

**GLOBAL DEFORESTATION,
TIMBER, AND THE STRUGGLE
FOR SUSTAINABILITY**

Making the Label Stick

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EXECUTIVE SUMMARY

This report examines timber consumption in the United States, the timber trade and global deforestation (in temperate and tropical forests), and analyzes the links between the timber trade and deforestation. It reviews ongoing national and international policy initiatives to encourage the shift to sustainable forest management, particularly proposed timber certification schemes. The study further explores a variety of policy options for the US, and recommends timber labeling as a cost effective step to encourage investment in sustainability. Timber labeling would complement and enhance the feasibility of efforts to create certification systems for sustainably produced wood.

The US is the largest producer and consumer of timber and forest products, and is second only to Canada in volume of exports. With under 5% of world population, the US accounts for 17% of global timber consumption, and has the highest per capita consumption of timber and wood products in the world. The international timber trade is however not itself the principal cause of deforestation in many countries. Much tropical timber, for example, is consumed in the tropical countries of origin. But the timber trade does link deforestation to consumer markets in the north. The timber trade in particular species such as South American mahogany, or in particular countries such as Indonesia or Canada, which export heavily, has ecological and social impacts disproportional to the share of trade value or volume of exports in global aggregates. Furthermore, where logging is not itself the major cause of deforestation, as in temperate forests, it is the key catalyst to deforestation in critical ecosystems, particularly in tropical countries. Tropical forests that have been selectively logged are four to eight times more likely to be colonized and extensively cleared than are other forests.

Existing and past policy initiatives seeking to promote sustainable forest management have met little success to date--deforestation rates in the tropics continue to increase, and while temperate forest cover is stable or slightly increased, much irreplaceable temperate old-growth forest is being lost or seriously threatened. Continued use of public funds in the US to subsidize economically irrational and environmentally destructive activities in benefit of private interests (e.g., below-cost timber sales from National Forests) encourages needless deforestation, and obstructs US ability to lead internationally.

Grassroots activism in the north in the form of tropical timber boycotts, bans and proposed trade restrictions, while often criticized as discriminatory or potentially counterproductive, has given rise to extensive national and international efforts to certify sustainably produced timber. The proponents of certification argue that increased prices or market share for verifiably sustainable timber will signal producers to invest in sustainable management, providing a market incentive for the shift to sustainability. Detractors of the approach maintain that expected premiums will be small in commercial terms, and that making certification a condition for market access in the north will result in trade diversion, with no environmental payoff. The investment of many international bodies, producer governments, and, increasingly, industry, in exploring certification suggests that many actors expect positive returns to certification. But the costs of certification and means of verification (chain of custody) largely remain to be worked out.

Certification programs, and criteria for sustainable forest management, are being formulated by numerous European and southern governments, NGOs and international organizations. The most advanced, and widely supported is the nongovernmental Forest Stewardship Council (FSC), which has drawn up principles for accrediting certifying bodies. Various United Nations and international organizations, including the International Standards Organization (ISO), with significant industry participation, are considering competing, and sometimes conflicting standards for sustainable forest management. The risk of confusing consumers with multiple conflicting claims and labels is great. If consumer confidence in certification is eroded, the value of certification will be drastically reduced.

Timber labeling in the US, for example by country of origin and species, would provide a cost effective and simple means of creating market incentives for sustainability. Labeling also would

increase the green market for sustainable timber and facilitate efforts to resolve tracking and verification issues. Currently both certification efforts and campaigns on destructive logging are limited in their effectiveness by lack of consumer information.

Mandatory labeling of timber and wood products by country of origin and species, to the extent it would apply to all products equally, should not constitute restraint of trade or discrimination under World Trade Organization (WTO) rules, and could be done at a small fraction of the cost of certification. Labeling would catalyze effective consumer education on the links between consumption and deforestation. It would thus help to reduce demand for the most notoriously unsustainable timber and wood products, while increasing demand for sustainably produced wood. A verifiable consumer information label in the US would help to meet existing consumer demand for information on the environmental effects of market options. Perhaps most importantly, an informational label, in conjunction with consumer education campaigns, can increase consumers' confidence in their ability to make informed judgements with positive environmental consequences.

Global Deforestation, Timber and the Struggle for Sustainability: Making the Label Stick

The very survival of the Nuu-chah-nulth people depends on the survival of old-growth forests. Old-growth forests are our most important places of worship. Within forests we are completely surrounded by life; within forests we can renew our spiritual bonds with all living things.¹

— Klah-keest-ke-uss
(Chief Simon Lucas)
Hesquiaht Indian Band
Nuu-Chah-Nulth
First Nations

We have been left with a sea of rotting stumps.²

- Sim'oogit Hleek
(Chief James Gosnell)
Nisga'a nation
First Nations

PART I. OVERVIEW

The rapid destruction of the earth's biological diversity is one of the major events of the second half of the twentieth century. Most of it is due to the clearing of the world's remaining old-growth forests, particularly tropical forests. Since 1950, the world has lost as much as half of its tropical forests.³ They now cover from six percent to seven percent of the earth's surface.⁴ Current scientific consensus is that they contain from 50 percent to 90 percent of the species of living organisms on the earth. The margin of uncertainty is a mark of how little we know about a basic parameter of life on earth—the number of living species of animals and plants, at least half of which inhabit tropical forests. It also indicates how much we may be permanently losing without even being aware of it. The destruction of tropical forests poses grave risks to the earth's environment. Tropical deforestation contributes between 10 percent and 25 percent of annual carbon flow to the atmosphere.⁵ Given the amount of carbon stored in tropical forests and the magnitude of forests' carbon exchange with the atmosphere, future deforestation could contribute far more to global climate change than it does now.⁶ Furthermore, new research argues that tropical forests may have a much greater role in the regulation of global climate than scientists previously understood. The forests may act as major "carbon sinks", absorbing massive quantities of CO₂ from the atmosphere.⁷

Of potentially equal or greater importance to regional and global climate is the role of tropical forests in water cycling, through the evaporation of water vapor from forest canopy. Deforestation disrupts this cycle and causes more sunlight to be reflected into the atmosphere. As a result, climate patterns in the region and beyond are affected and tend toward drying and warming.⁸

The most comprehensive survey of global deforestation,⁹ shows that both the area deforested and the annual rate of deforestation increased considerably between 1980 and 1990. Whereas

some 113,000 square kilometers of tropical forest per year were lost between 1981 and 1985, about 169,000 square kilometers per year were deforested for the period 1981-1990. The annual deforestation rate rose from 0.6 percent per year of the total forested area to 0.8 percent to 0.9 percent per year.¹⁰ Data from the Food and Agriculture Organization (FAO) are more conservative than other existing estimates; some studies calculate that deforestation rates may be higher. Even the conservative FAO estimate shows that—in spite of enormously increased international attention and myriad policy initiatives through the 1980's—tropical deforestation has speeded up instead of slowing down.

This alarming trend is clear in the Brazilian Amazon, a region which contains a third of the remaining tropical forest in the world. As deforestation rates spiraled in the 1980's, space shuttle and Landsat photographs made the destruction graphically clear to the world. The burning of the Amazon clouded Brazilian relations with the U.S. and European nations. At the 1992 Earth Summit in Rio de Janeiro, Brazil credited improved monitoring and enforcement with reducing deforestation rates in the early 1990's. Recently, the first data released by Brazil's National Space Research Institute (INPE) since 1992 revealed that deforestation is on the increase again. Economic recovery following the Fernando Henrique Cardoso government's stabilization plan, resulted in increased deforestation, in spite of supposed improvements in monitoring and enforcement.¹¹

Outside the tropics the picture is different. Temperate forests have remained stable overall and increased in some areas, although undisturbed old-growth forests are under increasing pressure.

In many critical ecosystems in both hemispheres, timber and pulp production—and the consumption that drives it—are now the leading direct causes of deforestation. In temperate forests, logging for timber and wood pulp is the major cause of deforestation. In the tropics, logging is the cutting edge of deforestation and the major activity through which previously isolated areas are made accessible to agriculture and settlement.

Citizens and consumers in the United States have a substantial responsibility for deforestation—and a correspondingly great opportunity to become part of the solution to it. The United States is the largest consumer of timber and wood products in the world. Our per-capita consumption is far greater than that of any other country in the world. With less than five percent of world population, the U.S. consumes 17 percent of the world's output of wood and wood products. This does not mean that the United States is, by itself, consuming the forests of the world, nor that U.S. timber consumption itself is responsible for most deforestation. As much as 80 percent of tropical timber may be consumed in the producing countries¹². While other estimates are lower, the international timber trade is, in the aggregate, not itself the leading cause of deforestation.

The problem has to do with where deforestation is taking place. In various critical ecosystems, timber production both for export and for internal consumption has ecologically disastrous consequences out of all proportion to the world market share of timber production from these ecosystems. Depending on the ecosystem in question, the form of extraction, government policies, and the corollary effects generated by logging, the timber trade can have massive environmental effects, even when the value generated is a small fraction of aggregate international timber production. This is the case with Amazonian mahogany, with the logging of old-growth coniferous forests in British Columbia, Canada, as well as in Indonesia, Malaysia and some African countries

So U.S. consumption of wood and wood products does link U.S. consumers directly to the destruction of ecosystems in other parts of the world. In addition, the style and standard of U.S. consumption is in many ways reflected around the world. Various international forums, including the 1992 Earth Summit, have made it clear that the ability of the United States to

be an international leader on forest issues is crippled by perverse incentives for the unwise use of our remaining old-growth forests—incentives such as public subsidies for building logging roads in National Forests where timber extraction would otherwise be uneconomic. If the United States, with less than 10 percent of its original forests still undisturbed, continues to subsidize their destruction, temperate and tropical countries with much more of their natural forest patrimony intact can hardly be expected to take seriously our expressions of concern about deforestation. In a diffuse but nonetheless real sense, our domestic policies have international repercussions, because the United States is a world leader. Furthermore in a global economy our domestic environmental policy may have more direct effects. The combination of protecting old-growth forests in the Pacific Northwest and restricting the export of U.S. wood products is expected to affect sawnlog, lumber, and plywood supply and prices around the world.¹³ As the world market adjusts, environmental gains in our Pacific Northwest may be offset by losses in tropical countries or the former Soviet Union. Therefore, our domestic policies must be seen in a global context.

It is also the case that U.S. policies and positions vis-à-vis international institutions—the International Financial Institutions, the International Tropical Timber Organization (ITTO), the World Trade Organization (WTO)—exert broad influence both on these institutions and other nations that belong to them. No U.S. policy goes unremarked by other nations when it affects a substantial commodity market such as the timber market. While domestic action in the U.S. will not of itself halt worldwide forest destruction, lack of action on our part on both domestic and international forest issues will surely contribute to accelerating deforestation internationally.

No global environmental problem has provoked more international discussion and debate over the last decade than global deforestation and loss of biological diversity. But while the problems are better understood and more visible than they previously were, they continue to grow.

U.S. domestic forest policy has been analyzed in detail elsewhere. Briefly, while we have made progress in recent years in protecting our old-growth forests, it has come at a high cost in pressure from natural resource-based industries to undermine basic environmental protection in the U.S. Early attempts by the Clinton administration to rationalize natural resource use on public land by reducing subsidies to private users of public goods were almost entirely rebuffed by Congress due to the influence of regional special interests. Nonetheless, threatened radical overhauls of key environmental legislation, such as the Endangered Species Act, have been turned back. If the U.S. wishes to take a strong leadership position on international environmental issues, concrete steps at home to reduce or eliminate subsidies for unsustainable private use of our public land and resources would be a solid position from which to negotiate. It would also be consistent with U.S. international policies of economic liberalism, free trade, and opening markets.

Internationally, various U.S. initiatives have addressed global deforestation. We will mention only a few, those most directly linked to timber production. U.S. leadership in the international campaign to reform the multilateral development banks (MDBs), the largest single source of public international development assistance, has effected comprehensive reforms in MDB policy.¹⁴ The banks have retreated from infrastructure and colonization/transmigration projects in tropical forest areas. In some regions, this change of policy has helped avoid the opening of isolated areas. However, an increasingly large number of private sector initiatives, in some cases with multilateral and/or bilateral risk insurance or loan guarantees, continue to contribute to the destruction of tropical ecosystems and may even increase. A number of planned or proposed infrastructure works in South America assume greatly increased timber production as central to their viability. The MDBs have also moved aggressively into financing environmental projects, including establishing the Global Environmental Facility (GEF), to assist developing countries in defraying the costs of global

environmental problems such as climate change and loss of biodiversity. This reflects a response to criticism by environmentalists of the MDBs' role in aggravating these problems, consistently voiced by U.S. representatives in the banks since the early 1980s. The environmental reform of the MDBs can still yield concrete results in promoting more sustainable use of forest resources, provided that current commitments to improved implementation of the World Bank's environmental policies moves from intention to practice. The Bank's policies must also apply equally to its private sector and loan guarantee windows, which have strategic leverage in rapidly increasing private sector direct investment in the developing world.

Other U.S. and international policy initiatives have had limited impact on deforestation. The Tropical Forest Action Plan (TFAP), originally formulated by the World Bank, World Resources Institute, and the FAO, has attracted less funding than originally anticipated. It was heavily criticized by developing country non-governmental organizations (NGOs) in its early stages and has undergone successive reformulations. The World Resources Institute, one of the original authors of the plan, stated frankly in its mid-term review of the plan that its goals were not being attained. After a decade of NGO efforts to affect deforestation through the International Tropical Timber Organization (ITTO) and the agreement it produced (International Tropical Timber Agreement ITTA), the groups most invested in this approach have concluded that the ITTO is unlikely to exercise much influence on moving forest industries towards sustainability. North-South conflicts, as well as ITTO's mandate as a commodity organization, have so far ensured that positions on sustainability (e.g. "Target 2000") have remained largely symbolic. The listing of particular timber species in the appendixes to the Convention on International Trade in Endangered Species (CITES) would be a positive step. This idea has been promoted by a number of environmental organizations and member nations in the case of mahogany (*Swietenia* spp.) and would help to regulate trade. The listing of South American mahogany, heretofore blocked by political pressure, particularly from Brazil, and by conflicting positions among U.S. government agencies, appears likely in the 1997 CITES meeting, since the U.S. has agreed to propose the listing and Bolivia has agreed to co-sponsor it.

Under the theory that increasing the revenue streams to sustainable producers in the forest would contribute to the conservation of the forest, NGOs and a number of entrepreneurs have since the late 1980s attempted to create or increase markets for sustainably produced tropical forest products and to add more value locally to such products. The underlying supposition is that increasing the value of standing forest will reduce the rate at which forests are converted to other uses. Consumers who now have the option of purchasing sustainable timber are beginning to create a growing market for sustainable products. This should increase the area of sustainably managed forest and reduce the expansion of the most destructive forms of exploitation. Currently, however, very little timber or wood product comes from sustainable sources.¹⁵ The most frequently cited sources suggest that less than one percent of the area which produces tropical timber is under some form of management.¹⁶ Sustained-yield forest management is at present the most economically significant of such initiatives; consequently, efforts to certify what is and what is not sustainable are particularly important. It is estimated that only about one half of one percent of internationally traded forest products are certified.¹⁷ In addition, there is substantial risk that various national and international certification schemes or sustainable management standards based on different or even contradictory criteria will come before the public at once. This would create confusion among consumers and undermine the credibility of certification generally, potentially vitiating the value of the entire approach. The risk of manipulation or misinformation of consumers through inaccurate or misleading certification is also substantial. There is thus a clear need for certification of the certifiers by an internationally recognized and credible body, as the Forest Stewardship Council (FSC) has proposed. The International Standards Organization (ISO) 1400 process, with far more industry participation than the FSC, is also

proposing standards for certification. and may confuse the question of who can reliably certify the certifiers.

At the same time, various environmental organizations, north and south, have promoted a number of forms of action: boycotts or trade restrictions on tropical timber; boycotts of particular companies involved in forest destruction in rainforests or elsewhere; state and local bans on the use of tropical timber; and moratoriums on timber extraction. While these initiatives have been no more successful in halting the increase in deforestation than the other policy initiatives mentioned above, they have drawn public attention to the issues, and have increased industry's sensitivity to the problem. In recent years, environmentalist campaigning on mahogany in the United Kingdom has substantially reduced mahogany imports. Specific companies have been persuaded in some instances to abandon destructive undertakings or not to use unsustainable products.

Much has been made of the potential risks of boycotts, based on the supposition of their success: If tropical timber were generally boycotted, it is sometimes claimed, then more forest would be destroyed as economic actors compensate for lost timber revenue by converting forest to lower-value pasture and cropland. This argument ignores the central role of logging in stimulating (and often financing) the opening of isolated areas that would otherwise probably remain inaccessible¹⁸. The major risk of boycotts from an environmental standpoint is not of their success but rather their failure. Boycotts may not reach a large enough public to affect markets substantially, are unlikely to cover all import markets, or on a national level may provoke trade retaliation—as threatened against Austria in 1992 in response to the proposed ban on unsustainable tropical timber—especially if boycotts can be characterized as discriminating against imports. Successful boycotts in the north could also lead to trade diversion, i.e., increased sales to markets that remain open. While boycotts alone are unlikely to succeed in significantly reducing deforestation, even limited boycotts and the threat of boycotts have already stimulated “green marketing” initiatives and encouraged some traders and retailers to seek more sustainable sources of supply. In the global market, where the flow of goods and services internationally long ago outpaced the regulatory capacity of existing international or transnational governance mechanisms, boycotts and certification initiatives are among the few direct channels for concerned citizens or consumers to see their views reflected in the marketplace.

Both timber certification and boycotts (loosely construed to include bans, trade restrictions, and moratoriums) curiously suffer the same deficiency in becoming more effective means of affecting deforestation. Preservation of biodiversity, climate regulation, watershed protection and soil conservation— all of which are benefits provided by standing forests— have substantial value, but the price of goods whose production causes deforestation does not incorporate this value. The environmental and social effects of deforestation are a case of “market failure”: They are diffuse but real costs that are not incorporated into the market price of the commodities whose production entails them. One key obstacle to internalizing these critical externalized costs of timber production is lack of information. No market can operate efficiently in the absence of freely-flowing information among buyers and sellers. At present the vast majority of timber and wood product consumers have no readily available means of knowing, for example, whether a given door frame was made from old-growth pine from British Columbia or a plantation-grown tree from North Carolina. Any attempt to create market signals that stimulate sustainable production must overcome this obstacle, be it negative (boycotts) or positive (certification).

Recent research suggests that consumers want environmental information on the products they buy and are, within limits, willing to pay more for environmentally sustainable products. But consumers lack sufficient information either to create enough demand to make sustained-yield management pay off beyond a few isolated cases, or to depress demand in major markets for unsustainably harvested species (e.g., South American mahogany). Timber and

wood product labeling is one step that would begin to fill the information gap. Accompanied by consumer education, labeling would send the signal to producers that investment in sustainable management will pay off. Various goods on the market in the U.S.—notably clothing—already bear mandatory labels identifying content and national origin of the product. Presently, with rare exceptions, consumers in major markets have little or no information as to their actual choices. Labeling wood products by country of origin and species, for example, would give consumers minimal critical information at the point of the sale. This is necessary for consumer education to function more effectively. Labeling in conjunction with consumer education would aid those consumers so inclined to avoid purchasing wood harvested under notoriously unsustainable conditions. Consumers could then signal producers that investment in sustainability would be repaid by maintaining or increasing market share in key export markets.

Whereas certification, supposing sufficient demand for sustainable wood, could operate well on a voluntary basis, labeling would require appropriate regulatory action. No individual firm is liable to find an advantage in voluntarily labeling timber in order to inform consumers of its origin and species when others do not. However, in the U.S. the information to label imported timber by country of origin and species already exists and is collected by the government. A general labeling requirement would not be onerous and would confer neither advantage nor disadvantage on any particular producer or importer.

Different types of labeling would have different potential consequences for World Trade Organization (WTO) trade rules and would provide consumers with different levels of information (see Section V). Minimal information, appropriately framed, could be provided without provoking challenges in the WTO. But as decreasing dolphin mortality in the wake of the Marine Mammals Protection Act has demonstrated, even trade restrictions that are open to challenge in the WTO may have sufficient environmental benefit, for broad sectors of public opinion as well as for policy makers, to justify provoking trade/environment conflict. Such conflicts also perform the service of testing the dispute resolution mechanisms of the WTO in the environmental area. Such disputes are still relatively novel for the organization, but they are liable to become increasingly contentious in coming years.

We have focused on the timber trade because it is a key catalyst for global deforestation that links consumers in the north with producers in the south. This link is an important opportunity to create incentives for sustainability. In addition, certification or the creation of standards for timber and wood products have come to the forefront of an increasing number of international forums on sustainability. Numerous national and international policy instruments, proposals, and other initiatives focused on or relevant to deforestation, particularly tropical deforestation, have not been cited or have been mentioned only in passing here—natural resource income accounting, the Biodiversity Convention, Agenda 21 as it relates to forests, bioprospecting, the Global Environmental Facility, the institutional reform of the International Financial Institutions more broadly, the G7 Pilot Program for the Conservation of Brazilian Tropical Forest, resource transfers for carbon sequestration in forests under pilot projects in “joint implementation” under the Climate Convention, among others. At various levels, all of these instruments and initiatives can contribute to addressing the problem, and some already do so. It is also the case that national policy frameworks are central to creating or eliminating incentives for deforestation. These vary widely and will ultimately be determined at the national level.

The single recommendation that best applies to most of the major timber producers and that would probably have the broadest effect in reducing deforestation would be to eliminate subsidies and economically inefficient public sector expenditures for activities that stimulate deforestation and largely benefit private interests (e.g., publicly funded road construction in U.S. National Forests, or continuing fiscal incentives for sawmills in the Brazilian Amazon). We refer here to eliminating policy distortions at the national level that favor deforestation.

Failure to include the depletion of natural resources and the consequent loss of environmental benefits in national income accounting undoubtedly distorts the analytic framework within which national planners work¹⁹. Treating forests, for example, as natural capital that should be depreciated as it is used up, rather than simply as income, would allow planners to understand better the costs of deforestation. But neither leveling the national policy playing field nor instituting more accurate national income accounts would of themselves halt the consumption of Brazilian mahogany or old-growth pine from British Columbia and the serious environmental consequences it entails. If the preservation of more than tiny islands of the world's tropical forests and temperate old-growth forests is to be more than a hope, a necessary part of the solution is to create market incentives for sustainability and to change consumer preferences in the vast markets, north and south, that catalyze much of current deforestation. This report addresses these issues of market incentives and consumer preferences.

A. Scope and Organization of This Report

This report discusses timber consumption in the United States and the environmental effects of timber production in tropical forests and old-growth temperate forests. It also analyzes selected national policy initiatives principally directed at timber and wood production, with emphasis on certification and standard-writing programs for timber. It concludes with a number of policy recommendations. This is neither a comprehensive report on global deforestation, nor an exhaustive compendium of the numerous national and international policy initiatives that have addressed the issue. Its scope is considerably more modest—to reexamine the issue of logging and its role in deforestation (in our view often misunderstood), to analyze the global timber trade in these terms, and based in this, to suggest ways that efforts to create market incentives for sustainability, such as certification, may be made more effective. Section II discusses U.S. timber and timber product consumption. Section III examines several case studies of the effects of timber production in critical forest regions—the U.S., Canada, Brazil, Indonesia and Africa. Sections IV and V summarize existing programs and proposals for timber certification, including timber labeling proposals, consumer preferences, and existing systems for tracking internationally traded commodities in the U.S. Section VI presents our conclusions and recommendations.

PART II.

U.S. CONSUMPTION OF TIMBER: SIGNIFICANCE AND RESPONSIBILITY

Global production, consumption, and trade in timber and worldwide consumption of fuelwood is accelerating at an alarming pace. World wood consumption has escalated dramatically from post-World War II levels of 1.4 billion cubic meters to 3.4 billion cubic meters in 1991.²⁰ This 250 percent increase in global consumption corresponds with a current per-capita annual consumption rate of 0.7 cubic meters.²¹

TABLE 1: Global Per Capita Consumption of Timber Products: Selected Countries, 1990

Country	Lbs. paper consumed	Cubic feet lumber and plywood consumed
U.S.	681	43
Japan	490	10
Soviet Union	79	13
China	28	1

Source: The American Forest Council

Consumer demand for wood and wood products in the U.S. remains the highest in the world. Furthermore, worldwide individual consumption levels are but a fraction of per-capita consumption levels in the U.S. With just 4.7 percent of world population, the U.S. accounts for 17 percent of total global consumption.²² Individual U.S. citizens consume 2.4 cubic meters of wood products each year, (excluding paper and pulp products) three times that of citizens in developing countries and double that of average individual consumption among other developed countries.²³ Global timber consumption would quadruple to over 12.7 billion cubic meters annually if global per capita rates matched the frenetic pace of U.S. consumption.

TABLE 2: Production, Net Trade, and Per Capita Consumption of Timber, 1992

Economic Group	Production (million m ³)	Net Trade (million m ³)	Consumption (million m ³)	Population (millions)	Per Capita Consumption (m ³)
Developed	1,534	9	1,525	1,265	1.2
of which U.S.	533	-55	588	249	2.4
Developing	1,922	-9	1,931	4,028	0.5
World Totals	3,456		3,456	5,293	0.7

Source: David J. Brooks. "U.S. Forests in a Global Context," USDA Forest Service

The United States is pivotal in every aspect of global trade in timber products. The U.S. leads the world in production and consumption of forest products and ranks second (behind Canada) in volume of exports. Additionally, the U.S. meets consumer demand for timber by importing enormous quantities from around the world. The U.S. dominates the furniture market as well, absorbing as much as 30 percent of world furniture exports. Participation in the global timber trade at these levels implies a requisite responsibility for the health and sustenance of forest ecosystems at home and abroad. (See Figure 1, Appendix 1.)

A. U.S. Timber Consumption: Old Habits

Timber consumption in the U.S. and the accompanying deforestation follow patterns established long ago, when old-growth forest cover was sacrificed to meet burgeoning demand for wood. In the 18th century, 400 million hectares of forests blanketed half of the land area that would become the United States. Today, 300 million hectares of mostly secondary growth remain.²⁴ From the mid-1800's through the turn of the century, pioneers in America were felling trees to fill the cargo bins of more than 2000 ships per year transporting wood to European markets. Demand for timber created momentum for westward movement, and loggers proceeded across New York, Michigan, and Wisconsin, reaching Minnesota by the late 1890's.²⁵ Presently, less than 10 percent of forest area in the U.S. remains undisturbed.²⁶ While much forest has come back in previously deforested parts of the United States, deforestation has caused the extinction of a substantial number of species. Forest has returned to New England, for example, but woodland caribou, bison, elk, and passenger pigeons have not.

Trends in the forest products timber sector are closely linked with fluctuations in the national business cycle and the global economy. Comparison of growth in GNP and disposable personal income with expenditures for new construction illustrates the connection between economic growth and increases in timber consumption. Recession and a corresponding downturn in the construction market at the start of the current decade resulted in a slight faltering of the acceleration of timber consumption. Despite the 1990-92 recession, however, both aggregate import and export levels remained above levels immediately preceding the boom of the late 1980's.

