the law and should delegate the field work or inspections to the Division of Forestry.

Opinions differ as to whether the law should be administered by a notification or a permit system. Foresters prefer the notification system while environmentalists and water quality personnel prefer permits, and perhaps management or harvesting plans as well. This division is also evident in Minnesota. Economic criteria such as costs in relation to benefits and administrative feasibility dictate that a notification system should probably be tried first in Minnesota.

Applicability and Exemptions

If a Minnesota forest practice law were adopted, most Minnesota natural resource leaders believe that the law should apply to all private forest land and non-federal public forest land. Since forestry problems are land problems, not sector problems, all lands should be addressed.

Literature criteria stated by the forestry sector suggest that a law should not prohibit legitimate conversion of forest land to other uses. Also, a law should probably exempt Christmas tree culture and harvest of minor forest products. Perhaps a law should also have an acreage or harvest production limitation under which it does not apply.

Violations and Penalties

Most of the modern state forest practice laws authorize powers of enforcement. The persons interviewed agreed that if a law were passed, it should provide strong enforcement tools. The possible sanctions should include informal conferences with violators, notices to comply, stop work orders, and agency authority to order corrective action at the violator's expense. One criterion stated that forest practice laws should include reasonable penalties for noncompliance. Interviewees assented to this criterion, feeling that civil misdemeanors and fines would usually constitute strong enough penalties for violation of the law or regulation.

Forest Practices Covered

The practices suggested for inclusion in a forest practice law vary widely. Some criteria state that all forest management activities should be regulated and some state that only specific identifiable problems should be regulated. Input from Minnesotans suggests that a law should control harvests, regeneration, and transporta-

tion networks and perhaps site productivity and soil erosion.

Literature criteria state that a forest practice law should satisfy all federal and state laws regarding water pollution, and that compliance with the law should constitute compliance with those laws. Minnesota leaders generally did not favor water pollution regulation, but might be more amenable to the idea if the law consolidated the plethora of water quality regulations currently in effect. Increasing concern over herbicide and pesticide use indicates that they should be considered for inclusion in a Minnesota law. Based on the opinions of the interviewees, burning, fertilizing, slash disposal, or less deleterious forest operations should not be included in a Minnesota state forest practice law.

Summary

State forest practice laws stand on firm constitutional ground and have strong legal precedents supporting their use. Precedents fall into two general categories—protecting the environment from negative externalities and protecting the rights of future generations to sustained productivity of forest lands. Cases supporting regulation to prevent negative externalities generally originated from court decisions regarding land use planning and zoning. Cases supporting regulation to maintain forest productivity originated primarily as challenges to early forest practice regulations. These two foundations combine to give public regulation of private forest practices strong constitutional and legal bases.

Debate regarding regulation of private forest practices has been waged continually since the early 1900's. Gifford Pinchot was one of the first and most vocal proponents, demanding federal regulation of private forest industry practices. Nationwide calls for federal regulation in the 1920's never bore fruit and the issue abated somewhat until the 1940's. At that time, renewed efforts spearheaded by Earl Clapp of the Forest Service and Senator Bankhead of Alabama led to many states passing seed tree laws regulating forest cutting practices. By the early 1950's, the wave of state regulations subsided and forest regulation became a lesser issue. The 1970's has seen a revival of the forest practice regulations issue, primarily as a means to control environmental damage such as water pollution.

The old seed tree laws passed during the decade of the forties were generally weaker and more limited than the modern state forest practice laws. With a few notable exceptions, they required only the leaving of seed trees for regeneration and had minimal penalties and enforcement.

The state forest practice laws enacted in the 1970's are comprehensive, detailed attempts to regulate private, and in some cases public, forest management practices. They are backed by strong enabling legislation, mandate complex regulations of forest practices, require detailed administrator and landowners actions, and are backed by strong penalties and enforcement

tools. They regulate most timber management practices, including harvesting, regeneration, skidding, and road building. In some cases they also control application of chemicals and fertilizers, disposal of slash, and pre-commercial thinning. Some modern laws require prior approval or permits before forest operations may begin and others require only notification of the administering agency. Administrative actions required vary from up to five required inspections per operation to inspections being necessary only when the agency feels they are required for implementation of the law. Penalties are strict, including agency-made corrective action which may constitute a lien on the operator or land, fines up to \$1,000, or jail sentences up to one year.

Criteria for judging the provisions of a state forest practice law are numerous. Many agree and lead to obvious conclusions about the possible provisions of a state forest practice law. Occasionally criteria cited by environmentalists and foresters, or by different foresters, may conflict.

Minnesota natural resources leaders generally question the necessity of forest practice law for Minnesota. If enacted they look for a law that is not overly restrictive on landowner discretion to manage forests for whatever purpose. This outlook stems from a general feeling that forest practices as currently applied are not causing major social, economic, or environmental problems. Although literature criteria and the opinions of persons interviewed vary considerably, the analysis leads to a Minnesota forest practice law that—if enacted—should probably contain a statement of purpose; define forest outputs to be addressed (*e.g.*, timber, water, wildlife, recreation); establish a framework for subsequent promulgation of rules; vest administrative authority for the law in the Minnesota Department of Natural Resources; establish regional rules and regulations; employ a notification system; apply to all private forest land and to nonfederal public forest lands; be vigorously enforced; and regulate harvesting activities, regeneration practices, design and construction of road networks, and forest practices that adversely impact future site productivity. Very little need for regulating practices thought to impact water quality was perceived.

