



## **The Environmental Regulation of Private Forests in the United States**

Private forestry operations are regulated by a fairly complex set of laws, regulations, and non-regulatory policies at the federal, state and local level. While the resulting framework is fairly complicated and can vary widely between jurisdictions, it has been effective in improving the environmental performance of forestry operations, and can be expected to do so in the future.

In addition to useful forest products, jobs and economic activity, working forests provide significant environmental benefits. Watershed protection, wildlife habitat, carbon dioxide absorption, and other “environmental services” are currently provided by private landowners at little or no cost to society. Whenever policymakers consider new environmental requirements on private forestry, such as eligibility requirements for biomass feedstocks intended for energy use, the implications for the economic viability of working forests should be considered. If new regulatory requirements reduce the private forest owner’s ability to realize value from a working forest; or if new market limitations constrain market opportunities for working forests, private forest owners might be compelled to consider other uses for their forests, which could result in the reduction of many of the broader environmental benefits they provide.

### **Background**

Private forests are currently regulated at the federal, state, and local level. The Federal Clean Water Act, Clean Air Act, Endangered Species Act, Insecticide Fungicide and Rodenticide Act, and the Coastal Zone Management Act each apply to private forest operations. These laws have been implemented through a variety of state programs, regulations, court decisions, agency precedents and policies. More narrowly focused State forest management regimes, local land use requirements, zoning and other stipulations have also been used to regulate or manage forestry operations. Additionally, third party sustainable forestry programs and a variety of voluntary agreements have also been used to achieve desired environmental goals.

There is considerable evidence that this complex framework of regulatory and non-regulatory activities has substantially reduced adverse environmental impacts from forestry, and will continue to do so in the future. While this paper will not exhaustively chronicle the scope of methods available to government at every level to regulate, manage, encourage or influence activities on private forests, many of the primary methods are listed here.

### **The Clean Water Act**

The Clean Water Act<sup>1</sup> is arguably the federal law of predominant relevance and application. Since forestry operations generally involve the construction of access roads and water crossings, as well as the disturbance or removal of trees and plants that would otherwise tend to control erosion, most of the environmental concerns related to forestry operations involve the protection of water quality and aquatic habitat. Forestry operations can also involve the

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<sup>1</sup> The Federal Water Pollution Control Act of 1972 (Public Law 92-500), as amended.

disturbance of plant litter and soil, the application of herbicides and fertilizers, equipment lubrication and refueling.

Under the Clean Water Act, “point sources” such as industrial facilities and wastewater treatment plants with effluents that can be directly monitored at known outfalls are regulated with a permit system based on technology-based effluent limitations. Conversely, “non point sources” such as runoff from forests and farms cannot be so easily monitored, measured or regulated. This is particularly true with forestry, since forestry activities generally involve numerous relatively small operations occurring sporadically over large amounts of space and long periods of time, often by different landowners operating independently of one another. Complicating the situation is the fact that different forests, even those in close proximity with one another, may have vastly different characteristics in terms of topography, tree species, soil types, wildlife habitat, geology and hydrology. Consequently, the approach to protecting the environment from forestry activities must be adapted to local conditions and circumstances.

Efforts to control non point source pollution from forest operations have been fairly successful. National Water Quality Inventories conducted by the Environmental Protection Agency now contend that “the most significant source of water quality impairment to rivers and streams and lakes, ponds, and reservoirs is *agriculture*, and the most significant source of impairment to estuaries is *municipal point sources* of pollution.”<sup>2</sup> Other significant sources include urban runoff, storm sewer discharges, and pollutants deposited from the atmosphere.<sup>3</sup>

Although forestry operations create fewer water quality impacts than agricultural operations, urban runoff and storm water, sewage plants and natural sources,<sup>4</sup> major hydrologic events such as 100 year storms can nevertheless result in significant releases of sediments<sup>5</sup> when sound forest management practices have not been employed. Although forest watershed protection efforts began on an ad hoc basis in the early half of the 20<sup>th</sup> Century, Section 208 of the Clean Water Act, adopted in 1972, directed states to develop watershed or regional water quality management plans to identify significant non point sources and assess their cumulative effects, and to “set forth procedures and methods (including land use requirements) to control to the extent feasible such sources.”<sup>6</sup> In 1987, the Clean Water Act was amended to include, among other provisions, Section 319, requiring states to develop control plans for any non point source activities that were causing state waters to fall short of water quality goals. Taken together, sections 218 and 319 comprise the authority for States to control non point source pollution, with oversight by EPA.

