

Cost and Effectiveness of Legal Mandates for the Practice of Forestry on Private Land: Experiences with State Forest Practice Laws in the United States

Russell K. Henly & Paul V. Ellefson

Comprehensive state laws regulating the practice of forest management on private lands are in effect in seven of the United States. Established to protect a wide range of non-timber forest resources and to ensure reforestation after harvest, these laws may impose significant administrative costs on states and significant compliance costs on landowners and timber operators. Total state administration costs for 1984 are estimated at \$10.1 and total private sector compliance costs are estimated at \$120.5 million, for a total regulation cost of \$130.6 million.

The resource protection effectiveness of state forest practice regulation is difficult to quantify. However, agreement is strong that regulation has led to significant improvements in forest resource conditions and has helped to increase reforestation.

Introduction

The modern generation of state forest practice laws, with us now since the early 1970's, imposes significant restrictions on forestry operations over large areas of some of the nation's most productive private forestland. Perhaps most simply characterized as comprehensive environmental protection laws for the conduct of forest management activities on private forestlands, modern forest practice laws are presently in effect in seven states: Massachusetts, Nevada, Alaska, Idaho, Oregon, Washington, and California. In order to comply with state forest practice regulations, timber operators and forest landowners must often expend significant effort and money to protect social interests in a range of public natural resources (e.g., water, fisheries, and wildlife). Likewise, states' governments expend millions of dollars annually to administer their forest practice laws.

Now that the modern forest practice laws

have been in effect for some time, there exists an opportunity to investigate public and private sector costs of administering such laws and to evaluate their effectiveness in protecting the resources they are designed to safeguard. In order to carry out such analysis, three steps were taken: a thorough literature review was conducted; an indepth questionnaire was sent to the state forester or forest practice program director in the seven states with comprehensive state forest practice laws; and personal interviews of state natural resource officials were made in Washington and California, states with the nation's most stringent forest practice regulations.

This research is supported by State and Private Forestry, U.S. Forest Service and the Department of Forest Resources, College of Forestry, University of Minnesota, St. Paul.

Table 1. State agency forest practice regulation administration and enforcement expenditures, by State and agency, 1984.

State and Agency	Expenditure
Massachusetts	
Division of Forests and Parks	\$ 500 000
Metropolitan District Commission	1 000
TOTAL	501 000
Nevada	
Division of Forestry	\$ 100 000
Alaska	
Division of Forestry	\$ 317 000
Department of Fish and Game	450 000
TOTAL	767 000
Idaho	
Bureau of Private Forestry	\$ 33 000
Bureau of Water Quality	45 000
Department of Water Resources	15 000
TOTAL	93 000
Oregon	
Department of Forestry	\$1 600 000
Department of Fish and Wildlife	40 000
Department of Environmental Quality	6 000
TOTAL	1 646 000
Washington	
Division of Private Forestry and Recreation*	\$1 635 000
Department of Game	395 000
Department of Fisheries	305 000
Department of Ecology	30 000
Department of Agriculture	5 000
Department of Commerce and Economic Devel.	5 000
TOTAL	2 375 000
California	
Department of Forestry	\$4 377 000
Department of Fish and Game	\$ 120 000
Regional Water Quality Control Boards	120 000
Coastal Commission	12 000
Department of Parks and Recreation	6 000
TOTAL	4 635 000
Total Expenditure by Above States	\$10 117 000

* Now called the Division of Private Forestry and Natural Heritage.

Costs of regulation

Administrative costs

In most states regulating forest practices, several agencies participate in administering and enforcing forest practice regulations, though the bulk of the effort and expenditure is almost always borne by the state forestry agency. Table 1 summarizes estimated forest practice regulation expenditures, by state and agency, for 1984. The 1984 state government forest practice regulation expenditures by the seven states totaled over \$10 million, with California spending the most (\$4 635 000) and Idaho the least (\$93 000).