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Appendix A

Digest of State Forest Practice Laws

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
<p>California California Department of Forestry The Resources Agency</p>	<p>Z'berg-Nejedly Forest Practice Act of 1973 California Public Resources Code Division 4, Chapter 8, Sections 4511-4628 (enabling law) California Administrative Code Title 14, Subchapter 4.1, Chapter 2, Division 2 (rules and regulations)</p>	<p>Policy of act: (1) Encourage prudent and responsible forest resource management to serve the need for timber and other forest products while protecting watersheds, fish and wildlife, and recreation opportunities in this and future generations. (2) Does not intend to take private property for public use without payment of just compensation. Outputs protected: timber productivity, recreation, watersheds, wildlife, range and forage, fisheries, aesthetic enjoyment.</p>	<p>Act establishes a new nine member Board of Forestry which is delegated the authority to adopt forest practice rules. Board members are appointed for staggered four year terms and subject to Senate confirmation. Five members from the general public, three from the forest products industry, and one from the range and livestock industry. No public member may have a direct financial interest in timberlands. Board directed to divide the state into at least three districts based on climate, soil type, principal forest practices, and other relevant factors. Board also appoints district technical advisory committee to advise the board in the establishment of district forest practice rules to govern timber operations. Advisory committees must have the same membership makeup as the board. An employee of the Department of Forestry acts as secretary and tie-breaker vote. Committee directed to maximize interagency cooperation and input in identification of problems and proposing solutions. Counties and the Lake Tahoe Regional Planning Commission may adopt rules and regulations which are stricter than those provided for in the act or made by the board.</p>	<p>Act is administered by the state forester and the employees of the California Department of Forestry. Timber operators are required to be licensed by the State Board of Forestry by separate law. Registered, professional foresters must prepare a timber harvesting plan which landowners or operators must submit to the department before cutting operations may begin. Department may then inspect proposed harvest area. If landowner does not hear from the department within a specified time after inspection, he may proceed. Timber owner or landowner must also notify the department upon completion of operations. Within five years after harvest, he must file a report on the stocking or regeneration of the area. The state forester or his employees should inspect the area before plan approval, during harvest operations, after the harvest, and after submission of the stocking report to insure compliance. The department may also inspect at any other time deemed necessary to enforce the law.</p>
<p>Florida Florida Division of Forestry Department of Agriculture and Consumer Services</p>	<p>Seed Tree Law—1943 Florida Statutes Annotated Sections 591.27-591.34</p>	<p>Designed to protect pine seed trees for regeneration purposes and to maintain forest productivity.</p>	<p>By state legislature in the basic act.</p>	<p>Seed trees must be branded with a "ST" by the Florida Division of Forestry and thereafter may not be cut without permission of the Florida Commissioner of Agriculture and Consumer Services.</p>

Applicability and Exemptions

Applies to all private lands, whether they belong to individuals, partnerships, corporations, or organizations. Rules and regulations apply to all timber harvesting operations. Timberland conversion requires a permit and can be denied on a number of bases.

Constructing rights-of-way, Christmas tree culture, fuelwood cutting, or removal of dead, dying, or diseased trees may be exempt by board regulations.

Applies only to landowners who request to have seed trees marked. Law has never been used.

Violations and Penalties

To stop violations, the Department of Forestry may initiate court action to obtain a restraining (stop work) order on the operation. The court may also order the defendant to take corrective action or authorize the department to do so. Any expense incurred by the department becomes a lien on the landowner's property.

If the timber operator does not obey a court ordered restraining order, he may be prohibited from performing any timber harvesting activities in the state.

Violations are a misdemeanor punishable by a fine of up to \$500, imprisonment in the county jail for up to six months, or both.

Cutting trees is a misdemeanor, punishable by a fine of up to \$500, or up to six months in jail, or both.

Forest Practices Rules

Rules and regulations made by the board are contained primarily in Articles 3 through 10 of the California Administrative Code. Article 3 regulates silvicultural methods which may be used and sets minimum stocking levels that must be met after harvest or thinning. Areas harvested must contain an average point count of at least 300 per acre, calculated as follows: 1) each countable tree not more than 4 inches d.b.h. to count as 1; 2) each countable tree between 4 and 12 inches d.b.h. to count as 3; and 3) each countable tree over 12 inches d.b.h. to count as 6. Or, the area may have an average residual basal area of stems greater than 1 inch d.b.h. of at least 85 square feet per acre on site class I lands or 50 square feet per acre on site class II or lower lands. Or, for redwood root crown sprouts, one sprout for each foot of stump diameter may be counted up to a maximum of six per stump. Article 3 contains additional rules and regulations which may be required in addition to or substitute for the above minimum requirements. The rules vary slightly in each of the three districts in the state. Silvicultural and harvesting methods addressed in the rules include commercial thinning, shelterwood, seed tree, clear cutting, and sanitation and salvage cuts.

Article 4 requires protection of water quality, maintenance of soil productivity, protection of young seedlings and residual trees. It also requires careful felling practices, tractor yarding, cable yarding, landing selection, debris disposal, and logging equipment service.

Article 5, erosion control, regulates logging roads, road drainage, tractor roads, landing location, and waterbreaks. The severity of regulation of practices depends on the soil erosion class of the soils in the harvest area. The classes are appended to the regulations.

Article 6, stream and lake protection, sets standards for timber operations, stream crossings, harvests in designated stream and lake protection zones, operating equipment in or near streams, exclusion of debris from streams, and harvests in wet areas or wet meadows.

Article 7, hazard reduction, regulates snag disposal and retention, slash burning, and protecting residual trees during slash burning.

Article 8, fire protection, requires timber operators to file yearly fire plans, keep roads passable, post fire rules, warn employees to obey rules regarding lunch and warming fires, watch welding fires, prohibit uncovered glass containers, and clear areas around cable blocks.

Article 9 requires silvicultural prevention of build-ups of forest peats or pathogens, and requires that any such breakouts be reported to the Department of Forestry.