To control non point source pollution from forestry operations, most states have adopted Best Management Practices (BMPs) designed to take regional climate, soils, topography, biota, legal,

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<sup>2</sup> National Management Measures to Control Nonpoint Source Pollution from Forestry. Page 1-1. EPA-841-B-05-001, United States Environmental Protection Agency, April 2005. (Emphasis added.)

<sup>3</sup> Ibid.

<sup>4</sup> National Water Quality Inventory: 2002 Report to Congress. EPA 841-R-07-001, United States Environmental Protection Agency, October 2007.

<sup>5</sup> National Management Measures to Control Nonpoint Source Pollution from Forestry. EPA-841-B-05-001, United States Environmental Protection Agency, April 2005.

<sup>6</sup> Section 208(2)(F)(ii) of the Federal Water Pollution Control Act of 1972.

technical and socioeconomic factors into account. BMPs vary widely among jurisdictions, which is understandable since a BMP that is appropriate for a coastal plain pine forest in Georgia may be wholly inadequate for a mountainous temperate rainforest in Oregon.

In spite of their variations, there are aspects common to most BMPs across jurisdictions. The general philosophy of BMPs is to “avoid, minimize, and mitigate.” More specifically, BMPs will generally strive to 1) minimize soil compaction and the extent of bare soils; 2) separate exposed soils from surface waters; 3) separate fertilizer and herbicide applications from surface waters; 4) inhibit hydraulic connections between bare ground and surface waters; 5) provide forested buffers around watercourses; and 6) promote stable roads and watercourse crossings.<sup>7</sup>

Different states manage BMPs in different ways. Some states employ mandatory BMPs administered by State Foresters under a focused state forest practices act. Other states employ non-regulatory BMPs developed or approved by state agencies, with landowner education to encourage compliance, and authority for agencies to take action against landowners who do not comply. Regardless of the approach, BMPs and the broader non point source pollution prevention programs implemented by the states are subject to EPA oversight and approval. States whose water quality inventories fail to show continued improvement invite closer scrutiny and review by the EPA, and poor performance can result in grant funding reductions or a federal takeover of the state program. Over time, BMPs have become an accepted, well understood, widely adopted method of protecting water quality in the waters of the United States.

Although it is beyond dispute that BMPs are widely stipulated, it is appropriate to consider 1) how effective they are in protecting water resources and other environmental values, 2) what the compliance rates are for BMP implementation, and 3) the factors associated with high rates of implementation and compliance.

There is a high correlation between high water quality and forested areas. Most of the waters failing to meet EPA-approved water quality standards and requiring the establishment of Total Maximum Daily Load (TMDL) specifications are in urban or industrial areas. But this correlation alone does not prove the effectiveness of BMPs. Fortunately, a variety of watershed scale research projects in the published literature have evaluated the effectiveness of BMPs in the United States. These studies, some of which are summarized by Stednick and Ice,<sup>8</sup> have found BMPs to be highly effective when they are used. Other studies point out that the major impediment to the protecting water quality is the lack of compliance with BMPs.<sup>9</sup>

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<sup>7</sup> Olszewski, R. and C.R. Jackson. 2006. Best management practices and water quality. *In A primer on the top ten forest environmental and sustainability issues in the southern United States.* NCASI Special Report No. 06-06. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

<sup>8</sup> Ice, G.G.; Stednick, J.D. (eds). 2004. *A Century of Forest and Wildland Watershed Lessons.* Bethesda, MD, USA: Society of American Foresters. 292 p.