The temporary downturn in the sector has been reversed during the current recovery. In fact, according to recent Commerce Department reports, the building materials and furniture markets were among a handful of industries leading the recovery in retail sales. The construction sector boomed as low interest rates motivated consumers to invest in new homes. Consequently, housing starts in 1993 gained approximately nine percent over 1992, and timber demand grew rapidly. By many estimates the timber sector will experience continued vigor and increasing demand well into the next century.

As a result of the trends outlined above, with added impetus from increasingly affluent baby boomers and an expanding population, timber product consumption in the U.S. continues to rise. The U.S. Department of Commerce estimates that U.S. consumers spent well over \$63 billion on wood products in 1993.²⁷

B. U.S. Consumption of Timber: Recent Trends

The U.S. is currently the leading producer and consumer of forest products. Timber imports increased from just over \$1 billion in 1950 to \$17.6 billion in 1992 (adjusted for inflation).²⁸ Consumption has steadily increased for the past three quarters of a century, accelerating sharply during the construction boom of the late 1980's. Consumption patterns reflect gradual increases—most notably in commodities closely tied to construction, namely lumber and plywood/veneer—with less significant increases in fuelwood and pulp products. Over the past 50 years, the average size of U.S. homes has grown from 100 square meters to 185 square meters. Per-capita floor space has increased from 29 to 69 square meters.²⁹ (See Figures 2 and 3, Appendix 1.)

1. Splitting Wood: Softwood vs. Hardwood Consumption³⁰

U.S. citizens consumed 16,230 million cubic feet of domestic and imported timber and timber products in 1990. Softwood consumption constituted three quarters of the total consumption, or 12,970 million cubic feet. Hardwood consumption of 3,260 million cubic feet made up the remainder of timber consumption.³¹ Domestic producers supply well over half of the wood and wood products demanded by U.S. consumers, and they also export a significant volume of lumber, logs, pulp, and paper. Imports from Canada and other countries supplement domestic production. Approximately one third of softwoods consumed in the U.S. are imported, mainly from Canada. Hardwood demand is also fulfilled in part by imports. Estimates of the proportion of imported hardwoods consisting of tropical woods range from 70 to 95 percent. Figure four compares the proportion of softwood to hardwood consumption and domestically supplied products to imports. (See Figure 4, Appendix 1.)

Softwood Consumption

The bulk of U.S. timber consumption consists of temperate softwoods. In 1988 the U.S. consumed 12,970 million cubic feet of softwood, of which 69 percent, or 8,915 million cubic feet, was domestically produced. Canada supplied 94 percent of the 4,055 million cubic feet imported by the U.S. in the same year.³² Analysis of softwood imports by commodity shows that Canada is the dominant supplier, but also that Brazil, New Zealand, and particularly Indonesia have gained a share of the U.S. softwood market, mainly in the softwood plywood sector. Softwood production in tropical countries is expected to increase as plantation-grown coniferous woods reach maturation. According to a report by the U.S. Forest Service and Forestry Canada for the United Nations Food and Agriculture Organization, "both New Zealand and Chile will have large volumes of radiata pine reaching marketable size over the next two decades."³³ The American Plywood Association reports that tracts of original Venezuelan forests have been replaced by plantations designed to produce pulpwood and coniferous plywood.³⁴ These reports indicate that tropical softwood imports of lumber, plywood, and paper products will continue to increase.

The greatest demand for softwoods in the U.S. is for lumber, followed by pulp, plywood/veneer, logs, and other products. Softwood lumber consumption was 7,285 million cubic feet in 1988, surpassing volume demand for all other softwood products combined, according to the U.S. Forest Service. Pulp consumption in the same year was 3,905 million cubic feet, while plywood and veneer consumption was 1,495 million cubic feet.³⁵ The construction industry absorbs as much as 80 percent of the softwood lumber consumed in the U.S., and it also utilizes a major share of softwood plywood, which is commonly referred to as "structural plywood." (See Figures 5-9, Appendix 1.)

Hardwood Consumption

U.S. hardwood sales amount to \$5 billion annually. As in the case of the softwood market, much of the demand for hardwood is fulfilled by domestic suppliers. Approximately 88 percent of hardwood originates in U.S. forests, while 12 percent is imported. The majority of hardwood imports are tropical woods, particularly nonconiferous plywood, which accounts for two thirds of total nonconiferous consumption, according to U.S. Forest Service and Forestry Canada estimates.³⁶ A conservative estimate is that tropical woods make up 73 percent of all imported hardwoods by value. Figure 10 illustrates the ratio of tropical to temperate hardwood imports. A report to the International Tropical Timber Organization and Forestry Canada estimates that tropical imports by the United States and Canada constitute over 95 percent of hardwood imports.³⁷

Domestic production of hardwoods fills a variety of needs. Red oak, white oak, poplar, aspen, maple, birch, black walnut, hickory, and cherry are among the domestic hardwoods harvested in the U.S. Much of the harvest, slightly over 40 percent, becomes fuelwood, while more than 25 percent is converted to pulp. Figure 11 displays common uses for temperate hardwoods. Uses specific to tropical hardwoods will be discussed later.

Both temperate and tropical hardwoods are imported into the U.S. from all regions of the globe. Canada remains a primary supplier of temperate hardwood logs, lumber, and veneer. But hardwood plywood is the major commodity group among imported hardwood products, and demand for it is primarily met by tropical imports from Southeast Asia and South America. Figures 12-15 illustrate hardwood imports by commodity. (See Figures 10-15, Appendix 1.)

2. Tropical Timber Consumption

Although the bulk of U.S. timber consumption consists of temperate softwoods and, to a lesser extent, domestic hardwoods, a significant share of hardwood imports are tropical woods. Estimates of tropical timber market share range as high as 95 percent of total hardwood imports.³⁸

In real terms the U.S. is the third largest importer of tropical timber, purchasing over \$800 million worth of tropical logs, lumber, plywood, and veneer every year, according to the U.S. Forest Service.³⁹ The volume of tropical timber imports each year ranges from 1.0 to 1.5 billion cubic meters. Additionally, the U.S. imports approximately \$200 million annually in value-added products manufactured from tropical woods, such as door frames, moldings, flooring, jewelry boxes, picture frames, and ornaments. Finally, well over \$500 million worth of furniture manufactured from tropical wood enters the U.S. annually, much of which is manufactured in Taiwan.⁴⁰ (See Figures 16-18 Appendix 1.)

U.S. Forest Service officials predict increasing imports from tropical countries. Tightening of harvest limits on U.S. public forest lands will result in increased demand for wood products from tropical areas with less restrictive policies.⁴¹ Craig Adair of the American Plywood Association believes that demand for imported plywood will inevitably increase, and plywood mills are currently being built by U.S. companies in Venezuela to capitalize on that trend. Companies operating in tropical countries or importing from the tropics will continue to deal in plywood made from tropical hardwood, while rapid conversion of previously forested areas to coniferous plantations will provide an alternative source for structural (softwood) plywood.⁴²

Demand for paper and paper products is also likely to outpace domestic production capacity. Costs are rising and supplies dwindling in the Pacific Northwest, leading companies to search for alternatives to domestic and Canadian supply sources, according to a spokesperson for Boise Cascade. The U.S. already imports large quantities of pulp from eucalyptus plantations in southern Brazil. Four U.S. companies in the Pacific Northwest received an 18,000-ton shipment of Caribbean pine chips from Brazil for testing in paper production in August 1993. Longview Fiber Company of Seattle, another company engaged in the initial study, ordered a second, larger shipment of chips and is continuing to test the viability of the Brazilian supply.⁴³

PART III.

TIMBER AND DEFORESTATION: CASE STUDIES IN CRITICAL ECOSYSTEMS

Twenty years after the U.S. government first began to make policy on tropical forests, and more than twenty years after the term “sustainable development” was coined, the rate of tropical deforestation continues to increase.⁴⁴ The average rate of clearing of tropical forests throughout the 1980s was, by the conservative estimate among the studies, close to one percent per year, nearly double the rate of the 1970s.⁴⁵ The most comprehensive survey of global deforestation, the Food and Agricultural Organization of the United Nations (FAO) Forest Resources Assessment, estimated that the annual rate of tropical deforestation between 1980 and 1990 was between 15.4 million hectares and 16.9 million hectares, equivalent to an area about the size of the state of Washington.⁴⁶ Global per-capita endowment of forest cover has been reduced by two thirds since the beginning of the century.⁴⁷

Estimates of how many species are being lost vary because the estimates of how many species of organisms there are also vary—largely a reflection of how much remains unknown about tropical forests. But it is a matter of scientific consensus that species are vanishing at rate unmatched since the last dinosaurs walked the earth. The most comprehensive global list of endangered and threatened species classifies 140 species of mammals as endangered and likely to become extinct. This is more than twice the number of mammal species lost in the last 400 years.⁴⁸ By recent estimates some two percent to eight percent of all living species will be lost in the next 25 years.

Various studies⁴⁹ conclude that since timber export is not in itself the leading cause of tropical deforestation, and since a large part of tropical timber consumption takes place either in tropical countries producing the timber or in Asian countries importing it, certification, boycotts, and other trade-related mechanisms are unlikely to have much impact on deforestation globally. However, in evaluating the impact of exports on deforestation, these studies ignore or minimize the disproportional environmental impact of extracting relatively small volumes of timber from critical ecosystems. The proliferation of timber certification programs around the world suggests that the pessimists on timber certification have also underestimated the effects on national policy of northern trade restrictions or their threat. They tend to argue that deforestation is best addressed at the level of national policy. It is true that achieving sustainability, however it is defined, will require a variety of national policy changes. But this should not prevent the United States nor other consumer countries from taking legal and feasible steps to create incentives for sustainability elsewhere in the world. Even relatively modest trade-related steps may contribute to needed national policy reforms. The effect of the Marine Mammal Protection Act on Mexican tuna fisheries, in which Mexican government action has enormously reduced dolphin mortality in response to U.S. pressure, is one example.

A. Temperate and Boreal Deforestation: Background

Considerable attention has been focused on tropical forests, where deforestation most directly and imminently threatens remaining reserves of biological diversity. While addressing tropical deforestation remains critical, it is necessary to see the process from a global and historical perspective. Vast tracts of closed temperate and boreal forests were exploited and destroyed long before tropical forests were invaded, and tropical countries have systematically raised this point in response to northern expressions of concern over tropical forests. Today, logging continues to destroy temperate old-growth forests in those same northern countries.

One fifth of the world's total forest area has been lost since pre-agricultural times. Prior to the 1950s, attrition was most severe in temperate forests. Estimates of loss of closed temperate forests range from 32 to 35 percent. Over the same period, losses were least significant in tropical forests. The agricultural frontier and the industrial revolution that swept across countries in rich temperate zones brought both forest conversion and destruction. North America lost 17 million hectares of forest between 1850 and 1900 and another 15 million hectares between 1900 and 1950, as forests were cleared for agriculture, fuelwood, industrial and residential construction, and trade.⁵⁰ Many original closed temperate forests of

Western Europe and the United States were depleted by the middle of the century. Unexploited forests became scarce, as did unallocated or inaccessible forest tracts. Thereafter, technological advances and demographic shifts redefined land use patterns and preferences, easing pressure on forests. Additional contributors to the slowing of temperate deforestation were conversion of agricultural lands to plantation forests and maturation of secondary-growth forests. As a result, statistics show that forest area in temperate zones is stable overall and is even increasing in some areas. But this increase is taking place in secondary and plantation forests. These planted groves provide timber, forest cover, and they may take pressure off of old-growth forests, but they do not contain the biological diversity of old-growth and may not provide the same ecosystem benefits.

In the U.S., the interests of loggers and industrialists in old growth forests continue to collide with those of environmentalists and a growing body of recreational users. Impassioned debate concerning the cutting of scarce old-growth forests in the western United States resulted in judicial action suspending cutting on public lands. In response, in 1995 the Clinton Administration unveiled a forest plan for the Pacific Northwest which covers much of the land administered by the Forest Service in the region. Nationally, however, the Forest Service manages approximately 500 million acres, just 18 percent of the country's total productive and available forest land. Most forest land, 72 percent of all forests in the U.S., is privately held by individuals and corporations. According to a 1990 report for the United Nations prepared by Forestry Canada and the U.S. Forest Service, "increased harvests to the year 2005 must originate almost entirely on private lands."⁵¹ Vulnerable old-growth forests under private ownership in the western United States are being rapidly depleted. At the present rate, they will all but vanish by the year 2000. Primary forests under private ownership in the Pacific Northwest have already disappeared.⁵²

U.S. domestic forest policy became highly controversial in the early 1990s, as did attempts to rationalize the economics of using natural resources on public land in general. The Spotted Owl controversy that led to protection of remaining old-growth forest on public land in the Pacific Northwest, also fueled efforts to overhaul and undermine the Endangered Species Act, the cornerstone of legal protection for species and ecosystems in the U.S. Nonetheless, the most radical initiatives to remove all restrictions on the exploitation of U.S. old-growth forest (e.g., by fundamentally weakening the Endangered Species Act) have met considerable resistance and have so far made no progress in Congress. The most controversial forest issue in the last several years was the "salvage" logging rider signed by President Clinton in the summer of 1995. The industry-promoted rider allowed the Forest Service to cut "dead and dying" stands for so-called "forest health" reasons. However, the legislation was interpreted so broadly that the Forest Service cut many perfectly healthy, green stands. Moreover, the rider exempted the "salvage" stand from the requirements of the Endangered Species Act, the Clean Water Act and other laws. The provisions of the rider expired at the end of 1996.

Scorched-earth rhetoric aside, there is a latent consensus that even on private property, some balance must be found between the rights of private property owners and the need to protect critical ecosystems such as wetlands and the remaining old-growth forests in the U.S. There is also broad support for the use of market incentives rather than government regulation to encourage conservation among private owners.

1. Forests of the Temperate Zone: Country Studies

Within the generally stable forests in temperate zones, some old-growth forests are being destroyed as fast as, or faster than, tropical forests.

Canada

In Canada, where one tenth of the world's forests are found, clearcutting of virgin forests continues virtually unchecked. Canada leads the world in forest product exports, shipping over 42 million cubic

meters of roundwood, softwood lumber, and waferboard annually, valued at \$17 billion (U.S. dollars). The United States consumes the bulk of Canadian exports.

Although Canada has demonstrated international leadership on several global forestry issues⁵³, perverse domestic public land-use policies and financial dependence on timber exports have led to astounding deforestation rates. Despite a recent systematic review of policies impacting forests and biodiversity, Canadian federal and provincial governments continue to lease public forest lands to multinational companies and subsidize their unsustainable harvesting practices.

Historically, Canada has failed to acknowledge aboriginal land claims, biological diversity, and other forest values. Although progress has been made to include these values in future decisions, extractions and clearcuts from old-growth forests continue. U.S. demand for Canadian softwood motivates most Canadian logging and will largely determine the fate of Canadian forests.

The Forests

Canada's forests include much of the world's diminishing temperate rain forests and over half of its boreal forests.⁵⁴ There are 17 hectares of forest per person in Canada—more than in any other nation.⁵⁵ Each year Canada's immense forests help to counteract global warming by providing a carbon sink of 72.1 million tons. Canadian forests offer habitat for some 200,000 species.⁵⁶

Temperate rain forests are exceptionally rare, biologically diverse, and productive ecosystems. They have never covered more than half of one percent of the earth's surface. They host a variety of species but are better known for their abundance of life, contributing more biomass (a nonfossil source of energy) than any other ecosystem. And they are even more endangered than their tropical counterparts: 55 percent have already been cut, leaving only a few fragmented zones around the world.⁵⁷ The Pacific coast has the largest contiguous zone of this forest. On Vancouver Island, where two thirds of the temperate rainforests have already been logged, Clayoquot Sound holds three of six remaining intact watersheds. Originally these watersheds numbered 91. Covering 245,000 hectares, Clayoquot Sound is the largest remaining lowland coastal temperate rain forest on the planet.⁵⁸

Timber Trade and Consumption

Timber trade is central to the Canadian forest industry and to the economy in general, providing one in every 16 jobs and adding \$19.2 billion (Canadian dollars) to Canada's balance of trade.⁵⁹

Canada's timber trade has been steadily rising for years and has expanded more rapidly in recent years. Exports surged 11 percent in 1992 over 1991, largely reflecting the boom in U.S. housing starts. Reliance on the timber trade has forced Canada to bolster its competitiveness in the global marketplace by focusing on softwood. Softwood trees make up 64 percent of Canada's forests and 90 percent of the nation's total harvest. Propped up by artificially low stumpage fees, Canada's forest industry has captured half of the world softwood export market.⁶⁰

Deforestation and Impacts

Canada loses some one million hectares of virgin forest every year to export-oriented logging.⁶¹ This loss is especially pronounced in British Columbia, whose forests are predominantly softwood and particularly critical to Canada's competitiveness in exports. To maintain their share of the world market, multinationals harvest ancient old-growth trees, which comprise 40 percent of the province's forests.⁶² The provincial government, which abandoned the goal of sustained-yield management in 1979 and candidly acknowledges that harvesting practices are not sustainable. Subsidies to those practices continue, accelerating the devastation of British Columbia's pristine wilderness.

Such practices have earned Canada the label of "Brazil of the North." Such a comparison speaks volumes about mismanagement of natural resources in both countries. When calculated as an annual rate, British Columbia's rate of rain forest loss is actually two to three times greater than that of Brazil!⁶³

During the course of the past forty years, as much as half of Canada's Pacific coastal forest has been destroyed. A clearcut of more than 180 square miles around Bowron Lakes is so severe and extensive as to be visible from space.⁶⁴ One hundred thousand acres of Vancouver Island's old-growth forests fall victim to clearcut logging each year, resulting in declining salmon populations, severe soil erosion, and mud slides. Logging operations in the region resort to clearcutting 90 percent of the time.

Further disappearance of these ancient, and little-understood forests can be expected in the future. Removals from British Columbia already exceed those from any other Canadian province, and industry analysts anticipate a 24 percent increase in the harvest over the next 20 years.⁶⁵ All of British Columbia's remaining unprotected old-growth coastal forests may be eliminated within the next 25 years.

The U.S. Role

The United States, which absorbs nearly 70 percent of Canada's annual timber exports, bears a major share of the responsibility for this situation. In 1992 alone, the U.S. imported 32,477,260 cubic meters of roundwood, softwood lumber, and waferboard; 13,853,697 tons of chips, wood pulp and paper products; and an additional 31,099,093 square meters of shingles and shakes from Canada, valued at nearly \$12 billion (U.S. dollars).⁶⁶

U.S. consumers find the supply of timber products abundant, but information sparse. Few consumers realize that clearcut Sitka spruce from British Columbia's coast sometimes frames U.S. homes. Pine from the Great Lakes-St. Lawrence region crosses the border as dimension lumber. Douglas fir from Ontario, western hemlock from British Columbia, balsam fir from New Brunswick, and spruce from Nova Scotia are all pulped for use in major U.S. newspapers. Cedar from Alberta becomes shingles and shakes. This information is not readily available to the consumer, leaving people unaware of the ramifications of their consumption on Canada's forests.

Still less evident to the consumer is the effect of timber demand on those who inhabit the forests.

Nuu-chah-nulth First Nations

Much of Canada's deforestation is contingent upon refusing to recognize aboriginal rights to forests. Several provinces continue timber subsidies to multinationals while failing to legitimate the land claims of indigenous peoples. British Columbia, which has witnessed a series of logging disputes between natives and industry over the past decade, is currently embroiled in a debate over the future of Clayoquot Sound and the land rights of the Nuuchah-nulth tribe. The indigenous people never surrendered their land or resource rights, and no treaties were ever signed with them. International attention focused on this conflict as it grew into a flashpoint for the future of the world's remaining ancient temperate rain forests and their inhabitants.

The Nuuchah-nulth First Nations tribe has inhabited the Sound and depended upon its forest and fish resources for millennia. Its population, once some 70,000, has declined to only 1,000 today.⁶⁷ The Canadian government accepted the Nuuchah-nulth land claim in 1983 but has yet to validate it through a final agreement. Although the tribe represents a majority (50 percent) of the region's population, it lives on government reservations of only one half of one percent of the land base. Politically disenfranchised and economically disadvantaged, the tribe has benefited least of anyone from the area's economic activity and has lacked a voice in determining land use.⁶⁸

British Columbia's Premier opened 74 percent of Clayoquot Sound's ancient forests to intensive logging in 1993, reflecting the heavy influence of timber interests and coinciding with the government's purchase of four percent of the stock of a major timber company.⁶⁹ The decision alienated both indigenous peoples and the public, three quarters of whom favor protecting Canada's forests for future generations,⁷⁰ and sparked the largest act of civil disobedience in Canada's history.⁷¹ Media coverage of this event provided a forum for the Nuu-chah-nulth to oppose the plan and register public protest of their unjust treatment. To push for recognition of its claims, the tribe formed a pact with U.S. environmental organizations, including the Natural Resource Defense Council and the Rainforest Action Network. They negotiated an Interim Agreement which created a government-to-government relationship between British Columbia and First Nations. Signed in March 1994, the agreement provided for joint determination of land use in Clayoquot Sound until a treaty could be negotiated.

While its central land questions remain unanswered, the Nuu-chah-nulth and their allies have halted clearcutting in Clayoquot Sound. In 1993, in response to the protest, the BC government created a panel of independent scientists and tribal elders to evaluate the effects of logging in the Sound. In 1995, the panel's sweeping recommendations were adopted, ending clearcutting and instituting modern, lower-impact forestry practices. Important ecosystems still need to be protected, and the Nuu-chah-nulth land claim is still not settled, but progress has been made. Nonetheless, twenty percent of the oldgrowth forest has already been lost, and its salmon runs have declined drastically. The Nuu-chah-nulth, deprived of an increasing amount of their forest resources, are rightly concerned that most of the area could be cut before the treaty is signed.

Haisla Nation

While some natives have asserted their land rights, others have emphasized the ecological importance of their region in order to protect their forest. The Haisla Nation has shown the biological diversity of their unique Kitlope ecosystem to be far more valuable than its timber resource.

The Kitlope river watershed, a coastal temperate rain forest along the Pacific coast, spans 400,000 hectares and hosts a great number and variety of species.⁷² Of the 25 coastal watersheds in British Columbia over 10,000 hectares, the Kitlope is the only remaining region unimpacted by logging.⁷³

For 3,000 years the Haisla Nation has lived, fished, and hunted in the Kitlope. Numbering some 600 today, the Haisla have endured many epidemics and frequent bouts of high unemployment. Now they face a logging threat. Eurocan, a Finnish-Canadian joint venture, had long owned a timber license in the Kitlope but had sought first to obtain the Haisla's consent to log. In the 1980s, facing pressure from the provinces, Eurocan made plans to log the watershed. The Haisla's subsequent efforts to officially preserve the land were unsuccessful. In 1990, however, a study by the U.S. conservation group Ecotrust identified the Kitlope as the largest intact temperate rainforest watershed in Canada, and possibly the largest in the world. The study also revealed that the area slated for logging held the densest concentration of wildlife in the region.⁷⁴ The group concluded that the scientific and forest management values of the forest merited protection from logging.

The Haisla like the Nuu-chah-nulth brought the government to the negotiating table. The government in consequence committed to increasing protected ecosystems in BC from 5.5 percent to 12 percent of the province by the year 2000. The Haisla have since turned down offers from the West Fraser logging company of employment in return for their consent to log. In January 1994 the tribe requested that the Kitlope be given protected status and be co-managed with the government. In the same year, the government, concerned to protect coastal forest in light of the Clayoquot protests, convinced West Fraser give up its concession in the Kitlope in exchange for another area. The Kitlope was subsequently protected, under the co-management of the government and the Haisla. The legal status of and management of the area are still under discussion, but the area has been protected.⁷⁵

Consumers as Players

Protecting native land rights and biodiversity will not be an adequate counterweight to the widespread clearcutting of Canadian forests. Government has largely ceded control over and stewardship of public forests to multinational timber companies and the pressures of the international timber trade, allowing Canadian forests increasingly to be viewed as a global resource. Accordingly, global consumers will play a pivotal role in the future of these forests. Since the legal and political circumstances allow such limited public involvement in decision-making, industry's control over the forests must be balanced by the power of consumer-driven market forces, a power far from fully utilized for environmental protection.⁷⁶ The direct and indisputable link between U.S. consumption of timber and deforestation is nowhere more evident than in Canada's forests, indicating an urgent need to unleash the power of consumer preference for responsible management of forests.

Russia

Constituting almost half of the world's coniferous forests, Russian forests are increasingly vulnerable to assault. Current Russian economic straits and an overburdened law enforcement agency spell disaster for Russian forests. As supplies dwindle and restrictions tighten elsewhere, the vast forests of Russia increasingly appeal to multinational timber companies. Fighting a straggling economy and political malaise, Russia may be tempted to delve into the forest resources of its remote eastern areas and become a major player in the global timber trade. Increasing logging activity in Russian forests indicates that this is now a real trend.

In 1991 the OECD noted rising concern over extensive operations in Siberia and a lack of information on Russian forestry management practices.⁷⁷ According to the Russian Ecological Union, some 20,000 North Korean workers are logging under slave-like conditions in the forests of Siberia, supplying the labor for a joint venture between two large companies, one from Russia and one from North Korea. In the Khabarovsk region, just one of the six or seven areas in which the companies are operating, forests have been clearcut in a ten-kilometer swath along the Urgal-Izvestkovyy railroad.⁷⁸

Multinational timber companies are taking advantage of the opening of the Russian economy. At least one U.S. company is reportedly negotiating for access to a million hectares of forest in the Botcha River basin. Relaxation of the state economy has also resulted in Russian prison camps receiving some latitude for developing private enterprises, including exporting timber. Deputy director of the prisoner camp department of Russia stated in the Russian magazine *Business People* (No.7, 1993): "With the help of American investments, we are establishing a big enterprise for log processing in the Krasnoyarsk region."⁷⁹

Norway

Norwegian forests are under siege as well. Recent reports from the Norwegian Society for the Conservation of Nature indicate that the irreplaceable old-growth Skotjernfell forests of southern Norway are being invaded by loggers. Opponents of the logging have been attempting to prevent deforestation of this fragile area for more than two years through cooperation with industry, Parliament, the Ministry of Agriculture, and the Ministry of the Environment. But efforts to prevent the destruction of the Skotjernfell forests have failed. Felling began in the area early this year. Logging threatens several endangered species of fungi and lichen that survive only in undisturbed areas. Additionally, progress toward protection of Norway's forests was thwarted when the Norwegian Plan for Conservation of Coniferous Forests was recently drastically reduced, limiting protection to less than one percent of Norway's woodlands.

The lack of a comprehensive conservation plan for Skotjernfell and other exposed primary forests places those forests at risk of degradation or destruction. The situation is a sign of complacency and lack of foresight and leadership. Norway does not figure prominently in international timber markets nor does it rely on income from timber trade. Developed countries, even those engaged in only minor timber harvesting, should adopt policies for integrated protection of forests and biodiversity, sustainable management, and balanced use of forest resources.