Leave not less than three or more than eight pine seed trees of the species being harvested, marked in accordance with the rules and practice of good forestry.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
<p>Idaho Idaho Department of Lands Division of Forest Resources</p>	<p>1974 Idaho Forest Practices Act Idaho Code Sections 38-1301 to 38-1312</p>	<p>Purpose: (1) Policy of state to encourage forest practices on public and private lands that maintain and enhance social and economic benefits as well as soil, air, and water resources and providing habitat for wildlife and aquatic life. (2) Assure continuous growing and harvesting of forest tree species while providing the above benefits. Outputs protected: timber supplies, soil, air, and water resources, and wildlife and aquatic habitat.</p>	<p>Law directs the Idaho Board of Land Commissioners to adopt minimum standards for the conduct of forest practices in the state. Board is composed of the governor, attorney general, state auditor, secretary of state and superintendent of public instruction (Idaho Code sec. 58-101). The Idaho Department of Lands is directed to appoint a seven member forest practices advisory committee to provide technical assistance to the board. Three of the members are required to live in the Northern forest district, three in the Southern, and the remaining one must be an Idaho resident. Members serve three year terms. Regulations took effect in 1976 after legislative approval.</p>	<p>Act is administered by the Director of the Idaho Department of Lands. The operator, timber owner, or landowner must notify the department before forest operations may begin. Department prepared management plans are in lieu of following the rules and regulations, as are similar plans approved by the local Soil Conservation District Board. The department is directed to achieve coordination and cooperation with other state agencies in administering the law and to provide management assistance to private landowners and timber operators. Notification is required for timber harvesting, road construction, reforestation, application of fertilizers and chemicals, and pre-commercial thinning.</p>
<p>Louisiana Louisiana Forestry Commission</p>	<p>Turpentine Seed Tree Law—1922 Louisiana Revised Statutes Annotated Sections 56:1493 and 1494.</p>	<p>To leave seed trees for regeneration on lands where trees are being bled for turpentine.</p>	<p>By state legislature in the basic act.</p>	<p>Administration of law delegated to the Louisiana Forestry Commission along with other general forestry law. No notification or permits required.</p>
<p>Maine Maine Land Use Regulation Commission</p>	<p>Maine Land Use Regulation Law—1969 Maine Revised Statutes Annotated Title 12 Sections 681-689</p>	<p>To prescribe standards for the use of air, land, and water in the state of Maine.</p>	<p>Practices prescribed by the Maine Land Use Regulation Commission. Commission classifies various land use districts according to their geographic, social, biological, and economic uses. Official land use maps designate that all parts of the state fall into one of the land use districts decreed by the commission. Degree of restriction on practices depends on which land use district the activity takes place within.</p>	<p>Depending on which land use district the practice takes place within, the practice may require permits from the Land Use Regulation Commission, or compliance with the commission's standards, or may not be regulated at all. Forest management usually only needs to comply with commission standards, except for timber harvesting. Timber harvesting in most environmentally or aesthetically sensitive areas requires a permit.</p>
<p>Maryland Maryland Forest Service Department of Natural Resources</p>	<p>1943 Forest Conservancy District Law Annotated Code of Maryland Natural Resources Article Sections 5-388 to -400</p>	<p>Designed to insure the proper use, development, and preservation of forests, timberlands, woodlands, and soil resources of the state. Designed to protect soil resources, prevent floods, improve wildlife productivity, and protect young timber and regeneration.</p>	<p>Forest practices rules may be promulgated by the Department of Natural Resources after advice from District Forest Practice Boards. Boards should publish proposed rules and regulations and hold hearings before submitting rules to the department. Board rules should address restocking, protecting young growth, and limiting use of clear cutting. Act also directs private landowners to meet good practice standards. Alternate plans to achieve goals of the act are acceptable. Board rules have been only advisory in nature, not mandatory.</p>	<p>The Department of Natural Resources administers forest conservation practices on private lands. The department must cooperate with other public agencies. The department must also direct and hear appeals from the district boards. Boards are made up of five members, each representing one major type of forestry or woodworking interest, and at least one farm woodland owner. Board members appointed by the department. Board has the responsibility for enforcing rules and regulations adopted by the department. Boards currently congruent with counties.</p>

Applicability and Exemptions

Applies to all non-federal, public land in the state. State prepared or alternate management plans are acceptable in lieu of compliance with the rules and regulations. Conversion of forest land to other uses is allowed.

Notification not required for routine road maintenance, recreational use, grazing, Christmas tree culture, or harvesting of minor forest products.

Ownerships of less than 10 acres are exempt from regeneration and stocking rules.

Applies only to private owners bleeding or cutting pine trees for turpentine. Is not currently being used.

Applies to private timber owners and operators. Permits required for fertilization within 250 feet of water, or timber harvesting within ¼ mile of a recreation lake, 100 feet of a recreation trail or stream, on slopes greater than 60 percent, above 2,700 feet in elevation, or in scenic or scientific areas.

Applies to private forest landowners. Does not apply to cutting firewood or timber for domestic use or to woodlands less than 3 acres in size.

Violations and Penalties

When violations occur, the Department of Lands must send a notice of violation to the timber operator ordering him to cease violation. If not complied with, the department may issue a stop work order for all operations. It may also order the operator to correct the violation, or take corrective action itself, if authorized by the Board of Land Commissioners. Costs incurred by the department become a lien on the personal and real property of the timber operator. If he cannot pay the costs, the amount remaining constitutes a lien on the real and personal property of the timber owner.

Violations are a misdemeanor punishable by a fine of up to \$300, jail terms up to 6 months, or both.

Violations are punishable by fines ranging from \$25 to \$100, imprisonment for not less than 30 days, or both.

The Land Use Regulation Commission has the power to issue stop work orders or orders to take corrective action.

Fines for violations of the standards or failure to obtain a permit may be up to \$500, with each day being a separate violation.

Violation is a misdemeanor punishable by a \$10 to \$500 fine or a maximum of six months in jail.

Forest Practices Rules

Timber harvesting rules require that trees of sufficient vigor and of acceptable species must be left after harvest to provide for continuous growth and harvest. Soils must be protected by proper skid trail location, landing size, and cable yarding techniques. Landing, skid trail, and fire trail location must be properly planned. Drainage systems must control the dispersal of runoff waters from exposed surfaces. Waste materials must not enter streams. Streams must be protected by avoiding skidding in or through them, avoiding cable yarding through them, and providing vegetation to shade the water, stabilize the soil, and act as a filter at the edge of the stream. Consideration should be given to aesthetics, wildlife and aquatic habitat, wildlife escape cover, and fruit and berry sites.

Road construction rules regulate landings, road specifications and plans, road construction, and road maintenance.