<sup>9</sup> Ice, G.G.; Stewart, G.W.; Waide, J.B.; Irland, L.C.; Ellefson, P.V.; July, 2007. 25 Years of the Clean Water Act: How Clean are Forest Practices? *Journal of Forestry.* Pages 9-13.

A more expansive treatment of this subject is contained in a technical paper currently in draft<sup>10</sup> by the National Council for Air and Stream Improvement (NCASI), soon to be published as a NCASI Technical Bulletin. Some of its key points are as follows:

- Forestry BMP prescriptions vary among jurisdictions due to a multitude of factors, but properly implemented BMPs are effective regardless of jurisdictional requirements;
- While monitoring programs and protocols vary among jurisdictions, rates of BMP implementation are generally very high.
- Jurisdictions having long-term monitoring programs in place have shown steady improvement in compliance rates over time.
- Forest certification programs, along with education and outreach programs, have had a positive and significant role in increasing BMP compliance with the various jurisdictional recommendations and/or recommendations.

This last point is particularly important. According to NCASI, the high rates of BMP compliance reported for industrially managed forestlands “are primarily attributable to sustainable forestry programs” such as the Sustainable Forestry Initiative (SFI), the Forestry Stewardship Council (FSC), and the American Tree Farm program. NCASI contends that these third party verification programs have been documented to result in higher compliance rates with BMPs.

BMPs have become, therefore, effective tools to advance the goals of the Federal Clean Water Act. As a consequence of this success, BMPs are increasingly being used to address ancillary issues such as wildlife habitat and other issues, some of which fall under the cognizance of other federal laws.

### **The Endangered Species Act**

The Endangered Species Act<sup>11</sup> (ESA) applies to private forestry operations as a direct federal regulatory program which relies mainly on prohibitions against the “taking” of listed threatened or endangered plant and animal species. About 1,320 species in the United States and U.S. waters have been listed as threatened or endangered,<sup>12</sup> many of which spend at least part of their life cycle in forests or waters affected by forestry activities.

Although the ESA does not enlist the support of States or state programs in ways comparable to other federal environmental laws, States and localities have amended their laws, regulations, land use plans, policies and BMPs to help protect ESA-listed species and their habitats. In addition, some private landholders have entered into habitat conservation plans (HCPs) designed to improve habitat for listed species, although HCPs have often proven to be costly,

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<sup>10</sup> National Council for Air and Stream Improvement, Inc. (NCASI). 2008. *Compendium of state and provincial forestry best management practices*. Technical Bulletin or Special Report *In Draft*. Research Triangle Park, N.C.: National Council for Air and Stream Improvement, Inc.

<sup>11</sup> 7 U.S.C.136; 16 U.S.C.460 et seq.

<sup>12</sup> See <http://www.nmfs.noaa.gov/pr/species/esa/>

difficult and time-consuming to negotiate. Still other private landholders have been encouraged by the ESA to engage in land sales and exchanges to bring important habitat into conservation easements, non-profit ownership, or public ownership.

### **The Clean Air Act**

The Clean Air Act<sup>13</sup> directs the Environmental Protection Agency to establish air quality standards protective of public health and welfare. States, in turn, develop plans and programs to achieve those standards. The direct impact of these plans and programs on forest management activities is to limit slash burning and prescribed fires. Indirect impacts include the demand for fuel wood in homes and other facilities. Finally, the motor vehicles and equipment used in forestry must be compliant with all applicable air quality standards.

### **The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)**

The Federal Insecticide, Fungicide and Rodenticide Act,<sup>14</sup> or FIFRA, establishes comprehensive programs regulating use of pesticides in forestry, agriculture and other situations. Under its provisions, pesticide compounds must be “registered” with (approved by) EPA for specific purposes and used only in accordance with EPA-approved “label” instructions designed to protect environmental resources. Pesticides which could pose environmental or health hazards if improperly handled or used by untrained people are restricted so they can be purchased and applied only by applicators trained and licensed by state agencies under EPA-approved programs.