Fighting Deforestation

Abundant evidence suggests that despite statistically stable forest area, primary temperate forests continue to suffer losses of volume and quality of stands. Forest depletion in one area leads inevitably to an onslaught in another area. Halting the destruction through policy change presents a tremendous challenge, as demonstrated by the ongoing debate in the U.S..

Given the difficulty of achieving reforms in the U.S., a rich nation with a strong conservation movement, changes under present market conditions are even less likely in developing countries dependent on timber harvests both for export and for fuel. Alan Durning points out that compared to

similar conflicts in other countries, the battle over control of forests in the western United States is a relatively mild example of how the "collusion of power and money" operates against conservation and natural resource accounting in favor of maintaining short-run profit schemes. Further, Durning argues that the battle against deforestation in less democratic societies is much more difficult:

In the United States, one of the most democratic societies in the world, it took five years of a nationwide grassroots campaign and a court injunction to arrest the clear-cutting of primary forests in the Pacific Northwest—even though such logging was patently illegal under both the National Forest Management Act and the Endangered Species Act. In less democratic societies, those who question the prerogatives of economic power all too often end up as murder statistics in human rights reports.⁸⁰

Thus, while successful attempts to limit further depletion and degradation of forests in temperate zones are hard fought and may be controversial, halting destruction in many tropical countries presents even greater challenges.

B. The Tropics: The New Frontier

1. Background

Tropical deforestation began to accelerate in the 1950's, as developed countries looked for untapped resources and as developing countries struggled with poverty, population growth and inequitable distribution of wealth and land. Steady acceleration of tropical deforestation, paralleled by increasing tropical timber consumption, has resulted in current losses of 42.5 million acres of tropical forests per year. Between 1950 and 1990, forest area decreased by 65 percent in Central America and the Caribbean, 16 percent in South America, 40 percent in Africa, and 53 percent in Asia and Melanesia.⁸¹ These attrition rates have resulted in tremendous losses of primary forest in many countries, notably Bangladesh, Benin, El Salvador, Haiti, Sierra Leone, Sri Lanka, Togo, India, the Philippines, Malaysia, and Thailand. At the current pace of deforestation, a similar fate will befall forests in Nigeria, Cameroon, Ivory Coast, Paraguay, Costa Rica, Indonesia, Papua New Guinea, the Solomon Islands, Laos, China, and Vietnam. Reduction of tropical forest cover is expected to continue; by the year 2000, only 10 of the 33 tropical countries that now show net exports of timber will still be able to export.⁸²

The predicted drop in the number of exporting countries due to depletion of forest resources testifies to the effects of the timber industry. Under current policies in many tropical countries, the timber industry, like other extractive industries, creates short-lived local booms that encourage the establishment of dependent settlements. Existing market incentives promote rapid exhaustion of the resource, without regard for the long-term sustainability of the resource or for the fate of local communities. Once the harvest is over and the resource is depleted, the industry moves on to new territory to repeat the cycle. Timber harvesting in the tropics, with extremely rare exceptions, is very far from sustainability.

Recent evidence shows that timber extraction is much more closely implicated in the causes of deforestation than was previously credited. Shifting cultivators, once held to be the major culprits in tropical deforestation, often gain access to isolated areas via logging roads, and may disturb the forest relatively less than industrial logging.⁸³ World Bank reports on deforestation in Indonesia maintain that commercial logging causes the most severe and extensive damage to forests.⁸⁴ Notably, the likelihood of forest being cleared is eight times greater in logged areas than in undisturbed areas. According to the World Bank study, commercial logging accounts for two thirds of deforestation, contrary to the previous supposition that shifting cultivation was responsible for the majority of clearing.⁸⁵ Peasant farmers may not always settle forested areas. Michael Dove's field study in Kalimantan suggests that they frequently settle previously deforested lands or lands which have never been forested.⁸⁶ We will examine the links between logging and deforestation further in country case studies.

2. Deforestation in the Tropics: Country Studies

Indonesia

Demand for timber and, more recently, plywood has fueled what has been called the "Forest Development Olympics" in Indonesia. Japanese log imports tripled between 1960 and 1966. At the same time, South Korean and Taiwanese plywood export industries showed rapid growth. By the mid-1960s, the Philippines, which had supplied the bulk of the South Seas timber exports, was already heavily logged.⁸⁷ Asian and U.S. companies were drawn to Indonesia's vast forests.

Recently, increasing and unprecedented rates of careless and often illegal logging activities have been destroying the once-dense forests of Indonesia's outer islands, including Borneo, Sumatra, Siberut, Irian Jaya, and Sulawesi. After the easily accessible timber stocks have been depleted, logging operations penetrated so far inland that transport of logs from harvest sites can take up to a week. Indigenous peoples living in remote areas are frequently forced out of their forested territories at gun point when their carefully managed forests are clearcut by officially sanctioned logging companies. The clearcutting of well-tended old-growth primary and secondary forests is often carried out in the name of "environmentally friendly" tree plantation establishment. Clearcutting is illegal in Indonesia, but "land clearing," consisting of clearcutting and bulldozing valuable forested areas, may be carried out if it is declared to be the first step in establishing a tree plantation. Logging companies may apply for "tree plantation" (HTI) permits, clearcut the existing forest, and sell or utilize the timber without establishing the plantations for which they have been granted permission. Company-sponsored transmigrants under official "Plantation Transmigration" schemes, essentially bonded laborers who cannot easily leave the remote forest settlements in which they have been placed, carry out the back-breaking tasks of forest felling.

Indonesia, with over 60% of Southeast Asia's tropical rainforests and the greatest numbers of endangered bird and mammal species in the world, provides over 70 percent of world demand for hardwood plywood.⁸⁸

Indonesia is the leading supplier of hardwood plywood to the U.S., fulfilling about 45 percent (value basis) of U.S. demand for imported hardwood plywood. The dramatic expansion of the Indonesian plywood industry, from two plants producing 28,000 cubic meters in 1973 to 133 plants yielding nine million cubic meters in 1991—along with Indonesia's underpricing of its forest resources, and its establishment of a monopoly plywood exporting board—explains Indonesia's rise to dominate world markets. Simultaneously, Indonesian production of lumber rose from 1.8 million cubic meters in 1974 to about 15 million cubic meters today. Analysts expect Indonesia's current log extraction of 25 to 30 million cubic meters annually to increase over the next several years to provide sufficient raw materials for plywood plants and sawmills.⁸⁹

The future of the largest remaining tropical forests in Southeast Asia depends on effective implementation and enforcement of Indonesia's sustainable forestry policies. According to Indonesian Ministry of Forestry sources, these policies have, so far, proven notoriously difficult to implement.

Deforestation and Terror for Indigenous Peoples of Indonesian Borneo

For well over 100 years, in response to demand from foreign markets, the indigenous Dayak peoples of Indonesian Borneo (Kalimantan) have practiced sustainable forest management and the cultivation of crops such as rubber and rattan for the export market. Their unusual and successful methods of tending their private rattan and fruit gardens have prompted a number of studies, including those by the Indonesian Ministry of Forestry, visiting U.S. Fulbright scholars, and Indonesian academics. Despite a wider awareness of the unique conservation and foreign exchange-generating practices of Dayak peoples such as the Bentian and the Benuaq, a recent study reports that the Indonesian government, through its issuance of "tree plantation" permits and through the

lack of enforcement of its own environmental and forestry laws, continues to sponsor the private sector-implemented destruction of carefully managed forests inhabited by these indigenous peoples.

In the early 1980s, the American timber company Georgia Pacific invaded Bentian Dayak forested territories in East Kalimantan, Indonesian Borneo, damming rivers along the length of their massive logging roads and bulldozing rattan, fruit gardens, and indigenous graves. In response, the Bentian people have attempted to protect their livelihood and secure the remainder of their territory, first by petitioning the government for over a period of ten years and later, when no governmental response was forthcoming, through public protest. In the mid-1980s Georgia Pacific pulled out of the concession, transferring ownership to one of Indonesia's most powerful timber tycoons—a man who has hired U.S. PR firms to laud Indonesia's forestry regulations on American and European television while his company violates them. Recently, the Indonesian Ministries of Forestry, Transmigration and Environment have made public pronouncements in favor of the Bentian and their right to exist and continue the careful stewardship of their forest resources. The logging company has responded with threats, intimidation, and the use of armed security guards, including uniformed Indonesian police and military officials against the local population. In a haunting climate of fear, the Bentian are now trying to survive the forced seizure and clear-cutting of their forested lands, the demolition of their carefully tended, income-producing rattan gardens, and the burning and bulldozing of community gravesites. The American market remains a major outlet for plywood from the concession operating on seized Bentian lands.

Malaysia

The situation is no better in nearby Malaysia. During the 1980's, rampant logging in the state of Sarawak allowed Malaysia temporarily to outpace Indonesia and become the world's leading exporter of tropical wood. A recent report by *The Economist* stated that, despite increasing concern by the outside world over the tragic exploitation of the Malaysian forests and the fate of forest peoples, logging continues virtually unchecked. Although the Malaysian government claims to be tightening control over logging, one of the largest concessions in Sarawak's history was recently granted to a company owned by the Minister for Environment and Tourism. Further, while Sarawak's chief minister heralds the creation of seven national parks, local environmentalists claim that loggers are frantically clearing designated parklands before they become legitimized by the government.⁹⁰

Judging by current trends, as forest cover in Indonesia, Malaysia, the Philippines and Thailand is rapidly depleted, the tropical timber industry has begun increasingly to focus on the “newly open” countries of Cambodia, Laos, Vietnam and Myanmar, as well as Africa and South America,⁹¹ particularly on the Amazon. With 30 percent of the world's tropical forests, the Amazon is the timber industry's final frontier.

The Brazilian Amazon Basin

How rapidly the Brazilian Amazon is being deforested and how extensive is the deforested area have been the subject of controversy in the past, particularly in the 1980s. Estimates varied by as much as a factor of four (from two million to eight million hectares per year). As deforestation became an issue to both the international financial institutions and in Brazil's bilateral relations with the U.S. and European nations, the polemic over deforestation intensified. An often unrecognized benefit of this controversy is that the scientific expertise in the interpretation of remote sensing data on deforestation has greatly increased. Currently, all of the major studies on deforestation in the Amazon essentially concur on how much forest was lost between the mid-1970s and 1991.⁹² The Brazilian Amazon covers about five million square kilometers, of which about four million kilometers was originally forested.⁹³ Between 1978 and 1988, about 20,000 square kilometers (2 million hectares) a year were deforested and between 1988 and 1989, about 18,000 square kilometers were lost. The annual area deforested fell to 14,000 square kilometers in 1989-1990, and to little more than 11,000 square kilometers in 1990-1991.⁹⁴ By 1991, a total of about 10.5 percent of the Amazon's forested area had been cleared.

While these deforestation rates are lower than those previously estimated, and while they have declined since the late 1980s, as remote sensing scientist David Skole notes, they are still very substantial. Twenty thousand square kilometers a year is roughly equivalent to four million football fields a year, or eight per minute.⁹⁵

There is more to the story. Between the June 1992 Earth Summit and July 1996, Brazil did not calculate the area deforested although the Brazilian National Space Research Institute (INPE) receives the necessary Landsat images every year. This huge gap in the record cast doubt on government claims of impressive environmental enforcement efforts in the region. Increased burning in 1995 fueled speculation that new deforestation had also increased⁹⁶ This was confirmed with the publication of the new Brazilian data in July 1996. INPE reported that average annual deforestation in the Legal Amazon increased from a low of 11,130 square kilometers/year in 1990/1991 to 13,786 square kilometers/year in 1991/1992, and to 14,896 square kilometers/year in 1992/1994. This represents a 34 percent increase in average annual deforestation between 1992 and 1994. The decline in rates between the late 1980s and 1991 is most probably due to economic recession rather than to government enforcement efforts. The Brazilian Environmental Institute has some 139 forestry agents empowered to enforce forest regulations in all of the Amazon. Researchers working in the region expect further increases in deforestation for 1995 and 1996.

Remote sensing studies show a very clear correlation between road building and deforestation in the Amazon. Indeed, the period of most rapid deforestation followed directly on the major infrastructure works carried out by Brazil's military government in the late 1960s and early 1970s, some of which were subsequently supported by the World Bank and Inter American Development Bank. Deforestation has proceeded most rapidly in those regions connected to the national highway grid, and it has lagged in areas where transport is still by river and air. But since the mid 1980s, no major new infrastructure works, including federal roads, have been built in the region due to the government's bleak financial situation.

Only two activities generate sufficient profit to finance even rudimentary road construction in most of the Amazon. These are gold mining and logging, largely of mahogany. Gold miners often operate from airstrips which are easier to build than roads in isolated areas and furnish quicker transport. Loggers build roads. In the 1980s alone, loggers in one area of the Amazon state of Para opened some 3,000 kilometers of roads.⁹⁷ This finding, from Verissimo's thorough empirical study of mahogany extraction, indicates the impact of the trade. "In addition to providing loggers with access to Mahogany stocks, these roads offer an entry point for settlers seeking land . . . there are clear signs that, within a 200 kilometer radius of the Mahogany processing center of Tucumã, Mahogany logging is the first step in a colonization process involving slash and burn agriculture and ranching."⁹⁸ Some 3,000 kilometers of roads radiate from a single mill town in southern Pará state. This ambitious road building is characteristic of the extraction process, and its magnitude hints at the environmental impact of mahogany logging across the region.

A World Bank study found the process described by Verissimo typical: "As logging advances into the forest, subsistence farmers soon follow. As soil fertility decreases, these farmers move forward, following the access provided by loggers. If they have managed to acquire land title, they will often establish pasture and sell the land to ranchers who follow. In this way timber is a vital step in the process of mining the nutrient stocks of the Amazon."⁹⁹ This process has been extensively described in the literature.

There is a synergism between public and private infrastructure in the region. Mahogany logging began to increase in the 1960s, after federal highways offered access to markets and it subsequently proliferated along state roads. Loggers then financed their own (often irregular) roads to reach more distant mahogany stands. With colonization and ranching following the logging roads, constituencies are created for public maintenance and road improvements, perpetuating and amplifying the deforestation cycle.

Since the 1970's, timber exploitation in the region has accelerated. In 1975, 4.5 million cubic meters of timber were harvested from the Amazon. By 1987, production had increased 5.5 times to 24.6 million cubic meters.¹⁰⁰ Accompanying the expansion in production was an increase in government-licensed sawmills from 194 in 1965 to 2,892 in 1987.¹⁰¹

About 1.5 million square kilometers, or nearly 40 percent of the Brazilian Amazon, is in the mahogany belt. On the whole, the states, or areas within them, that fall in the mahogany belt (Pará, Rondonia, northern Mato Grosso, Acre, and southern Amazonas) are being deforested more rapidly than those outside the belt, although rates vary within the belt.¹⁰²

In light of the above data, often repeated assertions that logging and timber production are responsible for an insignificant portion of deforestation in Brazil and the tropics are at best dubious. For example, the claim that only two percent of deforestation in the Brazilian Amazon is caused by forestry activities,¹⁰³ an estimate based on an attempt to calculate clearcutting as a percentage of total deforestation, obscures far more than it reveals about deforestation in the Amazon. Most deforestation in the Amazon has the creation of cattle pasture as its direct cause, and cattle ranching necessarily follows roads in the Amazon. Since at least the mid-1980s, roads have been built by loggers, especially mahogany loggers. Policy analyses of the effects of the forestry sector or the timber trade on the environment, or of the potential for measures such as certification to affect them, are flawed if they fail to take into account the dynamic relationship between logging and other land uses.

Mahogany, Indigenous Lands, and Conservation Areas

Logging, in particular mahogany logging, is not only a key catalyst to deforestation in most of the areas where it is occurring most rapidly in the Brazilian Amazon. The mahogany trade is also marked by notorious violations of environmental and indigenous lands law in Brazil as well as outright lawlessness and violence.

About a third of the area in which mahogany grows is made up of indigenous reserves and conservation units.¹⁰⁴ A significant part of the mahogany on the market is now coming from these areas, as accessible stocks in other areas have been exhausted. As a Brazilian government report put it, "Presently a large part of the mahogany utilized by the timber industry is extracted from indigenous areas, in violation of the legislation in force."¹⁰⁵ Mahogany loggers are the principal invaders of indigenous lands and conservation units where the species grows. In 1987, by one estimate, 69 percent of total mahogany exports from Brazil were taken from the Kayapo reservations in the eastern Amazon.¹⁰⁶ Perhaps 80 percent of the mahogany produced in the state of Pará, Brazil's major producer, comes from indigenous areas. An English court in 1994 ordered an entire shipment of mahogany in the possession of C & C Industria e Comercio seized on the high sea, as having been stolen from Indian land in Pará.¹⁰⁷

In addition to environmental degradation, invasion by loggers has provoked violent and sometimes deadly conflicts when Indians resist the incursions. There have also been serious internal conflicts within indigenous groups because of the logging. Death threats and assassinations over logging in indigenous areas have occurred in the Nambiquara areas of Mato Grosso, the Sururi area in Rondonia, and the Kampa reserve in Acre. On March 23, 1988, at the behest of a regional logger with interests in the area, 14 Txicuna Indians were murdered and 23 wounded at a meeting in their reserve in Amazonas state. A further ten Txicuna were missing. The victims included men, women and children.

On November 15, 1996, loggers ambushed and violently assaulted Katitaulhu (Nambikwara) Indians in the Sarare indigenous reserve, near the town of Pontes e Lacerda, Mato Grosso state. The loggers, irate at an announced plan by federal government agencies to clear the reserve of illegal logging and mining invasions, attacked and terrorized the Katitaulhu village, beating and torturing 14 men, women and children and subsequently looting the village. As of December 1996, the operation to clear the indigenous area of invaders was scheduled to go forward.

To date, no one has been punished in either the Txicuna massacre or the Nambikwara incident.

Violence in the process of staking and working timber claims in the Amazon is not confined to indigenous areas. Reports from the current mahogany frontier in southern Pará give a sense of the lawless and often brutal character of the extraction process. One field researcher, while conducting a detailed study of mahogany extraction¹⁰⁸ in southern Pará state in the summer of 1994, had occasion to see how mahogany loggers got access to timber in areas of uncertain or disputed land tenure.

The area in question is known as the “terra do meio”, (the land in between). It lies between the Iriri and Xingu Rivers, at the latitude of the town of São Felix do Xingu. Mahogany had just begun to be extracted in the region on land held by a defunct tin mining operation. The mine owners contracted with the Perachi logging company to take out mahogany but much of the land was occupied by posseiros or squatters. Numerous squatters had entered the forest to stake claims on the mahogany-bearing areas in order to sell the trees to the logging company. Disputes among claims were frequently settled at gunpoint. Military police from São Felix do Xingu working in the area estimated to the researcher that during the harvest (July-September) as many as seven to eight murders a day were being committed. In response to the researcher’s question, police estimated that “five to ten trees are enough reason for a guy to get up the courage to kill somebody and take the money.”¹⁰⁹

Enforcement Efforts in Brazil

By official Brazilian government figures, some 60 percent of sawnwood mahogany production is consumed internally, as is 86 percent of veneer production.¹¹⁰ So measures aimed at exports alone are obviously insufficient. While national forestry policies in Brazil and elsewhere are, often for good reason, considered inadequate to the task of promoting sustainability, enforcement of existing legislation would be an important step in the right direction. In fact, enforcement, may be more difficult than abstract policy reforms. Recent legal work in Brazil by governmental and non-governmental bodies, however, has demonstrated that the courts can be an effective means to inhibit illegal logging. In 1992 the non-governmental Nucleus for Indigenous Rights (NDI) filed suit against three logging companies and two government agencies for illegal logging activities in indigenous reserves in southern Para. In January 1993 a Federal judge granted a preliminary injunction suspending all logging activities, calling for immediate interdiction of access roads opened illegally by logging companies, and mandatory removal of all equipment from the area within ten days. The ruling was to be enforced by daily fines and arrests by Federal police. Additionally, the court gave the government agencies implicated in the suit for failure to enforce regulations ten days to establish permanent checkpoints on logging roads at entrances to the indigenous territories. The logging companies appealed the decision to the Federal Court of Appeals in Brasilia. In October, 1993, a Federal Court decision upheld the injunction, indefinitely suspending all logging activities in the indigenous areas Arawete, Apyterewa, and Trincheira Bacaja. Logging was in fact halted in the area at the time of the decision. NDI subsequently won a series of similar cases.¹¹¹

In 1994 the Federal Attorney General’s Office brought a Civil Action against IBAMA and the National Indian Foundation (FUNAI), obliging them to remove loggers from the Kayapo areas. In September 1994, with the help of the Federal Police, these agencies seized some 6,267 cubic meters of mahogany and eventually auctioned it off. The proceeds were placed in escrow, and specifically earmarked for sustainable development projects in the Kayapo areas. As of late 1996, FUNAI however had largely failed to formulate coherent project proposals, such that the Kayapo were unable to get access to most of the funds. Mahogany logging was temporarily checked in the Kayapo areas, but by the dry season of 1996 loggers were back in operation in the western part of the Mekragnoti reserve.

In September 1995, Representative Gilney Viana (Workers Party-Mato Grosso), chair of the Environment Committee of the House of Representatives, presented proposed legislation to prohibit mahogany exploitation in Brazil for five years (PL 1008). The proposed legislation followed a 1993 call by 80 (mostly Amazonian) Brazilian NGOs for a moratorium on mahogany production in order for adequate government regulation and enforcement to be put in place. In addition to the moratorium, the proposal would suspend current authorizations for extraction, require IBAMA to elaborate scientifically

based criteria for sustained-yield management of the species, and establish broader sanctions against violators. These would include loss of fiscal incentives, loss of access to government credit, fines, and jail sentences. Part of the concern driving the proposal is the possibility of commercial extinction of the species under present conditions. At least half a dozen other high-value tree species have vanished from the markets because of over-exploitation.

In response to the new INPE deforestation data, in July 1996 President Fernando Henrique Cardoso signed into law two measures, both based in Viana's legislative proposals. By decree 1.963, of July 25, 1996, new authorizations for the extraction of mahogany and virola (another highly threatened Amazon timber species) are suspended for two years. In addition, IBAMA and the Environment Ministry were given 60 days to carry out an audit of existing authorizations and concessions for the exploitation of the two species, in order to cancel irregular operations. If enforced, this measure would be effective, although its effects would not be discernible for at least several years. In another measure, this one subject in theory to Congressional approval, private property parcels in forested regions of the Amazon must have at least 80 percent of their area in forest—an increase from 50 percent under the former law. In other words, clearcutting is legally permitted on only 20 percent of any given property, rather than 50 percent. While the previously existing 50 percent legal reserve law was widely undermined through, for example, subdividing properties among family members or through resale, with adequate enforcement to prevent such maneuvers this measure could also be significant. Both steps were widely supported by the environmental community.

A further measure that could affect mahogany production significantly is contained in the proposed reorganization of the National Indian Foundation (FUNAI) elaborated by former FUNAI president Márcio Santilli. The proposal was delivered to the Brazilian Minister of Justice in December 1995. Santilli proposed legislation to implement FUNAI's authority to police indigenous areas—a power long dormant in the absence of implementing legislation. In addition, fines levied or funds raised from apprehended goods (such as mahogany) in indigenous areas would revert to FUNAI instead of to the Treasury. These would be used to strengthen the agency, including providing performance-based salary incentives to field staff. Presently the agency is heavily overstaffed in Brasília and regional centers and often absent in the indigenous areas. This practical and innovative proposal is in keeping with the federal government's broader program of reform of the state. Santilli's proposal could lower FUNAI's budgetary cost, improve its efficiency, and substantially reduce illegal resource mining in indigenous areas, and bring the mahogany trade under control. Santilli subsequently stepped down from the FUNAI presidency, but the proposal remains on the table.

Mahogany Exports

While more than half of Brazil's mahogany production is probably consumed within the country, the export trade contributes very substantially both to deforestation and to the negative social effects of logging on the Amazon frontier. At the same time, most of the money generated in the mahogany trade is made outside of the Amazon and outside of Brazil. Brazil is the world's principal exporter of mahogany and possesses the largest reserves. Between 1985 and 1990, Brazil exported one million cubic meters of mahogany, nearly half of which was destined for the United States.¹¹² Between 1991 and 1993, the U.S. imported more than 153,000 cubic meters, accounting for 42 percent to 48 percent of Brazil's total exports. Over those three years Brazil officially exported 341,696 cubic meters of mahogany with an export value (FOB) of between \$239 million and \$272 million.¹¹³ Like many commodities, the mahogany's increases drastically with distance from its place of origin. Stumpage fees (where paid) range from U.S. \$5 per cubic meter to U.S. \$40 per cubic meter. Once transported, sawn, and ready for market, a cubic meter of mahogany costs around \$500. In the port of London it costs over \$800. The retail price of a cubic meter of mahogany window frame is about \$1,826.¹¹⁴ For the logger, the key variable is the price FOB in the Brazilian port of Belem. This price can vary considerably—from \$530 to \$750 between 1988 and 1992—with drastic effects on profit margins.¹¹⁵

Given these price fluctuations, it is understandable that Brazilian exporters have shown concern over international timber boycott campaigns directed at mahogany, particularly in the U.K., and suggests that

such measures, if they more effectively restrained trade could send an appropriate signal. The FOE U.K. "mahogany is murder" campaign over the last three years has notably reduced mahogany imports to the U.K., in probably the first timber boycott campaign to show effects on the market. U.S. mahogany consumption over the same period increased proportionately, however, neutralizing the overall impact.

In the broader context of Brazil's exports, mahogany is practically insignificant. It has minimal weight in international timber markets. Latin America as a whole accounts for little more than five percent of tropical timber exports. But the 3,000 kilometers of roads opened by loggers in Pará, in addition to the opening of similar networks in the mahogany belt; the invasion of large parts of the protected areas, both indigenous and natural, that occur within the mahogany belt; and the violence and lawlessness often associated with mahogany extraction have far greater consequences in terms of deforestation and social impacts than is predicted by the value of the trade. Consequently, better enforcement of existing regulations in Brazil, improvements in the regulations themselves, and international efforts to influence the export trade by informing consumers about its effects can have leveraged environmental and social benefits. Listing of mahogany in Appendix II of the CITES convention, which requires documenting that internationally traded product is not extracted so as to endanger the species, would be an environmentally positive step and could be of long-term benefit to all countries where mahogany grows.

Africa: The Assault on the Rainforest Shifts from West to Central Africa

Over the past two decades, the destruction of the West African rainforest proceeded at a rate faster than anywhere else in the world and almost four times higher than the average for all tropical forest countries in the mid-1970s. West Africa's remaining intact forests have dramatically receded to a few islands in the midst of degraded forest lands.

Guinea, Côte d'Ivoire, Ghana, and Nigeria are examples of countries whose forests have been severely depleted. Worsening draught conditions and the growing impact of the Harmattan, the hot, dry wind from the Sahara, are direct consequences of deforestation in the region. Local farmers have already observed a fall in agricultural output, which eventually may threaten both the region's food supply and its export crops.