Reforestation rules require restocking to at least the following minimum levels: (1) from 150 trees per acre with an average d.b.h. of 2.9 inches or less down to 20 trees per acre with an average d.b.h. of 11 inches or greater for ponderosa pine type forests; or (2) from 200 trees per acre with an average d.b.h. of 2.9 inches or less down to 20 trees per acre with an average d.b.h. of 11 inches or greater for mixed type forests. Intermediate stocking levels vary on a sliding scale depending on average d.b.h. Countable trees must be of an acceptable species. Seeding or planting may be required if satisfactory natural regeneration does not occur within three years.

Chemical equipment and containers must be kept in leakproof condition and chemicals must not be mixed near streams. Aerial and ground applications of chemicals must leave filter strips next to bodies of water, containers must be properly disposed of, daily records of applications must be kept, and spills must be reported immediately.

Owners must leave an average of two trees per acre for every 10 acre plot. Seed trees must be healthy, of the kind being bled for turpentine, and not less than 10 inches d.b.h.

The following standards apply, even if a permit is not required. Areas within 250 feet of a body of water cannot have harvest-created openings greater than 7,500 square feet, or harvests removing more than 40 percent of the volume of trees 6 inches d.b.h. or greater, or slash left within 50 feet of water. Soil disturbance must be minimized and filter strips must be left.

Construction of land management roads and minor water crossings requires notice to the commission. Roads must be located, constructed, and maintained to minimize erosion. Road crossing of streams must be minimized, bridges and culverts of adequate size, cuts and fills constructed properly and revegetated, and culvert bottoms should be flush with or below streambed bottoms.

The District Forestry Boards have chosen to be advisory in nature and do not require compliance with specific minimum standards. The act itself specifies that the following standards should be met when harvesting timber: (1) leave conditions favorable for regrowth, (2) leave young growth, (3) arrange for restocking the land by leaving seed trees of desirable species or groups of trees for restocking, and (4) maintain adequate growing stock after partial cutting or selective logging.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
Maryland Forest Service Department of Natural Resources	Pine Tree Reforestation Law—1977 Annotated Code of Maryland Natural Resources Article Sections 5-501 to -509	Law enacted to require loblolly, shortleaf, or pond pine trees to be reserved or reforested upon completion of commercial cutting operations. Designed to protect pine sawtimber and pulp supplies.	Established by legislature in the basic act. Department of Natural Resources may also adopt additional rules and regulations to administer the provisions of the law if it is deemed necessary.	Cutting operations may not begin unless seed trees have been reserved or a reforestation plan has been approved by the department. The plan must be prepared by the landowner or his agent and must insure reproduction of young pine trees of desirable species. Subsequent landowners may not cut the seed trees.
Massachusetts Massachusetts Division of Forests and Parks Department of Environmental Management	Forest Cutting Practices Act -1943 Annotated Laws of Massachusetts Chapter 132 Sections 40-46	The public welfare requires rehabilitation and protection of forest lands in the state for the purpose of conserving water, preventing floods and soil erosion, improving conditions for wildlife and recreation, and providing a continuing and increasing supply of forest products in the state.	Governor must appoint a four member forestry committee representing farm woodlot owners, industrial woodland owners, other woodland owners, and the general public, with the director of the Division of Forestry as an ex-officio member. Members serve four year terms. Committee was to hold state-wide hearings, prepare tentative forest practices rules, and submit them to the commissioner of the department, who promulgates the rules. State may be divided into four forest practice regions.	Landowners proposing to cut forest products must give written notice to the director of the Division of Forestry before beginning operations. The director or his agent must inspect the area and write a management plan for the owner. If necessary, the director shall mark a minimum number of seed trees to remain after harvest. The director should inspect the area during and on completion of operations and write a harvest report to the forestry committee.
Mississippi Mississippi Forestry Commission	Forest Harvesting Act—1944 Mississippi Code Annotated Sections 49-19-51 to 49-19-77	Law designed to preserve seed trees to insure regeneration and continuous production of forest products.	By state legislature in the basic act.	State Forestry Commission is responsible for administering the act, but no notification is required and inspections do not have to be made. Alternate cutting plans are acceptable. Sheriffs, game wardens, and county attorneys are directed to inquire about violations of the act and report them to county circuit judges and the commission.
Missouri Missouri Department of Conservation	State Forestry Act—1945 Annotated Missouri Statutes Sections 254.010 to 254.300	A general enabling law for forestry programs in Missouri designed to protect against fires, limit timber trespass, and substitute a yield tax for part of the property tax. Practice rules are designed to provide adequate restocking of trees of desirable species and condition.	To qualify for the yield tax, landowners must enroll with the Department of Conservation, have a management plan prepared by a state forester, and follow the forest practices recommended by the Department of Conservation when harvesting timber.	At least 30 days prior to timber cutting, landowners enrolled under the program must give written notice to the Department of Conservation. Notice must be accompanied by the management plan prepared by the service forester when the land was enrolled in the program.
Nevada Division of Forestry State Department of Conservation and Natural Resources	Nevada Forest Practice Act of 1955. Amended 1971, 1973. Nevada Revised Statutes Sections 528.010-528.090	Establish minimum standards of forest practice, promote sustained productivity of forests, and preserve the natural water supplies of the state. Primary outputs protected are timber supplies, water, and soils.	Some practices established in the basic act—specifically cutting practices, erosion controls, activities near water, seed tree requirements, and fire prevention and suppression measures. The seven member State Board of Forestry and Fire Control is delegated the authority to promulgate rules to protect residual trees from damage during logging and any other rules necessary to carry out the forest practice act.	The state forester firewarden administers the provisions of the act. Before any logging or cutting operation, a timber owner must obtain a logging permit from the state forester firewarden. He must also submit a detailed harvest plan with the application and post a performance bond to insure compliance with the provisions of the logging permit.

Applicability and Exemptions

Applies to any county, state agency, municipality, or political subdivision thereof. Also applies to any individual, partnership, firm, association, or any other public or private corporation or entity.

Applies to all, public and private lands in the state. Cuttings for personal use are exempt, as are harvests of less than 25,000 board feet and 50 cords. Clearing land for rights-of-way and timberland conversion is exempt. Timber operators must obtain a license.