Not all state forestry agencies are satisfied with the level of funding available to carry-out their forest practice regulation responsibilities. The Massachusetts Division of Forests and Parks indicated that an annual funding level of \$1 million—twice the 1984 level—would be necessary, while the Nevada Division of Forestry called for \$200 000, twice the estimated 1984 level. Alaska's Division of Forestry was of the opinion that it was \$48 000 short of an adequate funding level. Worst off in terms of forest practice program funding was the Idaho Bureau of Private Forestry. That agency's funding for forest practice regulation in 1984 was only \$33 000 (down from a 1981 level of \$170 000), far below the indicated annual need of \$400–450 000. Washington's Division of Private Forestry and Natural Heritage indicated a need of an additional \$300 000 annually. The state forestry departments in Oregon and California were basically satisfied with funding levels for forest practice regulation programs, though concern was expressed that more monies might be needed were timber harvest levels to rise. Note that in both Idaho and Alaska, non-timber agencies had more funds in 1984 to devote to forest practice regulation efforts than did the state forestry agencies. This is due more to legislative priorities than to the two states somehow organizing themselves differently for forest practice regulation than other states examined.

While program administrators might always be interested in higher funding levels, the size of the funding shortfalls identified by forestry administrators in Massachusetts,

Nevada, and Idaho clearly indicates a concern beyond simple incremental expansion of their programs. In some cases, lack of funding has clearly reduced the potential effectiveness of states' forest practice regulation programs.

Private sector costs

The private sector cost of compliance with state forest practice regulations is difficult to determine. Traditional "with and without" analysis techniques are difficult to apply since the environmental soundness of management practiced by timber operators and forest landowners varied widely before regulations were enacted. Further, the environmental ethic of both the general public and of timber operators and landowners has increased greatly since "modern" state forest practice laws were enacted in the early 1970's. Thus, were all the present forest practice laws suddenly erased, forest management practices would likely be maintained at a higher level, vis-à-vis environmental protection, than they were at the time the laws were first implemented.

In addition to simple operating costs, several difficult-to-value and difficult-to-quantify costs are imposed by forest practice regulation. Vaux (1983) identifies psychological costs imposed by the frustration of complex paper work and oversight by state forestry officials. Duerr and Jones (1976) suggest political costs related to an enlarged bureaucracy and a loss of freedom. But regulation may also benefit landowners by improving the effectiveness of their forest management activities due to requirements for the preparation of harvesting or management plans (Schick 1977). Partly because of these problems, little has been done to estimate the private sector costs of state forest practice regulation in any thorough and systematic way.

The Nevada Division of Forestry estimated private compliance costs at about \$10 per thousand board feet (MBF) of timber harvested. Based on a survey, the Alaska Division of Forestry estimates compliance costs at \$5 per MBF, on average (Alaska Division of

Forestry 1984). Looking at the data more closely, 87 percent of the forest industry respondents to the Alaska survey indicated that compliance costs were \$10 per MBF or less, while the remaining 13 percent estimated added costs to be \$30 or more per MBF. Surprisingly, 13 percent indicated that they have been saving money since the advent of regulation. A University of Idaho (1978) study estimated the cost of compliance with that state's forest practice law to be \$1.50 per MBF, or \$2.22 per MBF in 1984 dollars. The Oregon Forest Industries Council has estimated forest practice compliance costs in Oregon to be \$12 per MBF. The Washington Division of Private Forestry and Recreation in 1977 estimated forest practice compliance costs in that state to be in the neighborhood of \$2 to 3 per MBF, or \$3 to 5 per MBF in 1984 dollars (Hawley 1977). More recently, the California Forest Protective Association has estimated compliance costs in Washington to be in the range of \$2-12 per MBF (Anderson 1985), while another source places the Washington compliance cost figure at \$10 per MBF (NCASI 1983). Compliance costs in both Washington and Oregon are expected to rise significantly if proposed riparian zone protection standards are approved. The California Department of Forestry estimates the private sector cost of compliance with the California Forest Practice Act at an average of \$25 per MBF. The California Forest Protective Association has estimated compliance costs to be in the range of \$22-80 per MBF (Anderson 1985).