One of the countries where the loss of forest cover has reached crisis proportions is Côte d'Ivoire, a country touted in the early 1980s as an "economic miracle" and a model to be followed by the rest of West Africa. The "miracle," unfortunately, was short-lived and had essentially collapsed by the early 1990s. It was largely based on agricultural conversion of forest lands for the planting of cash crops, mainly coffee and cocoa for export, and large-scale commercial logging. For a short period, Côte d'Ivoire was the world's leading exporter of cocoa, the third largest exporter of coffee, and one of world's main exporters of tropical timber.

World market prices for cash crops have in recent years been very volatile. Their severe decline in the late 1980s led to a severe economic crisis in Côte d'Ivoire. By that time, the country's forests and those of its neighbors had been so seriously depleted that multinational logging companies decided to move on to new regions of largely intact rainforest in Central Africa—a move rapidly carried out in the last few years.

The Central African rainforest, which covers an area of about 2.1 million square kilometers, is the second largest rainforest in the world after the Amazon. It covers large parts of Zaire, Gabon, Congo, Cameroon and several other countries in the region. It represents about 70 percent of Africa's remaining rainforest. Only about five percent of the forest has been set aside as protected areas, and the legal status of protected areas often means little because governments in the region have not demonstrated the capacity or the will to enforce environmental legislation against illegal logging and poaching.

Indigenous Peoples

The Central African rainforest is also the home of indigenous forest-dwelling peoples such as Baka (Cameroon), the Mbuti (Zaire) and the Aka (Congo). Better known as Pygmies, they find this term to be derogatory and prefer to be called by their proper ethnic names. They are mostly semi-nomadic peoples who spend much of the year in traditional hunting and gathering activities deep in the forest areas. Their intimate knowledge of the forest has taught them to use a wide variety of essential forest products for food, medicine, and shelter without disturbing the forest's delicate ecological balance. Central African governments have not recognized the special situation of these forest-dwelling peoples and are largely treating them as marginal backward groups that have yet to be integrated into regular rural society.

In Cameroon, for example, government policy is to lead these traditional societies to a "rational occupation of land," which means clearing the forest for permanent settlement. The law requires the *mise en valeur* of the forest—that is, it must be cleared for agricultural purposes before legal title may be granted. This leaves the Baka in Cameroon people very vulnerable since their survival as a people depends on the conservation of the forest. In addition to providing for the physical livelihood of the Baka, the forest is essential to their social organization, culture and spiritual life. They are effectively being denied any right to the forests they have inhabited for thousands of years. To obtain any legal right, the Baka would have to clear the forest and thereby destroy the ecological basis of their hunting and gathering economy. The situation is further aggravated by the fact that Cameroonian law requires that no people live in national parks or wildlife reserves.

Logging and the International Aid Connection

Uncontrolled commercial logging in a context of insecure land rights for local populations is the principal catalyst for the wholesale destruction of Central Africa's forests. The disappearance of African wildlife, including forest elephants, gorillas, and other endangered species, is a direct consequence of the increasing penetration of logging companies—and the poachers that follow in their track—into even remote areas in Central Africa.

International investments play an important role in opening up these remote areas to logging. Logging companies have been supported by international development aid, such as loans from multilateral sources like the World Bank and the African Development Bank, as well as assistance from individual governments. In the Congo, for example, the World Bank's investments in the Ouesso Wood Processing project had the explicit goal of expanding logging and wood-processing in a remote region of the country. In Gabon, the Transgabonais railway, which was financed by the African Development Bank and other donors, opened up the center of the country for timber exploitation.

Loans for infrastructure development, especially for road-building activities into remote areas, are little else but indirect subsidies for logging companies. The French bilateral aid agency minces no words and states clearly that its development projects finance the infrastructure necessary to French timber interests. Other donors are less straightforward in their project descriptions, but support for private sector development, which in the Central African region consist largely of transnational oil, timber, and mining industries, has become the common theme of development assistance in the 1990s.

Timber Trade

Timber from Central Africa has a reputation of being of higher quality than timber from Asian or Latin American forests. European companies continue to dominate the Central African logging and timber trade, and French companies hold the privileged positions. The difficulties of access and transportation, as well as the region's overvalued currency, have made Central Africa a relatively

more expensive region for foreign investment and have for many years provided something of a shield for the forest. However, in January 1994, the region's common currency, which has been tied to the French Franc for several decades, was devalued by 50 percent, radically changing the situation. With local production costs cut in half, foreign companies have been able to increase their profit margins substantially. The French group Rougier Gabon, one of the biggest forestry firms in Gabon, saw its shares go up on the Paris stock market from FF 160 in April 1993 to more than FF 800 by November 1994.

The devaluation has made Central African timber more competitive on international markets. For example, Cameroonian timber exports are estimated to have increased by about 400 percent in the year of the devaluation, threatening one of central Africa's richest rainforest areas.

In addition, the introduction of stricter logging quotas in some Asian producer countries, has increased demand for tropical hardwoods from Africa. While the traditional markets for Central African timber exports are in Europe, Asian companies are becoming increasingly active in the central African logging business. For example, new markets for Gabon's timber include China, Indonesia, and South Korea. These three countries absorb about one third of Gabon's timber exports.

This trend of Asian companies moving into Central Africa can be observed in other countries in the region. For example, Hong Kong-based Man Fai Tai Holdings, Ltd. is working in southern Congo and is now trying to obtain a large concession in a remote region of northern Congo.

Most of the timber leaves central African ports in the form of raw logs and is processed in saw mills abroad. Although legislation in several countries requires that a given percentage of logs be processed domestically, these laws are not being enforced. For example, a 1982 Gabon law requires that not less than 75 percent of logs should be processed or finished in Gabon in order to create jobs and widen the country's tax base, but the actual figure is estimated to be no more than 15 percent.

A similar lack of enforcement can be found in the area of rules and laws for environmental and forest protection. The Gabonese Ministry of Water and Forests spends the vast majority of its budget, including 95 percent of its allocation for fuel, at its Libreville headquarters. Its field presence is minimal, and it has little credibility as an enforcement agency.

In neighboring Congo, the regional forest administrations charged with overseeing logging operations in their regions have no vehicles. The responsible officials spend most of their time in under-equipped and dilapidated offices: The logging companies, of course, have vast fleets of jeeps and trucks as well as private airplanes.

Timber Extraction: A Contribution to Social and Economic Development?

Members of the economic elite in Central African countries receive a share of the fortunes being made by the export of timber from their countries. Often, these "shareholding" arrangements are agreed upon behind closed doors and made possible by a lack of transparency in the awarding of concession areas and other unorthodox business practices. There is widespread corruption, for example in Cameroon, which has gained the dubious distinction of being one of the most corrupt countries in the world. In addition, open governmental protectionism sometimes achieves similar rewards for the elites. In Gabon, for example, logging in the coastal plain areas extending about 150 kilometers inland is by law reserved exclusively for Gabonese citizens. The Gabonese holders of the concessions usually subcontract them to French logging companies and receive the economic rent generated by the government-imposed ownership.

Logging benefits for rural development and improvements in living conditions for poor villagers in logging areas are mostly non-existent. Despite massive logging, the current trend is one of increasing poverty in the midst of growing environmental degradation. Certainly, in many regions, the logging industry is the only employer. But the few jobs often go to people from outside the forest regions

who migrate with the logging companies. The jobs pay subsistence-level salaries and offer little in benefits related to health and education. Life in the logging camps is bleak. The camps spread alcoholism and prostitution into areas which previously had no such social problems.

The devastating ecological long-term costs are felt most immediately by local communities. The poaching of wildlife is a side-effect of logging, as logging roads and trucks allow poachers access into remote forest areas. As a result, local people find it more difficult to trap, hunt, and meet their nutritional needs for protein. There is evidence, for example, that trucks from a German-held concession area in northern Congo are supplying the major urban areas of Yaounde and Douala in Cameroon with bushmeat. The trucks use Cameroonian roads to transport timber to port. In southeastern Cameroon, the Baka people suffer because of the cutting of the Moabi tree by loggers. The Baka press the fruit of this rapidly disappearing tree into cooking oil, an essential staple for the local population.

There are growing conflicts between local communities and logging companies in Cameroon and some of its neighbors. Acts of sabotage against logging equipment have become a more frequent occurrence. In the Congo, local villagers have set fire to a 50,000 hectare eucalyptus plantation established on their forest lands, which supplies raw material to the French pulp and paper industry. These acts are signs of despair: little or no other means of recourse exist for local people to obtain redress for their grievances.

Halting the Juggernaut

Cameroon already is among the countries with the highest rates of deforestation in the world. Zaire, which holds the largest area of rainforest in the region, is the next frontier and logging operations are poised to move in aggressively as soon as the political situation has settled enough to ensure investments in the necessary infrastructure.

A repeat of the West African situation with the loss of most of central Africa's forests is a distinct possibility. In addition to the great harm inflicted on local populations, the global impacts of losing one of the richest biodiversity areas in the world could be incalculable. So could the impact on global climate change because of vastly increased greenhouse gas emissions as a result of massive deforestation.

Democratization, a strengthening of civil society and support for effective and accountable public institutions are essential to stemming the current tide of forest destruction. International development assistance should primarily focus on promoting these goals. Current plans, however, such as the World Bank's Congo Basin strategy, which relies to a large degree on supporting the same private sector companies that have wreaked havoc in West Africa, are completely misguided. The World Bank's focus on private sector interests stems in part from the inefficiency of the government bureaucracies that run many Central African countries. A solution to this would be to improve the effectiveness of public institutions and not to support private timber companies that to date have provided no evidence that they are willing and able to manage the forest sustainably and contribute to social and economic development.

A halt to inappropriate types of international public and private investments in Central Africa and consumer cooperation in purchasing alternatives to wood from unsustainable sources offer hope that history will not repeat itself.

PART IV.

EXISTING NATIONAL AND INTERNATIONAL INITIATIVES ON TIMBER

In the following section we survey selected national and international initiatives that have sought to address unsustainable timber harvesting. The survey focuses on those initiatives most specifically directed at timber production and the timber trade, although we recognize that other instruments and forums may be quite important to the problem of deforestation (for example, the environmental reform of the Multilateral Development Banks and the Biodiversity Convention, to name only two). We also offer a brief review of recent relevant U.S. commitments, nationally based log export bans, the Tropical Forestry Action Plan, the International Tropical Timber Organization (ITTO), CITES, and U.S. timber bans and boycott campaigns.

A. U.S. Commitments

The United States, a member of the International Tropical Timber Organization, supported the "Year 2000 Target." At the Ministerial Conference on the Protection of Forests in Europe in June, 1993 the U.S. representative stated: "The Year 2000 is the goal agreed by the members of the International Tropical Timber Organization (ITTO) for putting internationally-traded tropical timber on a sustainable basis. While this goal focuses on tropical timber producing countries, we believe that all countries should adopt the goal of sustainable forest management."¹¹⁶

More significantly, the United States has publicly and repeatedly stated that this commitment applies to its own forests. At the Second Ministerial Conference in Helsinki, the U.S. representative said: "The United States is committed to the national goal of achieving sustainable management of U.S. forests by the year 2000. We would like to see the countries present here, both participants and observers, join us in committing to this goal for their own forests."¹¹⁷ In June 1994 the United States government made a more definitive statement, clarifying that the sustainable management commitment applies to all U.S. state and private forests in addition to public lands.¹¹⁸ At the United Nations Conference on Environment and Development (UNCED),¹¹⁹ the U.S. pledged its commitment to the Forest Principles, an agreement outlining participants' willingness to manage and develop forest resources on a sustainable basis. Among the specific points agreed upon were promotion of sustainable patterns of production and consumption; enhancement of developing countries' capacity to conserve their forests; and accounting for environmental costs and benefits in the international trade of timber. Chapter 11 of Agenda 21 constituted a further extension of U.S. commitment at UNCED to sustainable management of forests. Chapter 11 strongly endorses creating a global policy to "achieve conservation and sustainable management of all forests to meet present and future needs for economic and ecological services."¹²⁰ The U.S. is also a signatory of the Biological Diversity Convention, although the treaty remains to be ratified. The U.S. Congress has considered legislative measures aimed at unsustainable timber extraction internationally. Hearings were held in 1991 on the "Tropical Forest Consumer Information and Protection Act of 1991"¹²¹—legislation designed to mandate labeling tropical timber imports by country of origin and species—before the Consumer Protection Subcommittee of the House Commerce Committee. The hearings prompted the International Hardwood Producers Association (IHPA) to claim that the industry would institute its own labeling program to educate consumers. IHPA assured proponents of the bill that it would find and implement a solution by December of 1991.

B. National Response

One approach tried by tropical countries exporting timber to either reduce rates of resource depletion, or increase returns, or both, is restricting exports of raw logs. This policy aims at replacing raw material exports with exports of value-added products. Related efforts include attempts to reduce or ban logging in sensitive areas and to declare temporary moratoria on all logging activities in order to allow the government to regain control of the situation.

Emphasizing value-added production can have perverse effects. The development of the world's largest hardwood plywood industry in Indonesia is a classic example. In most cases, promoting value-added

production for increased margin per unit yields greater profits. Increased margins often predict decreasing demand for the raw material in the production process. Some producing countries that simultaneously banned raw log exports and provided incentives for value-added production have successfully reduced harvest volume and maintained or improved profits. But Indonesia's strategy to quell logging in its forests sparked a different market response. Subsidies to domestic plywood producers promoted an inefficient industry, while the log export ban reduced log prices on internal markets, leading to increasing harvests at greater public costs.

The Indonesian hardwood plywood industry, boosted by government subsidies and protection, gained market share quickly. Indonesian log export bans and low stumpage fees sheltered domestic plywood processors by undervaluing the domestic prices of raw logs relative to world market prices (\$15 per cubic meter domestically versus \$90 per cubic meter internationally). The resulting waste and inefficiency, coupled with increasing world plywood demand, led to an increase in the harvest of raw logs. Between logging practices and processing inefficiencies, about a third of the harvest is wasted.¹²²

A log export ban and strict control of logging licenses in Ghana resulted in widespread illegal logging. The Ghanaian Foreign Minister recently warned that Ghana's forests will be devastated within ten years if smuggling continues. Recognizing that export bans are unlikely to work, Ghana's Forest Minister proposes tax disincentives to excessive logging.¹²³

Supply-side restrictions may also cause proliferation of illegal logging activities—often on indigenous peoples' lands, in parks, or in reserves—and smuggling of contraband goods across borders into countries where exports are still legal. Restrictions on supply typically cause a dramatic rise in price, heightening the reward for pirating timber.¹²⁴ In several countries the timber industry took on the characteristics of the drug trade. Corruption and violence became rampant, as members of government, military, and industry colluded to evade restrictions.

In both Indonesia and the Philippines, huge discrepancies were discovered between the official export statistics and reports from processors and shippers. In 1980 alone, "Japan imported 1.1 million cubic meters of logs from the Philippines, although only 0.5 million were recorded as Filipino exports" to Japan.¹²⁵ The situation is equally chaotic in Thailand and neighboring Myanmar. Thai logging bans and export restrictions on raw logs provide incentives for smuggling raw logs from Myanmar. Local non-governmental organizations speculate that the military and the loggers are cooperating in the illegal trade and that profits from the harvest are bankrolling military operations in the area.

Various developing countries are also developing timber certification schemes. (See Section IV, Certification.)

C. International Approaches

Multilateral approaches and programs involving the World Bank, the United Nations Environment Program (UNEP), the United Nations Commission on Trade and Development (UNCTAD), the International Tropical Timber Organization (ITTO), and other international forums have at different moments gained wide support in principle from industry, NGOs, and governments north and south as the most appropriate means of promoting sustainable use of forests.

1. TFAP

The earliest comprehensive plan to promote sustainability in the forestry sector was the Tropical Forest Action Plan (TFAP), launched in 1985. Designed in concert by the World Resources Institute, the World Bank, the United Nations Development Program, and the Food and Agriculture Organization (FAO), the TFAP was originally ambitious in scope. Its major goal was to curb deforestation by advising countries on sustainable forestry plans while coordinating efforts of development assistance agencies in funding those plans and increasing development assistance to the forestry sector.¹²⁶ However, implementation of the plan ran counter to its original intentions; top-down, project-oriented funding

and management concentrated in the FAO Forestry Department resulted in coordination of development assistance while the conservation-oriented goals went unmet. Developing country NGOs forcefully criticized the program for failure to consult with or adequately consider the needs of peoples living in and dependent on the forest. A 1990 WRI assessment concluded, "... the TFAP as currently implemented is not achieving many of the plan's original objectives."¹²⁷

2. ITTO

The International Tropical Timber Agreement (ITTA) is a commodity agreement signed in 1983 and ratified in 1985. Decision-making within the ITTA framework is conducted by an inter-governmental body, the International Tropical Timber Council (ITTC). The International Tropical Timber Organization (ITTO) is composed of the Secretariat and its staff who implement the Agreement under the direction of the ITTC. The ITTO was formed under the auspices of the United Nations Conference on Trade and Development (UNCTAD), and had its first meeting in 1987. The organization now has 51 member nations.

The ITTO was originally conceived as a conventional commodity agreement, but it subsequently came to incorporate environmental concerns as well. Its goals are to promote growth and diversification of international trade in tropical timber; improve the structure and increase the transparency of the international market; promote reforestation and forest management in industrial use of tropical timber; and "encourage the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources, and at maintaining the ecological balance in the regions concerned."¹²⁸

The decision-making mechanism in the body is, theoretically, a voting structure. Votes are divided equally between the consumer and producer groups. Voting share for the producer countries is proportional to their export volume and amount of forest cover. Consumer votes are accorded by volume of imports. Indonesia, the largest exporter of tropical timber, and Japan, the largest importer, have the most votes. In practice, however, the voting process has never been used.¹²⁹

The costs of operating the ITTO are covered by annual fees paid by ITTC members. Projects are funded on a volunteer basis by individual governments with interests in a particular project. In 1993 the ITTO funded over \$91 million of mostly forest management projects in producer countries.

Decision Making Structure

Policy decisions are made through a process of Council Resolutions and Decisions. As the ITTO is a non-binding agreement, resolutions and decisions are not mandatory, and the ITTO lacks the power to either enforce decisions or sanction lack of compliance.

NGO Participation

The ITTC allows observers to attend ITTO meetings. Observers usually represent intergovernmental organizations such as the FAO, UNEP and UNCTAD, along with timber industry trade associations and environmental and social non-governmental organizations (NGOs).

Initial response among environmental NGOs to the ITTO's trade and environment mandate was enthusiastic. Greenpeace, Japan Tropical Forest Action Network, Rainforest Action Network, Rainforest Information Center, Friends of the Earth, World Wide Fund for Nature, and IIED all attended meetings and lobbied their governments to fund the ITTO as well as specific projects.

As the ITTO proceedings continued, many environmental NGOs came to the conclusion that the dual mandate, consensus process, dominated by the largest producer and consumer nations, offered little hope for achieving concrete progress toward sustainability. The organization's lack of regard for the concerns of indigenous forest dwellers and its unwillingness to put forest peoples or their

issues on the agenda was a point of particular contention.¹³⁰ At the 1994 ITTA meeting, 20 NGOs endorsed a report concluding that “the ITTO has become an alibi for inaction at the international level and a diversion from effective change at the national level. [It] has neither achieved an effective reform of the timber trade nor provided any mechanism to achieve such reform.”¹³¹

ITTO Guidelines for Sustainable Management of Tropical Forests and Target 2000

In response to NGO detractors, defenders of the ITTO can point to two steps the organization has made toward fulfilling its environmental mandate. In 1991 the ITTO adopted guidelines for sustainable forestry management. Indonesia maintains that it has implemented the ITTO guidelines, but the organization lacks monitoring mechanisms.

The other step—ITTO's most important claim to making strides in the environmental arena—is Target 2000. Target 2000, Council Decision 3(x), was adopted by the Permanent Committee on Forest Industries at the May 1990 ITTC meeting in Bali, Indonesia. It encourages members to “progress towards achieving sustainable management of tropical forests and trade in tropical forest timber from sustainable sources by the year 2000.” Adoption of the target caused consternation in the industry and disappointment among NGOs. The ITTC subsequently outlined steps that members could take to achieve the target. Many countries have neither reported their activities nor detailed plans to meet the target.

Initially dubious, industry came to embrace the concept. After adoption of the target, the International Wood Products Association, (IHPA), a consortium of U.S. importers, cited Target 2000 in efforts to persuade municipal and state governments not to restrict or prohibit the use of unsustainably produced tropical wood for public works. The IHPA argued that since the U.S. is a member of the ITTO and endorses the target, restrictions on unsustainable tropical timber were unnecessary. NGOs argued from the opposite premise—that since the ITTO is ineffective in achieving sustainable forestry, vast reductions in the use of unsustainably produced tropical timber are needed to achieve the target.

ITTA 1994

A new International Tropical Timber Agreement was negotiated in 1994. NGOs pushed to extend the scope of the agreement to all timber, not just tropical timber, but found little support among northern nations. The proposal was tabled for reexamination in 1996. NGOs further recommended that ITTA confine its mandate to that of a commodity organization, but also recognize the need to internalize environmental and social costs of timber production, and adhere to the principles of existing relevant international conventions, in particular CITES. NGOs had pushed for several years to establish communication between ITTO and CITES, finding a marked lack of enthusiasm on the part of the timber organization. While ITTO's scope remains tropical timber, consumer countries, including the U.S., adopted a statement pledging to adopt sustainable management in their forests as well by the year 2000.

Subsequent ITTO sessions have devoted increasing attention to timber certification. The study commissioned by the ITTO in 1994 is the most comprehensive on the topic. Both producer and consumer countries requested additional information. Indonesia presented a proposal for support of its ecolabeling institute (LEI) in July 1995. The U.S. opposed it on the grounds that criteria for sustainable tropical forest management are insufficient for certification to be meaningful. U.S. industry has generally argued against certification in the context of the ITTO, claiming that it is a costly deterrent to trade.

During the 1994 ITTA renegotiation, the name Target 2000 was changed to Objective 2000, included in the preamble to ITTA 1994, and made conditional upon additional financial resources for developing countries. Members are further exhorted to adopt tropical timber reforestation and forest management and to rehabilitate degraded areas.

3. CITES/Mahogany

The Convention on the International Trade In Endangered Fauna and Flora Species (CITES) is a legally binding international mechanism to prevent the over exploitation of species threatened or affected by international trade. This international treaty came into force in 1975 and has 124 signatory countries. Each CITES signatory is responsible for carrying out the rules of the Convention in its own country and for aiding other country members to enforce the Treaty.

CITES includes three appendices that list species and classify the level of threat that trade presents to them. Sanctions or restrictions designed to ameliorate the risk of species extinction are based on the appendix in which a species is listed. Regulation is implemented through a permit system which either allows a controlled trade in wild plants and animals, or in the case of Appendix I, prohibits trade completely, sometimes even if the purpose is scientific research.

Definitions of the CITES Appendices:

Appendix I includes species, subspecies, or populations threatened with extinction that are, or may be, affected by trade. International commercial trade in wild specimens of taxa or populations listed in Appendix I is prohibited. Exceptions may be made for scientific or conservation purposes, requiring permits issued by the appropriate government authority in both the importing and exporting countries.

Appendix II includes species, subspecies, or populations which may become threatened with extinction if trade is not strictly controlled. It can also include other "look-alike" species which may not be threatened but are indistinguishable in trade from the threatened species and are therefore subject to the same regulations. Appendix II species require export permits only from the appropriate government agency in the country of origin.

Appendix III includes species subject to regulation within individual countries. A listing on Appendix III does not require the two-thirds approval that is necessary for species proposed for Appendices I and II. Certificates of Origin of the species are required, as is the cooperation of other CITES parties in controlling the trade.

CITES, although imperfect and at times bureaucratic, has proven to be a useful mechanism to protect threatened plant and animal species. One of the best examples of protection for trees has been the case of *Fitz-Roya cupresoides*, one of Chile's most valuable timber species. Chilean environmentalists hold that *Fitz-Roya's* listing in Appendix I has successfully reinforced the Chilean government's ability to protect the tree.¹³²

CITES has also been successful in shifting the trade in orchids and cacti from wild populations to artificially propagated plants, thus protecting the wild species.

Mahogany and CITES

Several proposals have come before conferences of the CITES signatories to list Latin American mahogany, *Swietenia* spp. The first proposal, submitted for the 1992 Convention of the Parties (COP8), was co-sponsored by the United States and Costa Rican governments. It called for an Appendix II listing of the *macrophylla* and *mahogany* species. The third species, *Swietenia humilis*, is already listed in Appendix II, and is considered indistinguishable from the *macrophylla* species in trade. *S. macrophylla*, commonly known as Big-Leaf mahogany, is now the most heavily traded species, due to decline of the *S. humilis* and *S. mahogany*.

When it was offered in 1992, the proposal was supported by the majority of the range states, including Brazil, one of the largest exporters of mahogany. Brazil had already listed *S. macrophylla*,

as "endangered" in a list issued by IBAMA, the Brazilian Environmental and Renewable Natural Resources Institute. The Brazilian Botanical Society also listed the species as endangered. In 1992 the Brazilian government argued CITES listing would reinforce domestic conservation quota systems.¹³³

The U.S. delegation withdrew the proposal following protests from industry and Congress. (Senator Jesse Helms from North Carolina, a major furniture manufacturing state, is said to have lobbied heavily against the listing.) Only the mahogany species was proposed. Little was gained by the measure, since trade in *S. mahogany*, commonly known as Caribbean mahogany, is virtually non-existent, and the species is held to suffer from genetic erosion. Currently, many Caribbean countries already import the *macrophylla* species from Brazil and Bolivia.

In 1994 a proposal for listing *S. macrophylla* in Appendix II at the ninth convention of the parties (COP9) was submitted by the Natural Resources Defense Council (NRDC) to the U.S. Fish and Wildlife Service. NRDC had collated studies indicating that this mahogany was "endangered" by the timber trade. However, conflicting reports on the biological status of the species, industry opposition, and interagency disputes eventually caused the U.S. to balk at making the proposal. Brazil and Bolivia, the range states, opposed the listing, arguing that there was insufficient scientific evidence that the species was threatened with becoming extinct. Appendix II, however, is supposed to include "all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival."¹³⁴

The COP9, after contentious discussion of the proposal which was put forward by the Netherlands, voted down the listing by a narrow margin of 50 in favor and 33 against—six votes short of the two-thirds majority required for approval. After the results of the vote were announced, Costa Rica stated that it would list its mahogany population to Appendix III, including the derivatives of saw logs, sawnwood and veneer. Big-Leaf Mahogany is now listed in Appendix III of CITES including the entire population of the Americas.¹³⁵

If *S. macrophylla* were listed in Appendix II trade would likely be affected. Listing might reduce mahogany export quotas, increase prices, assist the efforts of range states to manage the species, separate legal from illegal timber, and provide incentives to manage supplies for the long term.¹³⁶

The advantage of CITES regulation is that CITES is the only internationally binding agreement that establishes a permit system to regulate trade in species that are or may become threatened with extinction or affected by trade.