Although FIFRA is applicable to private forest lands, the forestry market for pesticides is relatively small compared to agricultural and urban markets. Because trees grow for long periods compared to food and forage crops, forest-use pesticides usually are applied on particular lands only rarely (e.g. when establishing new plantations or responding to rare pest infestations), in contrast to agriculture, urban lawns, golf courses and other areas where the same chemicals are applied more often. It is not surprising, therefore, that environmental damage from forest-use pesticides has not been documented in the legal or scientific literature as a significant problem.

### **Coastal Zone Management Act**

Unlike the Clean Water Act, Endangered Species Act, Clean Air Act, and Federal Insecticide, Fungicide and Rodenticide Act, the Coastal Zone Management Act<sup>15</sup> directly addresses broader land use issues rather than narrower environmental concerns. Twenty-nine states bordering on the West, East and Gulf Coasts, Pacific Ocean or Great Lakes participate in voluntary federal-state partnerships under the CZMA,<sup>16</sup> including most major private timber producing states.<sup>17</sup>

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<sup>13</sup> The Clean Air Act (42 U.S.C. 7401–7626) consists of Public Law 159 (July 14, 1955; 69 Stat.322) and the amendments made by subsequent enactments.

<sup>14</sup> 7 U.S.C. 136 et seq.

<sup>15</sup> Public Law 92-583, 16 U.S.C.1451-1456, as amended.

<sup>16</sup> See <http://coastalmanagement.noaa.gov/mystate/welcome.html> , a NOAA website containing a map of participating and eligible states and territories. Illinois is the only eligible state currently not participating.

<sup>17</sup> Except Montana, Arkansas, Tennessee, West Virginia and New Hampshire.

These CZMA programs are developed with technical assistance and funding from, and then subject to approval of, the National Oceanographic and Atmospheric Administration (NOAA) through its Office of Ocean and Coastal Resource Management (OCRM). They address a wide range of issues including coastal development, water quality, shoreline erosion, public access, natural resource protection, energy facility siting, and coastal hazards such as hurricanes and flooding.<sup>18</sup> Other states also address these issues through land use planning laws, local zoning ordinances, etc. Summaries of NOAA-approved CZMA programs are available through a NOAA website.<sup>19</sup>

An important component of CZMA programs is the Coastal Nonpoint Pollution Control Program under which states and territories with approved coastal zone management programs must develop and implement programs to control nonpoint source pollution from six main sources including forestry and losses of wetland and riparian areas.<sup>20</sup> Understandably, there are considerable variations among the states on how forestry issues are addressed in CZMA programs, reflecting differences in state constitutions, agency roles, court decisions, political and economic factors and environmental conditions.

### **State Forestry and Land Use Programs**

States have adopted a wide variety of regulatory and non-regulatory programs addressing forest-related environmental and land use issues. Generally these are incorporated into federally approved programs under the federal statutes listed above, but many deal with other forestry issues as well. All 50 states have a State Forester, who is responsible for administering forestry programs and coordinating regulatory and non-regulatory programs administered by his department and other agencies.<sup>21</sup>

Some states have forest practices acts regulating all or most forest management activities. Some require reforestation after timber harvests. Some require local government approval to convert forestlands to non-forest uses. Some provide various kinds of tax incentives to encourage forest owners to keep their lands in forests. All states provide landowner education and technical assistance delivered by State Foresters, land grant colleges and universities, and other institutions, often with federal funding through the by U.S. Forest Service state and private forestry programs and Natural Resources Conservation Service extension service programs.

Some states have struggled to contend with stakeholders who wish to see stricter regulation of forestry activities, notwithstanding the nearly universal view that greater environmental benefits result when forest owners keep their lands in forests rather than convert them to other uses. If forest owners encounter environmental regulations or environmental litigation risks that make forest management uneconomic, many are often compelled to consider alternative ways to obtain economic returns from their property. The problem is compounded by the fact that most

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<sup>18</sup> See <http://oceanservice.noaa.gov/topics/coasts/management/>

<sup>19</sup> At <http://coastalmanagement.noaa.gov/mystate/welcome.html>. Click on the map to bring up a summary for a particular state.

