

# DEFORESTATION

Technical Support Document

International Training Workshop

Principles of Environmental Enforcement



## **DEFORESTATION TECHNICAL SUPPORT PACKAGE**

## ACKNOWLEDGEMENTS

This document is one of five Technical Support Documents that have been developed to accompany international training workshops on the Principles of Environmental Enforcement. They were developed as resource documents for government officials and others who are motivated to try to reduce the adverse environmental impacts from activities described in the case studies used for the course. The five case study areas include:

- o Mining (Metallic ores and Minerals),
- o Petroleum Refining and Petrochemicals,
- o Residential and Industrial (Solid) Waste Disposal
- o Tourism, and
- o Deforestation.

The documents provide an overview of the environmental impacts, pollution prevention and control opportunities, range of institutional mechanisms to control adverse impacts, and an annotated bibliography of selected reference materials. They do not address institutional and program development issues surrounding regulatory and enforcement programs. These topics, as well as country specific program examples are developed in the Proceedings of the International Conferences on environmental compliance and enforcement, UNEP institution-building workshop materials and new capacity building documents under development for the Fourth International Conference scheduled to be held in April, 1996 in Thailand.

International workshops on the Principles of Environmental Enforcement provide an opportunity for governmental and non-governmental officials to discover and apply the definitions, frameworks and principles to develop a successful management approach, compliance strategy and enforcement program for any environmental problem in any cultural or legal setting and to explore negotiated resolution of enforcement problems. The Principles of Environmental Enforcement text and training was developed by the U.S. Environmental Protection Agency in collaboration with the government of Poland and in cooperation with the government of the Netherlands. It was adopted as a basis for international exchange after having been successfully presented with this purpose in mind at the Second International Conference on Environmental Enforcement held in Budapest, Hungary, September 1992.

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## TABLE OF CONTENTS

### SECTIONS

1.	INTRODUCTION	
1.1	Purpose and Overview of the Deforestation Support Package .....	1
1.2	Deforestation and the Environment .....	2
2.	PROFILE OF THE FOREST SECTOR	
2.1	Overview: International Deforestation .....	2
2.2	Forest Types .....	2
	Boreal Forests .....	4
	Temperate Forests .....	4
	Tropical Forests: Moist, Dry, and Mangrove .....	4
2.3	Causes of Deforestation .....	5
3.	PRINCIPAL DEFORESTATION-RELATED ENVIRONMENTAL PROBLEMS	
3.1	Loss of Water Resources .....	7
3.2	Erosion of Top Soil and Loss of Nutrients .....	7
3.3	Climate Change .....	9
3.4	Decreased Biodiversity and Habitat Loss .....	9
4.	PREVENTION/CONTROL OPTIONS	
4.1	Technological/Best Management Practices .....	10
4.2	Performance-based .....	12
4.3	Economic .....	12
4.4	Voluntary .....	13
5.	PLANNING, MONITORING, ENFORCEMENT AND COMPLIANCE APPROACHES	
5.1	Planning .....	13
5.2	Policy, Legislative and Regulatory Measures .....	14
5.3	Training, Education and Local Participation .....	14
5.4	Monitoring and Inspection .....	15
5.5	Enforcement and Compliance .....	15

### APPENDICES

APPENDIX 1: Ministries and Organizations Concerned with Forestry and Deforestation .....	19
APPENDIX 2: Annotated Bibliography	
A2.1 Books, Reports and Articles .....	20
A2.2 Journals and Newsletters .....	29
A2.3 Obtaining Selected Publications .....	30
APPENDIX 3: Sample Laws, Criteria, Permits, Survey Forms, Guidelines, Contracts, and Policies .....	31

## **DEFORESTATION\FOREST RESOURCES SUPPORT PACKAGE**

### **1. INTRODUCTION**

Forests cover almost a third of the earth's land surface<sup>1</sup>, providing many environmental benefits including a major role in the hydrologic cycle, soil conservation, prevention of climate change, and preservation of biodiversity. Forest resources can provide long-term national economic benefits. For example, at least 145 countries of the world are currently involved in wood production. However, deforestation, particularly in the tropical moist forests, is proceeding at a very rapid rate. Reasons for deforestation include clearing of land for agriculture and ranching, fuelwood gathering, unsustainable and inefficient logging practices, timber theft, and the adverse effect of air pollution on forests. The negative economic impacts of deforestation are substantial, and include losses due to pollution and siltation of water used for drinking, agricultural, commercial and industrial purposes; destruction of fisheries and aquatic habitat; flooding; siltation of waterways and dams; loss of top soil and soil fertility; climate change; reduction or loss of non-timber harvests; and loss of recreational resources that attract tourists. Many of these impacts can be avoided or controlled through the use of prevention and control options, and through planning, monitoring, enforcement and compliance.

#### **1.1 Purpose and Overview of the Deforestation Support Package**

The purpose of this support package is to provide a general resource for governments and others concerned about the environmental impacts of deforestation and to present alternatives for preventing, controlling or minimizing these impacts. It provides a brief overview of global deforestation, forest types and characteristics, and summarizes causes of deforestation. The document reviews some major prevention and control options, along with enforcement and compliance approaches that can be used to reduce or eliminate negative effects of deforestation.

For purposes of this document, deforestation is defined as the full-scale clearing of forest lands. Forest degradation refers to forest damage or significant alteration (for example, from air pollution or partial clearing of forest trees and/or vegetation). Sustainable use is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

This document is intended as an initial reference, providing summary-level information on deforestation prevention and minimization of adverse environmental effects. More detailed sources of information are provided in the Appendices, including information on organizations and ministries concerned with forestry and deforestation, an annotated bibliography, and sample documents.

## **1.2 Deforestation and the Environment**

Major environmental problems associated with deforestation include:

- Loss of water quality, including water used for drinking, commercial, agricultural and recreational purposes;
- Damage to fisheries and aquatic habitats from erosion and turbidity (dissolved and undissolved particles in water);
- Increased flooding during wet periods, and loss of water normally stored and released during dry periods;
- Erosion of top soil and nutrient loss;
- Climate change, such as decreased local rainfall and desertification; and
- Decreased biodiversity, and loss of habitat for wildlife and endangered species.

## **2. PROFILE OF THE FOREST SECTOR**

### **2.1 Overview: International Deforestation**

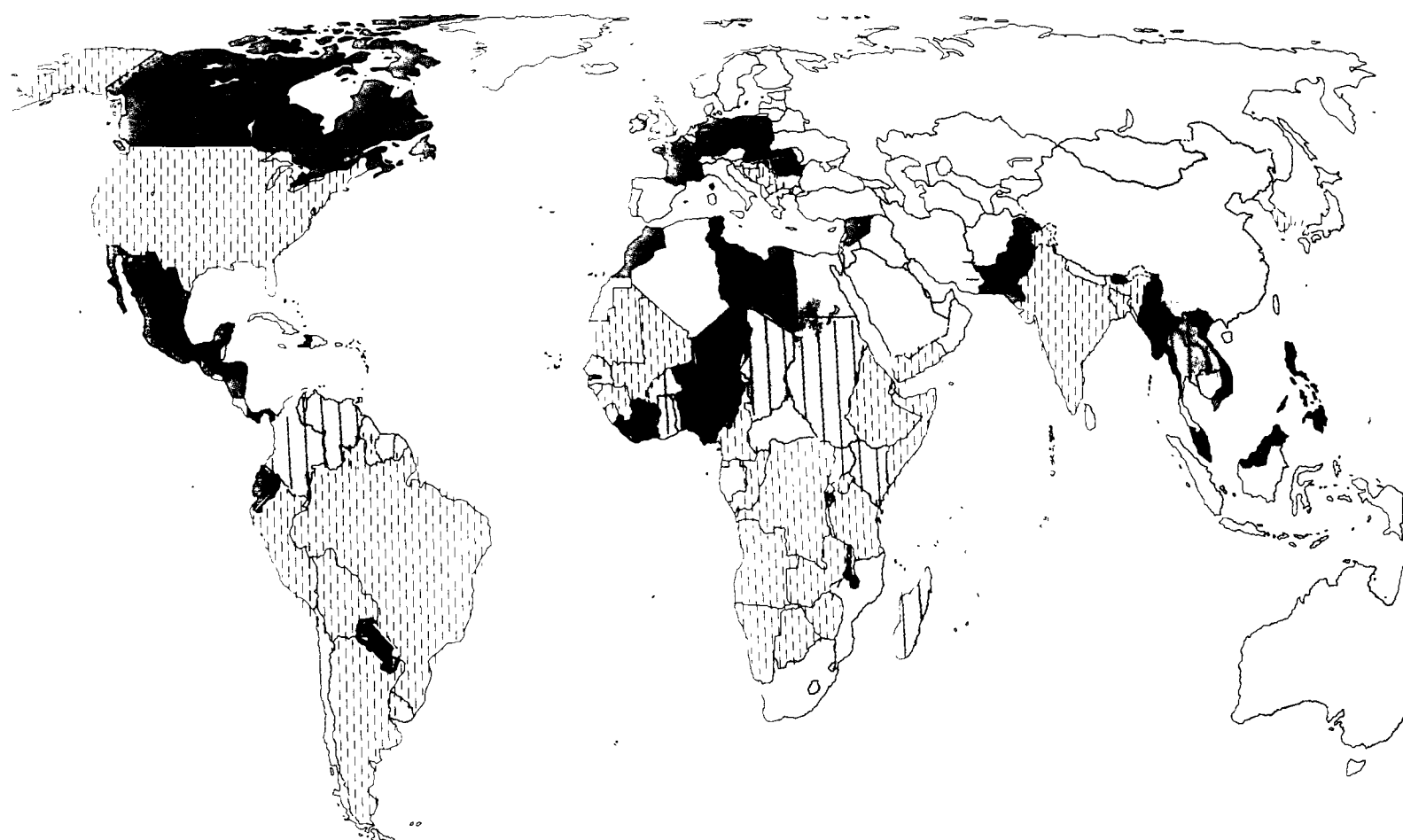
An overview of global deforestation between 1965-1989 is provided in Figure 1. A more detailed summary of forestry problems is provided in the Nations of the Earth Report of 1992 which summarizes reports prepared by 47 of the countries on environmental problem areas and programs for dealing them. Many of the country reports discuss deforestation problems. Countries with average annual deforestation rates over 2% during the 1980s include (in Africa) Algeria, Burundi, Cote d'Ivoire, Guinea-Bissau, Liberia, Malawi, Mauritania, Niger, Nigeria, and Rwanda; (in Asia) Nepal, Sri Lanka and Thailand; and (in Central & South America) Costa Rica, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, and Nicaragua.<sup>2</sup> A 1992 Food and Agriculture Organization of the United Nations (FAO) study reported that since the early 1980s, the rate of tropical deforestation had increased by 50%.<sup>3</sup>







Generally, the area of temperate forests is increasing as second growth forests replace the primary forest (original, intact or virgin forest) cut earlier. Many remaining tropical forests are primary forest which still retain their biodiversity. Differences between tropical and temperate forests are discussed in the following section.

### **2.2 Forest Types**

Around the world, there are three main forest types and related ecosystems: boreal, deciduous, and tropical. Variation in the longevity and growth capabilities of trees and

**Figure 2: Change in Forests and Woodland: 1989**



-  Very rapid decrease (-1.1 percent or more)
-  Rapid decrease (-0.6 to -1.0 percent)
-  Moderate decrease (-0.1 to -0.5 percent)
-  No change (0.0 percent)
-  Increase (+0.1 percent or more)
-  No data available

Source: Sheram, Katherine, The Environmental Data Book, (The World Bank, Washington, DC), 1993, p. 5.

Forest and woodland are decreasing most rapidly in developing countries. Many countries have no net loss of forest area—that is, the amount cleared is equal to the amount replanted. Some countries have a net increase.



vegetation, soil characteristics, and biodiversity between and within these different forest types all affect the environmental impacts of deforestation, and selection of the most effective management options.