John Turner, former director of the USFWS concluded in 1992 that an Appendix II listing for mahogany would "provide the opportunity for producing and consuming nations to collaborate through international efforts, to enable those range states to more effectively enforce national legislation and implement their management programs for the mahogany resource."

As a consequence of debate over the mahogany listing, CITES has established a Timber Working Group to address technical problems in the implementation of tree listings and to define its relationship with existing international organizations working on sustainable use of timber resources (e.g., the ITTO).

On January 10, 1997, the U.S. Fish and Wildlife Service announced that the U.S. would propose the listing of Big Leaf mahogany to Appendix II of CITES at the mid-1997 conference of parties. U.S. environmental organizations, including Defenders of Wildlife, Rainforest Action Network and EDF had written to Vice President Al Gore to support the action. Fish and Wildlife staff, most importantly, thoroughly examined the scientific data and reached the conclusion that American mahogany unequivocally qualifies for Appendix II listing. Bolivia, a range state, agreed to co-sponsor the listing. Brazil, the largest producer and most politically influential range state is studying

the issue and has not taken a stance. The likelihood is great that mahogany will be listed in the coming conference of parties to CITES.

4. U.S. Tropical Timber Campaigns and Boycotts

The first tropical timber boycott in the U.S. was initiated by the Rainforest Action Network (RAN) and its network of local Rainforest Action Groups. The boycott focused on Burmese teak. RAN modeled its campaign on earlier efforts of environmental groups in Europe, Australia, New Zealand and Japan to promote boycotts and blockades of tropical timber shipments, to target particular companies, and to seek municipal and county legislation preventing the use of tropical timber for public works.

The RAN campaign, according to its organizers, succeeded in persuading Smith and Hawkens, a furniture retailer, to stop buying Burmese teak. RAN also met with the U.S. owners of Scandinavian furniture stores selling teak furniture, some of which dropped or reduced their teak furniture line.

RAN issued a report in 1989 identifying luan (or meranti, also Philippine mahogany) as the number one tropical timber import and Georgia Pacific Corporation and Weyerhaeuser as the two largest importers. These companies and their subsidiaries were targeted for a boycott, with emphasis on household paper product lines.

Shortly after the campaign started, Weyerhaeuser sold its percentage in an Indonesian logging concession and is said to have reduced direct imports of Indonesian wood. Weyerhaeuser continued buying luan and other Indonesian wood products through a third company, Chesapeake Hardwoods.

Educational efforts led to the formation of the Woodworkers Alliance for Rainforest Protection (WARP), which sought alternatives to unsustainably produced tropical timber and urged members to buy only from sustainable sources. RAN also issued a "Good Wood" guide.

Whatever their effects on the timber trade, boycott campaigns have increased public awareness of the issue. A 1992 Golin/Harris Communications and Angus Reid Group poll found that 61 percent of the respondents said they would "go out their way to purchase environmentally friendly products—even at greater cost." Such poll results are increasingly common.¹³⁷ Some furniture companies such as the Knoll Group and Lexington Furniture have started to purchase certified wood.

RAN and other groups went on to target use of luan plywood by Hollywood film studios. Capitalizing on Hollywood's pro-environmental image and a series of rainforest movies, the groups got extensive media coverage for preventing a shipment of luan plywood, destined for film production lots, from unloading in the Los Angeles port. Actors such Kevin Costner and Ed Asner and producers such as the Zucker brothers came out against use of the wood. After further media-directed campaigning, major studios agreed to end the use of luan (some 2/3 cheaper than available substitutes), and RAN is satisfied that they have largely done so.

Municipal, County and State Legislation

Environmental groups in the United States and Canada have successfully promoted state and local ordinances banning the use of unsustainably produced tropical timber, although to a lesser extent than in Europe. The following cities have passed bans: Bellingham, WA; Santa Monica, CA; San Francisco, CA; Santa Clarita, CA; Los Angeles, CA; Baltimore, MD; Harrisburg, PA; and Ottawa, Canada. Counties that ban tropical timber include Howard and Hartford Counties in Maryland and several in Ontario, Canada. The states of Arizona and New York have also approved bans. Similar legislation in California was supported by both the House and Senate but was vetoed by Governor Pete Wilson, under industry pressure.

Although some state and municipal officials note that they often have no means of knowing the origin of given wood products, the ordinances have in some instances been enforced and have come to the media's attention. For example, the New York Post discovered that New York City had bought park benches made from Brazilian wood. The city officials in charge of the purchase had misinterpreted the law and thought it only pertained to state public works. The law in fact includes all New York municipal, county, and state purchases of tropical timber products.

5. U.K. Mahogany Boycott Campaign

Environmentalists in the United Kingdom have promoted tropical timber campaigns since the mid-1980s. In recent years, they have paid increasing attention to mahogany of which the U.K. is one of the two major consumers internationally. Over the last four years, the FOE U.K. "mahogany is murder" campaign has reduced mahogany imports to the U.K., from about 31,300 cubic meters in 1992, to some 18,900 cubic meters in 1996. This is perhaps the first clear demonstration that consumer mobilization can effect a major consumer market (the U.K. had previously alternated with the U.S. as the largest mahogany importer.) However, increased U.S. consumption has essentially offset the effect of the U.K. boycott over the same period.¹³⁸

6. Boycotts and Certification

Boycotts, even if they have had limited demonstrable effect on market trends in the U.S., have been effective in drawing attention to the issues of logging and deforestation and have created momentum for certification proposals. They have, in short, raised consciousness. Public awareness of ecologically damaging forestry practices in tropical, temperate, and boreal forests has been increased by these initiatives, and industry has noted the trend. In April 1995 Greenpeace U.S. polled the top U.S. 50 furniture companies, the majority of whom said they did not use tropical timber, many on environmental grounds. In the following section we discuss the emergence of consumer consciousness that sustains certification efforts, and we consider industry's response.

Consumer Consciousness

Consumers are becoming more aware of the impact of their purchasing habits on the environment. Discussion of the health of the environment is common in the media and in the schools. Visitors to popular family and tourist attractions, from the Sedgewick County Zoo in Wichita, Kansas, to the National Aquarium in Baltimore, Maryland, are treated to graphic, informative exhibits on tropical forests and the destruction of those essential natural resources. Visitors are encouraged to examine their own activities and purchases that contribute directly or indirectly to the devastation of forests, the obliteration of indigenous peoples and their cultures, and the extinction of incalculable numbers of plant and animal species that are dependent on forests for survival. Educational media concerning our interconnection with and reliance on forests is proliferating, and the public is reacting.

Results of a recent survey by Purdue University demonstrate that "69 percent of residential consumers polled are changing their purchasing behaviors by boycotting or avoiding products."¹³⁹ Similar results were reported by a Golin/Harris Communications and Angus Reid Group poll, in which "61 percent of those surveyed 'go out of their way to purchase environmentally friendly products—even at greater costs.'"¹⁴⁰ The Consumer Solid Waste Survey conducted by Gerstman and Meyers (1991) indicates that almost three-quarters of U.S. consumers (72 percent) feel that it is extremely/very important that environmental information appear on packaging. The same study demonstrates that 85 percent of consumers feel that too little information is available.¹⁴¹

Prompted by consumer advocacy groups, in 1992 the Federal Trade Commission addressed consumer concerns regarding truth and accuracy in labeling by issuing guidelines for environmental labeling. According to the Purdue survey, a majority of consumers, 79 percent, "place more trust in a label or stamp than on advertisements, brochures or catalogs, or salespeople," while 82 percent "trust a label that assures wood resource sustainability when they're making a furniture purchasing decision."¹⁴²

The potential net effect of labeling or certification on the cost of wood products is unclear. Nevertheless, the Gerstman and Meyers survey demonstrates that 75 percent of consumers would pay five percent more for environmentally safe products, while the Purdue study shows that nearly 70 percent of consumers would pay more for furniture constructed of materials originating from a sustainably managed forest. Further, the Purdue survey states that one third of all respondents indicated they would pay 6 to 10 percent more for furniture manufactured from sustainably harvested wood. The Purdue report concludes that "an independently certified label or stamp, assuring wood resource sustainability, would be a viable information source for environmentally-oriented consumers, as well as those desiring more information prior to furniture purchases."¹⁴³

7. Industry Response

Although most wood importers appear resistant to change, many retailers, importers, manufacturers, and distributors, as well as architects, woodworkers, and furniture makers are interested in taking steps to minimize deforestation. These members of industry calculate that meeting public demand for environmentally responsible business practices will be profitable and rewarding.

Among the industry leaders in the movement toward sustainable use of forest products is San Francisco-based Ecotimber International, which strives exclusively to import sustainably-harvested tropical woods and stocks many rarely-used species. Environmental Construction Outfitters (ECO), a wholesale supply company owned by architects Paul Novak and Paul Bierman-Lytle, is committed to providing "environmentally responsible products for the built environment." Paul Novak of ECO stresses the importance of guaranteeing his customers sustainably-harvested wood, given the lack of credible information in the marketplace: "people will tell you anything to sell you anything ... there is a lot of misinformation out there. You go into a lumberyard and ask for sustainable wood, but in most cases, the wood is not sustainable and you would never know unless you asked for the certificate, which may or may not exist."¹⁴⁴

Another architect advocating change in wood utilization practices is William Edgerton, chair of the American Institute of Architects' Task Force on Tropical Forests and Natural Resources. Mr. Edgerton's mission is to inform the public and his colleagues on the deforestation issue. Architects are a primary user of tropical woods in architectural trim applications. However, Mr. Edgerton says, "probably the major users of tropical woods don't even know they are using them ... because they are not labeled in any manner."¹⁴⁵

Also dedicated to achieving sustainable forest management and certification of sustainably-harvested wood is the thousand-member Woodworkers Alliance for Rainforest Protection (WARP), a conglomeration of artisans, furniture makers, and wood importers and suppliers. Furniture maker Silas Kopf, a WARP Director, finds the "industry" resistant to change. He suggests that attention to consumer demand for certified, sustainable wood is the key to progress.¹⁴⁶

Manufacturers and retailers are playing a role as well. Smith & Hawken, a California mail-order company, located a source for responsibly harvested teak to accommodate its customers' concerns.¹⁴⁷ Ikea, a Swedish international home furnishings company, utilizes rubber trees in some of its products. The trees are harvested only after their latex supply dwindles. Additionally, Herman Miller, a Fortune 500 office furniture manufacturer, announced in March 1990 that tropical woods that cannot be obtained from sustained-yield forest sources would be eliminated from its standard product line. Staff members of the gigantic home improvement retailer, Home Depot, are seeking similar solutions. Mark Eisen, Environmental Marketing Manager of Home Depot, ponders global issues surrounding scarce natural resources and feels that, in practice, the industry has a responsibility to provide information to customers about the origin of the wood in the products they are buying. As Eisen put it, "what you have to do in the long run is give the customers the information to make the choice. It is wrong not to."¹⁴⁸

PART V. Timber Certification

Heightened public concern for forests and increased awareness of the connections between natural resource management and the condition of the environment have encouraged the development of a multitude of certification programs for forest management. Certification of forests was conceived to address public concern about the management of forest resources by means of a program which could simultaneously maintain the productivity and economic value of forests, protect the forest ecosystem, and address socio-economic concerns of parties interested in or affected by forest management. Several certification programs have been implemented, with varying degrees of acceptance. Some certification programs are linked to consumers through a label or seal. The seal is typically licensed to the producer or manufacturer and may appear on or accompany a product derived from the certified forest.

Certification may benefit consumers by allowing them to choose a product which meets specific environmental, social, and other criteria. The forest industry may benefit from certification through a common understanding of preferred management practices and outcomes, reduced trade friction in international markets, increased efficiency of the forest resource base, fewer regulatory violations, greater market acceptance, and improved public relations. The rewards of improving forest management through certification are the long-term environmental, social, and economic benefits derived from a thriving forest ecosystem.

As certification programs proliferate, consumers and producers face choices as to which certification programs carry the most value. Consumers will need to understand who is doing the certifying, whether the certification is credible, and to what standards the forest has been certified. Differentiating between certification programs will be necessary unless a minimal set of criteria can be agreed upon internationally. The need to distinguish the accuracy and merit of competing forest certifications may confuse consumers as well as producers and raise questions about which certification programs best serve the needs of the environment, the public, and producers. Which certification programs best contribute to sustainable development? Is the certified forest really green, and how can “greenwashing” be avoided? Is certification the answer, or do the multi-faceted issues of global deforestation require a number of additional remedies?

A. What Drives Certification?

Product claims associated with certification aim at tapping the growing public demand for environmentally preferable products. Claims appearing on a product must be preceded by a chain-of-custody exercise which documents that the product was derived from the certified forest. The goal of certification initiatives is to identify sustainably managed forests and their products to the consuming public. Sustainable forest management means use of a forest that maintains productivity, does not degrade the ecosystem and preserves the forest’s benefits, including social and cultural benefits to the peoples that live in it. Traditionally, sustainability implied “sustained yield” of the forest product. SFM requires a broader approach to forest management, and the specific approach and practices vary depending on local forest conditions and requirements of the forest ecosystem. Achieving and identifying “sustainability” in forest use is clearly a complex and potentially conflict-riven process. Even the organization that has worked longest on the issue, and won probably the widest acceptance for its standards for certifiers, the Forest Stewardship Council (FSC), does not claim that its standards necessarily identify “sustainability”.

Certification implies that a forest area has been evaluated against a set of standards or criteria. Depending on the certification program followed and the demands of the marketplace, the certification may be first, second, or third-party certification. First-party certification is a producer’s self-assessment of the environmental and other attributes of his/her own product or forest management. An evaluation completed by a supplier, customer, trade association, or other entity with a vested financial interest in the producer constitutes a second-party certification or claim.

Evaluation by an independent, objective entity is considered a third-party certification or claim. Consumers generally have more confidence in third-party claims than in other types of claims.

The success of certification as a tool to encourage environmental improvement is largely dependent consumers' understanding and acceptance of certification. Whether the purchaser of wood products is a major institutional buyer, a national or local government, or an individual consumer, the need is equally great for accurate and informative claims. For example, Home Depot, a leader in the do-it-yourself building products industry with experience selling certified products, recognizes that "certification is only a step in bringing green wood products to the consumer. The retailer or producer must then convey this information in a way that is clear and easily identifiable." Manufacturers such as Mater Engineering convey a similar understanding of the importance of well-informed consumers: "Consumers must be satisfied that a certified product meets their values. And the market growth [of certified products] will be short-lived ... if the public lacks confidence that certified forests are truly sustainable."

Third-party certification may inspire confidence in consumers, particularly if the third party has been accredited by another reputable party. Many standards bodies follow this type of accreditation/certification model, including the International Standards Organization (ISO) and the Forest Stewardship Council (FSC). An accrediting body provides some degree of assurance that the certifier has been trained by an accredited training program and is qualified to perform an evaluation against a specific set of criteria within a given field.

Prior to certification, however, a set of standards must be developed. Standards should be developed in an open and transparent manner by a balanced matrix of interested parties. All interested and affected parties should be invited to participate in the development of the standards. Acceptance and credibility of standards is closely related to how the standards were developed, the standards themselves, and the accrediting or certifying process by which organizations are evaluated against the standard. Standards must include chain of custody requirements to track the product through the manufacturing process to the point of purchase if product labeling is permitted.

In some cases, as in the FSC, the accrediting body administers the development of the standards, which are written by parties interested in and experienced with the issues. An alternative is to assemble a group of experts to form a committee which develops standards, as in the case of the ISO. The accrediting body in the ISO process is determined on a national level and is the responsibility of the national ISO member body. The traditional standards development process for technical specification standards proved much less difficult than developing standards for processes such as forest management, which potentially affect a wide array of interested parties. The process of developing forestry standards has proven particularly sensitive. It is illustrative of the challenges facing the writers and potential users of standards that attempt to integrate performance requirements with management systems functions. A technical standard for paper sizes does not require provisions for how to grow the trees from which the pulp is derived. But a standard for sustained forest management (SFM) requires, by definition, a reconciliation of a management system for forests with the need for performance requirements appropriate to the local forest conditions and adequate targets to ensure sustainability. The development and implementation of such a standard has presented complex challenges. A single internationally agreed upon standard for SFM has yet to materialize and indeed may not be possible. Were a single standard for all forests feasible—with global principles and criteria for forest management as well as provisions for developing specific, localized performance requirements—it could harmonize competing concepts of SFM, present the marketplace with a unified standard for sustainable forestry, and facilitate international trade.

Standards for certification are being developed or discussed on three parallel tracks: 1) the intergovernmental level and national governmental programs; 2) non-governmental initiatives; 3) private sector initiatives.

Activity at the intergovernmental level aims to develop widely-accepted principles and criteria for forest management by type of forest or geographical region. One center of activity within the intergovernmental processes is the UN Commission on Sustainable Development's Intergovernmental Panel on Forests, which is pursuing a global forest convention. The program of the IPF includes discussions of certification of SFM and labeling of timber. Among other intergovernmental initiatives are the Helsinki Process, a European effort to develop principles and criteria for management of temperate and boreal forests; the Montreal Process, the parallel to the European effort in which non-European nations including the U.S. and Canada have developed principles and criteria for temperate and boreal forests, culminating in the Santiago Declaration of February 1995; and the International Tropical Timber Organization, which is also developing principles and criteria for tropical forest management. These forums have made slow progress but continue to inform the continuing debates on forest certification and appropriate standards for forest management. While governments have not taken a lead in developing certification programs, they are making intergovernmental commitments to trade in sustainably produced timber. Reliable certification is necessary if governments are to meet these commitments.

We describe the principle initiatives below.¹⁴⁹

1. Austria

In 1992 the Austrian Parliament, in response to environmentalist concerns, passed legislation requiring mandatory labeling of tropical timber and wood products and creating a mark of quality for sustainably produced timber. In June 1992 the Parliament passed a resolution calling for a 70 percent tariff increase on unsustainable tropical timber. The law also established criteria for sustainability and called for a voluntary label to certify sustainable timber from all forests.

After enactment of the legislation, ASEAN, led by Indonesia and Malaysia, communicated to GATT (General Agreement on Trade and Tariffs) their view that the mandatory labeling violated Articles I and III of the GATT, regarding most favored nation status and national treatment—i.e., that the Austrian requirements discriminate against tropical nations as opposed to other timber exporters and favor domestic over imported goods. In addition, Indonesia and Malaysia are reported to have threatened retaliatory trade sanctions as well.

Austria consequently amended its legislation, maintaining only voluntary labeling. Austria favors development of internationally sanctioned labeling, beginning with a first phase in which timber is labeled by origin and species, to be followed by development of certification criteria.

2. Netherlands

In June 1993 the Dutch government and Dutch NGOs, unions, industry, and environmental organizations signed the Netherlands Framework Agreement on Tropical Timber (NAFATT). The pact seeks to establish a legally binding agreement to ensure that by 1995, only sustainably produced timber and wood products will be traded in the Netherlands. The NAFATT aims to correct market “imperfections” by providing adequate information to consumers, including certification of sustainably produced timber. This certification is considered essential to market access in the Netherlands. The Dutch government has negotiated bilaterally with trading partners on how to achieve the objective, and the signatories to NAFATT support international cooperation to meet the goal.

3. Germany

Probably more municipalities and states in Germany have banned the use of tropical timber than in any other nation. Tropical wood appears to have lost market share relative to temperate softwood. In response to these bans, and as an attempt to avoid further domestic restrictions. In 1992 the German timber importers, processors, and timber trade union founded “Projekt Tropenwald” (“Project Tropical Forest”) or “Initiative Tropenwald” (IT) to promote sustainable timber production and provide

technical and financial incentives to this end. IT seeks a cooperative approach internationally. Like the NAFATT, it has done considerable work on defining sustainability criteria.

4. United Kingdom

In 1989 the British branch of the World Wildlife Fund (WWF-U.K.) founded the 1995 Group aimed at phasing out unsustainable timber consumption from all sources by 1995. The 1995 Group (and its sister initiative, the North American Buyer's Group) intended to pull together groups of major retailers who committed to stock a certain amount of certified product by a specified date. The Group initially proposed to adhere to Forest Stewardship Council (FSC) guidelines on certification of sustainability. It was supported by the British Retail Consortium (BRC), which represents more than 90 percent of the retail industry in the U.K. Companies which join the group must submit an action plan on how they intend to meet the goal and submit to audits. Simon Counsell, of the Rainforest Foundation U.K., notes that the Group failed to set intermediate targets and commit to meeting these before the 1995 deadline. The 1995 Group did not meet its goal and has changed its name to the "1995 Plus Group". In 1996, the U.K. Timber Trade Federation threatened action against the group under European Community trade and U.K. antitrust rules. The Federation argued that retailers' adherence to FSC standards and the target date constituted restraint of trade. The Group subsequently dropped both.

WWF-U.K. has also publicized misleading or fraudulent labeling schemes.¹⁵⁰

The U.K. Timber Trade Federation, under pressure particularly with respect to U.K. mahogany imports, created and funded the "Forests Forever" campaign to promote "balanced" discussion of the issues. This industry initiative persuaded major Brazilian mahogany exporters in 1993 to adhere to a declaration that no mahogany illegally extracted from Indian reserves would be marketed. The declaration was however entirely cosmetic and without effect on illegal extraction.

5. Indonesia

Indonesia is establishing an Ecolabeling Institute (Lembaga Ecolabeling Indonesia) to design and implement national certification of timber and other wood products. The Ecolabeling Institute is linked to a broader national accreditation committee made up industry, government and private groups. Institutional arrangements as well as criteria for accreditation and certification are still being worked out, but Indonesia is said to have a strong interest in applying a sustainable forest standard developed within the International Standards Organization (ISO) framework. The ecolabeling system for wood products is slated to become fully operational by 1997. Initially, it will likely receive funding from government sources, but Indonesian Forestry Minister Surohadikusomo expressed hope that industry or international agencies will take over support of the program. Malaysia is developing a similar program.

6. African Timber Organization

The ATO resolved in 1993 to create a "Green" label for African Timber, aimed principally at the environmentally conscious European market and seeking to differentiate African timber from Asian and Latin American timber. The organization plans to develop criteria for natural forest and plantation management.

7. Forest Stewardship Council

In the non-governmental/non-profit arena, the center of activity is within the Forest Stewardship Council (FSC) and its affiliates. Founded in 1994 and based in Mexico, the FSC was created to develop a set of principles and criteria for natural forest management and guidelines for certifiers through a consensus process involving environmental groups, certifying organizations, grassroots organizations, consumer groups, retailers, and industry representatives. The council now has some 42 members in the U.S. and 170 internationally. The alliance recognized the need not only to

develop a set of widely-accepted standards, but to become an accreditor of certifying bodies to ensure the integrity and accuracy of the certification process. In July 1995 the FSC accredited four certifiers, of whom two are in the US. A further eight certifiers have since applied for accreditation, and their applications should be considered this year. The principles and criteria of the FSC will be interpreted at a national and in some cases regional level by FSC national or regional chapters. The chapters are engaged in writing standards specific to their respective forest types and conditions. Founding assemblies for Canadian and U.S. chapters occurred early 1996, and several regional efforts in the U.S. are developing certification standards.

8. CERFLOR- Brazil

An example of a national level non-governmental/non-profit certification program is the Cerflor program of the Brazilian Society for Silviculture. Founded in 1955, one of the primary goals of the Society is the formation, recomposition, and sustainable use of forests. In 1992, the society developed Cerflor, a “System for the Certification of Origin of Forest Raw Materials.” The goals of the certification are to support sustainable forestry within Brazil and to distinguish Brazilian forest-based products from those of other countries. Its immediate purpose was to “ecolabel” Brazilian pulp and paper products in the EC market in order not to lose market share to the EC ecolabeling program.

9. Others

Switzerland has an industry-based certification of national origin program for domestically produced timber and is studying certification criteria for tropical and other imported timber. Japan has an ecolabeling program (EcoMark) but prefers to view timber certification in the broader framework of harmonization of trade and environmental policies.

10. Private Sector Initiatives

Private sector initiatives to manage forests sustainably—and in some cases to accompany that management with certification—cover a wide range: industry trade association agreements, private sector standards bodies developing certification programs, and individual producer-supplier arrangements for environmentally preferable products to meet specific procurement criteria. Private sector initiatives are rapidly expanding to fill the demand for certified products.

Among the private sector initiatives are the efforts of individual companies, such as California-based Collins Pine Company, Seven Islands Land Company of Maine, and the Menominee Indian lands of Wisconsin, to hire a certification firm and to be evaluated for management practices and environmental performance against that certifier's criteria. Companies can collaborate through their trade associations to develop criteria, as is the case in the U.S. The American Forest and Paper Association developed a set of principles and implementation guidance for forest management based on a systems model rather than a prescriptive performance template. Adherence to the principles became a condition of membership in the Association as of January 1996.

Another industry-driven initiative is the Nordic Forestry Environmental Labeling Offensive, a collaborative effort by the forest industries of Finland, Norway, and Sweden to create a practical environmental labeling system for wood and paper. Recognizing that certification of forest management is the first step in such a system, the Nordic countries are reviewing their operations to ensure that biological diversity is not sacrificed to positive economic growth rates. Collectively, the Nordic states supply nearly half of Europe's wood and paper needs. European consumers have become increasingly sophisticated in their knowledge of and concerns about forests. In response, the Nordic states intend to use certification to demonstrate responsible methods and management. A separate but related effort was initiated by German publishers and paper makers, who have been pushing for certified product from their Nordic suppliers. Frustrated by the slow pace of

development of certification programs, the publishers entered into an agreement with Nordic suppliers to work toward a global certification scheme.

Cooperative initiatives between individual suppliers and buyers (such as the North American Buyers Group and the U.K. 1995 Plus Group) may gain appeal with the implementation of the ISO 14000 series of standards for environmental management. With these standards it will be commonplace for buyers to specify that their suppliers have an environmental management system in place. The ISO 14000 series of standards still under development and similar standards-writing endeavors reflect the sensitivity of the forest industry and other interested parties to sustainable forest management concerns. These projects are spearheaded by national standards bodies such as the American Society for Testing Materials (ASTM) in the U.S. and the Canadian Standards Association (CSA) in Canada.

11. Forest Management Standards in the U.S. and Canada

Architects and specifiers of building products were instrumental in proposing the creation of national standards in the U.S. Through its committee on Environmental Assessment, ASTM is developing a standard for Sustainably Harvested Wood. NGOs tracking the development of the standard note that draft standards lack specificity and require further development before they could serve as a standard for sustainably harvested wood. As currently written, verification of compliance with the standard will not ensure that sustainable forest management is being achieved. Standards bodies typically operate on a consensus model, and influencing the development of the standard requires the resources to attend meetings, comment on drafts, and hold voting privileges in the appropriate committees.