<sup>20</sup> CZMA Sec. 3217; see also [http://coastalmanagement.noaa.gov/programs/coast\\_div.html](http://coastalmanagement.noaa.gov/programs/coast_div.html)

<sup>21</sup> See National Association of State Foresters website, <http://www.stateforesters.org/>

forestry investments are “sunk” at or near the beginning of a forest stand rotation while most of the economic return is received decades later when the stand is harvested. Therefore, willingness to invest in new forest stands can depend on perceptions about whether harvest will be allowed decades later and what costs might be imposed by regulatory programs at that time. Many states have addressed this dilemma by trying to keep both administrative “transaction” costs and operational costs of forest regulation reasonable, relying on landowner education and voluntary cooperation as much as possible, providing technical assistance on forestry issues, favorable tax treatment for forestlands and forestry activities, and other incentives to encourage owners to increase forestry investments and keep lands in forest use. This incentive-based approach has sometimes been criticized by those seeking more regulatory mechanisms, but overall it seems to have produced good results: The amounts of forestland have been gradually increasing in most states for about 90 years as forests have grown back on former farmlands and pasture lands at faster rates than forestlands have been lost to urban development and other non-forest uses. For example, in some New England states land uses have shifted from about 80% agriculture to about 80% forests over the last 100 years or so. Similarly in southern states many lands formerly used for grazing, tobacco, cotton or other agricultural uses have returned to forests. In most regions the volumes of standing timber and other biomass have been increasing and could increase further if landowners could be induced to increase forestry investments to enhance timber growth and thus increase their forestry-based economic returns.

### **Voluntary Cooperative Activities**

In addition to the regulatory and non regulatory approaches listed above, some innovative cooperative projects between private landowners, states, and private foundations have resulted in the protection of critically important natural ecosystems and the interests of private landowners and other stakeholders. Here are a few recent notable examples:

- In 2007, the Nature Conservancy, the Lyme Timber Company, Conservation Forestry LLC and the State of Tennessee completed the largest conservation transaction in Tennessee since the creation of the Great Smoky Mountains National Park in the 1930s, protecting nearly 130,000 acres of hardwood forests, mountains and streams on the Cumberland Plateau, through a combination of working forest agreements, conservation easements, and land purchases.
- In 2008, Plum Creek Timber Company and King County, Washington entered into an agreement to protect the Green River Watershed by granting the county a conservation easement at no cost to the taxpayer, in exchange for Development Credits that allowed for increased development density in urban areas.
- In 2007, Forest Capital Partners signed an agreement with the Minnesota Department of Natural Resources that will restrict development on more than 51,000 acres of their privately owned forestland in Itasca and Koochiching counties in Minnesota. State and private money was used to purchase a working forest conservation easement from Forest Capital Partners, the largest single transaction for conservation in three decades in Minnesota. The

terms of the conservation easement, which is in perpetuity, guarantees public access for outdoor recreation, ensures sustainable forest management, and conserves wildlife habitat.

- In 2001, the Pingree family forest ownership in Maine, in partnership with the New England Forestry Foundation, created the world's largest conservation easement (764,000 acres) designed to maintain this land in an undeveloped condition while promoting continued use of the acreage as a working forest.

These kinds of creative arrangements—employed alongside the methods already available to the federal, state and local governments to regulate, manage, or influence activities on private forests through direct regulation, regulatory and non-regulatory BMPs, land use planning, and incentive arrangements—constitute a rich set of tools that can be used in pursuit of national goals, while remaining responsive to local needs and interests.

### **Will an Increased Demand for Energy Biomass require Changes in Forest Management Regulation?**

As a result of the growing dependence of the United States of foreign oil and the desire to increase the supply of renewable energy sources, working forests have been increasingly viewed as an important potential source of wood and biomass for conversion into electricity or liquid fuels such as cellulosic ethanol. Some have expressed concern that a “biomass boom” might result in the wholesale conversion of working forests into plantations of short rotation woody crops for the exclusive purpose of energy production, resulting in a loss of wood supply for saw logs, wood chips for pulp, or other forest products. Still others have expressed concerns that such a conversion might result in a loss of some of the environmental benefits that working forests provide.