### Boreal

The boreal forest is found in northern latitudes and composed almost completely by coniferous trees -those bearing pine cones - such as firs, spruce, pines, and hemlock.

### Temperate

Temperate forests include both coniferous and deciduous trees. About 39% of the land area of temperate regions is covered by forests.<sup>4</sup> About half of the world's total forest and other wooded land is in the temperate-zone regions, with about 25% in the former USSR and almost 20% in North America. The World Conservation Monitoring Centre in England reports that for temperate forests overall, forest area is increasing.<sup>5</sup>

The temperate rainforest is a special category of forest, such as the alerce forests of Chile and the redwood forests of California. These coastal forests are noted for heavy fog and rain, and are home to some of the oldest trees on earth such as coast redwoods which have a life expectancy of up to 2,000 years, and the giant sequoia which reaches full growth at 3,000 years.<sup>6</sup>

Deciduous forests lose their leaves every year during winter, and include trees such as oak, beech and maple. These forests have been heavily impacted by man. However, some scientists think that some of these temperate forests have natural destruction/regeneration cycles of about 250-450 years, with destruction caused by storms, fires caused by lightning, old age, insects and disease.

### Tropical Forests

Tropical dry and moist forests are characterized by warm temperatures all year and moist tropical forests by abundant rainfall. Generally, nutrients in tropical forests are stored in the vegetation, unlike temperate forests where many nutrients are stored in the ground. Often when moist tropical forests are cleared, the rains quickly wash away nutrients in the soil and agriculture cannot be sustained very long. Tropical forests also contain tremendous biodiversity, partly because of the favorable growing conditions, and also because unlike the boreal and deciduous forests, the tropical forests were not periodically destroyed by glaciers. Moist tropical forests, at an estimated 7% of the world's land area, may contain over 50% of all named species in the world biota.<sup>7</sup> Tropical dry forests are concentrated in Africa, and are utilized heavily for fuelwood gathering. Deforestation of some tropical dry forests, such as those in the Sahel, may contribute to desertification.

Environmentally important mangrove forests, found in tropical coastal areas such as bays, lagoons, and river estuaries, are a special category of tropical forest. Mangroves grow in shallow water and protect coastal areas during storms. The bark and leaves of some species are used for medicinal purposes. The mangrove forests also serve as nurseries for fish and shellfish. In India, for instance, the mangroves shelter 105 species of fish, 229 crustacean species, and 20 shellfish species, but during the last 25 years, almost 30% of the Indian mangrove forests have been destroyed.<sup>8</sup>

## **2.3 Causes of Deforestation**

Major causes of deforestation include cutting for fuel, clearing of land for agriculture and ranching, and logging. Causes of forest degradation include air pollution (such as acid rain and ozone), slash and burn agriculture, and non-sustainable partial clearing. Timber theft accounts for some deforestation and degradation. Unnecessary deforestation also takes place in many areas because lower than market prices are charged for government logging concessions, residual timber is unnecessarily damaged during the logging operations, and inefficient processing wastes lumber.

### **2.3.1 Fragmentation**

A precursor of deforestation is fragmentation of forests, because fragmented forest units are more accessible for clearing, timber theft, and fuelwood cutting, and subject to decreased biological diversity. A study found 2/3 of the tropical rainforests were fragmented (under 400,000 hectares and had road or water access). South America had the least fragmented rainforests, with 41% of the rainforest remaining in large tracts, Central America has about 33% remaining, Africa has about 20%, and forests in Southeast Asia and Oceania are the most fragmented with only 12% in large tracts.<sup>9</sup>

### **2.3.2 Fuelwood**

About 80% of wood used in developing countries is for fuelwood.<sup>10</sup> (Even an industrially developed country like Hungary reports that in 1989, 44% of the wood production was for fuelwood<sup>11</sup>). Fuelwood gathering is often concentrated in tropical dry forests and degraded forest areas.

### **2.3.3 Clearing without Timber Utilization**

About 60% of the clearing of tropical moist forests is for agricultural settlement<sup>12</sup>, with logging and other reasons (roads, urbanization and fuelwood) accounting for the rest. As an example of the scope of the clearing without timber utilization, 6000 separate fires were burning on a single day in 1988 in the Amazon forest as a result of slash and burn deforestation.<sup>13</sup> Other examples include Ghana and the Ivory Coast, where in Ghana, with 80% deforestation, the forest department estimates only 15% of the timber was harvested before land clearance. In the Ivory Coast, estimated loss from unutilized timber was perhaps \$5 billion.<sup>14</sup>

#### 2.3.4 Air Pollution

Air pollution is associated with degradation of some European and North American forests. The syndrome is called "Waldsterben" or forest death. For example, in 1982, 8% of all West German trees exhibited damage, rising to about 52% by 1987.<sup>15</sup> One report indicates that half the trees in the Alps are dying of Waldsterben.<sup>16</sup> High elevation forests show the earliest damage, including forests in the northeast and central US. Scientist E. Schulze of West Germany concluded that nitrogen compounds and sulfates (acid rain components from fossil fuel burning) acidify the forest soil, freeing toxic aluminum to enter the tree roots instead of calcium and magnesium which are crucial to tree nutrition. The calcium/magnesium deficiency stunts growth. Increased nitrogen depositing on tree foliage and into roots acts at the same time as a fertilizer, stressing the trees. Thus weakened, the trees succumb to pests and adverse weather, conditions which would not otherwise kill the trees.<sup>17</sup>

#### 2.3.5 Timber Harvesting

Timber harvesting is another leading cause of deforestation. Of the approximately 185 - 190 countries currently recognized as independent, at least 145 are wood producers (the former USSR, now 12 entities, is counted as 1). The lead United Nations agency for forestry issues is the Food and Agriculture Organization (FAO), which defines wood production (roundwood) as "the quantities removed from forests and from trees outside the forest, including wood recovered from natural, felling and logging losses... Commodities included are sawlogs and veneer logs, pulpwood, other industrial roundwood ... and fuelwood." As of 1992, using this definition, wood production by region was: Africa - 15%, North and Central America - 22%, South America - 10%, Asia - 32%, Europe - 10%, Oceania - 1%, and the former USSR (CIS) - 10%.<sup>18</sup>

#### 2.3.6 Inefficient Timber Processing and Revenue Practices

Inefficient timber processing and revenue practices cause unnecessary deforestation. A World Bank study indicated that these problems are common to many countries. For example, a World Bank study cited a situation in Cameroon where in 1987 the total of all forest revenues collected from forest fees was only between 2-4% of the FOB (price of timber including transportation to the ship) price of export logs, and in Ghana where 1988 forest revenues collected from all forest fees was only about 1/6 the amount that should have been realized.<sup>19</sup>

### **3. PRINCIPAL DEFORESTATION-RELATED ENVIRONMENTAL PROBLEMS**

Loss of water resources, erosion of top soil, climate change, and decreased biodiversity are major environmental problems associated with deforestation, as summarized in Table 1, and described, with examples, in the following section.

### **3.1 Loss of Water Resources**

Water resources affected by deforestation include drinking water, fisheries and aquatic habitats, flood/drought controls, waterways and dams affected by siltation, less appealing water-related recreation, and damage to crops and irrigation systems from erosion and turbidity.

Turbidity (dissolved and undissolved particles in water) is one of the problems caused by deforestation. As indicated in Table 1, turbidity can impair the use of water for a variety of purposes. For example, turbidity interferes with treatment of drinking water, as illustrated in Washington, DC recently when high turbidity levels in the municipal drinking water supplies resulted in a recommendation that residents boil their water during a ten day period. One of the ways turbidity can contribute to water pollution is that many chemical constituents, such as pesticides, are sorbed onto fine particles in the water. Turbidity can damage or even eliminate fish and aquatic habitat.<sup>20</sup> High turbidity levels from deforestation in the Pacific Northwest of the U.S. are reported to be one of the causes of reduced salmon harvests.

Examples of the extent of damage to waterways and dams include a reduction by half in the useful life of the dams on Himalayan rivers and a rate of erosion in the watershed area of the Himalayan rivers five times greater than the rate over the past 40 million years. The estimated 50 year life of the Tarbela dam in Pakistan was reduced to under 20 years by sedimentation from deforestation, cultivation of steep slopes, and overgrazing. Another example of the costs includes flood damage in India from deforestation in the Himalayas costing about \$210 million annually in emergency assistance.<sup>21</sup>

### **3.2 Erosion of Top Soil and Loss of Nutrients**

Erosion of top soil from deforestation affects many countries. Examples include Ethiopia, Nepal, and Haiti; half of Ethiopia's land area was affected by erosion in the 1980s. In the United States, billions of dollars have been spent by the US Soil Conservation Service to prevent loss of top soil in areas which were converted to agricultural use from forests. Tropical forest soils are particularly vulnerable to nutrient loss. Because forests converted to pastures quickly lose fertility and productivity, and therefore can carry few cattle, the per hectare revenue from Brazil nuts and wild rubber from the same land is estimated to be four times greater than the revenue from cattle ranching in the Brazilian state of Acre. Similarly, in a 1987 evaluation of a one hectare forest area near Iquitos, Peru, total net revenues from sustainable harvesting of non-wood forest products (using market prices in Iquitos) were 66% greater than those from forest conversion.<sup>22</sup>

Table 1  
**Major Environmental Problems Caused by Deforestation  
 and Inappropriate Forestry Practices**

<b><u>Loss of Water Resources</u></b>	Uncontrolled runoff carries soil and debris into surface water, reducing water quality for drinking, fisheries and aquatic habitat, and flood prevention. Navigable waterways and dams are silted up
Drinking Water	Increased turbidity reduces effectiveness of chlorination, increases adsorption of toxic materials, provides food for microbes which can then multiply in the water distribution system, interferes with ion exchange and carbon adsorption processes and with lab analysis of water quality
Destruction of Fisheries and Aquatic Habitat	Siltation kills fish, spawning areas and vegetation needed by fish to reproduce and survive
Flooding	Uncontrolled runoff increases flooding
Siltation of Waterways,Dams	Turbidity & suspended solids deposit in navigable waterways (requiring dredging) and dam impoundments (shortening the useful life of the dam)
Decreased Recreation	Turbid waters are dangerous for swimming and diving because the depth and submerged hazards cannot be seen. Also, users prefer clear water and clean beaches for aesthetic reasons.
Crop Damage	Turbidity damages irrigation systems and equipment, films form on plant leaves, reducing growth and market value, crusts form on soil surfaces inhibiting water absorption, young plant growth and soil aeration.
<b><u>Erosion of Top Soil &amp; Nutrient Loss</u></b>	Removal of the trees, ground cover, and leaf litter allows uncontrolled runoff and nutrient leaching during rains, making reforestation and farming difficult
<b><u>Climate Change</u></b>	Large deforested areas can cause undesirable climate change, such as decreased rainfall, or can contribute to global warming
<b><u>Decreased Biodiversity</u></b>	Loss of sustainable forest is accompanied by loss of habitat, species and genetic diversity, and loss of non-timber harvests

### **3.3 Climate Change**

Climate change (also known as global warming or global change) includes anthropogenically produced climatic and ecological problems such as recent apparent climatic temperature shifts and precipitation regimes in some areas, sea level rise, stratospheric ozone depletion, atmospheric pollution and forest decline. "Greenhouse gasses", including carbon dioxide, trap heat in the earth's atmosphere, creating a warming, or greenhouse effect. Forested areas serve as "sinks" or reservoirs of carbon because carbon is part of tree and plant tissue. Thus, deforestation increases the greenhouse effect, and reforestation reduces it. Over 90% of the carbon lost from deforestation is released to the atmosphere as carbon dioxide, and carbon dioxide is a long-lasting gas, with an average residence time in the atmosphere of 100 years. Release of the carbon dioxide from deforestation accounts for an estimated 25% of emissions from combustion of fossil fuels.<sup>23</sup>