ASTM is also developing a standard Guide for Environmental Life Cycle Assessment of Building Products and Building Materials, which will be useful in evaluating the environmental releases and associated impacts of a product or process throughout its life cycle, including impacts associated with the growth of timber, the manufacturing and distribution processes, and the final disposition of the product into the waste stream, recycling stream, or re-use process. Yet another standard being considered is a Guide for Design, Specification, Construction and Operation of Residential Green Buildings. This standard encompasses all building products and intends to improve and promote environmentally sound building, including the selection and wise use of wood building materials.

In Canada, industry efforts to establish a domestic certification process were heralded by the Canadian Standing Committee on Natural Resources, which called on the Canadian government to support the industry effort toward establishing an industry-wide standard for sustainable forest management. The Canadian Standards Association (CSA), a standards writing body similar to ASTM, is administering the effort. Participants in the development of the standard include non-governmental organizations representing consumer, native peoples, and environmental interests, industry and labor representatives, academics, and government representatives.

The CSA standard has caused considerable concern among environmental advocacy groups dissatisfied with both the process and the substance of the standards under development. Their concerns revolve around issues of participation, including inadequate representation of some groups within the technical committee and alienation at the outset of the process when groups felt they were not invited in a timely fashion. EDF was an observing member of the technical committee developing the standard. EDF participated because we are concerned about Canadian forests, because the U.S. is Canada's biggest market, and because U.S. consumers may encounter products from a certified forest in the marketplace. While the CSA initiative does not include provisions for product labels, and while labels asserting conformity with the standard are restricted to use in advertising, U.S. consumers will very likely be presented with information on the certification of Canadian forest companies.

Recognizing that environmental groups felt underrepresented, the CSA held several information sessions across Canada for advocacy groups and solicited their comments on the documents. Over 100 responses were received and reviewed by an editing committee. Industry and environmental groups however were unable to reconcile differences over whether or not a performance based

standard (one tied to specific production criteria for forestry operations) was preferable to a management systems approach, without performance criteria.

Environmental groups became particularly suspicious of the CSA process when Canada and Australia jointly introduced a proposal to the International Standards Organization (ISO) to initiate work on a standard for sustainable forest management which would parallel the effort in Canada at an international level. The highly politicized issues surrounding forestry engendered much discussion and debate within the ISO process over the creation of a new work item.

B. ISO 14000: The Perceived Need for Environmental Standards

While the Forest Stewardship Council is a cornerstone of international certification efforts and is highly regarded by environmental groups, industry and some national standards-setting bodies perceive a need for an additional set of standards for forest management. The activities of the ISO have been in the spotlight since it formed Technical Committee 207 (TC 207) to develop a family of standards dealing with environmental management. Discussions are ongoing to assess the appropriateness of developing an international standard, or least provide orientation for sustainable forest management within the ISO process and/or the technical committee charged with developing standards for environmental management.

1. Background

The International Standards Organization (ISO) is a private sector international standards body which was founded in 1947 to promote the international harmonization and development of manufacturing, product and communications standards. Over 120 countries are full voting members of ISO and are represented in ISO by an official member body. The U.S. is represented by the American National Standards Institute (ANSI), which organizes and administers U.S. participation in ISO activities.

Harmonized standards can serve to facilitate the exchange of international goods and services, and the existence of international standards are accorded deference in trade disputes by the World Trade Organization Technical Barriers to Trade Agreement. Traditionally, ISO has focused on the development of technical standards such as film speeds. A need for harmonization of product quality standards in the late 1970's expanded ISO's role beyond technical specification standards to systems standards.

2. The ISO 9000 Series on Quality Systems Standards

The ISO 9000 series of standards, a framework for quality systems management processes, was created to enable purchasers some degree of assurance that the products they selected were manufactured in accordance with known, verifiable, and accepted methods of manufacture and distribution. Conformance with ISO 9000 does not indicate the quality of a product, but it offers evidence that a company has a quality management system in place. The existence of a system for quality control is likely to ensure a consistent product, whether of high or low quality. In many industries, companies trading in the international marketplace have made ISO 9000 registration a de facto condition of doing business. Contractual relationships between producers and buyers often specify ISO 9000 registration, as do many government purchasing policies.

Nearly 100,000 companies are registered to the ISO 9000 standard, and that number is rapidly expanding. One industry executive described the value to his company of ISO 9000 this way: "Imagine reviewing a component that is one of hundreds that need to go into your product. The manufacturer of the component is overseas. I need to order thousands of this particular component and have no way to review the entire batch. I look at a few and check to see if they have ISO 9000 registration. If I like the product and they are registered, I have more assurance that the entire order

of components will resemble the one or two I reviewed. This assurance can be worth a lot of money.”

3. ISO 14000 Series of Standards for Environmental Management

As an addition to quality management systems standards, ISO began to consider developing standards for environmental management. Many organizations around the world were beginning to recognize the importance of implementing a system for managing the environmental impacts and activities of their business activities. The systems model successfully developed in ISO 9000 shifted thinking away from an end-of-pipeline orientation toward a “systems” approach encompassing all stages of production. Based on the conclusions of ISO's Strategic Advisory Group on the Environment, ISO formed Technical Committee TC 207 to develop a series of standards relating to and facilitating environmental management, such as auditing, environmental labeling, environmental performance evaluation, life cycle assessment, and environmental aspects of product standards. Work on this family of standards, the ISO 14000 series, began in June 1993.

Just as the ISO 9000 series does not determine the level of quality of a product, the ISO 14000 series does not prescribe environmental performance levels. Indeed, compliance with ISO 14000 does not indicate any particular level of environmental performance, nor does it suggest environmental improvement. It does require organizations to establish an environmental policy and to set targets and objectives for environmental performance. The appeal of ISO 14000 to industry in particular is that it will harmonize a vast array of emerging national and regional management, auditing, and other environmental standards which can be confusing and can create trade barriers. To facilitate trade, global commerce wants one standard for environmental management. Additional incentives to ISO 14000 implementation are reduced environmental management costs due to the efficiencies of a systematic approach; potentially fewer regulatory violations and penalties since business would in theory better understand its environmental performance; improved management of environmental risks and liabilities possibly leading to reduced insurance premiums; meeting customer demands; and improving public image. ISO is also attractive to industry because it is a voluntary, non-governmental scheme, not a traditional government command-and-control measure.

ISO 14000 initially presented the promise of becoming an important market-based approach to improving environmental management. If widely implemented, the ISO 14000 standards could have significant effects on industry's approach to and practice of environmental management. The result could be a raising of the floor of environmental performance worldwide.

4. ISO 14000 and Forests: Friend or Foe?

At the June 1995 plenary meeting of ISO 14000 in Oslo, Canada and Australia introduced a new work item on the creation of an international standard for forest management. The proposal was met with resistance from industry, whose representatives did not favor sector-specific standards, and from environmental groups, who feared that an industry-dominated process would develop a weak or illusory standard for forestry based on a systems rather than a performance approach. As illustrated in the ISO 9000 and ISO 14000 generic management systems standards, there is substantial latitude in the application and practice of non-prescriptive management system standards. Within ISO 14000, the ultimate benefit to the environment is dependent on the intentions of those who implement the standards and on the integrity and rigor with which they apply the standards. Any standard for sustainable forest management requires, by definition, provisions ensuring that compliance with the standard indicates that sustainable forestry is being achieved or least approximated. That requirement is difficult to reconcile with ISO's bent towards systems-based standards. Environmental groups were concerned about the direction that the standards writing might take and were dissatisfied with the substance and content of the new work item proposal, which was officially withdrawn by its sponsors.

Recognizing the complexity of the issue and some level of support for the development of a standard, New Zealand offered to host an informal discussion group to examine:

- Sustainable forest management and a wide range of forest outcomes.
- Appropriate management procedures and tools for sustainable forest management and what place these might have within ISO.

The initial meeting of the discussion group took place in Wellington, New Zealand. While the participants made notable progress on substantive issues, the tendency of the meeting was to avoid the exploration of the fundamental questions concerning the purpose of certification and the need for an international standard to encourage and help companies to achieve sustainable forest management. Interested parties are wrestling with the need for and suitability of an ISO standard for forestry. Although the discussion group is not part of the official ISO process, the results of the discussions could feed into ISO 14000 through a number of routes. The parties continued these discussions at the second meeting of the New Zealand Informal International Study Group on Sustainable Forestry, in early 1996 in London.

Subsequent discussions, including two further meetings in Helsinki, have polarized around NGO insistence that certification of sustainable management be based in performance criteria on one hand, and industry and national standards groups commitment to a systems based approach, precluding performance measures. NGOs fear that consumers may confound ISO certification of management systems with certification of forest management practices. Industry appears largely uninterested in what it perceives as overly restrictive performance standards. Consequently, TC 207 has called for a working group to develop a report “describing information and reference material” on what ISO 14000 means for forest managers. At present, it seems unlikely that any attempt to develop an ISO standard for the forestry sector will proceed. ISO approved certifiers can however perfectly well certify forestry companies for broader environmental management standards. Both NGO efforts to prevent ISO from claiming standing as a certifier for forestry, and attempts to formulate an ISO forestry management standard have for the meanwhile failed.

C. Whither Certification?

A number of recent studies on the economic prospects for timber certification have tended to counsel caution in the adoption of trade-related policies intended to influence deforestation. These studies argue that much timber never enters international trade, that domestic policies and market distortions may be more important than trade in stimulating unsustainability, and that the financial returns from certification may be limited.¹⁵¹ These studies uniformly disparage bans and boycotts of tropical timber as discriminatory and liable to produce perverse results. Their conclusions favor voluntary, uniform multilateral standards as the most likely way of achieving positive results, while they recognize that institutional and technical difficulties may make it difficult to define such standards.

It is certainly the case that domestic policy and market distortions in timber-producing countries, north and south, are key stimuli to deforestation. It is also true that changes in international trade are of themselves unlikely to halt global deforestation. But the timber trade studies tend to treat existing markets as static in a certain sense, or rather as changing only in response to supply and demand and to price and demand elasticity. The many attempts now under way to define sustainability criteria in order to certify timber are themselves evidence that the market has already changed. It has changed in response to other, exogenous criteria—specifically the growth of consumer demand in northern countries for sustainably produced wood. Curiously, the trade studies recognize that much of this activity came in response to ban and boycott initiatives of one sort or another. It may be premature to conclude, for example, that the aggregate commercial value of a “green premium” for sustainable tropical timber in the U.S. and Europe is \$500 million a year, rather than \$1 billion or \$1.6 billion.¹⁵² The presently predictable value of such a green premium may indeed be less, or even more, but in 1980

the predictable value of such a premium was in all probability zero, since there was little or no consumer consciousness of the effects of logging on the environment.

Policy should therefore seek efficient means of increasing consumer consciousness and the potential “green premium” that goes with it. In this regard, bans, boycotts, or the threat of such measures, should not be discarded. Consumer campaigns have had an important effect in putting the sustainability of timber production on the agenda and have begun to create market incentives for sustainability. Just the threat of market restrictions—as in Austria, The Netherlands, and the U.K.—has moved some producing countries to attempt to preempt them by designing their own certification procedures or supporting multilateral efforts to do so.

Much is made in the trade studies of the potential for diversion of trade. For example, if European or U.S. markets exclude unsustainable timber, southern exporters might increase domestic consumption and divert trade either to Asian countries where less demand for certified timber exists or to south-south trade. While such scenarios are useful to consider, the behavior of major exporters suggests that they wish to maintain or increase market share in U.S. and European markets, and that diversion of trade is perceived as a second-best alternative. Were this not so, neither Indonesia, Malaysia, nor the African Timber Organization would be engaged in designing their own certification programs. In addition, domestic policy in producer countries may be affected by international pressure of various sorts, including trade-related measures. The reorganization of Brazil’s environmental agencies under the Sarney government in 1989 (the so-called *Nossa Natureza* program), including amelioration of some policy distortions that contributed to deforestation, is one example.¹⁵³

In view of the myriad certification and standards writing initiatives presently under way, the most obvious conclusion that comes to mind is that there are many of them. Diverse national, international, industry-sponsored, NGO-led, consumer-supplier partnership efforts are going on at once. The number of institutions and the diversity of interests they comprise virtually guarantee conflicts in the definition of what constitutes sustainable use of forests. This is all the more true since criteria for sustainability in forests are complex. Existing ITTO guidelines for tropical forest management, for example include 41 principles and 36 recommended actions.¹⁵⁴ Worse, different labels on wood may be labeling entirely different things. A standard indicating that a management system is in place is not the same as certifying that a given consignment of timber was sustainably produced, but both may appear on labels. The risk, as all the adherents of certification have noted, is that competing claims or conflicting labels confuse consumers, causing them to lose confidence in certification and labeling and thus depriving the approach of its value. The solution is to educate consumers so that they can make their own decisions about whose claims to believe. The minimal precondition of effective consumer education is labeling of timber and wood products as to origin and species. Labeling, as opposed to certification, need await neither multilateral agreement on the criteria for sustainability nor consensus on how best to apply them in order to get results. Labeling can also help to expand existing demand for sustainable timber by catalyzing more effective consumer education. Yet labeling does not restrict trade or discriminate against exporters or particular firms. Labeling and consumer education will help to make ongoing certification efforts more effective. We will return to this point in the conclusion of this report (section VI).

D. Existing Tracking Systems

Tracking and identifying the origin of wood is crucial to international certification initiatives as well as to labeling more generally. In 1991 timber labeling hearings, the International Wood Products Association (IHPA) representatives alleged that labeling costs would be onerous for industry and consumers. In the United States however, much of the information needed to label imported timber—a more complex undertaking than labeling domestic—is already collected by the government and the private sector. The following paragraphs describe the existing systems.

An array of systems designed to identify and track imported commodities, including wood and wood products, are currently operating in the United States. The Harmonized Tariff Schedule and systems for

classifying and grading construction materials are managed by the government. Designed for the purpose of assigning duties to imported commodities, the Harmonized Tariff Schedule classifies goods by a ten-digit code which corresponds to an article description. Descriptions of articles become more specific as the number of digits in the code increases. In terms of wood imports, the Heading/Subheading "4407" is "Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded, or finger-jointed, of a thickness exceeding 6mm." More specifically, the eight-digit "4407.10.00" is Coniferous wood. At the ten-digit level, "4407.10.00.08", the species is frequently classified. In this case, it is Sitka spruce, Rough.¹⁵⁵ When a specific ten-digit code does not exist for a commodity, the commodity is classified by a basket code. Additional harmonized codes are added to the Schedule when the Census Bureau recognizes a need to classify a commodity more precisely. The public may also petition the Census Bureau to expand a code to the ten-digit level for a given commodity.¹⁵⁶

Assignment of a Harmonized Tariff Schedule code to imported goods is the responsibility of the importer. The Tariff Schedule U.S.A. number (T.S.U.S.A. No.), which appears on U.S. Customs form 7501, must be filed by the importer with Customs. According to the Foreign Trade Division of the Census Bureau, 98 percent of the Customs forms are filed electronically. In practice, a shipment of mahogany from Brazil to New Orleans is held by U.S. Customs at the port of unloading until the importing company files three forms, including form 7501. Upon receipt of completed paperwork and any duties owed, Customs releases the goods to the importer. Without exception, form 7501 contains the country of origin of the shipped wood or wood product. Form 7501 also references the species of the wood through the T.S.U.S.A. No., unless the Harmonized Tariff Schedule does not contain a code that designates an individual species for the given product. Minor modifications to the Harmonized Tariff Schedule would be adequate to identify all major imported timber species.¹⁵⁷ Anyone may recommend additions to or changes in the Harmonized Tariff System to the Census Bureau by petition. Petitions are subject to review by the Foreign Trade Division of the Census Bureau.

The Port Import/Export Reporting Service (PIERS) is a company which markets the information referenced above as well as additional information pertaining to the exporters and importers of a given product. PIERS collects and sells information that importers file with Customs, including product descriptions found on the Freight Manifest, a Customs form which typically contains more detailed information about the species and nature of the shipped goods than does form 7501.

In addition to systems that identify and classify imported goods, the U.S. Government has systems for grading, stamping, or classifying wood products after they are processed into construction materials, namely lumber and plywood. Lumber is graded according to specifications for structural uses by the Department of Commerce. Structural plywood also must conform to the U.S. product standard and must be grade stamped by a licensed testing organization, such as the American Plywood Association.

The latest technology to facilitate the tracking and labeling of imported wood and wood products is the British "Forest Log" system, based on the bar code concept. A unique bar code is affixed to a shipment of logs, first by a plastic tag. The bar code is later transferred to a steel-housed microchip at the point of processing. Hand-held computers read the codes and allow entry of log volume, species, and quality. As reported in the *New Scientist*, the system has successfully tracked a shipment of timber from an Indonesian forest to a British importing company. The technology is expected to be available through SGS Forest Services of Oxford.¹⁵⁸

PART VI. OPTIONS FOR ACTION AND CONCLUSION

We have seen in the foregoing pages that various initiatives are now under way that seek to create global market incentives for the sustainable production of timber through timber certification or the identification of sustainably produced wood. Timber certification can enable consumers to signal a preference for sustainable product or pay a premium for it. We have touched on various national and international initiatives relevant to deforestation and to the role of timber production in deforestation (e.g., domestic forest policy in the U.S., legislative and administrative efforts to control illegal logging in Brazil). Here we will evaluate the effectiveness of several major options in the United States for creating incentives for sustainable timber production globally: timber bans and boycotts; tariffs, taxes, and north-south government to government compensation and financial transfers; and timber labeling.

In our view, the certification initiatives in course reflect an important novelty in international markets—commercial demand for sustainably produced products. It is probably less important that current demand for sustainable timber is limited, and that current supply is even more limited, than that the demand has come into being. The incipient green market for sustainable timber is a concrete signal that consumers are in principle willing and able to internalize heretofore externalized costs of global environmental degradation. In this light, policies that tend to increase this market and help to overcome the considerable obstacles to a uniform international system of timber certification appear the most promising.

A. Bans and Boycotts

National campaigns to ban unsustainably produced tropical timber (e.g., in Austria or the Netherlands) have, where proposed to date, been abandoned or compromised. Banning only unsustainable tropical timber is open to the legitimate criticism of discrimination against tropical producers, since much temperate timber is also unsustainably produced and causes ecologically significant damage. Import bans are also open to challenge under World Trade Organization rules.

While various recent studies argue that bans are liable to be ineffective since the international timber trade accounts for a limited portion of timber production globally, this argument fails to consider the disproportionate environmental impacts of the production of timber from particular key species or of the timber trade in particular countries. The environmental impact of mahogany logging in the Brazilian Amazon, as a catalyst to deforestation, is far greater than the aggregate value of mahogany production would lead one to believe. In addition, timber exports from such countries as Indonesia or Malaysia, which export more of their production than the average, have correspondingly greater impacts. In these cases, effective bans would in all probability have positive environmental effects. The problem of substitution by other environmentally damaging products (say of Indonesian luan by Canadian spruce) has no simple solution. A rigorous ban of unsustainable timber consumption generally would be impossible under present circumstances since a sufficient supply of sustainable wood does not exist. Furthermore, it is unlikely that adequate political will exists in the U.S. to achieve even targeted bans of particular species or of exports from particular countries. Even limited bans could entail WTO challenges and possible bilateral trade retaliation. A national ban or boycott, even if it targeted the most destructive practices or locations, has something of the quality of an ICBM as an instrument of policy; Once launched, nothing more drastic remains in the arsenal. Like the ICBM, national bans are probably more effective as a deterrent than as a weapon to use.

Nonetheless, bans and boycotts have provided critical impetus to action on deforestation, and they have made a crucial contribution to creating consumer consciousness on the issue in the U.S. and Europe. State and local tropical timber bans in Germany and in the U.S. have provided an irreplaceable incentive for producer and consumer governments and firms to take up certification. Wherever possible, further state and local bans can continue to provide incentives to action. A local or even state-level ban on unsustainable timber, or on timber from old-growth forests, could be feasible, since sufficient supply of sustainable or at least plantation-grown timber could be found to meet demand at this level. It is true that

banning tropical timber in, for example, a U.S. county is just as discriminatory as a national boycott, and the U.S. government could be held accountable before the World Trade Organization (WTO) for the county's action (GATT, Article XXIV:12).¹⁵⁹ But there are numerous instances of municipal and local bans and boycotts of tropical timber in Europe and the U.S. that in practice have not provoked complaints before GATT or the WTO.

B. Tariffs, Taxes, and North-South Compensation

Developing countries, especially tropical timber exporters, have long held that escalating tariffs on wood products exported to developed-country markets impede their ability to develop value-added processing industries and unfairly limit their access to northern markets. "Escalating tariffs" means tariffs that increase with the degree of processing. Log export bans or export taxes are generally justified as a means of compensating wood processors for tariff barriers they face in developed-country markets, and as a means of furthering the development of the processing industry. Such escalating tariffs may have the environmentally negative consequences of encouraging raw log exports and stimulating excessive logging. However, a number of factors (the role of non-tariff barriers, the comparative advantage of newly industrialized countries in wood processing industries) complicate efforts to determine what the environmental effects of escalating tariffs are.¹⁶⁰ From an equity standpoint, however, reducing or eliminating escalating tariffs makes sense, and doing so would in all probability remove an obstacle for northern governments in negotiating international forest policy issues, since the tariffs have become a point of contention.

Various proposals have also been floated to create taxes or timber surcharges in order to compensate developing countries for the costs of implementing sustainable forest management. Taxing tropical imports to the U.S., Europe, and Japan by one percent to three percent would, according to one study, raise some \$31 to \$94 million annually. More could be raised by taxing all timber sold in consumer countries.¹⁶¹ In the present political climate of the United States, the latter proposal is orders of magnitude less feasible than a national ban on unsustainably produced timber. Taxing only tropical timber is equally as discriminatory as selective tropical timber bans. Other proposals, such as marketable forest protection and management obligations (FPMOs, championed by Resources for the Future forester Roger Sedjo), would create more complex systems of international compensation for forest protection. FPMOs propose "marketable" obligations based in a voluntary international agreement and allocated on the basis of GNP and forest area. Countries with little forest and high GNP would then be constrained to obtain "excess" obligations from countries with much forest and less GNP. While this proposal has the appeal of creating an equitable market-like scenario it presupposes the willingness of northern countries to voluntarily sign up for presumably substantial north-south resource transfers. In the present U.S. political context, this seems unlikely.

More generally, north-south compensation mechanisms for forest protection have the disadvantage that they propose government-to-government transfers. The actual agents of deforestation are seldom governments; rather, they are individuals and firms. While restrictions on forest use may deprive governments of revenue or foreign exchange, those most directly affected are the individuals and firms that use forests. Compensation to governments may not reach the actual economic actors or may reach them only circuitously and inefficiently. The prospect of signaling the economic actors directly—e.g., through timber certification—thus promises greater efficiency.

C. Timber Labeling

The prospect of a "green market" for timber has, over the last decade, captured the imagination of activists and policymakers alike. Such a market would reward sustainable producers by paying a premium or increasing market share and so eventually substitute current resource mining practices with sustainable forest management on a voluntary, market-driven basis. At present count, seven national timber certification programs are in one stage or another of preparation. In addition, criteria are being developed for sustainable forest management or for environmental labeling by the ITTO, UNCTAD, UNDP, FAO, and ISO. The FSC has elaborated standards for certification programs, the African Timber

Organization has proposed regional certification, and there are a number of NGO and private certification programs. Related discussions are taking place in the UNCSO, UNDP, and the OECD. While virtually all actors agree that certification will be best implemented through a uniform multilateral standard, a standard general enough to be applicable across global forest types and ecosystems will virtually by definition also be open to divergent interpretations by divergent interests.¹⁶² The FSC's effort to define criteria for certifying certification programs is perhaps the most ingenious solution to this problem to date and merits support.

Equally important is the broader problem of harmonization of standards. The proliferation of guidelines, criteria, standards and programs threatens a proportional proliferation of labels, making confusing or contradictory claims and consequently undermining the credibility of certification. If this happens, the value of certification in general will be severely reduced if not eliminated, since consumers will buy sustainable timber only if they believe that it is what it claims to be.

The best, and probably only, remedy for consumer skepticism is consumer education. If consumers in major markets have information on the options before them in the market place, they will be able to evaluate their choices and better make judgments about competing eco-labeling claims. The starting point for effective consumer education is to provide information at the point of sale that links timber products to their production process. Identification of timber and wood products by country of origin and species would provide minimal information as a first step toward a broader stream of consumer information. In this sense, timber labeling is not a counter-proposal to certification or an alternative to it, but an independent step that can counteract the serious risks of conflicting claims in certification while it helps to increase the public consciousness that is the basis of certification. Since the current predicted value of the "green premium" to developing countries for timber certification is small and since loss of credibility to consumers is the greatest potential threat to certification programs, timber labeling should be understood as a complementary precondition to successful certification.

Timber labeling would in fact augment the impetus to serious discussions about certification. Scientists, environmentalists, and the media have provided the public with sufficient information on the links between timber consumption and deforestation for consumers to create the green niche market that currently exists. Exporters and timber producers have frequently countered environmentalists' claims. Labeling will not favor either side in the debates over deforestation and sustainability, which will certainly continue. Nor will it contribute directly to defining what constitutes sustainable management of forests. But it will allow consumers to better educate themselves and make their preferences known more effectively in the market place.

Lack of information on what is available in the marketplace has probably limited the effectiveness of bans and boycotts, and it has at times frustrated state and local legislative initiatives. Labeling would thus allow consumers who wish to do so to avoid purchasing the most notoriously unsustainable timber species or timber from the countries with the most predatory logging practices. Labeling would make NGO-driven campaigns more effective. In practice, labeling would most likely lead to some initial decline in demand for tropical hardwoods and for Canadian exports and a corresponding increase in demand for domestic timber in the U.S. or possibly for plantation-grown timber, depending on the form of labeling adopted. The small supply of sustainably produced wood (e.g., from the sources of Ecotimber International) would likely sell at an increased premium.

But all countries and firms would have equal opportunities to defend their own practices before the public and indeed to formulate and publicize credible plans for sustainable management. Certification efforts would gain through growing consumer awareness, through consumers' increased self-confidence in their ability to make informed judgments on the environmental costs and benefits of market choices, and through increased incentives for the most unsustainable producers to save or gain market share by investing in sustainable management. As long as entire markets are not denied to tropical producers, the risk of wholesale diversion of trade to Asian or southern markets would be lessened. In this way, market signals to producers could begin to increase the presently negligible quantities of sustainably produced timber on the market. While the green market does not at present exist in Asian consuming countries

or in the South, it did not exist in Europe and the United States until very recently. The best way for this market to grow internationally is for it grow where it already exists first—in the U.S. and Europe.

In addition, labeling would be an inexpensive means of testing, developing, and improving tracking systems necessary to put certification schemes into operation. (See below, Timber Labeling by Country of Origin and Species).

Labeling can be designed to be completely compatible with international trade regulations. The degree of compatibility, or conflict with WTO rules depends on the specific form of labeling adopted, especially on the extent to which similar products are subject to equivalent requirements regardless of national origin. We discuss below several options, their probable consequences with relation to the WTO, and their potential effects as tools for environmental consumer education.