It is important to note the forest products industry is already a major producer and user of renewable electricity, and that biomass already produces roughly 53% of the nation’s non-hydro renewable electricity.<sup>22</sup> Forest landowners have harvested biomass for energy in some locations for more than 20 years. In many instances, forest management that includes biomass harvesting has been included in BMP audits and third party certification programs.

Market history also suggests that wholesale conversion of working forests to dedicated energy crops is unlikely, since biomass intended to be used as an energy feedstock generally has a lower market value than other forest products. While wholesale conversion may be a valid concern in the case of “row crop” agriculture, where native grasslands, lands set aside for conservation purposes, or lands in food production might be converted to dedicated energy crops, such is not the case for working forests where energy biomass removals are likely to be in addition to, not in lieu of, the existing production of higher value products.

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<sup>22</sup> U.S. EIA at [www.eia.doe.gov/cneaf/alternate/page/renew\\_energy\\_consump/table3.html](http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/table3.html) - Biomass is the primary energy source for 55.4 billion kilowatt hours of the 103 billion kilowatt hours of non-hydro renewable energy produced in 2007 (preliminary figures, subject to revision).

But there probably are opportunities for working forests to be managed, in the pursuit of higher value products, to produce increasing amounts of biomass for renewable energy production. To ensure that soil productivity, wildlife habitat, or other values are not compromised by the removal of additional material that would otherwise be left in the forest without an ancillary market for biomass energy feedstocks, some states are exploring approaches to revise existing BMPs, or to establish new guidelines in addition to existing BMPs, to guide in the harvest of biomass for large scale energy. Because BMPs or the development of other BMP-like guidelines can take local factors into account, it seems prudent that enhancements or adjustments to state practices and guidelines be considered without federal interference, particularly as we gain a greater understanding of how biomass conversion technologies and markets will actually evolve.

With respect to the other potential impacts of increased forest biomass utilization for energy on air and water quality, wildlife habitat, and pesticide use, it is difficult to speculate beyond broad generalizations. However, the removal of additional biomass could be *beneficial* to air quality to the extent that it reduces the need for prescribed burns, lowers the risk of catastrophic wildfire or displaces fossil fuels as an energy source. Water quality would arguably be unchanged, since the largest factor in non-point source pollution associated with forest operations involves the construction and placement of roads, and biomass collection would likely occur using the same roads and access points used for the higher value product harvests. Increased use of wood for renewable electric power generation is unlikely to occur to the detriment of ESA-listed species since most wood-based biofuels have been and probably will continue to be byproducts of timber harvests conducted primarily for production of lumber, pulp, paper and other traditional forest products. Increased use of wood for renewable energy could contribute to increased pesticide use in some intensively managed plantations, mainly at the time new crops are being established. However, healthy fast-growing intensively managed timber crops are seldom subject to the kinds of insect and disease problems that sometimes require use of insecticides in “overmature” timber stands or other stands containing large amounts of dead, dying or damaged trees that attract forest pests. Therefore increased use of wood-based biomass seems unlikely to generate widespread pesticide problems or increased use of pesticides in the forestry sector.

## **Conclusion**

A robust yet flexible array of tools, in the form of federal, state and local laws, regulations, programs and Best Management Practices have measurably improved the environmental performance of forest operations in the United States. In addition, voluntary activities and third party sustainability programs have worked to promote environmental goals without sacrificing jobs and economic activity. As policymakers consider the imposition of new environmental requirements on private working forests, or market limitations on the participation of private working forests in emerging renewable energy markets, the implications for the economic viability of working forests must be considered to avoid inviting an unintended result—compelling private forest owners to consider alternative uses for working forests that do not provide the environmental services that provide healthy watersheds, wildlife habitat, carbon sequestration and similar benefits that are highly valued by society.