Estimates of the global warming effect of the six greenhouse gasses released by deforestation in the Brazilian Amazon in 1990 indicated that the emissions represent 7-8 times the annual carbon release from Brazil's use of fossil fuels. A study by the Lawrence Berkeley Lab indicated that ending deforestation in Brazil would cut greenhouse emissions as much as making all the cars in the world three times more fuel efficient.<sup>24</sup>

### **3.4 Decreased Biodiversity and Habitat Loss**

When forest is destroyed, fragmented or degraded, biodiversity and habitat for migratory birds and for many types of endangered species is lost. Retaining the biodiversity of the forested areas is retaining a form of capital, until more research can establish the relative importance of various plant and animal species. The value of biodiversity in the medical area alone is illustrated by several examples. According to the World Health Organization, as much as 80% of the world's population relies for primary health care at least partially on traditional medicine. Much traditional medicine relies on forest plants. The local economic value of medicinal forest products was studied in Belize. Two scientists evaluated the sustainable harvest from two forest plots of all the medicinal plants that could be sold to local herb healers and pharmacists. On a sustainable basis (30 year harvesting rotation), the herb harvest was worth \$294 and \$1,346 per acre on the two plots. In comparison, clearing rain forests for agriculture was worth \$117 per acre in Guatemala, and \$137 in Brazil.<sup>25</sup> Pharmaceutical use of forest-based drugs includes the rosy periwinkle from tropical forests in Madagascar, used to treat childhood leukemia and Hodgkin's disease, and the yew bark from temperate forests used to treat ovarian cancer. It is estimated that less than 1% of tropical plants have been screened for medical uses.<sup>26</sup>

## **4. PREVENTION/CONTROL OPTIONS**

Around the world, governments have used a variety of prevention/control options to prevent environmental damage from deforestation as well as to retain existing forests and forest

resources, to prevent unnecessary deforestation, and encourage reforestation where appropriate. Many of these control options are technological (e.g., use of best management practices to control erosion). However, many control options, such as bans on logging, limits on forest destruction or subsidies, can also be viewed as management options. We discuss each of these different types of options in this section. A summary of some major options is included in Table 2, with examples provided in the following section.

<b>TABLE 2: SELECTED PREVENTION/CONTROL OPTIONS</b>
<b>TECHNOLOGICAL/BEST MANAGEMENT PRACTICES</b>
Establish Best Management Practices (BMP) for forestry operations, institute a full or partial logging ban, limit access to forests, control major air pollution affecting trees
<b>PERFORMANCE-BASED</b>
Set a Performance Goal (e.g. no net forest destruction, x% increase in forested area, limit turbidity levels from forestry runoff into surface waters)
<b>ECONOMIC</b>
Maximize the market for non-wood products, improve forest pricing and concessions policies, change laws providing inadvertent economic incentives for deforestation, develop social forestry programs
<b>VOLUNTARY</b>
Provide technical assistance, set up a timber certification program, use awards programs

#### **4.1 Technological/Best Management Practices**

Best Management Practices (BMP) include water pollution control measures in widespread use in forestry operations throughout the world. These management practices involve a variety of locally appropriate erosion control measures which help prevent pollution in surface waters resulting from forestry activities and deforestation. In the United States, recent surveys indicate forestry activities contribute approximately 3-9% of all non-point source pollution of water bodies.<sup>27</sup> Best Management Practices are important because they prevent or minimize environmental problems associated with forestry activity such as turbidity, nutrient transport, and runoff of herbicides, insecticides and fungicides into surface waters affecting drinking water, fisheries and

aquatic habitats, flooding, siltation of dams and irrigation systems, and crop damage from siltation on leaves from irrigation water.

Many different specific control technologies, or Best Management Practices, are available, including preharvest planning to minimize runoff and erosion from roads and harvest areas into streams, use of streamside buffer or management areas (areas along surface waters where the vegetative cover is left) to reduce runoff from upslope activities and trap sediments, use of road construction, maintenance, and post-harvest revegetation techniques that minimize erosion, and use of effective erosion control devices, as locally appropriate, such as sediment control devices like silt fences, riprap, and sediment traps or check dams. Other control technologies include timber harvesting techniques that minimize erosion like cable yarding and aerial harvesting, particularly for dispersed high value timber. Fire management is important in preventing erosion, particularly on steep slopes near streams. Careful management of chemicals used in forestry is important in reducing environmental damage. Aerial applications of pesticides may pose the greatest risk to water quality, but streamside buffer zones have been found to minimize the effects of pesticide application. Studies have shown prompt revegetation of disturbed areas effectively reduces erosion. Detailed information on effectiveness, applicability, and costs of different Best Management Practices is contained in many of the references in Appendix 2, the Water Resources and Forestry section of the Bibliography.

An indication of the extent to which different Best Management Practices are used in the U.S. is provided in a 1993 U.S. Environmental Protection Agency study. The study reported that over 80% of the states had state BMP regulations or manuals. Most state BMPs addressed preharvest planning (over a third), road construction and maintenance (all), timber harvesting, streamside buffer or management zones (almost 60%), site preparation, chemical management (over 40%), revegetation (almost 70%), prescribed burning, and drainage structures in some.<sup>28</sup> A recent summary by USEPA of the effectiveness of various forestry management measures indicates revegetation, roads, and streamside buffer or management zones offer some of the greatest opportunities for pollution reduction.

Logging Bans/Protected Areas: The establishment of various categories of protected forest areas has been used effectively by many countries to retain important benefits of forests and prevent environmental damage from deforestation. In some countries, the only remaining forests are those with protected status. Protected forest areas have existed since the 4th century BC in India, and hunting reserves existed in Europe for hundreds of years. Most protected areas were established in the late 19th century. The International Union for the Conservation of Nature has developed a standard classification system of ten types of protected areas. Using this criteria, 169 countries have protected sites covering over 5% of the world's land area. Of this amount, about 9% is in subtropical/temperate rainforests/woodlands, about 5% in tropical humid forests, 4.7% in tropical dry forests/woodlands, 4.7% in evergreen sclerophyllous forests, about 3% in temperate broad-leaf forests, and about 2.9% in temperate needle-



leaf forests/woodlands.<sup>29</sup> Because of the range of different forest types protected, preservation of biodiversity is a major benefit.

A different type of ban/protected area was established by the government of Thailand. A full commercial logging ban on government forests was imposed after uncontrolled runoff from rains caused landslides, and destroyed the homes of 40,000 people. However, between 1985 and 1988, forest cover fell from 29% to 19%.<sup>30</sup> A logging ban was also imposed in Ecuador to reduce deforestation.

Another example of a national timber ban is one imposed by the Kingdom of Bhutan in the Himalayas. In 1974, the government stipulated that 60% of the country would remain under permanent forest cover. A tree planting program was initiated to increase the forest area, and the government has started giving villages their own forest plots to manage.<sup>31</sup>

Other types of logging bans which have been used include bans on steep slopes (e.g. over 30% grade), bans on logging near surface waters (streamside buffer areas), and logging bans in government reserves (extractive reserves). Examples of such bans include Brazil's new system of nine extractive reserves where logging is prohibited, but activities such as rubber harvesting, shellfish gathering and fishing, and coconut harvesting are permitted.<sup>32</sup> A critical component of such programs balancing the extraction of non-wood products with the maintenance of biodiversity, and to avoid over-harvesting.

## **4.2 Performance-Based Options**

Performance-based options leave the choice of management options up to the regulated group or individual but require measurement and monitoring methods to determine whether the performance standard has been met. An example of a performance-based goal or standard is the surface water turbidity standard used by the United States and Canada. A copy of the standard for the province of British Columbia, Canada is included in Appendix 3.

## **4.3 Economic Options**

Economic options use market forces to encourage activities reducing deforestation and/or forestry activities causing environmental problems. Such options include tax policies that reduce assessments for "conservation land", government assistance for reforestation, tax incentives and government subsidies for turbidity control and other Best Management Practices, and extending the life of timber concessions to provide an incentive for protection and maintenance of the reforested area until the new growth is well established. Other economic options include changing laws inadvertently causing deforestation, provision of secure land tenure for forest residents protecting the forest, the development of community forestry programs, and programs for timber theft prevention.

An example of an economic option is the use establishment of "conservation land" areas in Lincoln, Massachusetts, USA. Tax rates are set at a lower level for forest lands of conservation interest to the town. Another example of an economic option is the timber theft program established by the State of Louisiana, USA which helps private landowners protect their forest lands against timber theft (see Appendix 3 for more information on this program).

Brazil changed a policy which provided economic incentives for conversion of forests to ranches in Amazonia. The changes involved suspending the economic incentives for new livestock ranches in Amazonian forests.<sup>33</sup>

Another example of an economic option is changing the forest pricing methods. Options include raising forest sale fees to market levels, simplifying overly complex procedures, adjusting for inflation, increasing collection rates, using market mechanisms (e.g. competitive bids) for concession allocation, and reducing wasteful logging through payment per tree or volume of trees felled (rather than removed). The Grut, Gray and Egli report by the World Bank on Forest Pricing contains detailed recommendations in each one of these areas.

Community forestry programs and land titling programs work with local populations and their economic interests to increase forest protection. For example, the Awa reserve was created in 1982 in Ecuador to protect 1700 hectares of forest from deforestation by developing a multi-faceted program including land titling for local residents, inventorying forest resources and developing a program for effective forest use.<sup>34</sup> In Nepal, an effort to combat deforestation involved establishment of community nurseries and distribution of tree seedlings free or at minimal cost, and promotion of agroforestry.<sup>35</sup>

#### **4.4 Voluntary Options**

Voluntary approaches are widely used in the forestry area to encourage compliance with environmental goals. Voluntary options include education and technical assistance, timber certification programs, and awards programs. Examples include many of the Best Management Practice programs in the US which are voluntary, and depend heavily on education and technical assistance efforts by forestry staff. For instance, a study of the effectiveness of U.S. State programs directed at private landowners indicated technical assistance programs were judged most effective<sup>36</sup>.

## **5. PLANNING, MONITORING, ENFORCEMENT AND COMPLIANCE APPROACHES**

### **5.1 Planning**

Planning is used in many countries, from the national to local levels, to maximize the benefit from forest resources, and minimize the environmental damage resulting from deforestation and forestry activities. Typical plans relating to deforestation include land use

planning, natural resource planning, park and recreational planning, and harvest planning, with special attention focused on sensitive areas. For example, Madagascar is currently undertaking a major national planning effort to preserve the remaining 20% of its forested areas and is studying the potential of nature tourism in these areas.<sup>37</sup> At a local level, the State of California precludes any person from conducting timber operations unless a timber harvesting plan, prepared by a registered professional forester, has been approved by the Director of Forestry. The plan must be based on site-specific characteristics including vegetation type, topography, and stream characteristics.<sup>38</sup>

## **5.2 Policy, Legislative and Regulatory Measures**

A wide variety of policy statements, and legislative and regulatory measures have been established to protect forests and prevent pollution. Two reference volumes allow country-by-country analysis, IUCN's Protected Areas of the World: A Review of National Systems, and FAO's Forest Legislation in Selected African Countries. A review of legislation specifically pertaining to Biodiversity is contained in the World Conservation Monitoring Centre's Global Diversity. Legislation on water quality and climate change is often available through the offices responsible for those programs. Costa Rica's recent forest policy, referenced in Appendix 3, is an example of a coordinated national effort, developed through a cooperative process by the government and private forestry sector representatives. The State of Virginia's recent Forest Water Quality Law is included in the same Appendix as an example of a legislative measure designed to prevent water resource damage from forestry activities.

## **5.3 Training, Education and Local Participation**

Training and education of stakeholders helps people understand how to prevent and reduce adverse environmental effects associated with deforestation and forestry activities, and take appropriate action when possible. It also has been particularly important in promoting community based programs which seek to substitute other economic uses of forest resources and new forestry practices for forest clearing.