1. Mark of Origin

Both WTO and previous General Agreement on Trade and Tariffs (GATT) regulations explicitly accommodate national provisions for a Mark of Origin on imported products (Article IX, GATT).¹⁶³ This consists of a label identifying the country of origin of the product. According to United States Trade Representative officials, a mark of origin on all timber imported into the United States would have no consequences for the WTO, since domestic timber would by default be equally identified, and there would be no discrimination among importers. The WTO defines the point of origin as the “country where the good has been wholly obtained, or, when more than one country is concerned in the production of the good, the country where the last substantial transformation has been carried out.” (WTO, Agreement on Rules of Origin, Article 9.1 (b.))¹⁶⁴ Thus, timber harvested in Irian Jaya and made into a table in South Korea would be identified as originating in South Korea. From an environmental standpoint this is an inadequate solution, since it restricts the information that countries can require on the ecological origin of imported processed wood products. Furniture and manufactured products account for about 40 percent of the dollar value of tropical wood imports to the U.S. and are the most readily visible of tropical imports in the retail market. Thus, an intermediate goal for greening the WTO would be to change Mark of Origin language to explicitly permit the inclusion of information on the ecological origin (as opposed to “country of last substantial transformation”) of raw materials in the Mark of Origin. Nonetheless, the Mark of Origin as presently construed has the advantages of being explicitly sanctioned by the WTO and therefore immune to challenge; of providing some information where none exists; and being extremely simple and inexpensive. Furthermore, since domestic industry, as opposed to importers, would be required to do nothing under a requirement for a Mark of Origin for imported timber, the possibility of industry opposition is lessened.

2. Timber and Wood Product Labeling by Country of Origin and Species

To the extent that it applied to all timber and wood products equally, a mandatory requirement for labeling timber and wood products by country of origin and species would also have no effect with regard to WTO rules. From an environmental standpoint, such a requirement would provide a better basis for consumer education because timber would be identified by its actual country of origin for all products. Identification of species would in some cases help interested consumers to identify the site where the wood originated and to understand its production processes more precisely. For example, Brazilian mahogany occurs only in certain parts of the Amazon and there are particular problems associated with its extraction, as discussed above in Section III of this report. Mahogany from Mexico’s Yucatan peninsula, on the other hand, is generally considered as close an approximation as exists to sustainably produced mahogany. Species identification would also provide a basis for consumer education on the production processes and their environmental impacts within the United States.

In hearings before the Consumer Protection Subcommittee of the Commerce Committee of the U.S. House of Representatives on proposed U.S. timber labeling legislation in 1991,¹⁶⁵ industry representatives argued that the proposed tropical timber labeling law would be onerously expensive and unworkable. However, as noted above (see Existing Tracking Systems), U.S. Customs currently collects

most of the information necessary for labeling along these lines, and the harmonized code system could easily be adapted to accommodate species that are not currently listed. While little work has been done on the costs of labeling as such, costs of certification (including inspection, tracking and monitoring) are estimated to range between 30 and 60 cents (U.S.) per hectare in developed countries.¹⁶⁶ At this rate, it would cost Canadian Pacific (CP) Forest, with the largest timber holdings among North American pulp and paper companies,¹⁶⁷ between \$3,244,000 and \$6,488,000 to certify production from its 26 million-plus acres of timber holdings. This represents, at most, 0.3 percent of CP's annual sales. Labeling alone, only part of the certification process, would be much less expensive. While certification costs might be higher in tropical countries—perhaps 5-10 percent of current logging costs—labeling alone could be done so as to entail no additional cost to tropical exporters (who already provide the requisite information to importers) and would have minimal cost impacts on importers and vendors. Labeling for country of origin and species would serve as a simpler and far cheaper test case for the working out of operational issues that bedevil certification schemes (e.g., accurate monitoring of chain of custody, products composed of multiple species, products processed in third countries).

The disadvantage of labeling by country of origin and species is that some sectors of the timber industry are may oppose it. However, major retailers such as Home Depot actively support consumer information. Requiring labeling of only imported wood would be an open challenge to WTO rules as preferential treatment for national products. While the possibility of WTO challenges is not in itself grounds for rejecting the option, there are environmental reasons to favor labeling of all timber—particularly in the U.S. where the environmental impacts of the forestry sector vary greatly according to the ecosystem in question.

Other labeling schemes can be imagined. For example, timber might be identified according to whether it came from old-growth, secondary or plantation forest. Such a scheme might appear to offer more relevant environmental information to consumers than country of origin and species identification. But it would require the creation of international standards for the forest categories in question, agreement on which forests fit in which category, and extensive monitoring. Such issues must ultimately be dealt with if global standards for certification are to be achieved, but for the present the advantages of a simpler country and species label are great.

D. Conclusion

Of the policy options examined above, timber and wood product labeling offer the greatest potential at the least cost to help create market incentives in the immediate future for eventual sustainable forest management on a global scale. On the international level, making incipient market demand for sustainability grow will require that consumers have access to information on the ecological effects of their purchases. In this light, WTO and other international trade regulations with respect to labeling should make explicit provisions to allow informational labeling of traded goods by their ecological origin. Changes in WTO Mark of Origin language to allow identification of the origin of raw materials would be useful starting point, and should be consistent with GATT/WTO General Exceptions for protection of animal and plant life and the conservation of exhaustible natural resources (Article XX (b), (g)).¹⁶⁸

The critical opportunity in the U.S. is to provide basic information to consumers in the world's largest market for wood and wood products where virtually none now exists—information enabling consumers to evaluate the consequences, positive and negative, of their actions in the marketplace. Timber labeling, as a means of capitalizing on and boosting the existing trend toward green markets, is the simplest, least costly, and immediately available step to help transform the U.S. market from part of the problem of global deforestation into part of the solution.

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- ² Herb Hammond, *Seeing the Forest Among the Trees* (Vancouver: Polestar, 1991).
- ³ Norman Meyers, "The World's Forests: Problems and Potentials," *Environmental Conservation* 23 2 (1996).
- ⁴ World Conservation Monitoring Center (WCMC) *Global Biodiversity: Status of the Earth's Living Resources*, ed. Brian Groombridge (London: Chapman and Hall, 1992).
- ⁵ Daniel Nepstad and Paulo Moutinho, *The Role of Brazilian Amazonia in Global Climate Change and Biodiversity Losses: What do we know? What can be done?* (USAID/Brazil Environmental Program Workshop, Brasilia March 20-23, 1996).
- ⁶ E.A. Serrao, D. Nepstad and R. Walker, "Upland Agricultural and Forestry Development in the Amazon: Sustainability, Criticality and Resilience," *Ecological Economics*, 18 (1996) 3-13.
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- ¹⁰ FAO 1992, 1993, *ibid*; WCMC, *Global Biodiversity*, 1992. The World Conservation Monitoring Centre reported a deforestation figure of 169,000 km² per year, or 0.9 percent of tropical forest, based on a preliminary version of the FAO forest resources assessment, whereas FAO's final report was revised downwards, giving the figure of 154,000 km²/year, or 0.8 percent of total tropical forest.
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¹⁴ Bruce Rich, *Mortgaging the Earth: The World Bank and the Global Environment*. (Boston: Beacon Press, 1995).

¹⁵ By “sustainable management” for forests, we understand, as general principles, management that permits yields to be maintained indefinitely; that preserves ecosystem services (watershed protection, soil conservation, maintenance of regional climate); that conserves biological diversity; and that contributes to the well-being of forest communities and populations directly dependent on forests.

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¹⁷ Society of American Foresters, “Forest Certification: An SAF Study Group Report,” *Journal of Forestry* 93 (April 4, 1995).

¹⁸ Adalberto Verissimo et al., “Extraction of a High-Value Natural Resource in Amazonia: The Case of Mahogany,” *Forest Ecology and Management* (in press 1995).

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²¹ David J. Brooks, *U.S. Forests in a Global Context*, General Technical Report RM.-228 (USDA Forest Service , 1993).

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²³ Ibid.

²⁴ Ibid.

²⁵ Jonathon Weiner, *The Next One Hundred Years: Shaping the Fate of Our Living Earth* (New York: Bantam Books, 1990).

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⁴¹ Cynthia West, Personal communication, December 8, 1993.

⁴² Craig Adair, American Plywood Association, Personal communication, 15 December 1993.

⁴³ "Papermaker Tests Brazilian Woodchips," Environmental News Network, 21 February 1994.

⁴⁴ Popular accounts to the contrary, the overwhelming consensus of the scientific community is that deforestation and species extinction constitute a major global environmental threat. For a detailed account of a popular book's efforts and misinterpretations of the scientific evidence, see *A Moment of Truth: Correcting the Scientific Errors in Gregg Easterbrook's A Moment on the Earth*, Environmental Defense Fund, 1995.

⁴⁵ ^aResults from the 1980 and 1990 FAO Forestry Assessments of the Tropical Zone indicate an average increase in deforestation rates in 52 tropical countries from 0.6 percent to 1.2 percent. See Edward Barbier et. al., *Environmental Effects of Trade in the Forestry Sector*, OECD, 1991.

^bT. Allan and J.P. Lanly suggest that the rate of increase may be closer to 50 percent due to underestimates in the earlier FAO study. See David J. Brooks *U.S. Forests in a Global Context*, U.S.F.S., 1993.

⁴⁶ Food and Agricultural Organization, *The Forest Resources of the Tropical Zone by Main Ecological Regions* (Rome: FAO, 1992) and Food and Agricultural Organization, *Forest resource assessment 1990, Tropical Countries*. FAO Forestry Paper 112 (Rome: FAO, 1993). FAO deforestation figures refer to change of land use with depletion of tree crown cover to less than 10 percent. Forest degradation, which reduces biodiversity and fragments habitat, is not included in the figures.

⁴⁷ Brooks, *U.S. Forests in a Global Context*.

⁴⁸ WCMC, *Global Biodiversity*, 1992.

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Appendix:
Figures 1-18

US Per Capita Consumption of Timber Products

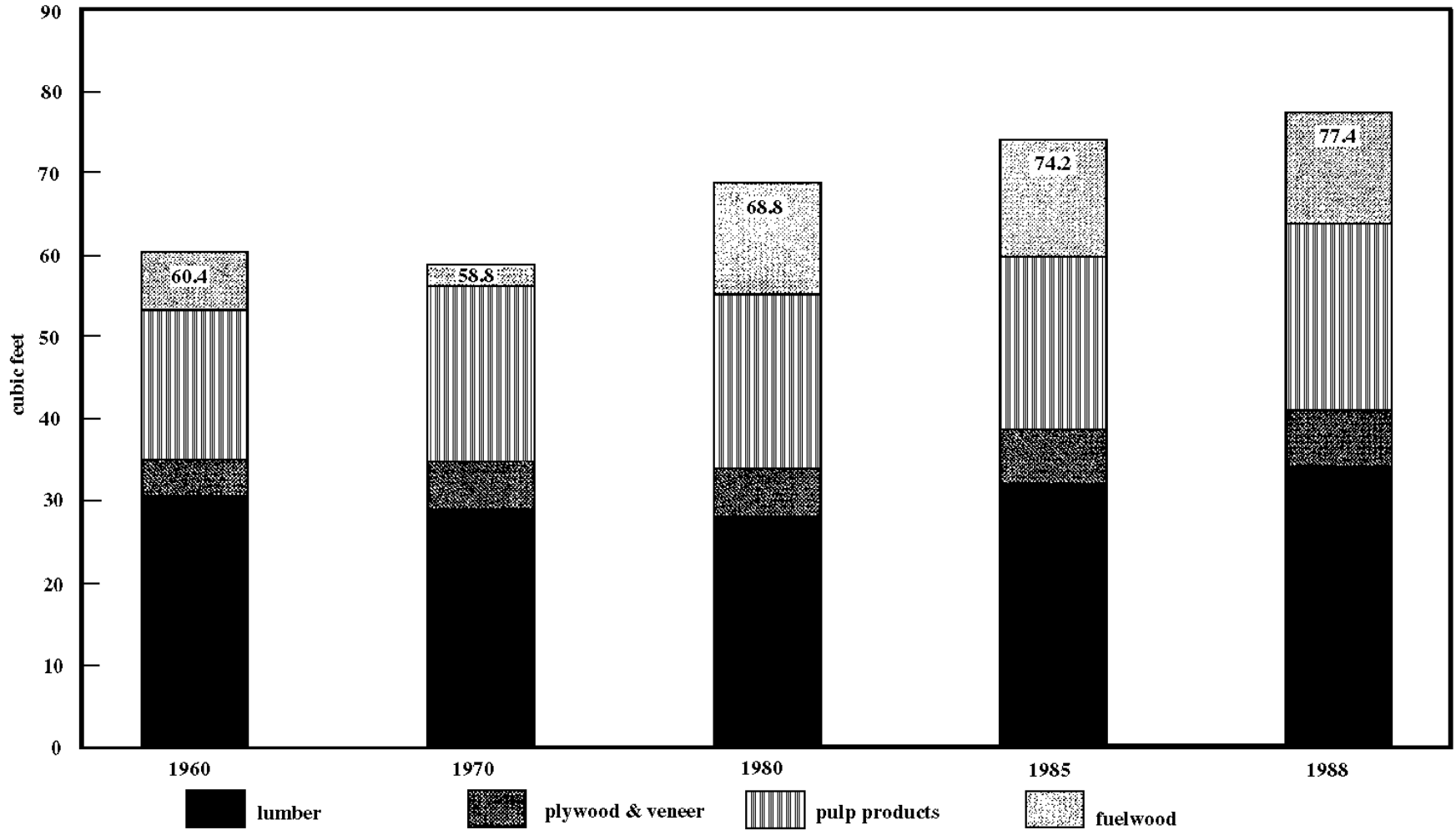


FIGURE 1

source: figures exclude consumption of other industrial products, (i.e. cooperage logs, poles and piling, fence posts, etc.)

source: Alice H. Ulrich. US Timber Production, Trade, Consumption, and Price Statistics 1960-88, USDA Forest Service Misc. Pub. No. 1486, Dec 1990.

US Expenditures for New Construction Related to GNP and Personal Disposable Income 1960-1988

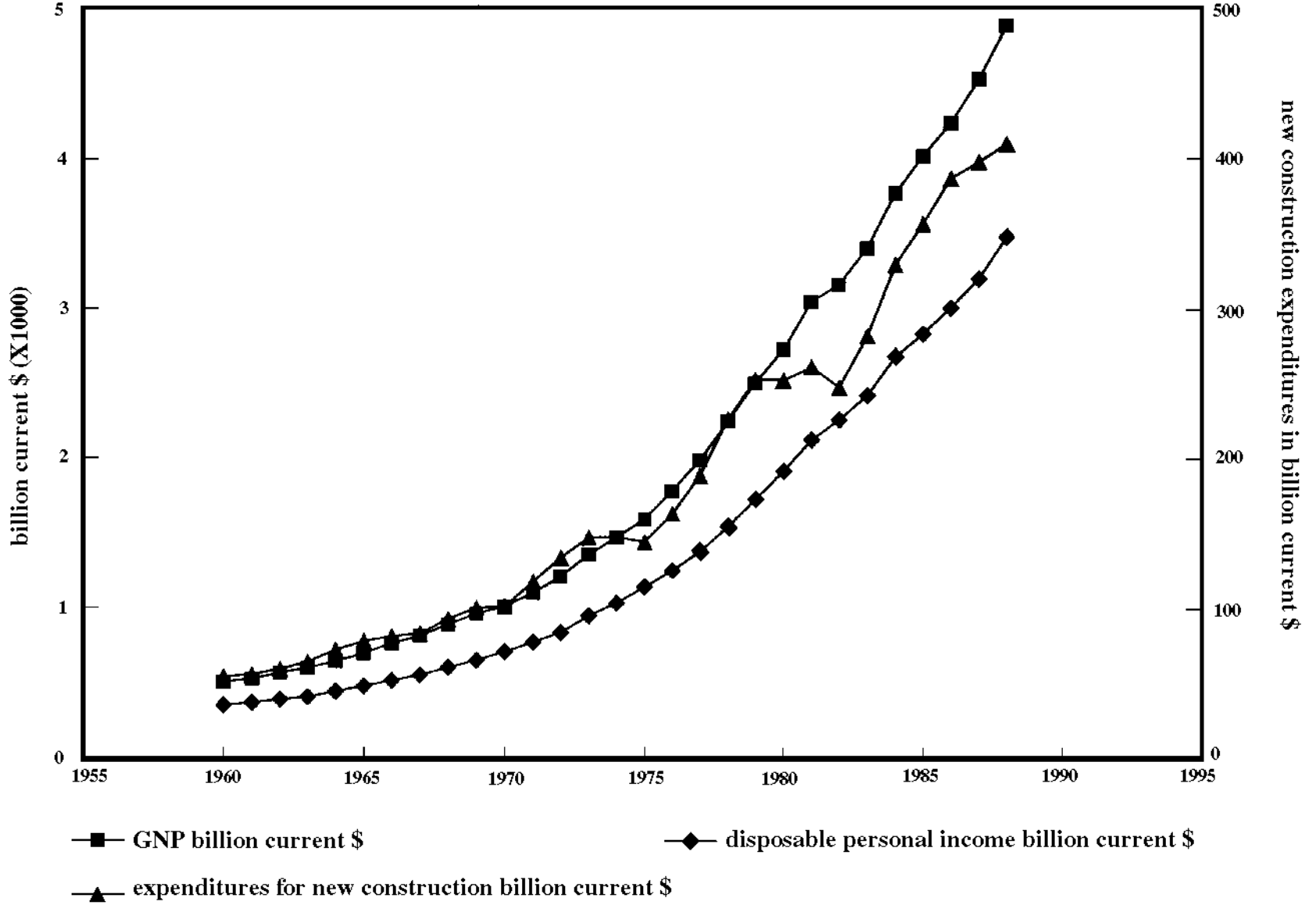


FIGURE 2

source: Alice H. Ulrich. US Timber Production, Trade, Consumption, and Price Statistics 1960-88, USDA Forest Service Misc. Pub. No. 1486. Dec 1990.

US Consumption and Imports of Timber: 1960-1988

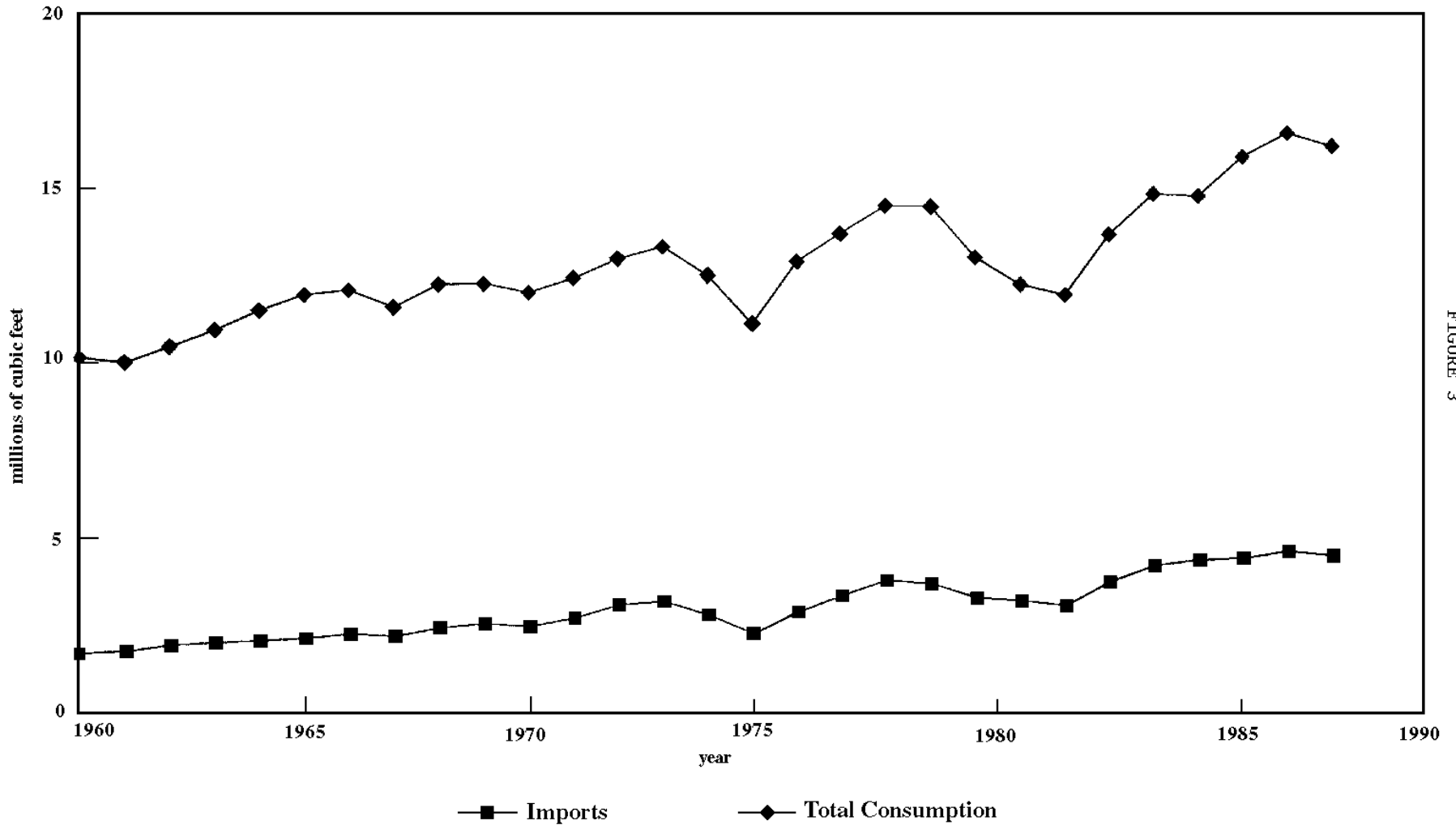


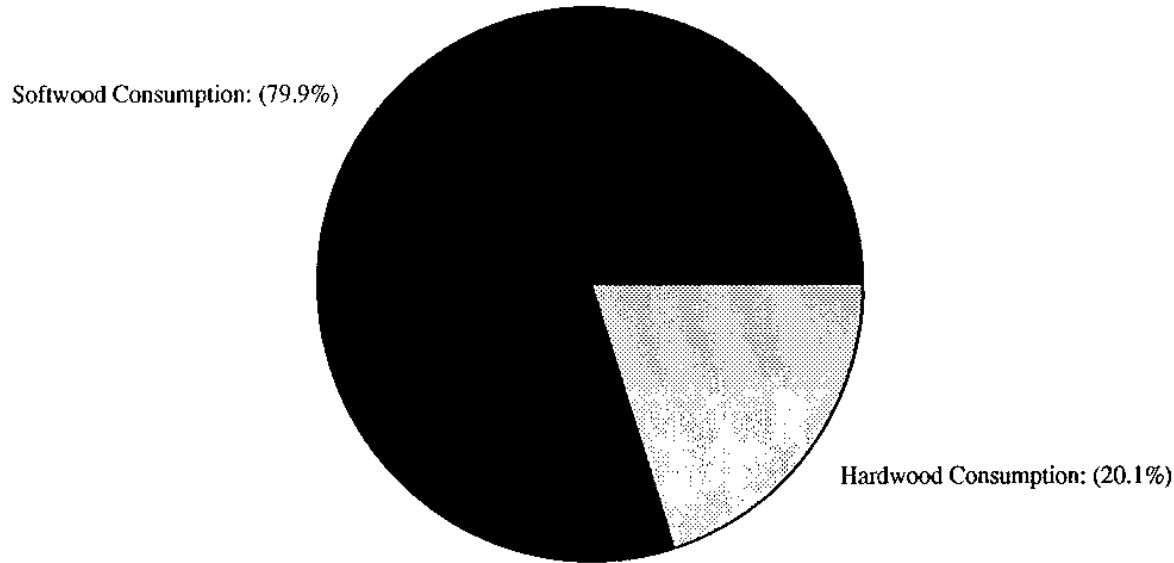
FIGURE 3

Figures include industrial roundwood only, (fuelwood excluded.)

source: Alice H. Ulrich. US Timber Production, Trade, Consumption, and Price Statistics 1960-88, USDA Forest Service Misc. Pub. No. 1486. Dec 1990.

Total US Consumption of Domestic and Imported Timber and Timber Products, 1988

Total Consumption: 16,230 million cubic feet, (roundwood equivalent)

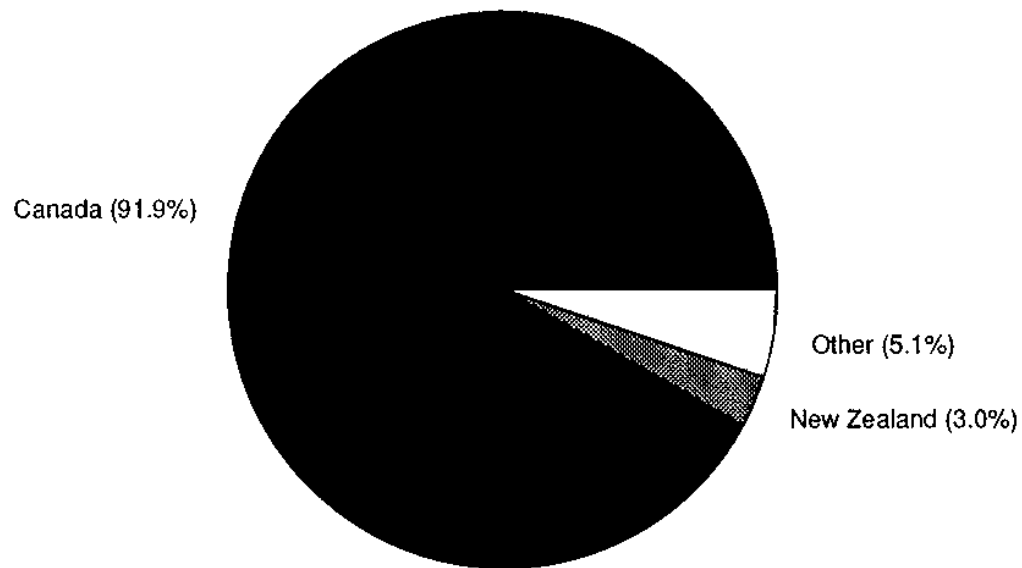


 of which, 30% is imported  of which, 12% is imported

source: Alice H. Ulrich. US Timber Production, Trade, Consumption, and Price Statistics 1960-88, USDA Forest Service Misc. Pub No. 1486, Dec. 1990.