Applying private sector compliance cost estimates to the amount of timber harvested from private forestlands in the states with forest practice laws provides some indication of the substantial magnitude of regulatory costs to the private sector—an estimated \$121 million in 1984 alone (Table 2). These direct private sector costs are over 10 times the state administration costs; combined, the total costs of state forest practice regulation in 1984 (except for the direct private sector costs in Massachusetts) were \$131 million.

Table 2. Private sector forest practice regulation compliance costs, by State, 1984.

State	Cost factor (\$/MBF)	Private timber removals (MMBF)*	Compliance cost (Million \$)
Nevada	10.00	0.2	0.002
Alaska	5.00	202	1.010
Idaho	2.22	861	1.911
Oregon	12.00	3,078	36.936
Washington	8.00	3,545	28.360
California	25.00	2,093	52.325
TOTAL			\$120.544

* Source: Nevada estimated from Green and Van Hooser 1983; all others from Warren 1986.

Effectiveness of regulation

As identified above, the protection of forest resources through forest practice regulation is a costly endeavor. With such a large investment being made, it is only reasonable to query the effectiveness regulation and the nature of the benefits it has accrued. Unfortunately, any sort of monetary estimate of benefits received simply cannot be made at this time. Not only are there few production functions which relate specific forest practices to benefits generated (added numbers of fish, increased wildlife, improved water quality, etc.), but there also exist serious problems in trying to value such outputs. Further, it is extremely difficult to separate the effects of regulation on forest practices and forest resource protection from the effects of (a) a general growth in public concern for a quality environment and (b) the rather large increase in stumpage values which occurred after a number of the present state forest practice laws were enacted (Green and Gallez 1982). While increases in stumpage values will tend to increase harvest levels, they also serve as an incentive to invest in sound forest practices (e.g., reforestation, protection of residual timber, conservation of soil productivity) which can ultimately lead to larger future timber harvests.

Because of these problems, the best that can be hoped for is a subjective, qualitative indication of how well forest practice regulation is meeting intended resource protection goals (goals which are themselves expressed in subjective terms). Measures of effectiveness can be based on field studies; on the general observations of individuals involved in forest practice regulation and forest resource protection; and on factors such as the adequacy of forest practice program funding levels, frequency of inspection of operations for compliance with the laws, and the degree of noncompliance found.

A general conclusion that can be drawn from the handful of field studies that have been conducted is that state forest practice laws—when fully complied with—are reasonably effective at protecting forest resources; however, adverse resource impacts are common and often significant when compliance is not achieved (Brown et al. 1977; University of Idaho 1978; U.S. Environmental Protection Agency 1979; Sachet et al. 1980a, 1980b). A number of survey-type studies, largely focused on various sectors of the forestry community, have found generally favorable responses vis-à-vis the accomplishments of forest practice regulation at improving the protection of forest resources (Alaska Division of Forestry 1984, Green 1982, Green and Gallez 1982). Other testaments to the positive accomplishments of regulation may be found as well (Vaux 1983, Green et al. 1981).

Responses to a 1985 study (Henly and Ellefson 1986) were also largely positive as to the resource protection accomplishments of state forest practice regulation. Though agreement was universal that resource protection accomplishments have been made through regulation, not all (primarily those individuals in water quality, fisheries, and wildlife agencies) were satisfied that an adequate standard of resource protection had been achieved. In the case of Idaho, it was noted that although the state's forest practice regulations as written are at least somewhat effective in protecting various forest resources, as applied—due to the severely limited forest practice program funding and the low level of enforcement which that funding level will support—they are in some cases less than effective.