Where local populations live in or near forests, local participation has been found to be essential to the successful prevention of deforestation. Many case studies of local participation are included in Saving the Tropical Forests, and in People and Parks: Linking Protected Area Management with Local Communities. The first study includes a number of positive approaches to tropical forest conservation, and the second is a analytical look at the results of a number of projects. Another report, Developing a Partnership of Indigenous Peoples, Conservationists, and Land Use Planners in Latin America, includes case studies of some successful forest preservation projects developed with indigenous peoples.

An example of a different type of community participation is the local volunteer monitoring of water quality by organizations like the Izaak Walton League of America in their Save Our Streams program. Started in 1969, the program has grown to several

thousand active projects across the United States.<sup>39</sup> Local groups "adopt" a stream of their choice and monitor it for a year or more. Timber operations are one of the non-point sources whose effects on surface waters the local groups are trained to monitor. Local citizens are trained in conducting biological and/or chemical testing, and reporting stream abuses, and are given information on improving water quality through measures such as Best Management Practices for forestry activities. A Stream Quality Survey form, used for monitoring of macroinvertebrates sensitive to turbidity and other forms of pollution, is included in Appendix 3.

#### **5.4 Monitoring and Inspection**

Monitoring compliance is essential to a effective enforcement program. Forestry monitoring may include evaluation of the overall extent of deforestation or forest degradation, and/or examination of specific environmental problems caused by deforestation such as erosion, and effects on surface water. Major monitoring tools in forestry include on-site inspections by staff, citizen monitoring and complaints, aircraft overflights, and use of satellite data. Despite the difficulty of monitoring theft and illegal logging in forest reserves, many countries and indigenous populations are mounting effective monitoring and surveillance programs. Countries such as Guyana have enlisted the support of their defense forces and police in surveillance of sensitive forest reserves threatened by theft and encroachment, (described in the Proceedings of the Third International Conference on Environmental Enforcement, Oaxaca, Mexico, April 25-18, 1994.) Indigenous tribes in Panama (Cuna) and Ecuador (Awa) have used coordinated tribal action to monitor and protect designated forest reserves.

#### **5.5 Enforcement and Compliance**

This Document is intended to accompany the Principles of Environmental Enforcement Text, U.S. EPA, which describes the basic elements and approaches for establishing effective compliance strategies and enforcement programs. As a supplement to international efforts to advance effective environmental compliance and enforcement programs, the readers are referred as well to the UNEP IE training manual on Institution Building for Industrial Compliance and Proceedings of the series of International Conferences on Environmental Compliance and Enforcement for further discussion.

Many formal and informal enforcement/compliance mechanisms are used to prevent deforestation and environmental problems from forestry activities empowering citizens and governments to impose legal consequences to encourage and compel compliance. These approaches include negotiation, warnings, Stop Work Orders, Notices of Violation, fines, arrests, and court action. An example of a successful enforcement program is on the Bururi and Rumonge forest preservation and reforestation projects in Burundi, where increased enforcement was reported to be critical in reducing illegal fuelwood gathering and logging.<sup>40</sup> Samples of legislation and other documents supporting enforcement actions are included in Appendix 3.

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## **APPENDIX 1: MINISTRIES AND ORGANIZATIONS CONCERNED WITH FORESTRY AND DEFORESTATION**

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## APPENDIX 2: ANNOTATED BIBLIOGRAPHY

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### **A2.3 OBTAINING SELECTED PUBLICATIONS**

#### HOW TO OBTAIN SELECTED PUBLICATIONS

UNITED NATIONS (FAO) PUBLICATIONS: Check your local bookstore, or write:

UNIPUB  
4611/F, Assembly Drive  
Lanham, MD 20706-4391, USA

US ENVIRONMENTAL PROTECTION AGENCY PUBLICATIONS:

U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460, USA

WORLD BANK PUBLICATIONS:

World Bank  
Publications Office  
1818 H St., N.W.]  
Washington, DC 20433, USA

FEDERAL LAW ENFORCEMENT TRAINING CENTER PUBLICATIONS:

Federal Law Enforcement Training Center  
Glynco, GA 31524, USA

US FOREST SERVICE PUBLICATIONS:

Forestry Support Program  
USDA Forest Service  
PO Box 96090  
Washington, DC 20090-6090

### **APPENDIX 3: SAMPLE LAWS, CRITERIA, PERMITS, SURVEY FORMS, GUIDELINES, CONTRACTS AND POLICIES**

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A3.4 NGO(Non-Government Agency) Stream Quality Survey

A3.5 Timber Theft Legislation, Prevention Guidelines, and Sample  
Timber Sales Contract: State of Louisiana, USA

A3.6 National Forestry Policy: Costa Rica, 1993

## APPENDIX A3.1: Forest Water Quality Law and Description Commonwealth of Virginia, 1993.

### CHAPTER 948

*An Act to amend and reenact § 10.1-1105 of the Code of Virginia and to amend the Code of Virginia by adding in Chapter 11 of Title 10.1 an article numbered 12, consisting of sections numbered 10.1-1181.1 through 10.1-1181.7, relating to silvicultural activities affecting water quality; civil penalties.*

[H 2055]

Approved April 7, 1993

Be it enacted by the General Assembly of Virginia:

1. That § 10.1-1105 of the Code of Virginia is amended and reenacted and that the Code of Virginia is amended by adding in Chapter 11 of Title 10.1 an article numbered 12, consisting of sections numbered 10.1-1181.1 through 10.1-1181.7, as follows:

§ 10.1-1105. Additional powers and duties of State Forester.—The State Forester shall supervise and direct all forest interests and all matters pertaining to forestry within the Commonwealth. He shall have charge of all forest wardens and shall appoint, direct and supervise persons he employs to perform labor in the forest reservations or the nurseries provided for herein. He shall take such action as is authorized by law to prevent and extinguish forest fires; enforce all laws pertaining to forest and woodlands; prosecute any violation of such laws; collect information relative to forest destruction and conditions; direct the protection and improvement of all forest reservations; and, as far as his duties as State Forester will permit, conduct an educational course on forestry at the University of Virginia for credit toward a degree, at farmers' institutes and at similar meetings within the Commonwealth. *He shall provide for the protection of state waters from pollution by sediment deposition resulting from silvicultural activities as provided in Article 12 (§ 10.1-1181.1 et seq.) of this chapter.* In addition, the State Forester shall cooperate with counties, municipalities, corporations and individuals in preparing plans and providing technical assistance for the protection, management and replacement of trees, wood lots and timber tracts and the establishment and preservation of urban forests, under an agreement that the parties obtaining such assistance shall pay the field and traveling expenses of the person employed in preparing such plans.

#### Article 12.

##### *Silvicultural Activities Affecting Water Quality.*

§ 10.1-1181.1. Definitions.—As used in this article unless the context requires a different meaning:

"Operator" means any person that operates or exercises control over any silvicultural activity.

"Owner" means any person that (i) owns or leases land on which silvicultural activity occurs or (ii) owns timber on land on which silvicultural activity occurs.

"Pollution" means such alteration of the physical, chemical or biological properties of any state waters resulting from sediment deposition as will or is likely to create a nuisance or render such waters (i) harmful or detrimental or injurious to the public health, safety or welfare, or to the health of animals, fish or aquatic life; (ii) unsuitable with reasonable treatment for use as present or possible future sources of public water supply; or (iii) unsuitable for recreational, commercial, industrial, agricultural, or other reasonable uses.

"Silvicultural activity" means any forest management activity, including but not limited to the harvesting of timber, the construction of roads and trails for forest management purposes, and the preparation of property for reforestation.

"Special order" means a special order or emergency special order issued under subsection B or C of § 10.1-1181.2.

§ 10.1-1181.2. Conduct of silvicultural activities; issuance of special orders.—A. If the State Forester determines that an owner or operator is conducting or allowing the conduct of any silvicultural activity in a manner which is causing or is likely to cause pollution, he may

advise the owner or operator of corrective measures needed to prevent or cease the pollution. Failure of the State Forester to advise an owner or operator of such corrective measures shall not impair the State Forester's authority to issue special orders pursuant to subsection B or C of this section.

B. The State Forester shall have the authority to issue special orders to any owner or operator who is conducting, or allowing to be conducted, any silvicultural activity in a manner which is causing or is likely to cause pollution, to cease immediately all or part of the silvicultural activities on the site, and to implement specified corrective measures within a stated period of time. Such special orders are to be issued only after a hearing with reasonable notice to the owner or operator, or both, of the time, place and purpose thereof, and they shall become effective not less than five days after service as provided in subsection D of this section.

C. If the State Forester finds that any owner or operator is conducting any silvicultural activity in a manner which is causing or is likely to cause an alteration of the physical, chemical or biological properties of any state waters resulting from sediment deposition presenting an imminent and substantial danger to (i) the public health, safety or welfare, or the health of animals, fish or aquatic life; (ii) a public water supply; or (iii) recreational, commercial, industrial, agricultural or other reasonable uses, the State Forester may issue, without advance notice or hearing, an emergency order directing the owner or operator, or both, to cease immediately all or part of the silvicultural activities on the site, and to implement specified corrective measures within a stated period of time. The commencement of proceedings by the State Forester for the issuance of a special order pursuant to subsection B of this section shall not impair the State Forester's authority to issue an emergency special order pursuant to this subsection. The State Forester shall provide an opportunity for a hearing, after reasonable notice as to the time and place thereof to the owner or operator, to affirm, modify, amend or cancel such emergency special order.

D. The owner or operator to whom such special order is directed shall be notified by certified mail, return receipt requested, sent to the last known address of the owner, or operator, or by personal delivery by an agent of the State Forester, and the time limits specified shall be counted from the date of receipt.

E. The State Forester shall not issue a special order to any owner or operator who has incorporated generally acceptable water quality protection techniques in the operation of silvicultural activities, which techniques have failed to prevent pollution, if the State Forester determines that the pollution is the direct result of unusual weather events which could not have been reasonably anticipated.

F. Any hearing required under this section shall be conducted in accordance with § 9-6.14:12 unless the parties consent to informal proceedings.

§ 10.1-1181.3. Civil penalties.—A. Any owner or operator who violates, or fails or refuses to obey any special order may be assessed a civil penalty by the State Forester. Such penalty shall not exceed \$5,000 for each violation. Each day of a continuing violation may be deemed a separate violation for purposes of assessing penalties. In determining the amount of the penalty, consideration shall be given to the owner's or operator's history of noncompliance; the seriousness of the violation, including any irreparable harm to the environment and any hazard to the health or safety of the public; whether the owner or operator was negligent; and the demonstrated good faith of the owner or operator in reporting and remedying the pollution.

B. A civil penalty may be assessed by the State Forester only after the owner or operator has been given an opportunity for a hearing. Any hearing required under this section shall be conducted in accordance with § 9-6.14:12, unless the parties consent to informal proceedings. If the owner or operator fails to avail himself of the opportunity for a formal hearing, a civil penalty shall be assessed by the State Forester after the State Forester finds that a violation of a special order has occurred and the amount of the civil penalty warranted, and issues an order requiring that the civil penalty be paid.

C. If a person who is required to pay a civil penalty fails to do so, the State Forester may transmit a true copy of the final order assessing such penalty to the clerk of circuit court of any county or city wherein it is ascertained that the person owing the penalty has any estate; and the clerk to whom such copy is sent shall record it, as a judgment is required by law to be recorded, and shall index the same in the name of the Commonwealth as well as of the person owing the penalty, and thereupon there shall be a lien in favor of the Commonwealth on the property of the owner or operator within such county or city in the amount of the penalty. The State Forester may collect civil penalties which are owed in the same manner as provided by law in respect to judgment of a court of record. All civil penalties shall be paid into the state treasury and deposited by the State Treasurer into the Virginia Forest Water Quality Fund pursuant to § 10.1-1181.7.

D. With the consent of any owner or operator who has violated or failed, neglected or refused to obey any special order of the State Forester issued pursuant to subsection B or C of § 10.1-1181.2, the State Forester may provide, in an order issued by the State Forester against such owner or operator, for the payment of civil charges for violations in specific sums, not to exceed the limit specified in subsection A of this section. Such civil charges shall be in lieu of

any civil penalty which could be imposed under subsection A of this section, and shall be placed in the Virginia Forest Water Quality Fund pursuant to § 10.1-1181.7.