Applies to private persons, partnerships, firms, or corporations.

Applies only to landowners who request to be enrolled in the yield tax program. Notices not required for cutting of firewood, posts, and timber for use by the owner.

Applies to all nonfederal public and to all private forest landowners. Conversion requires a permit also.

Violations and Penalties

The department, acting through the Attorney General and the county circuit court, may enforce compliance or enjoin violation of the law. Enforcement may include money damages payable to the department equal to the estimated cost of compliance. The department must use the funds to reforest the lands.

Violations are punishable by a fine of up to \$25 per acre. Failure to obtain an operator's license is punishable by a maximum fine of \$25 for each violation.

Violation is a misdemeanor punishable by a fine of not less than \$25 or more than \$50 for each separate offense. A 40-acre unit is used as the basis for checking compliance or determining multiple fines.

Violation is a misdemeanor. Non-compliance on classified lands makes owner liable for all back taxes at normal property tax rates, plus penalty, plus reimbursement to the state for all taxes paid to the county.

Violation is a misdemeanor punishable by imprisonment for not more than six months or fines ranging from \$10 to \$500, or both.

Forest Practices Rules

Unless otherwise provided for in a reforestation plan, the operator or landowner must leave uncut and uninjured at least eight cone-bearing loblolly, shortleaf, or pond pine trees 14 inches or larger in diameter eight inches above the ground. If eight such trees are not present on each acre, at least two cone-bearing trees of the next largest diameter must be left standing. Trees must be healthy, have well-developed crowns, and be well-distributed throughout the acre. Cone-bearing trees need not be reserved if there are at least 400 well-distributed, vigorous, and free-to-grow seedlings per acre on the site after completion of harvest.

Leave from 4 to 25 seed trees of desirable species per acre depending on the diameter of the seed trees. Coniferous seed trees should be left surrounded with young trees for protection. Clear cutting permitted if the harvest area has 1,000 or more seedlings per acre or if the stand is injured beyond recovery by fire, insects, or disease. Keep logging damage to residual trees to a minimum. No cutting of seed trees is allowed until the ground is stocked with 1,000 or more seedlings per acre.

Naval stores: work no trees less than 10 inches in diameter unless 100 4-inch or four 10-inch trees remain uncut per acre. Wood products: leave at least the same number of trees required for naval stores on pine sites. On hardwood sites, leave at least six 10-inch hardwood seed trees per acre or 100 4-inch trees per acre of the commercial species being harvested. On mixed sites, leave at least four 10-inch pines and two 10-inch hardwoods per acre as seed trees.

Provide for adequate restocking of trees of desirable species and condition. Reserve growing stock to keep land reasonably productive. Use reasonable efforts to prevent and suppress forest fires. Control grazing to maintain adequate stocking. Follow any additional practices recommended by the state district forester.

Leave all trees less than 18 inches d.b.h. in old growth stands and leave at least 10 seed trees per acre greater than 18 inches in diameter. Young growth being cut for sawtimber or veneer must meet the same requirements. Seed trees must be approved by the state forester firewarden. Young growth cut for other forest products must have left at least: (1) 420 trees per acre less than 4 inches d.b.h., or (2) 150 trees per acre 4 to 6 inches d.b.h., or (3) 75 trees per acre 8 to 10 inches d.b.h., or (4) 40 trees per acre 12 inches or more d.b.h. Tractor logging is prohibited on wet or saturated soils or unstable soils.

No harvesting, skidding, rigging, or construction is allowed within 200 feet of any body of water unless a variance is granted. Soil erosion from skid trails, landings, roads, and firebreaks must be minimized. When necessary, roadside berms must be constructed, waterbreaks and culverts must be installed, or drainage must be outloped in lieu of waterbreaks. Seeding of roads, landings, and trails is required upon completion of operations. Fire prevention and suppression practices are addressed. Tractor logging on slopes greater than 30 percent is prohibited unless a variance is granted. Board of Forestry and Fire Control also makes rules governing skid trails, felling techniques, stump heights, slash disposal, and insect and disease protection.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
<p>New Hampshire Division of Forests and Lands Department of Resources and Economic Development Water Supply and Pollution Control Commission</p>	<p>Act Relating to Forest Conservation and Taxation-1949 New Hampshire Revised Statutes Sections 79:3, 10:12, & 19: N.H.R.S. 224:44-a & 224:44-b (slash disposal, 1971). N.H.R.S. 149.8-a & 149:19 (pollution of waterways, 1971)</p>	<p>Section 79 is a timber tax law requiring reporting of forest cutting operations. Section 224 regulates cutting practices and waste disposal near highways and waters. Section 149 regulates altering the shape of the land, including by skid and log roads, to protect water quality.</p>	<p>Rules governing practices in all the sections are established by the state legislature in the basic act.</p>	<p>Owners must apply to the local assessing officials for intent to cut forms and file the form before beginning cutting. After harvest, owners must file the volume of wood cut with the assessing officials, under section 79. Section 224 merely requires compliance with the standards in the law. Section 149 requires operators to apply to the Water Supply and Pollution Control Commission for permits before altering land near any water.</p>
<p>New Mexico Department of State Forestry</p>	<p>Act for Protection of Growing Timber-1939 New Mexico Statutes Annotated Sections 62-1-1 to -5 N.M.S.A. Sections 62-3-3 & -11 (slash disposal laws)</p>	<p>Protect growing timber and young growth from fire hazards and prevent logging practices that will increase fire hazards. Prevent soil erosion caused by uncontrolled water runoff. Control disposal of slash from timber operations.</p>	<p>Practices governing the leaving of seed trees and protection of growing timber established by the state legislature in the basic act. Rules governing slash disposal are promulgated by the Forest Conservation Commission to suppress forest and brush fires and to control forest pests. Conservation Commission composed of the Governor, Commissioner of Public Lands, and State Forester.</p>	<p>Administered by the Department of State Forestry. No notification or permit is required, but the standards in the law and Conservation Commission rules apply to all qualifying operations.</p>
<p>New York New York State Department of Conservation</p>	<p>New York Forest Practice Act—1946 New York Conservation Laws Annotated Sections 3-1101 to 3-1151</p>	<p>Provide a service to landowners, to improve cultural practices, to encourage proper harvesting of forest lands, and to prevent timber over-cutting.</p>	<p>Forest practice standards are made by District Forest Practice Boards consisting of three members from each county in the district. Members are appointed by the county chairman of the Board of Supervisors, and are subject to approval by the Board of Supervisors. Forest Practice Boards make rules applicable to the various forest types in their districts.</p>	<p>The Commissioner of the Department of Conservation authorized to establish not more than 20 forest districts. Fifteen were established, each containing one or more counties. District Board activities are coordinated by a State Forest Practice Board. When woodland owners request assistance, the District Boards send a trained forester in their employ to provide assistance in silviculture, harvesting, or regeneration. The forester writes a management plan following the standards made by the District Board.</p>
<p>Oregon Oregon Department of Forestry</p>	<p>Oregon Forest Practices Act—1971 Oregon Revised Statutes Sections 527.610 to 527.990</p>	<p>Recognizes that forests make a vital contribution to Oregon by providing jobs, products, and a tax base, and other social and economic benefits by helping to maintain forest tree species, soil, air, and water resources and by providing habitat for wildlife and aquatic life. The act intends to encourage forest practices that will maintain and enhance such benefits. It intends to achieve coordination among all state agencies concerned with the forest and consolidate all forestry regulations into one act. It intends to insure the continuous growing and harvesting of forest tree species to protect the soil, air, and water resources.</p>	<p>State Board of Forestry has the authority to develop and enforce regional rules. The board establishes forest practices regions and a nine member forest practices committee for each region. Committee members are appointed by the board for three year terms. A Department of Forestry staff member serves as a non-voting secretary. The forest practices committee recommends forest practices rules appropriate for their region to the board. The board then provides the state forester with rules establishing minimum standards for forest practices in each region or subregion after consulting with other state agencies and political subdivisions. State Board of Forestry has 13 voting members, including the dean of O.S.U. Forest Resources, six forest products members, one representative from counties, farms, range, and labor or conservation group, and two from the public at large.</p>	<p>The board has the authority to designate operations for which notification is required. An operator, timber owner, or landowner must notify the state forester before commencing an operation. The state forester must then send a copy of the rules to the landowner, timber owner, and timber operator. The timber operator must follow the rules when performing the pertinent forest management activities. The state forester or his employees check a percentage of the operations, currently about 50 percent, to insure compliance. Actions with the most potential for damaging the environment are inspected most frequently. Landowner appeals to actions taken by the state forester may be made to the Board of Forestry.</p>