One area of accomplishment where some

quantitative indicators are available is in reforestation. In most cases, all seven of the states with comprehensive forest practice laws require, in most cases, that a site be reforested or adequate regeneration provided for after harvest. State forestry agencies indicated that regulation had led to increased reforestation (Henly and Ellefson 1986). Massachusetts indicated that reforestation requirements are being met 98 percent of the time. The Alaska Division of Forestry has been somewhat hesitant to aggressively investigate and enforce reforestation requirements due to dependence on the political influence of the state's industrial timberland landowners (Peacock 1985). In Idaho, reforestation standards are not being met 20 percent of the time and are being exceeded 10 percent of the time. Only a trace more land is being reforested than would have been in the absence of regulation. The chief of the Idaho Bureau of Private Forestry has noted the inadequacy of the state's present reforestation requirements in assuring good commercial timber productivity: "Low quality residual trees and/or saplings are or may be left or [allowed to] seed-in to take care of the 'reforestation' requirements . . .," (Almas 1984b). Thus, although harvested trees may be replaced, the new growth may not have the potential to adequately replace the productivity of the prior stand. In Oregon, the reforestation requirements of the Forest Practices Act are being met 95 percent of the time; because of the Act's requirements, 30–40 percent more area is being reforested than otherwise would have been. Based on a state Department of Natural Resources study (Bigger et al. 1983), Washington estimates that reforestation goals are being met 80 percent of the time and that 10 percent more area is being reforested due to the requirements of forest practice regulation. In California, reforestation requirements are being met or exceeded 99 percent of the time and exceeded 75 percent of the time; 25 percent more area is being reforested than otherwise would have been; and regulation has resulted in an estimated annual \$2–3 million reforestation investment which would not have otherwise occurred (Vaux 1983).

As discussed previously, several state forest practice programs are severely underfunded, a condition which raises concerns about their

effectiveness. All seven of the forest practice law states except Massachusetts have legal provisions authorizing the state forestry agency to repair adverse resource impacts caused by landowner violations of law when such landowners fail to repair such impacts themselves. Mechanisms are also provided (e.g., liens and foreclosure on property or performance bonding [Nevada]), for the state to collect the cost of repairs from the landowner and/or timber operator. However, Idaho and Washington have never had the funds necessary to make such repairs.

Inadequate funding also leaves state forest practices programs with too few staff to review forest practice notifications or applications, to inspect operations and help timber operators and landowners understand and apply the regulations, and to aggressively enforce the regulations when operators and landowners fail to willingly comply. Non-timber state resource agencies, sometimes given oversight responsibilities by forest practice laws, are generally too poorly funded to carry-out such responsibilities to the degree that they would like.

Looking at inspection rates as an indicator of the effectiveness of forest practice regulation—the assumption being that frequent inspection of operations leads to high compliance, which in turn leads to a high level of resource protection—data indicate that inspection rates range from quite low to quite satisfactory. Massachusetts inspects all operations both before commencement and after completion (McLean 1985). That level of inspection was viewed to be sufficient to assure a high level of compliance, though room for improvement was indicated. The Alaska Division of Forestry policy is to inspect every operation of which it is notified (Peacock 1985). The Division is of the opinion that current inspection frequencies are adequate to ensure a high level of compliance with the forest practice regulations. This is even though the Division has not been following through on conducting reforestation inspections.

In fiscal year 1984, the Idaho Department of Lands inspected only 168 (6 percent) of the estimated 3 000 operations occurring on private forestlands within the state (Idaho Department of Lands 1985, Idaho Division of Environment 1985). In the southern part of

the state, where about one-fifth of the operations occur, no inspections were made (Almas 1984a). Compared to fiscal year 1981, 70 percent fewer inspections were made in fiscal year 1984. In 1983, during which 10 124 forest practice notifications were filed in Oregon, the state Department of Forestry conducted 14 268 inspections (Oregon State Department of Forestry 1984). On average, the Department inspects operations more than once each year. The Department considers the current inspection rate to be adequate to assure a high level of compliance with the state's forest practice regulations.