§ 10.1-1181.4 Final decisions; costs of hearing examiner.—A. Any final order or decision rendered pursuant to this article shall be reduced to writing and shall contain the explicit findings of fact and conclusions of law upon which the decision is based. Certified copies of the written decision shall be delivered or mailed by certified mail to the parties affected by the decision.

B. If any final agency case decision is rendered following a hearing conducted in accordance with § 9-6.14:12 presided over by a hearing officer, the officer shall be paid by the State Forester if the owner or operator is the prevailing party, or by the owner or operator if the State Forester is the prevailing party. The findings of the hearing officer shall specify which party prevailed in the hearing.

§ 10.1-1181.5 Judicial review.—Any person aggrieved by a final order or decision under this article shall be entitled to judicial review thereof in accordance with the Administrative Process Act (§ 9-6.14:1 et seq.). The commencement of a proceeding for judicial review under this section shall not, unless specifically ordered by the court, operate as a stay of the order or decision of the State Forester.

§ 10.1-1181.6 Enforcement by injunction.—Any owner or operator violating or failing, neglecting or refusing to obey any special order issued by the State Forester may be compelled in a proceeding instituted in any appropriate circuit court by the State Forester to obey same and to comply therewith by injunction, mandamus or other appropriate remedy, without the necessity of showing that an adequate remedy at law does not exist.

§ 10.1-1181.7. Virginia Forest Water Quality Fund established; administration and disbursements.—A. There is hereby established a special, nonreverting fund in the state treasury to be known as the Virginia Forest Water Quality Fund, hereafter referred to as the Fund, to be used for education efforts, promoting the implementation of proper silvicultural activities, research, and monitoring the effectiveness of practices to prevent erosion and sedimentation. The Fund shall be a nonlapsing fund consisting of moneys received and credited to the Fund by the State Treasurer for civil penalties and civil charges assessed pursuant to this article. Interest earned on the Fund shall be credited to the Fund. The Fund shall be established on the books of the State Comptroller. Any money remaining in the Fund at the end of the biennium shall not revert to the general fund but shall remain in the Fund.

B. Disbursement of moneys from the Fund shall be made by the State Comptroller at the written request of the State Forester. Disbursements from the Fund may be made for the purposes set forth in subsection A of this section, including, but not limited to, personnel, administrative, and equipment costs and expenses directly incurred by the Department in connection with such purposes.

Helping Forests

Provide for

All Virginians



•Clean water

•Jobs

•1000's of Forest  
Products Used  
Everyday

### Purpose

The purpose of this law is to ensure that those individuals who are not doing their share to protect water quality through the voluntary program will be prohibited from degrading the waters of Virginia.

### What this law is about!

- This legislation will give the Virginia Department of Forestry (DOF) legal authority to protect water quality from excessive sedimentation originating from forestry operations.
- This law will come into effect **July 1, 1993**.
- Procedures will be developed by The Department of Forestry and will feature a cooperative effort to solve water quality problems.
- The DOF can enter into a **Special Order** to implement corrective measures for forestry operations. Should this be ignored, a **Stop-Work Emergency Order** may be issued. Violation of any order may be subject to a civil penalty of up to \$5,000 per day.
- Tracts completed prior to July 1, 1993 will not be subject to the law but active tracts after July 1, 1993 will be affected.
- The State benefits significantly by avoiding an unnecessary and expensive regulatory program. This legislation will be implemented through routine contacts currently conducted by DOF foresters on a county level.
- If serious water quality degradation is occurring, a **Stop-Work Emergency Order** may be issued immediately.

### Answers to frequent questions

#### ***Why is this legislation needed? Is the current program ineffective?***

The current non-regulatory program has proven successful. The logging community has responded with good results, indicating widespread support of the stewardship principles of the non-regulatory plan. In only a few instances have operators been unwilling to participate. This legislation is designed to complement the existing voluntary water quality program.

#### ***What groups are supporting this legislation?***

Groups endorsing the legislation include the Forestry Task Force for Water Quality, the Virginia Wildlife Federation, the Lumber Manufacturer's Association of Virginia, the Virginia Forestry Association, the Appalachian Forest Management Group, and the Virginia Chapter of the Association for Consulting Foresters.



***What will be the extra compliance cost to timber harvesters and landowners?***

One advantage of the proposed legislation is that no extra costs should be incurred by those who are currently adhering to Virginia's non-regulatory forestry program.

***Will there be any costs to the Commonwealth?*** No. Although the Department is still short-handed in many areas of Virginia, the costs to the state should be minimal. This legislation can be implemented through routine visits by local DOF personnel to forestry operations. The number of operations projected to be affected by this legislation are few.

***Who will have the authority to enforce this law and how does it work?***

Local county personnel with the DOF would continue to visit forestry operations to monitor efforts with the current non-regulatory BMP program as well as The Seed Tree Law, and Debris in Streams Law. The following is the anticipated sequence of events:

**First Visit**- •If a problem is found during this visit, the "operator" or "owner" will be provided with recommendations and a designated time frame for corrections.

**Second Visit**- •A **Notice of Required Action** will be issued if the corrective action is not taken. This **Notice of Required Action** will have recommendations and a designated time frame for corrections.

**Third Visit**- •If the problem is not corrected, an informal conference will be scheduled and a **Special Order** written, signed by both the DOF and the logger. This **Special Order** will have recommendations for correcting the problem and a designated time frame for completion.

**Fourth Visit**- •If the terms of the **Special Order** are not followed, a **Stop-Work Emergency Order** will be issued, a formal hearing scheduled, and civil penalty assessed. **Stop-Work Emergency Orders** will be issued by the Regional Forester.

**NOTE- A STOP-WORK EMERGENCY ORDER CAN BE ISSUED ANYTIME IF A SEVERE WATER QUALITY PROBLEM EXISTS.**

***What safeguards will be in place to protect the timber harvester for land activities taking place after he has left the site in compliance with the current non-regulatory program?***

The procedures for the legislation will include provisions for a final inspection by DOF personnel at the conclusion of the harvesting job. If the "operator" or "owner" has used proven conservation measures and protected water quality, he would be relieved from future water quality corrective action on the tract.

If you have any questions, please contact the DOF Regional offices listed below:

John M. Carroll  
PO Box 198  
Waverly, VA 23890-0198  
(804)834-2300

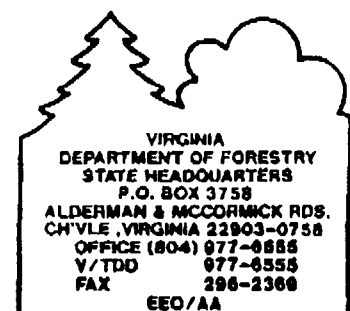
Michael T. Griffin  
PO Box Q  
Charlottesville, VA 22903  
(804)977-5193

Frank Burchinal  
PO Box 100  
Salem, VA 24153-0100  
(703)387-5461

William L. Saunders  
PO Box 759  
Tappahannock, VA 22560-0759  
(804)443-2211

Gregory H. Winston  
PO Box 386  
Farmville, VA 23901-0386  
(804)392-4159

J. Randall Parris  
PO Box 978  
Abingdon, VA 24210  
(703)676-5488



## **APPENDIX A3.2: Provincial Turbidity Criteria British Columbia, Canada, Feb. 1985.**

MINISTRY OF ENVIRONMENT  
PROVINCE OF BRITISH COLUMBIA

### **WATER QUALITY CRITERIA FOR PARTICULATE MATTER**

#### **RECOMMENDED CRITERIA**

These criteria are based on a detailed analysis given in a technical appendix.

#### **AQUATIC LIFE (Freshwater, Estuarine, and Marine)**

##### **TURBIDITY (NTU)**

Induced turbidity should not exceed 5 NTU when background turbidity is  $\leq 50$  NTU, nor should induced turbidity be more than 10% of background when background is  $> 50$  NTU.

**SIDE TWO**

38

# SIDE ONE

<p align="center"><b>NOTIFICATION OF OPERATION / APPLICATION FOR PERMITS</b>  <b>STATE OF OREGON</b>  DEPARTMENT OF FORESTRY  DEPARTMENT OF REVENUE</p>			
<p><b>FILING THIS DOES NOT GRANT PERMISSION TO REMOVE FOREST PRODUCTS! FIRST GET PERMISSION FROM THE LANDOWNER OR TIMBEROWNER</b></p>			
<p>1 County (Enter only one) _____</p>		<p>2 Check Appropriate Boxes (2A, 2B, 2C, or 2D)</p>	
		<p>2A NOTICE TO THE STATE FORESTER THAT OPERATION WILL BE CONDUCTED ON LANDS DESCRIBED ON REVERSE (ORS 527.670)</p> <p>2B APPLICATION FOR PERMIT TO OPERATE POWER DRIVEN MACHINERY (ORS 477.625) Expires at end of calendar year</p> <p>2C APPLICATION FOR PERMIT TO CLEAR RIGHTS OF WAY (ORS 477.685)</p> <p>2D NOTICE TO THE STATE FORESTER AND THE DEPARTMENT OF REVENUE OF THE INTENT TO HARVEST TIMBER (ORS 321.550)</p>	
<p>3</p>		<p>Person to be contacted in case of Fire Emergency (Designated Representative) Phone No _____  PLEASE PRINT</p>	
<p><b>CHECK ONE BOX IN THE FAR LEFT COLUMN TO INDICATE WHO FILLED OUT THE APPLICATION</b></p>			
<p><input type="checkbox"/> 4 Operator Information</p>		<p>Name/Title _____  Company Name _____  Mailing Address Street _____  City State and Zip Code _____ Phone No _____</p>	
<p><input type="checkbox"/> 5 Landowner Information</p>		<p>Name/Title _____  Company Name _____  Mailing Address Street _____  City State and Zip Code _____ Phone No _____</p>	
<p><input type="checkbox"/> 6 Timberowner and Harvest Tax Payer</p>		<p>Name/Title _____  Company Name _____  Mailing Address Street _____  City State and Zip Code _____ Phone No _____  Timberowner Employer Identification Number _____ or Social Security Number _____</p>	
<p>7 Timber Sale Name and/or No _____</p>			
<p>8 WESTERN OREGON PRIVATE LAND ONLY!  Is any timber being harvested certified under the Western Oregon Small Tract Optional Tax (WOSTOT) program?  None <input type="checkbox"/> Part <input type="checkbox"/> All <input type="checkbox"/></p>			<p>WOSTOT Certificate Number _____</p>
<p>If you have checked Part or All please list the number in the WOSTOT Certificate Number box</p>			

On-site inspections may be conducted by the State Forester/Forest Practices Forester to ensure compliance with all the laws and rules governing fire protection and forest practices on private land

APPLICANT REMARKS



# Instructions For Filling Out Notification Of Operation/Application For Permits

## Side One

File a new notification of operation form (629-6-2-1-002a Rev. 12/93) at an Oregon Department of Forestry (ODF) office if **any** of the following conditions apply:

- Your operation area is brand new
- If anything in your current operation has changed in any way
- If your operation is outside an ODF Forest Protection District (Contact an ODF office listed on back page for this information)
- If your operation area was completed in 1993 and you want to work on another area
- Multiple harvest units can be listed on one notification **BUT!** if two or more **HARVEST** units would be separated by a mile or more (in a straight line) file separate notifications for each unit.

By December 31, 1993, obtain a signature sticker from an ODF field office to renew your Permit to Operate Power Driven Machinery if both of the following conditions apply:

- If you are continuing an operation in progress with NO changes and
- The operation is within an ODF Forest Protection District.