Applicability and Exemptions

Applies to private landowners and timber operators.

Applies to any person, firm, association, or corporation cutting sawtimber species in the state. Owners may substitute alternate plans instead of complying with the commission rules.

Act and forest practices standards apply only to landowners who request cooperative assistance from the District Boards

The act applies to any individual, partnership, corporation, or association, including the state or any of its political subdivisions.

Notification is required for harvesting of forest crops, road construction or reconstruction, site preparation, application of chemicals or fertilizers, clearing forest land, treatment of slashing, and pre-commercial thinning. Notification is not required for routine road maintenance, recreational uses, grazing, tree planting or direct seeding, or removing minor products.

Waiver of notification does not relieve the owner or operator of the responsibility of complying with applicable forest practices rules.

Alternate plans proposing equivalent or better practices are acceptable.

Violations and Penalties

Section 79 and 224—Failure to obey law is a misdemeanor with a fine not to exceed \$50, including failure to apply for cutting permit. Fine of \$100 if owner fails to file volume cut at harvest. Failure to report may also result in doubling of taxes. Section 149—disposal of logging wastes in a body of water can result in fines up to \$1,000 per day. Altering land near water without written permission can result in \$25,000 fines, six months in jail, or both.

Violation of section 62-1 is a misdemeanor punishable by up to \$200 fine, six months in jail, or both. Violations of slash rules made by the commission under section 62-3 are a misdemeanor punishable by a \$10 to \$100 fine, imprisonment in the county jail for 30 days, or both.

Noncompliance after signing a cooperative agreement results in discontinuing the management services of the forester. No other penalties exist, since compliance with the practices is strictly voluntary.

The state forester must serve the operator with a citation if a violation is detected. The citation must order the operator to cease violation and may order him to take corrective action. If the violation continues, the state forester may issue a stop work for all operations. If the operator does not take corrective action, the state forester, after authorization from the forestry board, may take corrective action and bill the landowner, timber owner, and operator. Costs so incurred will constitute a general lien on the real and personal property of the landowner, timber owner, and operator.

Failure to comply with the provisions of the act is a misdemeanor punishable by up to one year in jail, fines up to \$1,000, or both.

Forest Practices Rules

Slash and mill waste may not remain in any river, stream, or brook. It may not remain within 25 feet of the land of another person, or any stream, river, or brook which can float a canoe at normal level. It may not be within 50 feet of any great pond or navigable river, the nearest edge of a public highway, or within 60 feet of a railroad right-of-way, or within 100 feet of an occupied building. Slash and mill waste may not extend more than 4 feet above the ground between 50 and 150 feet of any great pond, navigable river, stream, brook, or public highway without written consent of the state forester. Equipment, supplies, or other waste cannot be disposed of in any stream, lake, or pond. Altering land near bodies of water so as to change the natural runoff patterns is prohibited without the written consent of the Water Supply and Pollution Control Commission.

Take reasonable precautions to prevent fires in harvest areas, construct fire lanes by piling and burning slash, and reserve sufficient seed trees. Areas cut for lumber products: Leave all trees under 12 inches in diameter and at least two 17-inch seed trees per acre. Cutting for ties and mine timbers: Leave all trees under 5 inches in diameter and at least four 17-inch trees per acre. Spruce type or mixed spruce and fir type areas: If an adequate stand of young growth is not present, leave uncut at least 5 percent of the young coniferous trees, many of which should be of seed-bearing size.