For Washington, information was not readily available for the number of general compliance inspections made annually, though the state Division of Private Forestry and Natural Heritage indicated that the number of inspections being made was insufficient to assure a high level of compliance. The low number of reforestation inspections being made in the state (an average of 1346 per year for fiscal years 1983 through 1985), relative to the number of operations (an average of 5 992 new operations per year for the same period) raises concerns as to how well the state's reforestation requirements are being met, as does the reforestation study cited earlier (Bigger et al. 1983). The state Department of Ecology seems comfortable with the current rate of forest practice inspections being made by the Division of Private Forestry and Natural Heritage (Sachet 1985).

On average, 80 percent of the timber harvest permit applications in California receive an inspection from the Department of Forestry before being approved or denied (California Department of Forestry 1985, 1984, 1983). In 1984, when 1187 new timber harvesting operations were approved, the Department of Forestry made 6793 inspections. The total number of operations active during a given year is usually several times the number of applications approved during that year, since an approved harvesting plan is valid for 3 years and restocking need not be achieved for up to 5 years after an operation is completed. Each operation probably receives 2–3 inspections over its lifetime, in addition to any preharvest inspections made (Green and Gallez 1982, Slack 1985). All operations are inspected for compliance with restocking standards. The Department of

Forestry views the present inspection level as sufficient to assure a high level of compliance with the forest practice regulations; however concern was expressed that an improvement in the timber market, bringing an increase in harvesting, would make it difficult to maintain such a rate of inspection. Green and Gallez (1982) found that timber operators and registered professional foresters overwhelmingly agreed that inspection levels were "sufficient to assure compliance . . ." However, this high response may also indicate a distaste for state oversight on the part of the operators and foresters.

The inspection of operations is a critical step in enforcing forest practice regulations. However, this should not be taken to imply that forest practice regulations are enforced with an iron fist. Rather, state forestry agencies generally work closely and cooperatively with timber operators and landowners to resolve violations through improving practices or repairing damages. In many cases, the application of formal sanctions is used only as a last resort, i.e., when the responsible party refuses to cooperate with the state to resolve a violation. Thus, in some sense, the number of formal forest practice law enforcement actions taken by states is to a degree representative of the success of their regulatory programs; i.e., formal enforcement actions represent failures in the cooperative resolution of violations—violations which are likely to involve direct resource impacts. Enforcement actions, of course, also depend upon vigilant inspection of operations for violations; where few inspections are made, few violations are likely to be detected.

Applying the above, state forest practice regulation must be given high marks—very few formal enforcement sanctions (such as fines, jail sentences, or license revocations) are ever applied by states. As late as 1985, Massachusetts had imposed no fines, nor had any timber harvest licenses been revoked for forest practice violations (DiSabatino 1985). Alaska reports an average of 3 to 4 forest practice violations each year; full prosecution has been sought in only two cases (Peacock 1985). In fiscal years 1981 through 1984, Idaho issued only 11 violations for the 378 operations found to be unsatisfactory (Idaho Department of Lands 1985). The Oregon State Department of Forestry (1981) esti-

mated overall compliance with its forest practice regulations from 1976 through 1980 to be 98.3 percent—clearly a very high level. During 1980 through 1983, 706 citations were issued (Wilson 1985) on a total of 43 213 operations, again indicating an excellent level of compliance. Washington issued only 53 criminal citations for the 20 912 operations during fiscal years 1983 through 1985 (Walters 1985). California, as well, has had a low rate of application of formal enforcement sanctions. Though an average of 1 117 violations per year were issued from 1980 through 1984, formal enforcement actions were initiated on an annual average of only 82, with the bulk of these being satisfactorily corrected (Henly and Ellefson 1986).