1992 US Softwood Log Imports by Value

Total Value of Softwood Log Imports: \$18 million



■ Canada ▨ New Zealand □ All Other

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 US Softwood Lumber Imports by Value

Total Value of Softwood Lumber Imports: \$3,296 million

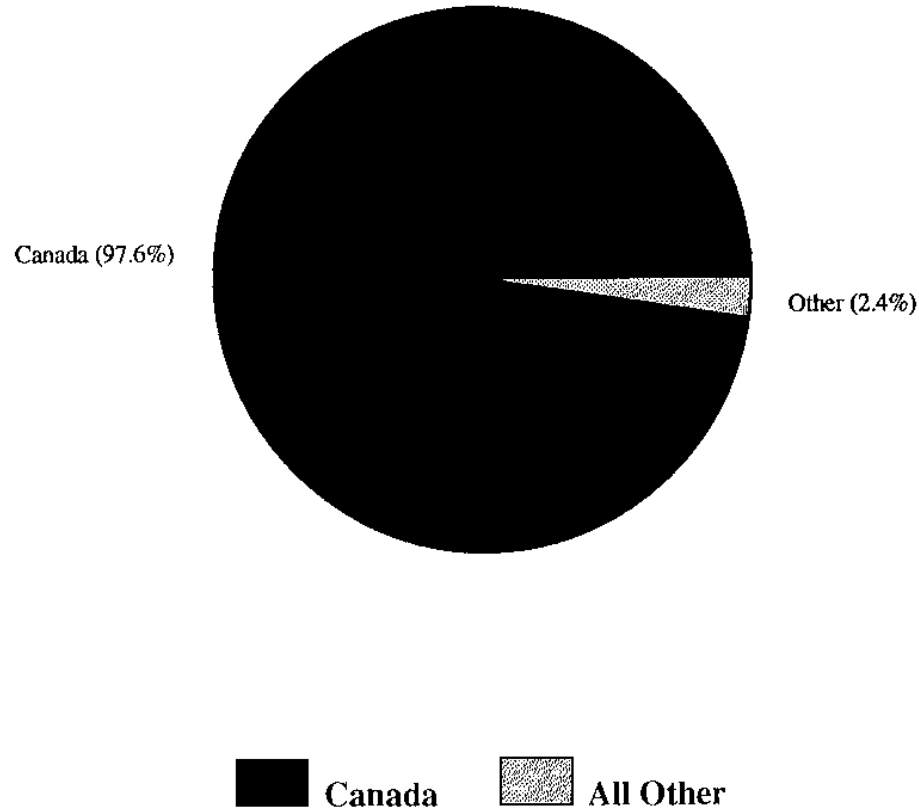
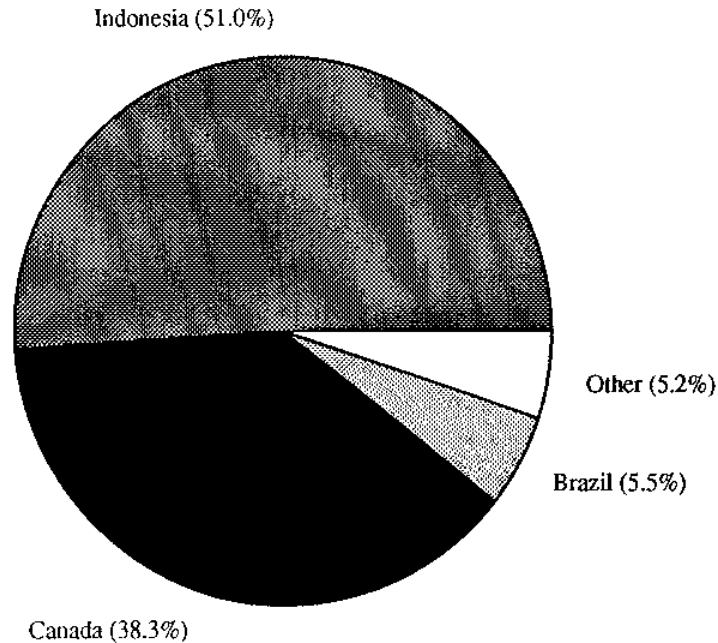


FIGURE 6

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 US Softwood Plywood Imports by Value

Total Value of Softwood Plywood Imports: \$15 million



 **Indonesia**  **Canada**  **Brazil**  **All Other**

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 US Softwood Veneer Imports by Value

Total Value of Softwood Veneer Imports: \$35 million

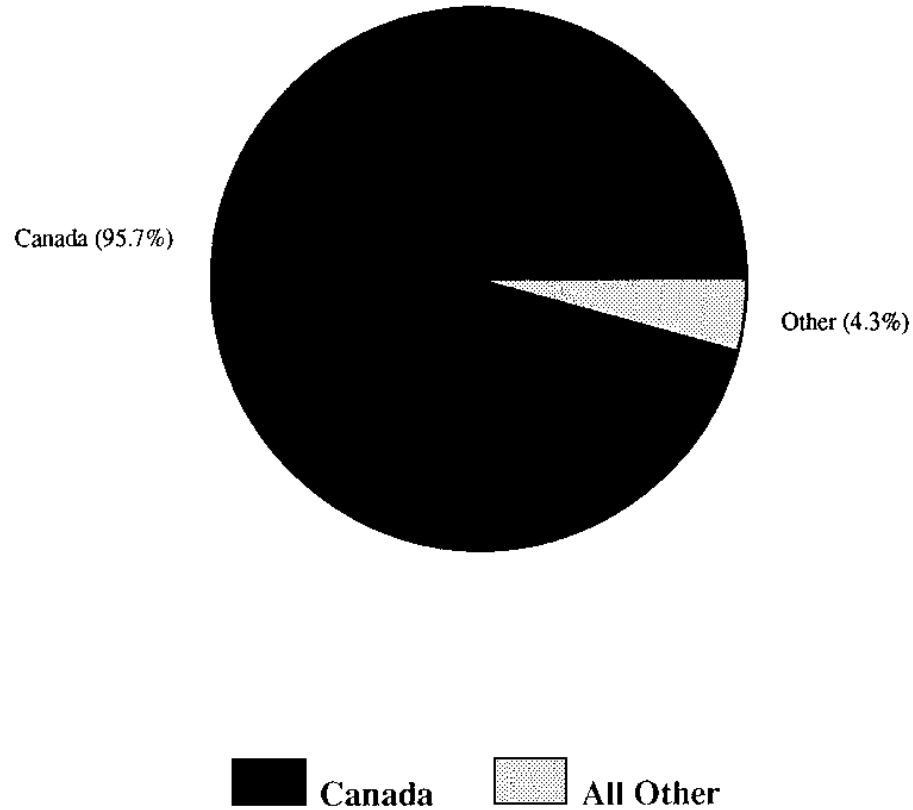


FIGURE 8

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

Common End-Uses For Softwood Timber and Timber Products in the US

Representing 1986 Consumption of 13.5 billion cubic feet

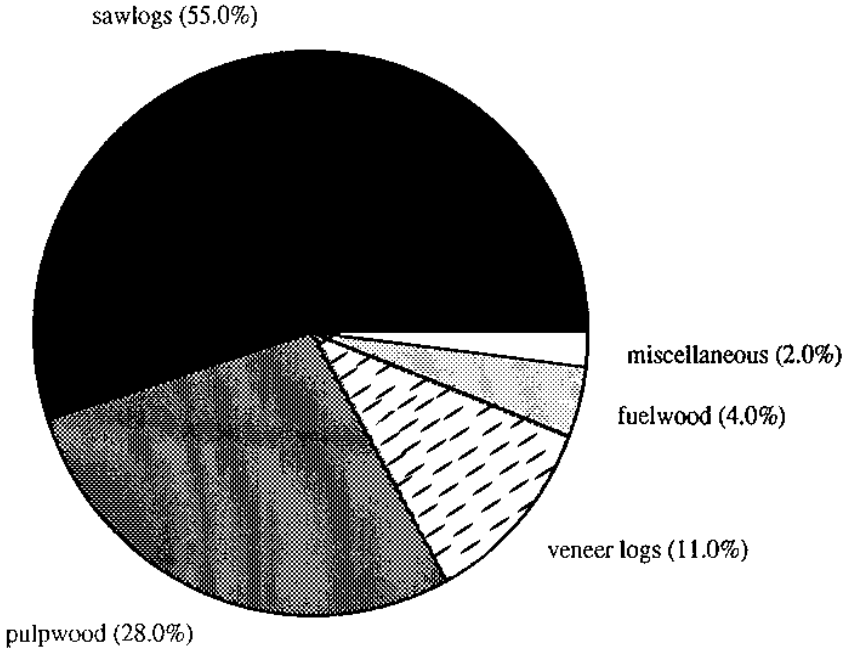


FIGURE 9



source: American Forest Council. The American Forest: Facts and Figures 1991, Feb. 1992.

1992 US Imported Hardwood Consumption by Value

Total Value of Hardwood Imports: \$911,000,000

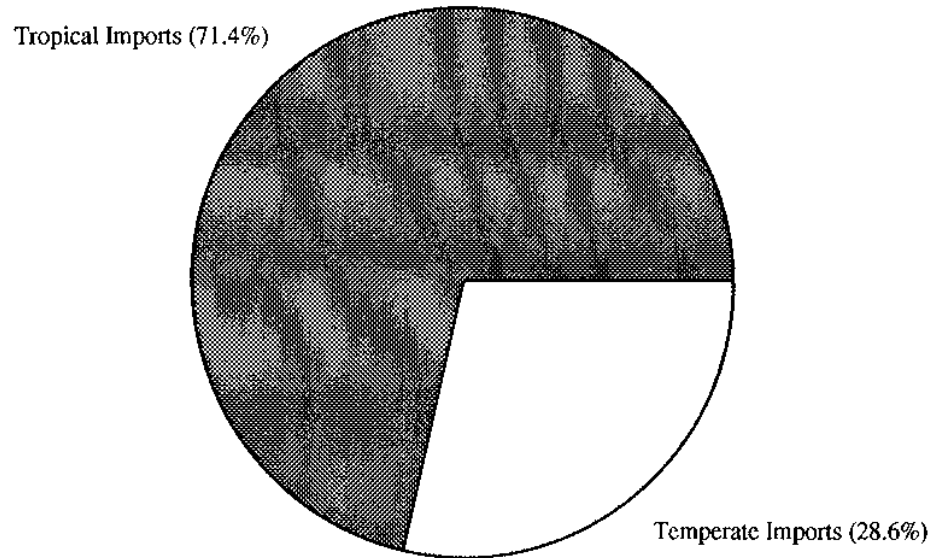


FIGURE 10



Tropical Hardwood Imports



Temperate Hardwood Imports

Common End-Uses For Hardwood Timber and Timber Products in the US Representing 1986 Consumption of 6.3 billion cubic feet

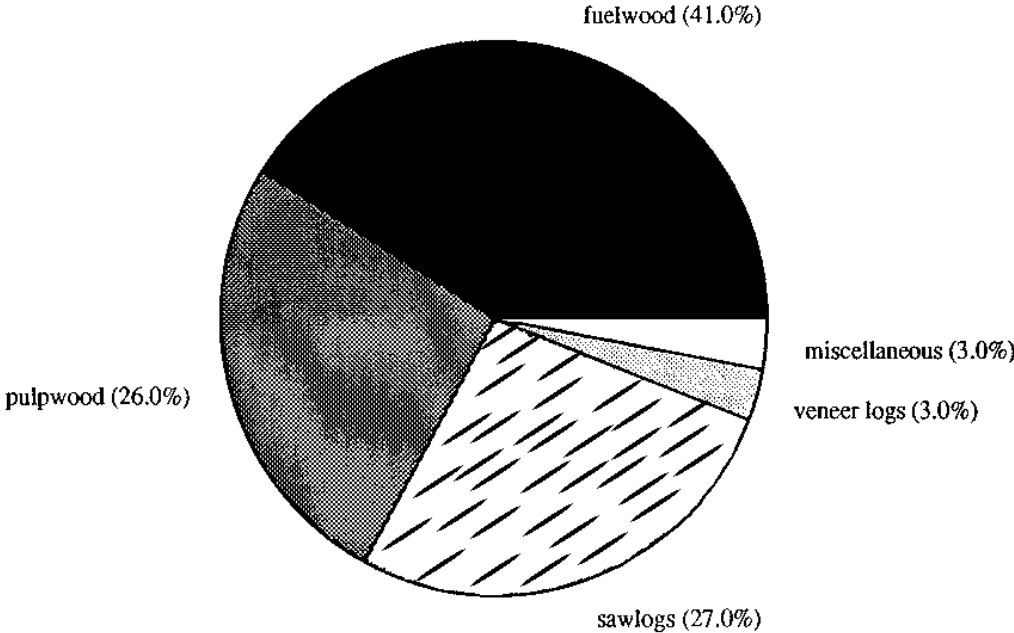


FIGURE 11

Fuelwood **Pulpwood** **Sawlogs** **Veneer Logs** **Miscellaneous**

source: American Forest Council. The American Forest: Facts and Figures 1991, Feb. 1992.

1992 US Hardwood Log Imports by Value

Total Value of Hardwood Log Imports: \$6 million

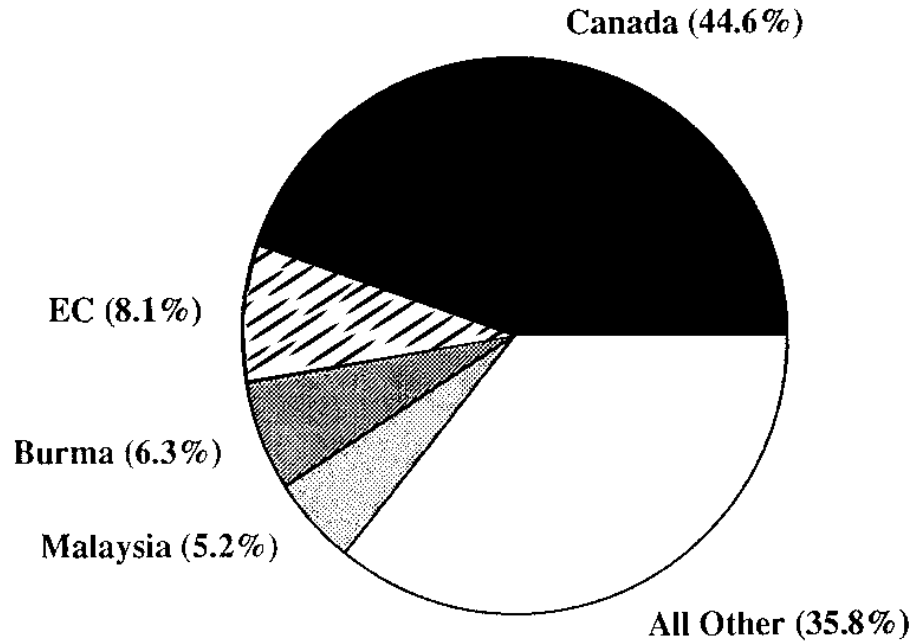


FIGURE 12

Percentage of Hardwood Log Imports which are Tropical: 29.2%

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 US Hardwood Lumber Imports by Value

Total Value of Hardwood Lumber Imports: \$176 million

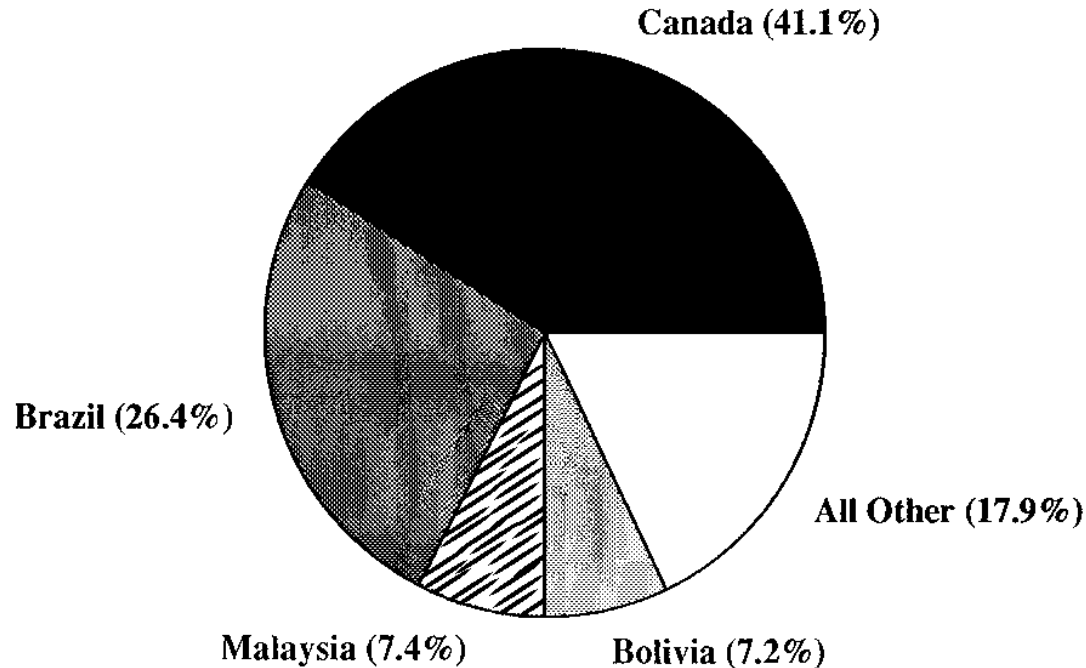


FIGURE 13

Percentage of Hardwood Lumber Imports which are Tropical: 58.2%

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP1-93, , March 1993.

1992 US Hardwood Plywood Imports by Value

Total Value of Hardwood Plywood Imports: \$559 million

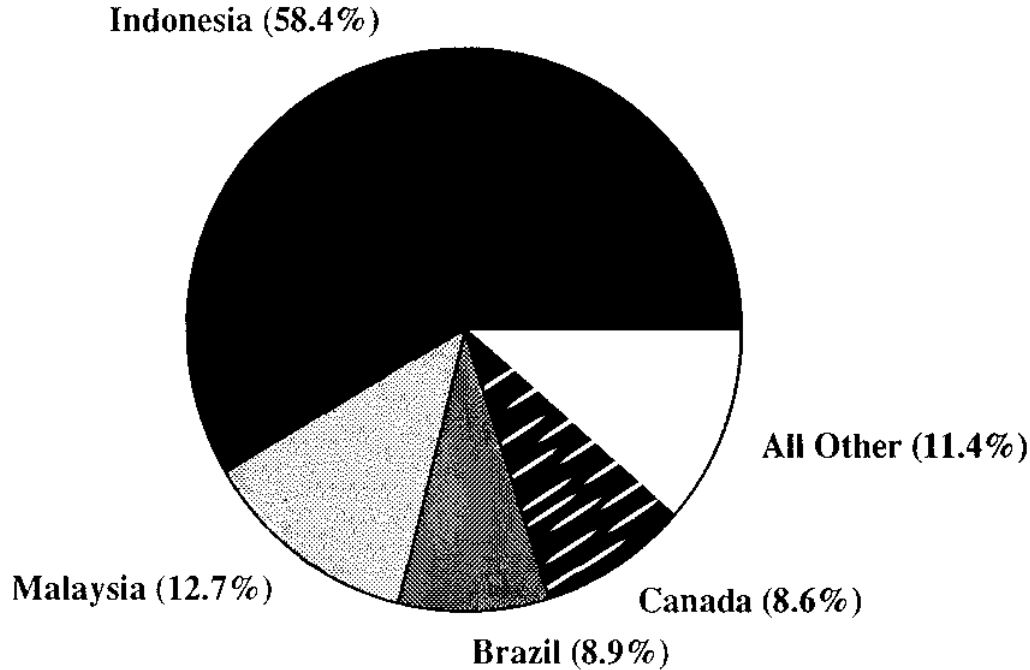


FIGURE 14

Percentage of Hardwood Plywood Imports which are Tropical: 89.6%

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 US Hardwood Veneer Imports by Value

Total Value of Hardwood Veneer Imports: \$170 million

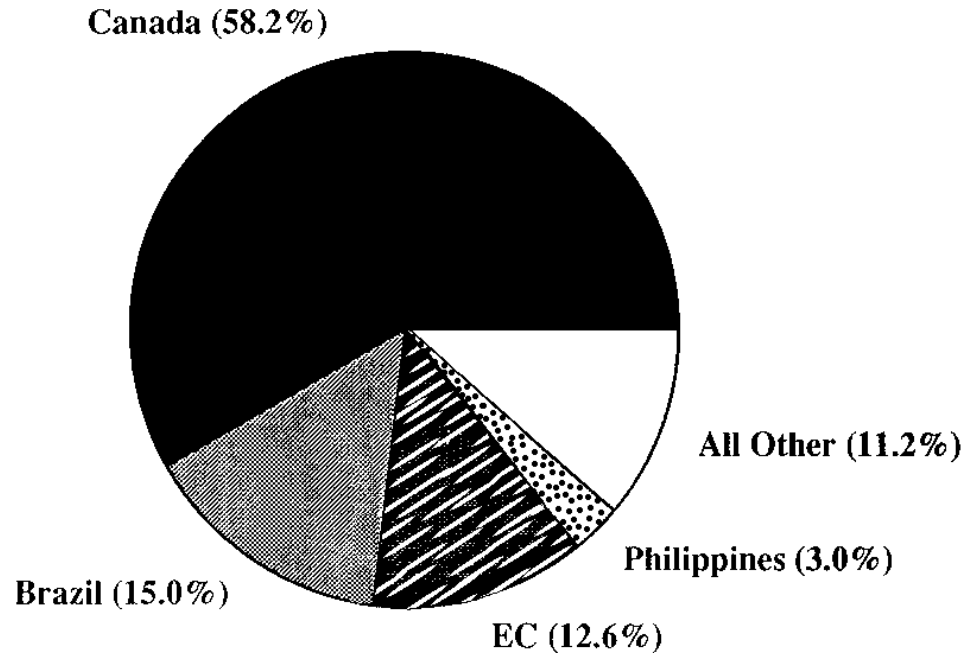


FIGURE 15

Percentage of Hardwood Veneer Imports which are Tropical: 26.6%

source: Wood Products Trade and Foreign Markets, USDA Foreign Ag. Service, Circular Series WP 1-93, March 1993.

1992 Total US Tropical Timber and Value-Added Timber Product Imports by Value

Total Value of Imports: \$1,048,621,000*

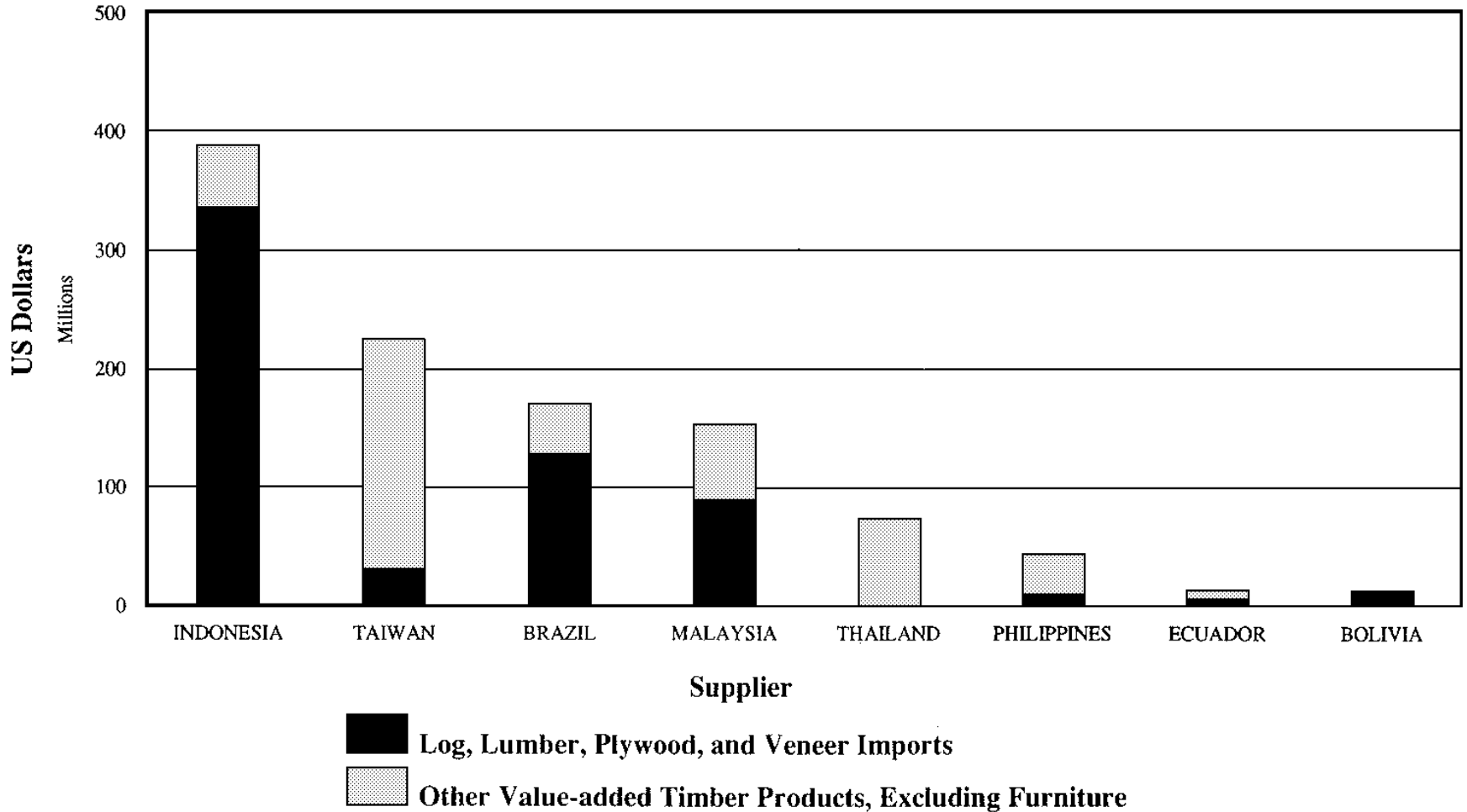


FIGURE 16

* excluding furniture

source: compiled from US International Trade Commission Statistics, 1993.

Figure 17

U.S. Tropical Log Importers: Top Supplier-Countries

Commodity: Logs

Country	1989 Quantity (in cubic meters)	1992 Quantity (in cubic meters)	1992 Value (in U.S. dollars)
Brazil	155	1,986	\$ 1,107,509
Honduras	1,163	2,634	425,269
Thailand	0	41	82,178
Ivory Coast	41	37	55,645
Peru	1,100	49	44,609
Total			\$ 1,715,210
Total of All Tropical Log Imports: 1992			\$ 1,746,984
Percent of Total Represented by Top Five Countries			98%

Source: Compiled from U.S. International Trade Commission Statistics, 1989-1992

Figure 18

U.S. Imports of Tropical Lumber: Top Five Supplier-Countries

Commodity: Lumber

Country	1989 Quantity (in cubic meters)	1992 Quantity (in cubic meters)	1992 Value (in U.S. dollars)
Brazil	169,910	148,356	\$ 50,402,745
Malaysia	20,545	34,934	13,158,650
Bolivia	27,906	21,981	12,757,435
Philippines	27,776	10,404	4,596,922
Ecuador	16,066	10,095	3,363,720
Total			\$ 84,279,502
Total of All Tropical Log Imports: 1992			\$ 102,369,057
Percent of Total Represented by Top Five Suppliers			82%

Source: Compiled from U.S. International Trade Commission Statistics