**On-site inspections may be conducted by the State Forester/Forest Practices Forester to ensure compliance with all the laws and rules governing fire protection and forest practices on private land.**

**The instructions are numbered to match the numbered form areas. Please print or type the information on the form. Do not fill out any grey shaded spaces.** File notice with the State Forester at least 15 days prior to the date you would like to start operating. A notification is not considered accepted until it is received by the appropriate Forestry office. Mail or deliver the form to one of the offices listed on the back of these instructions.

1. "County (Enter only one)". Fill in the county name where the operation will take place. If an operation spans two or more counties, file a separate notification for each county.  
An operation can be any combination of the following activities: harvest of forest crops; road construction or reconstruction; site preparation; chemical application; clearing land for use change; treatment of slashing; pre-commercial thinning; or other activities which require separate explanation.

**For assistance filling out the notification form contact your local Forestry office.**

2. "Check Appropriate Boxes (2A, 2B, 2C, or 2D)" Checkmark next to the notice you are giving and/or the permit(s) you need. Anyone getting a permit for hauling should check boxes 2B and 2D.
3. "Person to be contacted in case of Fire Emergency (Designated Representative). Phone No.". Print the name and telephone number of the person to contact in case a fire starts on this operation. The person should know what resources you have available to fight the fire, and have the authority to commit those resources in case of a fire.
- "Check one box in the left column to indicate who filled out the application." (Did the operator, landowner or timber owner fill out the form?)
4. "Operator Information". Just fill in either a person's or a company's name, address and phone number. Add the timber sale name and number in the bottom of this section: "Timber Sale Name and/or No. ". This information is required for all state and federal sales and is optional for private land timber sales.
5. "Landowner information". Fill in either a person's name or a company's name, address and phone number. **The landowner has the responsibility to reforest if the harvest results in an understocked condition.** If the timber to be harvested is from public land, do not fill out the Western Oregon Private Land Only! portion. If it is a harvest on private land, check with the landowner to see whether the timber has been certified under the Western Oregon Small Tract Optional Tax. (WOSTOT) law. Timber removed from land certified under WOSTOT is normally exempt from the Western Oregon Severance Tax. If you have checked "Part" or "All", please list the certificate number in the WOSTOT Certificate Number box.

"RC/EG/S" Boxes. Information gathered in RC (Recipient Class), EG (Ethnic Group), and S (size) are needed for annual federal reports.

RC: (Recipient Class) Write the appropriate code number that best identifies the landowner in the box:

- |                     |                      |
|---------------------|----------------------|
| 1. Local Government | 4. Individual        |
| 2. State Government | 5. Partnership/Corp. |
| 3. Federal agency   | 6. Other (private)   |

EG: (Ethnic Group) This is the ethnic group of the landowner identified as 4 - Individual in Recipient Class. Write the appropriate code number which best identifies the individual landowner in the EG box. Don't fill in a code if the landowner is Recipient Class 1,2,3,5,or 6.

- |                   |                                   |              |
|-------------------|-----------------------------------|--------------|
| 1. Does not apply | 4. Hispanic                       | 7. All Other |
| 2. White          | 5. American Indian/Alaskan Native |              |
| 3. Black          | 6. Asian/Pacific Islander         |              |

S: (Land Ownership Size) Enter the appropriate code number that best identifies the total forest ownership of the landowner.

- |                   |                      |                  |
|-------------------|----------------------|------------------|
| 1. Does not apply | 4. 100-499 acres     | 7. 5,000 + acres |
| 2. 0-9 acres      | 5. 500-999 acres     |                  |
| 3. 10-99 acres    | 6. 1,000-4,999 acres |                  |

6. "Timberowner and Harvest Tax Payer" You must fill in either a person's or a company's name, address and phone number. Fill in EITHER the timberowner's Employer Identification number or the timberowner's social security number, not both. The party who owns timber at the point of first measure is the timberowner, and is responsible for paying the taxes.

## SideTwo

### Site Information

7. "Unit Numbers". You assign a one-or two-digit unit number, beginning with 1 and going sequentially up to 99. Or, if there is a unit number associated with a state or federal timber sale, use that number in the unit column. A unit can be:
- an operating area with a state or federal sale unit number; or
  - a single operating area within a continuous boundary; or
  - an operating area with a separate harvest tax number; or
  - a separate area within your total operation area on which you plan to conduct a single type of activity (for example, 30 acres of clear cut only).

In all cases, all activities you plan on that piece of land should be listed beside the unit number. For example, road construction activity needed prior to starting a commercial timber harvest should be described along with the harvest activity. If there will be more activities happening in the unit than you can fit on one line straight across, continue on the lines below.

**Activity Code.** Write the codes for all activities taking place in one unit under this heading. Use numbers, code names and associated methods. See codes and examples on page four.

Write the methods you will use in the "Methods Used" column next to the code for the activity, in the same order as the activity codes are listed. If you need more space, go to the next rows down in the same column. Write in the brand name of the spray product, the formulation and the carrier. See the example on page 4.

**Quantity Column.** Fill in either the acres (A) or lineal feet (F) involved in the activity. The example shows 65 acres of harvest and 3000 ft. of road construction.

**Approximate Thousand Board Feet (MBF) Removed.** List the approximate MBF to be removed for each unit with commercial timber harvesting.

**"Average age of harvest trees  $\leq$  40"** The number entered as the average age should be the average total (not Diameter Breast Height) age of all the commercially harvested timber in the unit. You should not attempt to differentiate the age of groups of trees within units. Find the average age over the whole unit. Enter the code for each age group: 0-29, 30-39, 40-59, 60+. (Codes A,B,C, and D.)

**8. "Location of Operation" (Legal Descriptions).** Enter the legal descriptions for each unit number. If you have several rows worth of activities that will take place at one location, REPEAT THE CODES, not the legal descriptions.

**9.a & 9.b. "Activity Estimated Starting and Activity Estimated Ending Date".** The starting date should be at least 15 days after the date the form is received by the appropriate Department office.

**10. "Western Oregon Severance Tax Unit Number".** Large landowners will have a list of harvest tax numbers which apply to the site(s).

**11. "Site Conditions".** Fill in a D,T, and S code for each unit, as shown in the example. Fill in DWS, WG or SW codes when necessary.

D = Distance to Class 1 waters... A Class 1 water is "any portions of streams, lakes, estuaries, significant wetlands, or other waters of the state which are significant for (a) domestic use, including drinking, culinary and other household human use; (b) angling; (c) water dependent recreation; or (d) spawning, rearing or migration of anadromous or game fish."

D100 = Class 1 waters are within 100 feet of the operation.

D 1 = Class 1 waters are within  $\frac{1}{8}$  mile but greater than 100 feet from the operation.

D 2 = Class one waters are with in  $\frac{1}{4}$ – $\frac{1}{8}$  mile of the operation.

D 3 = None within  $\frac{1}{4}$  mile.

T = Topography ...

T1 is a slope of 0 to 35% (percent)

T2 is a slope of 35% to 65%

T3 is a slope greater than 65%

S = Slope Stability...

S1 = No evidence of mass soil movement (landslides, slips, slumps).

S2 = Evidence of old slides, small failures.

S3 = Recent or active movement; wet areas.

DWS = The operation affects a Domestic Water Supply.

WG = The operation takes place in the Willamette Greenway.

SW = The operation takes place near a Scenic Waterway.

UGB = The operation takes place with an Urban Growth Boundary.

SH = The operation takes place near a Scenic Highway.

CC = The operation will result in a single clearcut or continuation of contiguous clearcuts that exceed 120 acres.

IC2 = The operation takes place near an influential Class II stream.

**12.** If you request a waiver of the 15 day waiting period, check the box and contact the Forest Practices Forester (FPF). The FPF will decide if a waiver can be granted.

**13.a. & 13.b.** Print your name and date in 13. a. and sign your name and write the date in 13. b.

**14. ATTACH MAP AND/OR AERIAL PHOTOS!** The notification form is not complete unless a map or aerial photo of the operation area is attached.

Activity Code	Methods Used	Activity Code	Methods Used
1a. Partial Cut (Partial Cut code must not be used for a pre-commercial thinning operation. Can be used for home site preparation.)	Cable/Ground/Other	4a. Herbicide Application	Ground/Aerial/Complete Brand/Name/Carrier Additives/Application Rate
1b. Clear Cut	Cable/Ground/Other	4b. Insecticide Application	
1c. Cutting only		4c. Rodenticide Application	
1d. Cutting < 40 years old or pre-commercial thinning		4d. Fertilizer Application	
2a. Road Construction	Dozer/Backhoe/Other	5. Clearing for Land Use Change(Local land use rules may apply.)	
2b. Road Reconstruction	Dozer/Backhoe/Other	6. Treatment of Slashing	Burning/Mechanical
3. Site Preparation (Does not include building site preparation.)	Manual/Mechanical/Burning	7. Pre-commercial Thinning	Manual/Chemical
		8. Others	Explain

Office Address	Phone Number	Fax Number
ASTORIA: RT 1, Box 950, 97103	325-5451	325-2756
BAKER CITY: Rt.1, Box 211, 97814	523-5831	523-5874
CENTRAL POINT: 5286 Table Rock Road, 97502	664-3328	776-6260
COLUMBIA CITY: 405 E. St., 97018-9737	397-2636	397-6361
COOS BAY: 300 Fifth St., Bay Park, 97420	267-4136	269-2027
DALLAS: 825 Oak Villa Rd., 97338	623-8146	623-9034
FOREST GROVE: 801 Gales Creek Rd., 97116-1199	357-2191	357-4548
FOSSIL: Star Route, 97830	763-2575	763-2027
GRANTS PASS: 5375 Monument Dr., 97526	474-3152	474-3158
JOHN DAY: P.O. Box 546, 97845 (400 NW 9th)	575-1139	575-2253
KLAMATH FALLS: 3400 Greensprings Dr., 97601	883-5681	883-5555
LA GRANDE: 611 20th St., 97850	963-3168	962-1058
LAKEVIEW: 2290 N. 4th St., 97630	947-3311	947-3767
MEHAMA: 22965 N. Fork Rd. S.E., Lyons, 97358	859-2151	859-2158
MOLALLA: 14995 S. Hwy. 211, 97038	829-2216	829-4736
MONUMENT: P.O. Box 386, 97864 (May Street)	934-2300	934-2960
PENDLETON: 1055 Airport Rd., 97801	276-3491	276-0710
PHILOMATH: 24533 Alsea Hwy., 97370	929-3266	929-5549
PRINEVILLE: 220710 Ochoco Hwy., 97754	447-5658	447-1469
ROSEBURG: 1758 N.E. Airport Road, 97470-1499	440-3412	440-3424
SISTERS: P O. Box 190, 97759 (221 SW Washington)	549-2731	549-9422
SPRINGFIELD: 3150 E. Main St., 97478	726-3588	726-2505
SWEET HOME: 4690 Hwy. 20, 97386	367-6108	367-5613
THE DALLES: 3701 W. 13th St., 97058	296-4626	296-4993
TILLAMOOK: 4907 Third St., 97141-2999	842-2545	842-3143
TOLEDO: 763 N.W. Forestry Rd., 97391	336-2273	336-5261
VENETA: P.O. Box 157, 97487	935-2283	935-0731
WALLOWA: 802 W. Hwy. 82, 97885	886-2881	886-9085

## EXAMPLE

### SIDE TWO

7. ACTIVITY CODES										8. LOCATION OF OPERATION																9. A			9. B			10. WEST OREGON SEVERANCE TAX UNIT NUMBER	11. SITE CONDITIONS	REGULATED USE AREA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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## APPENDIX A3.4: NGO(Non-Government Agency Stream Quality Survey

# VIRGINIA SAVE OUR STREAMS

## Stream Quality Survey

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can notice and document changes in water quality. Refer to the SOS insect card and instructions to learn how to trap and identify the organisms

Stream \_\_\_\_\_ Station \_\_\_\_\_  
County \_\_\_\_\_ State \_\_\_\_\_ Location \_\_\_\_\_  
Group or individual \_\_\_\_\_ Number of participants \_\_\_\_\_  
Weather conditions \_\_\_\_\_

Stream width (Average) \_\_\_\_\_ ft. Water depth (In riffle) \_\_\_\_\_ in.