Commission promulgated rules to control fires and insect and disease require logging roads to be passable after harvest, be properly drained to prevent erosion, and be reseeded with grass. All slash must be scattered in piles no higher than 4 feet, snags must be felled unless occupied by wildlife, and tree tops must be trimmed to 4 inches. Logs must be skidded in a manner that minimizes erosion of the soil.

Cooperators must manage their lands according to a plan approved by the district director. They must prevent fires, eliminate grazing, rehabilitate idle lands, and enhance the value of immature forest stands through improvement practices. They must report any timber sales to the director.

On high and medium quality sites, individual tree selection is recommended. On low quality sites, diameter limit or clear cutting is recommended. Selective cutting is recommended in uneven-aged stands. High quality hardwoods under 16 inches d.b.h. and softwoods less than 12 inches will not be cut. In uneven-aged stands, cutting recommendations vary with species, age class, and stand conditions. Logging roads, skid trails, log decks, and yards must be located to minimize site, stand, and other values. Roads must be stabilized after cutting.

All regions: Chemicals must be kept and used in leak-proof containers, water quality must be protected during mixing of chemicals, waterways protected when spraying chemicals, daily records of chemical use must be kept, and chemical accidents must be reported to the state forester immediately. Slash should be minimized by maximum utilization. If necessary for regeneration, it should be scattered, windrowed, chopped, or burned. Roads should be located on stable areas, should avoid steep slopes, should minimize stream crossings, and should use buffer strips to minimize the risk of material entering streams. Road specifications, cuts and fills, road width, and culverts should control the dispersal of runoff waters to minimize turbid waters. Debris overburden should be placed to prohibit entry into water. Road maintenance should provide a stable running surface and keep all drainage systems working.

Quality of residual stocking should be protected during harvesting operations. Avoid skidding on wet or easily compacted soils or on slopes greater than 35 percent. Cable log only up hills and minimize log landings. Landings, skid trails, and fire trails should be located on stable areas above the high water mark of streams. Drainage systems must be provided for runoff water from landings, skid trails, and fire trails. Waste materials, debris, and overburden must not enter streams or lakes. Streambeds and streamside vegetation must be kept as natural as possible by avoiding skidding or cable yarding through streams. Seventy-five percent of the original shade should be left over streams. When

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
Vermont Vermont Board of Forests and Parks	Conservation and Management of Forest Land Law—1945 Vermont Statutes Annotated Title 10 Sections 2051-2055	Protect immature timber, obtain natural reforestation, control water runoff, provide a continuous supply of merchantable timber, preserve the tax base, lessen the hazards of forest fires, and alleviate soil erosion.	Recommended forest practices are promulgated by the Vermont Board of Forests and Parks.	The Board of Forests and Parks publishes the recommended forest practices so that landowners may follow the guidelines if they choose to do so. The guidelines are not mandatory, so compliance depends on voluntary cooperation by landowners and timber operators.
Virginia Virginia Division of Forestry, Department of Conservation and Econ. Development	Virginia Seed Tree Law—1950 Code of Virginia Annotated Sections 10-74.1 to 10-83.01	Reforest the woodlands of Virginia, improve the quality of the environment, protect watersheds and rivers, and protect the state forest businesses.	Established by state legislature in the basic act.	Administered by the state forester. No permit or notification is required, but owners must leave seed trees per the requirements of the law.
Washington Division of Forestry Department of Natural Resources	Washington Forest Practice Act—1974 Revised Code of Washington Annotated Sections 76.09.010 to 76.09.935 Washington Forest Practice Rules and Regulations—1976 Washington Administrative Code Sections 222-08 to 222-50	Protect, promote, foster, and encourage timber growth and require minimum reforestation. Protect forest soils, recognize the private and public interest in the profitable growing of timber, permit maximum operating freedom, avoid unnecessary duplication of forest regulation, and provide for interagency input. Achieve compliance with all applicable requirements of federal and state laws regarding nonpoint source pollution of water caused by forest practices. Intends to protect the following outputs: forest productivity, forest soils, fisheries, wildlife, water quantity and quality, air quality, recreation, and scenic beauty. Rules may not be specially promulgated to protect recreation or scenic beauty.	The act, as amended in 1975, creates an 11-member Forest Practices Board composed of the commissioner of public lands, directors of the departments of Commerce and Economic Development, Agriculture, and Ecology. An elected member of a county legislative body is a member. The remaining must be from the general public, one of whom shall own not more than 500 acres of land, and one of whom shall be an independent logging contractor. The board has the authority to promulgate rules and regulations after review and approval by the Departments of Ecology, Fish, and Game and all the counties in the state, and after holding public hearings on the rules. The board receives technical advice on the rules to adopt from the Forest Practices Advisory Committee. The advisory committee in turn receives suggested rules from regional advisory committees. It must also hold hearings to take testimony about the rules before submitting them to the board. The board also divides the waters of the state into five categories, depending on their value for human consumption, fisheries habitat, or other uses. The same forest practice may be subject to differing degrees of regulation, depending on which water class the activity is taking place near.	The law operates under a combination of standards, notifications, and permits. The board must determine which forest practices fall into one of four administrative classes. Class I actions have no direct potential for damaging a public resource, and Class II actions have less than ordinary potential for damaging a public resource. Class III actions include practices not included under Classes I, II, or IV. Class IV forest practices have potential for substantial impact on the environment and may also require a state environmental impact statement. Class I forest practices do not require notification, just compliance with the regulations. Class II practices require notification of the Department of Natural Resources. If no reply is received within five days, the operator may proceed. Class III practices require an application to the department which the department must approve or disapprove within 15 days. Class IV practices require application to the department which must be acted on within 30 days if an environmental impact statement is not required or within 60 days if one is required. Local government units may also require an environmental impact statement. The Department of Natural Resources must inspect operations before, during, and after completion to check compliance. The Department of Ecology may also inspect to insure water quality is maintained. Forest practices may also be regulated by other local government units.

Applicability and Exemptions

Compliance with the recommended practices is strictly voluntary.

Applies to all private landowners, timber owners, or timber operators. Valid where white, loblolly, shortleaf, or pond pine constitute 10 percent or more of each acre being harvested.