Conclusions

Where has the regulation of forest practices brought us? Though a totally clear answer is not possible, there seems to be almost universal agreement that the implementation of state forest practice regulation has been responsible for significant improvements in the protection of non-timber forest resources. And there is some evidence, though mixed, that the reforestation requirements of forest practice laws will have a significant positive impact on future timber supplies. Higher levels of resource protection and timber production could likely be gained, under current forest practice regulations, were the administering state agencies provided with more financial and human resources to discharge their regulatory responsibilities. The main point of contention surrounding the effectiveness of state forest practice regulation is not whether *any* resource protection improvement has been gained, but rather whether *enough* (or too much) has been achieved.

Gains accomplished thus far through state forest practice regulation have not come without cost. The estimated \$131 million annual gross societal cost of forest practice regulation is large. Unfortunately, adequate information and methodology do not exist to calculate the concomitant benefits to society. This lack makes it very difficult to quantitatively evaluate whether or not the costs of regulation

outweigh the benefits, or whether the marginal benefits of more-stringent regulation are greater than the marginal costs.

In sum, it can be safely said that state forest practice regulation has indeed led to the improvement of both timber and non-timber forest resources. Whether an economically or socially efficient degree of regulation has been achieved cannot yet be said with any certainty; however a reasonable degree of political efficiency—that quintessence of the public policy arena—does indeed appear to have been reached.

Literature cited

- Alaska Division of Forestry. 1984. Forest Resource and Practices Act Survey Results. Alaska Division of Forestry, Department of Natural Resources, Anchorage.
- Almas, D. P. 1984a. Letter to Reid Kreutzweiser, University of Guelph, Ontario. August 13, 1984. Chief, Bureau of Private Forestry, Idaho Department of Lands, Couer d'Alene.
- 1984b. Personal correspondence. November 7, 1984. Chief, Bureau of Private Forestry, Idaho Department of Public Lands, Couer d'Alene.
- Anderson, M. 1985. Personal interview. May 14, 1985. Staff, California Forest Protective Association, Sacramento.
- Bigger, D., Baxter, B. & Chambers, C. J. 1983. 1983 Statewide Forest Practices Reforestation Survey. DNR Note 40. Washington Department of Natural Resources, Olympia.
- Brown, G. W., Carlson, D., Carter, G., Heckerth, D., Miller, M. & Thomas, B. 1977. Meeting Water Quality Objectives on Oregon's Private Forest Lands through the Oregon Forest Practices Act. Oregon State Department of Forestry, Salem.
- California Department of Forestry. 1985. California Forest Practice Program—1984. California Department of Forestry, Sacramento.
- California Department of Forestry. 1984. California Forest Practice Program—1983. California Department of Forestry, Sacramento.
- California Department of Forestry. 1983. Status of the California Forest Practice Program for Calendar Year 1982. California Department of Forestry, Sacramento.
- DiSabatino, R. 1985. Telephone interview. July 29, 1985. Secretary to State Forester, Massachusetts.
- Duerr, W. A. & Jones, J. C. 1976. Some economics of forestry practices controls. Proceedings of the Seventh Annual Forestry and Wildlife Forum. Virginia Polytechnic Institute and State University, Blacksburg. p. 73–81.
- Green, A. W. & Van Hooser, D. D. 1983. Forest Resources of the Rocky Mountain States. Resource Bulletin INT-33, August, 1983. Intermountain

Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Ogden, UT.