Flow rate: high \_\_\_\_\_ low \_\_\_\_\_ normal \_\_\_\_\_

You should select a riffle where the water is not running too fast (ideal depth is 3 - 12 inches), and the bed consists of cobble-sized stones or larger.

Monitored riffle area (should be 3 foot square) \_\_\_\_\_ Average stream depth \_\_\_\_\_ Water temperature \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_ Sample Number \_\_\_\_\_

Type of test: macroinvertebrate count \_\_\_\_\_ chemical test \_\_\_\_\_ other \_\_\_\_\_

### MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1 - 9, B = 10 - 99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Then add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE	SOMEWHAT-SENSITIVE	TOLERANT
<input type="checkbox"/> caddisfly larvae <input type="checkbox"/> hellgrammite <input type="checkbox"/> mayfly nymphs <input type="checkbox"/> gilled snails <input type="checkbox"/> riffle beetle adult <input type="checkbox"/> stonefly nymphs <input type="checkbox"/> water penny larvae	<input type="checkbox"/> beetle larvae <input type="checkbox"/> clams <input type="checkbox"/> crane fly larvae <input type="checkbox"/> crayfish <input type="checkbox"/> damselfly nymphs <input type="checkbox"/> dragonfly nymphs <input type="checkbox"/> scuds <input type="checkbox"/> sowbugs <input type="checkbox"/> fishfly larvae <input type="checkbox"/> alderfly larvae <input type="checkbox"/> atherix	<input type="checkbox"/> aquatic worms <input type="checkbox"/> blackfly larvae <input type="checkbox"/> leeches <input type="checkbox"/> midge larvae <input type="checkbox"/> pouch (and other) snails
<input type="checkbox"/> # of letters times 3 = _____ index value +	<input type="checkbox"/> # of letters times 2 = _____ index value +	<input type="checkbox"/> # of letters times 1 = _____ index value

Now add together the three index values = \_\_\_\_\_ total index value.

Compare this total index value to the following numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample.

### WATER QUALITY RATING

☐ Excellent (> 22)

☐ Good (17 - 22)

☐ Fair (11 - 16)

☐ Poor (< 11)

Note: You should test at least 3 different riffles within a 24-foot area to ensure that you have a truly representative sample which includes all key organisms. Record results from the sample which gives the best diversity.



**Defenders of Soil, Air,  
Woods, Waters and  
Wildlife**

**RETURN THIS FORM TO:** Izaak Walton League of America, SOS Program  
1401 Wilson Blvd., Level B,  
Arlington, Va. 22209 (703)528-1818



recycled paper

**Fish water quality indicators:**

☐ scattered individuals  
☐ scattered schools  
☐ trout (intolerant to pollution)  
☐ bass (somewhat-tolerant to pollution)  
☐ catfish (tolerant to pollution)  
☐ carp (tolerant to pollution)

**Barriers to fish movement:**

☐ beaver dams  
☐ dams  
☐ waterfalls  
☐ other  
☐ none

**Surface water appearance:**

☐ brownish  
☐ clear  
☐ colored sheen (oily)  
☐ foamy  
☐ milky  
☐ muddy  
☐ brown  
☐ black  
☐ grey  
☐ other ( )

**Odor:**

☐ rotten egg  
☐ musky  
☐ oil  
☐ sewage  
☐ none

**Stability of stream bed:**

Bed sinks beneath your feet in:

☐ no spots  
☐ a few spots  
☐ many spots

**Stream bed deposit (bottom)**

☐ grey  
☐ orange/red  
☐ yellow  
☐ black

☐ brown  
☐ silt  
☐ sand  
☐ other ( )

**% bank covered by plants, rocks and logs (no exposed soil) is:**

Stream bank (sides)

Top of bank (slope and floodplain)

**Good**

> 70%

**Fair**

30% - 70%

**Poor**

< 30%

(> = greater than, < = less than)

**Stream bank vegetation composition:** % shrubs % grasses % trees

**Stream bank erosion:**

> 80% severe

20%-49% moderate,

50%-80% high,

< 20%-0% slight

**Bed composition of riffle:**

☐ % silt (mud)  
☐ % sand (1/16" - 1/4" grains)  
☐ % gravel (1/4" - 2" stones)  
☐ % cobbles (2" - 10" stones)  
☐ % boulders (> 10" stones)

**Algae color:**

☐ light green  
☐ dark green  
☐ brown coated  
☐ matted on stream bed  
☐ hairy

**Algae located:**

☐ everywhere  
☐ in spots  
☐ % bed cover

**Land uses in watershed:** Record all land uses observed in the watershed area upstream and surrounding your sampling site.

Indicate whether the following potential land uses have a high (**H**), moderate (**M**), or slight (**S**) potential for impact. Refer to the SOS stream survey instructions to determine how to assess H, M, or S values.

☐ Oil & gas drilling  
☐ Housing developments  
☐ Forest  
☐ Logging  
☐ Urban uses (parking lots)

☐ Sanitary landfill  
☐ Construction  
☐ Mining (types)  
☐ Cropland (types)

☐ Refuse dump  
☐ Fields  
☐ Livestock pasture  
☐ Other ( )

**Are there any discharging pipes?**

☐ no ☐ yes If so, how many?

**What types of pipes are there?**

☐ runoff (field or stormwater runoff)

☐ sewage treatment, ☐ industrial: type of industry

**Did you test above and below the pipes to determine any change in water quality and were changes noticed?**

**Describe % and type of litter in and around the stream:**

**Comments** Indicate what you think are the current or potential future threats to your stream's health:

## **APPENDIX 3.5: Timber Theft Legislation, Prevention Guidelines, and Sample Sales Contract: State of Louisiana, USA**

### **TIMBER THEFT**

#### **I. The Problem**

A. Statewide timber standing inventory according to 1985 Federal Study is approximately 53 billion board feet of sawtimber and 87 million cords of pulpwood. Using today's market stumpage prices, that's over 8 billion dollars of standing timber which could be subject to theft.

B. Average retail outlet loses anywhere from 2-4 percent of volume sales through theft. Timber theft could very well surpass that percentage. the volume of timber stumpage sales is approximately \$3000 million annually.

C. Most cases fall under this State's theft statutes.

1. Theft - Title 14. Section 67, definitions and penalties:

Theft is the misappropriation or taking of anything of value which belongs to another, either without the consent of the other to the misappropriation or taking, or by means of fraudulent conduct, practices, or representations. An intent to deprive the other permanently of whatever may be the subject of the misappropriation or taking is essential.

Whoever commits the crime of theft when the misappropriation or taking amounts of a value of five hundred dollars or more shall be imprisoned, with or without hard labor, for not more than ten years, or may be fined not more than three thousand dollars, or both.

When the misappropriation or taking amounts to a value of one hundred dollars or more, but less than a value of five hundred dollars, the offender shall be imprisoned, with or without hard labor, for not more than two years, or may be fined not more than two thousand dollars, or both.

When the misappropriation or taking amounts to less than a value of one hundred dollars, the offender shall be imprisoned for not more than six months, or may be fined not more than five hundred dollars, or both. If the offender in such cases has been convicted of theft two or more times previously, upon any subsequent conviction he shall be imprisoned, with or without hard labor, for not more than two years, or may be fined not more than one thousand dollars, or both.

When there has been a misappropriation or taking by a number of distinct acts of the offender, the aggregate of the amount of the misappropriations or takings shall determine the grade of the offense.

2. The majority of people in the industry are honest, hard-working individuals who work in one of the nation's most dangerous professions.
- D. Trees are vulnerable to theft
  1. Isolated
  2. Infrequently monitored
  3. Difficult to trace
    - L.F.A. Committee to recommend Legislation
  4. Many landowners don't recognize the value of their timber resources.

## II. Methods of Theft

- A. Diversion
  1. Diverting a load of sawtimber or pulpwood from a legitimate harvest to another mill or woodyard and registering for payment in a name other than the rightful owner.
- B. Cut and Leave
  1. An individual simply picks someone's land, cuts a load or loads, sells it for himself and then moves to someone else's property and repeats the process.
- C. Fraud or misrepresentation
  1. laying false claim to the timber through acts of fraud.
  2. When facts regarding the land and resources are criminally misrepresented to the landowner.
- D. Firewood Theft
  1. The cutting of firewood for personal use or commercial sales without the direct permission of the landowner.
    - a. Large number of individuals participating
    - b. Not viewed as criminal
    - c. Increasing prices of hardwood will require closer monitoring of firewood thefts
- E. Cutting across boundary lines
  1. Criminal
    - a. Can be charged with theft if cutter willfully and intentionally cut across boundary lines
  2. Civil - Previous court decisions allow for mainly three types of recovery
    - a. Moral bad faith
 

Willful and intentional - in some cases, the owner can collect up to three times fair market value plus, reasonable attorney fees, clean and replant land general damages for aesthetic value, expert witness fees, and at time mental anguish and emotional trauma.
    - b. Legal bad faith
 

Cutter should have been aware that timber did not belong to him. usually liable for damages three times fair market value of timber cut, can be held responsible for reasonable attorney fees if not paid within 30 days after being informed of demand.

c. Good faith

No evidence to show that cutter should have been aware - is liable for only fair market value of timber at the time it was cut.

F. Bribery

1. When someone gives or offers to give, directly or indirectly, anything of apparent present or prospective value to a private agent, employee or fiduciary without the knowledge and consent of the principal or employer in an attempt to influence the agent, employee or fiduciary into actions which betrays the best interest of the principal's or employer's affairs.

III. Self Protection

A. Boundary Lines

1. Make sure boundary lines are correct and well marked (check description at courthouse.
  - a. Will prevent honest mistakes
  - b. Add to the chain of evidence should theft occur

B. Frequent visits to property

1. Make sure no unauthorized logging activities are taking place
2. Daily visits to site when you have a logging job, including firewood activities, in operation or when one is occurring on adjacent property.

C. Absentee owners

1. They are especially vulnerable
2. Should arrange for an overseer
  - a. Paid employee
  - b. Professional consultant
  - c. Hunting Club
  - d. Friend or neighboring landowners
  - e. Combination of all
3. Make local authorities aware that you are an absentee landowner.

D. Selling of timber

1. Check with the Office of Forestry on service offered
2. Hire professional consultant
3. Draw written contract
  - a. Spell out limitations and conditions of sale and method of logging
  - b. Estimate volume to be cut (cruise or tree count)
  - c. Identify trees to be harvested
  - d. Lump-sum sale - excellent method
  - e. Bid timber to as many buyers as possible
  - f. Police terms of contract

E. Firewood cutting

1. Make sure permission is directly authorized by you
  - a. Written
  - b. Verbal
2. Specify area and trees to be cut

3. Do not allow transfer of authorization
4. Police cutting activities
- F. If theft occurs
  1. Report theft as soon as possible
    - a. Office of Forestry
    - b. Local Sheriffs Office
    - c. Both
  2. Provide as much and as detailed information on alleged theft as possible
    - a. Make yourself written notes
  3. Cooperate to the fullest with authorities
  4. If arrest is made - PRESS CHARGES
  5. Positive reinforcement for participating public officials (all landowners)
- G. Rewards
  1. Louisiana Forestry Association offers rewards of up to \$1000 for information leading to the arrest and conviction of individuals responsible for committing woods arson, forestry equipment theft or vandalism and TIMBER THEFT
  2. The identify of individuals providing information or receiving rewards will be kept in strictest confidence.

FOR MORE INFORMATION  
CONTACT:

Tom Trahan  
Forestry Enforcement Chief  
Louisiana Department of Agriculture  
& Forestry  
Baton Rouge, LA, USA 70821-0631  
(Telephone) 504 925 4500

## Timber Sales Contract

This contract is made and entered into by and between \_\_\_\_\_,  
 herein after called the Seller and \_\_\_\_\_  
 \_\_\_\_\_,  
 herein after called the Buyer.