Applies to all private and non-federal public lands. Practices exempt from regulation include tree marking, surveying and road flagging, cutting firewood for personal use, and removal of minor forest products. Urban lands with potential for development in the next 10 years and utility rights-of-way need not be reforested.

Applies to conversion of forest land to other uses.

Alternate reforestation plans may be acceptable.

Violations and Penalties

The law carries no penalties for noncompliance.

Violation is a misdemeanor punishable by fines of \$10 for each seed tree cut, not to exceed \$80 per acre. Fines shall be used to replant the areas where harvesting took place.

The Department of Natural Resources must first have informal conferences with violators. It may then order them to stop work or take corrective action. If the operator, landowner, or timber owner does not take corrective action, the department may do so and place a lien on the forest landowner's title.

Landowners may appeal enforcement actions to a newly created Forest Practices Appeal Board. The board is composed of three members qualified by experience and training in matters pertaining to the environment, with at least one being an attorney.

Counties may also bring suit against landowners, operators, or the department to enforce the rules.

Violators may be subject to a \$500 per offense fine, with each violation being a separate offense. Failure to comply with a stop work order is a separate offense for each day of violation. Willful violation of a forest practice rule is a gross misdemeanor punishable by a fine of \$100 to \$1,000, imprisonment for one year, or both.

Forest Practices Rules

harvesting, consideration should be given to scenic areas, critical wildlife or aquatic habitat, wet areas, and wildlife escape cover.

Eastern and southwestern region only: When stocking of acceptable species is reduced below 25 percent, 100 seedlings and/or saplings must be established per acre, within six years in the eastern region and within four years in the southwestern region. Northwestern region only: When stocking reduced below 25 percent, 150 seedlings and/or saplings must be established per acre within three or five years, depending on the subregion.

Board rules recommend the minimum diameter level for harvest cuts. Clear cutting should be allowed only where 1,000 young trees 2 or more feet high per acre are present or where stand is overmature and owner will insure regeneration. Partial cutting is the generally recommended practice and should leave the following minimum number of trees per acre. Spruce-fir: leave 400 thrifty trees 3 to 8 inches d.b.h. or a proportionate number of trees over 9 inches d.b.h. Mix should vary from 15 trees over 9 inches d.b.h. up to 350 trees from 3 to 8 inches d.b.h. Northern hardwoods: leave over 300 hardwoods, 2 to 6 inches d.b.h., or 30 trees over 12 inches d.b.h., or 120 trees 6 to 11 inches d.b.h., or a mix of the sizes on the basis of four trees 11 inches d.b.h. being equal to one tree 12 inches d.b.h. or over. In intermediate weedings, about 200 of the best shaped and tallest trees should be left on each acre for crop trees.

Leave two 14-inch tulip poplar seed trees per acre after harvest. Leave eight 14-inch or greater loblolly, shortleaf, pond, or white pine trees per acre after harvest. If 14-inch or greater seed trees are not available, two trees of the next largest diameter class must be left uncut. Seed trees must be left uncut for three years.

Road location and design should minimize width, cuts and fills should be balanced and at the same slope as the sidehills, and roads must meet minimum drainage specifications. In road construction, organic debris should not be buried, fills should be compacted, soils stabilized, stream channels cleared, moisture conditions favorable, and waste disposed of properly. Active, inactive, and abandoned roads must be properly maintained. Location, drainage, and rehabilitation of rock quarries, gravel pits, borrow pits, and slash disposal areas is regulated.

Logging systems must be appropriate for the terrain and soils. Landings must be located above 50-year flood intervals and minimized in size. Harvesting practices should leave the area conducive for timber production and encourage wildlife habitat. Brush and high stumps should be left to insure streambank integrity. At least 50 percent of the summer midday stream shade must be left. Felling into or log bucking in streams is prohibited. Cable yarding must not cross streams and should only be done uphill. Tractors and wheeled skidders will not be used in streams and should be used minimally in streamside management zones or on wet or erodible soils. Slash and other logging debris must be removed from streams.

Reforestation is required for clear cuts and cuts removing more than 50 percent of the volume of a stand in any five-year period. It is not required for salvage cuts or if 300 vigorous, desirable seedlings are present per acre. Clear cuts must be replanted within three years or naturally regenerated within five years with an acceptable species. Adequate stocking requires 300 well-established, well-distributed seedlings per acre.

Chemical leakage during storage or application is prohibited, chemical mixing must occur away from all waters, and aerial applications must leave 50 feet wide buffer strips and be made parallel to bodies of water. Ground applications using power equipment should leave a 10 feet wide buffer strip to avoid entry into water. Hand applications must be applied only to specific targets. Chemical containers must be removed and disposed of properly, or cleaned and reused, or properly buried. Daily records of aerial applications must be kept. All chemical spills must be reported immediately to the Departments of Natural Resources, Agriculture, and Ecology.

Appendix B

Organizations Contacted for Personal Interviews

Public Agencies

- Division of Forestry (three interviews)
Minnesota Department of Natural Resources
- Division of Waters (two interviews)
Minnesota Department of Natural Resources
- Division of Fish and Wildlife
Minnesota Department of Natural Resources
- Planning Section (two interviews)
Division of Water Quality
Minnesota Pollution Control Agency
- Area Planning Representative
State and Private Forestry
U.S. Forest Service
- County Land Department (two interviews)
Itasca County

Legislators

- Senator
Committee on Agriculture and Natural Resources
Minnesota State Legislature
- Senator
Committee on Employment
Minnesota State Legislature

Citizen Conservationists

- Attorney and Legal Counsel
North Star Chapter
Sierra Club
- Northeastern Area Vice President
Izaak Walton League of America

Forest Industry

- Minnesota Woodlands Division
Diamond International Corporation
- Forester
Rajala Timber Company
- Woodlands Division
Blandin Paper Company
- Northwest Paper Division
Potlatch Corporation
- Public Relations Department
Boise Cascade Corporation
- Wheeler Division
St. Regis Paper Company

Others

- Minnesota Timber Producers Association
Minnesota Timber Law Committee
- Consulting Forester
- Retired Administrator
Minnesota Department of Natural Resources