- Green, P. F. 1982. Government Regulations in the Forest: Impacts of the 1973 California Forest Practice Act. Environmental Quality Series No. 36, April, 1982. Institute of Governmental Affairs and Institute of Ecology, University of California, Davis.
- Green, P. F. & Gallez, G. P. 1982. Private Forester and Timber Operator Perceptions of the Implementation of Forest Practice Regulation in California. Institute of Ecology, University of California, Davis.
- Green, P. F., Norbury, F. L., Palley, M. N. & Vaux, H. J. 1981. Regulation of Forest Practices in California. Department of Forestry and Resource Management, College of Natural Resources, University of California, Berkeley.
- Hawley, G. S. 1977. Personal letter to Fred Cabbage, Department of Forest Resources, University of Minnesota. August 16, 1977. Supervisor, Division of Private Forestry and Recreation, Washington Department of Natural Resources, Olympia.
- Henly, R. K. & Ellefson, P. V. 1986. State Forest Practice Regulation in the United States: Administration, Cost, and Accomplishments. Agricultural Experiment Station Bulletin, University of Minnesota, St. Paul.
- Idaho Department of Lands. 1985. Tenth Annual Report, 1983–84. Idaho Department of Lands, Boise.
- Idaho Division of Environment. 1985. Final Report of the Silvicultural Nonpoint Source Task Force. Idaho Department of Health and Welfare, Boise.
- NCASI. 1983. Summary of Silvicultural Nonpoint Source Control Programs—1982. Special Report No. 83–01. National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
- Oregon State Department of Forestry. 1984. A Summary of Forest Practice Activities From January 1983 through December 1983. Forest Practices Section, Oregon State Department of Forestry, Salem.
- Oregon State Department of Forestry. 1981. A Summary of Forest Practice Activities from January 1980 through December 1980. Forest Practices Section, Oregon State Department of Forestry, Salem.
- Peacock, M. 1985. Telephone interview. July 24, 1985. Forester, Division of Forestry, Alaska Department of Natural Resources, Anchorage.
- Sachet, J. S. 1985. Personal interview. May 9, 1985. Environmental Planner III, Washington Department of Ecology, Olympia.
- , Keller, S., McCoy, A., Orr, T. Jr. & Wolff, N. 1980a. An assessment of the Adequacy of Washington's Forest Practices Rules and Regulations in Protecting Water Quality: Technical Report, 208 Forest Practices Assessment. DOE 80–7A, October 1980. Washington Department of Ecology, Olympia.
- , Keller, S., McCoy, A., Orr, T. Jr. & Wolff, N. 1980b. An assessment of the Adequacy of Washington's Forest Practices Rules and Regulations in Protecting Water Quality: Summary Report, 208 Forest Practices Assessment. DOE 80–7, October 1980. Washington Department of Ecology, Olympia.
- Schick, B. A. 1977. Forest Practice Regulations: Weighing their Potential Economic Effects. Mimeo. College of Agriculture and Forestry, West Virginia University, Morgantown.
- Siegel, W. C. & Cabbage, F. W. 1984. Environmental protection law and forest management regulation on private lands in the United States. Working Group Document on Selected Problems of Forestry and Forestry Related Legislation. IUFRO Working Party S.4.06–04 FOREST LEGISLATION. International Union of Forestry Research Organizations, Rome.
- Slack, H. R. 1985. Personal interview. May 14, 1985. Forest Practice Information Officer, California Department of Forestry, Sacramento.
- University of Idaho. 1978. Final Report, 208 Forest Practices Project. College of Forestry, Wildlife, and Range Science, University of Idaho, Moscow.
- Vaux, H. J. 1983. State interventions on private forests in California. In *Governmental Interventions, Social Needs, and the Management of the U.S. Forests*. R. A. Sedjo, ed. Resources for the Future, Washington, D.C. p. 124–168.
- Walters, C. R. 1985. Personal correspondence. May 13, 1985. Staff Forester, Division of Private Forestry and Natural Heritage, Washington Department of Natural Resources, Olympia.
- Warren, D. D. 1986. Production, Prices, Employment, and Trade in Northwest Forest Industries, Third Quarter 1985. Resource Bulletin PNW-129. Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture, Portland, OR. 54 p.
- Wilson, L. W. 1985. The Oregon forest practices act. *Journal of Soil and Water Conservation* 40 (1): 103–104.

Total of 34 references