## SECTION I

The buyer agrees to pay \$ \_\_\_\_\_ for all marked  
 or designated trees included in this contract and located on the Seller's  
 property, \_\_\_\_\_ Parish, Louisiana, and estimated to be \_\_\_\_\_  
 acres definitely designated on the ground by the Seller.

## SECTION II

The Buyer agrees to the following conditions:

A. No timber shall be cut except that which has been marked or design-  
 nated as follows: \_\_\_\_\_

B. Other merchantable timber, if cut or unnecessarily damaged, shall  
 be classified according to the highest product it will make and be  
 be paid for as follows:

Sawlogs.....\$ \_\_\_\_\_ M Bd. Ft.

Poles and Piling under 50 feet.....\$ \_\_\_\_\_ Each

over 50 feet.....\$ \_\_\_\_\_ Each

Pulpwood.....\$ \_\_\_\_\_ Cord

Fence Posts.....\$ \_\_\_\_\_ Each

C. All existing roads on the sale area and on other property of the  
 Seller shall be kept passable. Roads damaged by the logging oper-  
 ation shall be restored to their former condition upon completion  
 of operations.

- D. Logging debris in streams will be removed as such to allow normal drainage. All stream crossings constructed during logging shall be re-opened within 30 days of completion of logging operations.
- E. All damage caused by the Buyer or his agents to fences or other improvements of the Seller shall be satisfactorily repaired or replaced by the Buyer within 30 days of completion of operations.
- F. Any fire started by the Buyer or his agents must be immediately suppressed. Suppression costs and damages resulting from the fire will be paid by the Buyer.

In the event damages resulting from fire and/or damages under any section of this contract cannot be agreed upon by the Seller and the Buyer then each will appoint one representative who together will select a third disinterested party to form an appraisal board of three members to determine damages under the terms of this contract.

- G. All timber shall be cut and removed by \_\_\_\_\_, 19\_\_\_\_\_, unless written extension of time is granted and made a part of this contract.
- H. Failure to comply with all the terms of this contract as determined by the aforesaid appraisal will result in an immediate termination of all operations and an immediate forfeiture of the full purchase price of the timber.

### SECTION III

The Seller agrees to grant normal access across the sale area but reserves the right to approve the location of any new roads.

The Seller reserves the right to halt logging operations if and when site conditions due to wet weather become such that to continue said operations would cause undue damage to the site and/or residual timber or cause excessive soil erosion. Logging would resume when site conditions are such that logging operations would not excessively damage the site and/or residual timber. This determination of whether or not to suspend or resume logging operations is a right reserved by the seller.

During the duration of this contract, if the Seller would suspend logging operations for more than 30 days in the aggregate, then the difference exceeding 30 days would be added to the contract period as an extension to the termination date.



SECTION IV

It is mutually agreed:

- A. That this contract may not be assigned in the whole or any part without the written consent of the other party.
- B. In lieu of a performance bond, the Buyer has deposited with the \_\_\_\_\_ Bank, \_\_\_\_\_, Louisiana, \$ \_\_\_\_\_ to be held in escrow to cover any penalty charges which the Buyer may incur under the terms of this contract.
- C. As a further guarantee of a faithful performance of conditions of contract, the Buyer delivers herewith the sum of \$ \_\_\_\_\_ in full payment of the timber in this sale.

Signed in duplicate this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_

WITNESSES:

\_\_\_\_\_

\_\_\_\_\_

BUYER

\_\_\_\_\_

\_\_\_\_\_

SELLER

## **APPENDIX A3.6: National Forestry Policy Costa Rica, 1993**

**Costa Rica's Forestry Policy contained in a September 1993  
publication of Costa Rica's Ministry of Natural Resources,  
Energy, and Mines**

### **I. General Forestry Policy** (pp. 9-11):

a) achieve an equilibrium between conservation of forest-related natural resources (biodiversity, water, soil, and oxygen) with the productive development of the forestry sector, within the paradigm of sustainable development.

b) apply within the process of state reform, a process of administrative deregulation, accompanied by liberalization of the forestry sector, and a gradual reduction of incentives for cutting down trees.

c) adapt forestry administration to focus on promotion and support, making the technical and administrative procedures efficient, in order to enhance the productive process.

d) conserve and support the increase of natural forest products and establish and regulate protected forests. At the same time, increase the national forest inventory through the recuperation of areas with good forest potential, based upon technical criteria.

e) reorient the utilization of money authorized by the Government of Costa Rica for forest development.

f) look for a more efficient and competitive forestry industry through modernization of the industrial process, adequate methods of commercialization, forest pricing, the elimination of restrictive barriers, and the gradual elimination of industry protectionism.

g) increase the capacity of forest management through investigation, training, and forestry extension; accomplished in coordination with the public and private sectors and with universities through mechanisms of technological transfer.

h) [not translated since not relevant to the project.]

i) adapt Costa Rica's forestry legislation to its forestry policy.

## **II. Specific Forestry Policy** (pp. 11-15):

a) adapt customs and non-customs restrictions as an indispensable requirement of fulfilling the objective of giving value or worth to the forests and of assuring sustainability of forest resources.

b) establish clear and precise procedures through the creation of procedure manuals, with the goal of facilitating administration and of promoting the saving of administrative costs for the Costa Rican Government, but principally with the purpose of making the system convenient for the user.

c) provide security for forestry investment and ownership, without restrictions for sustainable use in accordance with the owner's interest, provided that the owner complies with the rules for sustaining this resource.

d) development of a plan of action or management plan (hereinafter "Management Plan"), is an indispensable requirement in order to establish and make use of forest plantations that receive incentives, and in order to enable use of natural forests.

e) concentrate forest protection and control functions in areas of forestry interest, while in other areas permit local organisms such as municipalities and associations to assist in forestry protection.

f) promote the formation and operation of consultative forestry groups, with the goal of establishing adequate mechanisms of agreement that will benefit forestry development at the national level, but with regional protection.

g) fortify the infrastructure of the Costa Rican Forestry Department<sup>1</sup> in areas of forestry interest, in order to facilitate operating conditions, to stimulate regional staff, and thus to improve the Department's efficiency.

h) support actions that help consolidate the organization of the forestry private sector. There is special interest in helping the formation of consortiums and associations of small businesses in order to achieve better business capacity within the concept of democratization of the economy through small business.

i) authorize a preponderant role to the State forestry operation, requiring it to take responsibility to conduct, control, and promote the development of private forestry projects.

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<sup>1</sup> The "DGF" or "Dirección General Forestal" is referred to in this paper, for ease of English use only, as the "Costa Rican Forestry Department" or as the "Department of Forestry".

j) reorient the use of incentives authorized by the Government. Use of these incentives will be exclusively in lands with forestry potential, and for the administration of degraded, natural and secondary forests, for natural regeneration, and for reforestation by small land owners.

k) create a mechanism for waiving payment of territorial taxes in areas voluntarily submitted to the State Forestry Operation, and making it attractive to the owners of such areas.

l) eliminate all time periods for submission of documents. The service provided to users will be continuous and expedited.

m) eliminate all transactions or forestry permits required for the profitable use of trees on an owner's land.

n) adapt the granting of authorizations to cut trees to the stages, or steps, established in the Management Plan.

o) accept the right of possession for those that receive incentives for reforestation, cutting, profitable use of trees, and forest management, regardless of whether such persons are formally registered as the owner.

p) promote and facilitate the importation and exportation of forestry products.

q) eliminate all taxes based on the value of standing timber. Solely establish a tax applicable to the final product, such tax to be paid by the consumer.

r) offer technical assistance to small forest owners, preferably to those who are organized and who conduct projects of social interest.

s) produce statistics and data bases as a basic and elemental function in order to achieve the full development of

the forestry resource, in order to determine policy and to support and foster the private sector.

t) complete, in the shortest time possible, an inventory of the forests in Costa Rica. This inventory will constitute the basis for a "National Forestry Development Plan", which will become the basic model for planning, use of, and benefiting from, forestry resources.

u) adapt the organizational structure of Costa Rica's Forestry Department to guaranty the sustainable management of forest resources and to complement the actions taken by the private sector.

v) adequately prepare the personnel of the Department of Forestry so that they can respond to the required necessities for the development of the forestry sector.

u) decentralize administration and responsibilities in order to provide expedited service. The regions will offer service of a quality level necessary to resolve all matters or administrative problems. The regions will administer the budgets assigned to them, based on their basic needs.

### **III. Areas of Natural Forest (pp. 15-17):**

a) value the producing forest through industrialization and commercialization, with a large number of permanent and sustained forest products. Consideration will be given to other benefits such as social and environmental, which cannot be quantified by the mechanisms of established markets.

b) base the administration of the forest on the concept of sustainability. The benefits from this approach will be achieved through a combination of protection and production, guaranteed through the incorporation of the technical rules or norms established in the Management Plan.

c) guarantee through the forestry Management Plan, as a technical tool to achieve sustainable use of the forest, recovery and replacement of the forest in accordance with the requirements of national policies and of international rules of sustainability. This will permit full backing for commercialization of the wood.

d) eliminate existing barriers or restrictions to forestry development. This activity will be integrated into the national economy, so that the market will fix the prices, and so that these prices can cover the cost of administration and also provide a clear reference point of forest activity.

e) support the sustainable management of natural forests on lands with good forest potential through the use of adequate credits directed to that end, providing incentive for the administration of secondary forests and of degraded or damaged forests in order to support their growth and production.

f) create an incentive for forestry protection, in order to promote the natural regeneration and permanency of natural, protected forests located in biological corridors, in high valleys, and in water discharge areas which are of communal and national interest.

g) prevent changing the use of lands with tree coverage which are located in areas of forest potential, for example, in areas with agricultural potential located in buffer zones to protected areas or to biological corridors. Forestry business will be promoted in these areas as a permitted use of the land.

#### **IV. Areas of Reforestation (pp. 17 - 19):**

a) become a driving force for the development of large blocks of reforested areas that permit the administration, profitable use of, and industrialization in an efficient manner. A definition and priority list of the areas marked for inclusion will be prepared.

b) authorize incentives for reforestation of lands with good forest potential, until the National Forestry Financing Fund (hereinafter "FONAFIFO") is funded. In addition, use will be made of fiscal incentives such as waiving territorial taxes, waiving taxes on uncultivated land, and protection of land owners against land squatters.

c) without the use of incentives, promote the establishment of compact plantations or agro-forestry systems in areas with agricultural potential. These plantations will be promoted under the concept of a income-producing product.

d) promote foreign investment for the financing of reforestation projects which guarantee a socio-economic benefit to the areas that are developed.

e) promote the use of native species previously identified and prioritized by region, and in so doing thereby foment research and publication.

f) establish a "Certificate of Free Harvest" for those plantations established with one's own resources.

g) modify conditions for incentives, while those are still in effect, financing the management of the plantations until the species on them are mature. The purpose is to guarantee the success of the forestry-cultivation program, whose goal is to improve the quality and quantity of the final products.

h) to promote forestry-cultivation in rural communities in order to incorporate them in the process of reforestation for commercial purposes.

i) give support to fixing the conditions under which FONAFIFO will provide credit, such conditions to be based upon research concerning costs and income. With this information, establish the value of species by region for use with the establishment and administration of plantations.

#### **V. The Forestry Industry (pp. 19 - 20):**

a. adapt the industry to a market that manages typical amounts of natural tropical forest, but primarily of small dimension and young or "juvenile" product from plantations and secondary forests.

b. eliminate restrictions to the installation, enlargement, and transfer of new industry, permitting competition based on efficiency and technological transfer.

c. promote industrial conversion based upon an appropriate financing system that permits industry to make technological changes, transferring part of the benefits to the owner of the forest, but always working under the concept of efficiency.

d. establish systems of normalization and of standardization of forest products, so that the consumer can have better quality products, while at the same time benefiting the producer.

e. promote the commercialization of forest products through stock exchanges and auction houses, etc., that afford the forest owner direct access to the market and to price information.