



United States  
Department of  
Agriculture

**Forest Service**

Pacific Northwest  
Research Station

General Technical  
Report  
PNW-GTR-538  
June 2002



# **A Comparative Study of Forestry in Finland, Norway, Sweden, and the United States, with Special Emphasis on Policy Measures for Nonindustrial Private Forests in Norway and the United States**

Berit Hauger Lindstad



## **Author**

**Berit Hauger Lindstad** is advisor, Ministry of Agriculture, Forest Department, P.O. Box 8007 Dep., 0030 Oslo, Norway.

Cover photo by Norsk Skogbruk.

## **Abstract**

**Lindstad, Berit Hauger. 2002.** A comparative study of forestry in Finland, Norway, Sweden, and the United States, with special emphasis on policy measures for nonindustrial private forests in Norway and the United States. Gen. Tech. Rep. PNW-GTR-538. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 35 p.

In recognition of the cultural, economic, and ecological importance of forestry in Finland, Norway, Sweden, and the United States, this paper compares forest resource data, ownership patterns, management issues, and the impact the forest sector has on the national economies of these four countries. There is particular emphasis on the analysis of policy measures that affect nonindustrial private forests (NIPFs) in Norway and the United States. This comparison of similarities and differences in the management of NIPFs serves to identify different solutions to common challenges faced by the forest sectors of Norway and the United States.

**Keywords:** Nonindustrial private forests, NIPFs, forest policy, forest regulations, ownership, taxation, economics, Finland, Norway, Sweden, United States, Nordic.

## Foreword

Forests and forest products have a long history of cultural, economic, and ecological importance both in the Nordic countries and the United States. There is an increasing awareness of forestry issues that a single nation cannot effectively address (climate change and biodiversity). Forest-related questions are thus higher on the international agenda. To address this, regional and international initiatives have been taken to help ensure sustainable management of the world's forests.

Awareness of the differences and similarities between regions and countries is important for understanding the variations in current situations and possible effects of various initiatives discussed in regional and international processes. I compare forestry issues in three Nordic countries and the United States to increase the understanding of differences and similarities between and within two broad regions.

Nonindustrial private forests (NIPFs) are important in the Nordic countries and the United States, and they are managed with complex and varied objectives. In this paper, I compare some main characteristics of forestry in Finland, Norway, Sweden, and the United States. I then take a closer look at NIPF owners and policy measures affecting NIPFs in Norway and the United States. Current policies and their effects are described and compared. These initial comparisons illustrate the complexities and challenges associated with ongoing intergovernmental dialogues on forest-related issues. In closing, I give some preliminary conclusions and recommendations for further studies and topics for further investigation.

## Contents

1	<b>Introduction</b>
1	<b>Forest Resources</b>
4	<b>Ownership and Management</b>
6	<b>The Forest Sector in the National Economy</b>
8	<b>Policy Measures Affecting Nonindustrial Private Forests in Norway and the United States</b>
8	<b>The Policy Measures and Their Interaction</b>
9	Regulatory Measures
15	Economic Measures
23	Information and Extension Services
26	<b>Comparison of Policy Measures Affecting Nonindustrial Private Forests in Norway and the United States</b>
27	Evaluations of Policy Measures
28	<b>Closing Remarks</b>
32	<b>Acknowledgments</b>
32	<b>English Equivalent</b> s
33	<b>References</b>

This page has been left blank intentionally.  
Document continues on next page.

## Introduction

This study compares basic forest figures between the United States and the Nordic countries. Forest resource data, ownership patterns, production and management issues, and the importance of forestry in the national economy are described. Regional data for the United States and national data for each of Finland, Norway, and Sweden are compared. The intent is to present a general picture of the differences and similarities between the regions and countries.

## Forest Resources

Table 1 presents the total land area and land use patterns for the Nordic countries and the United States, based on The World Resources Institute et al. (1996), data table 9.1. Land area of the United States is almost 10 times greater than the Nordic countries combined. Land use patterns show significant differences between the countries. Forests and woodlands dominate the landscape in Finland and Sweden but cover less than one-third of the land area in Norway and the United States.

These aggregated numbers hide great regional differences; for example, the extent of forest cover in the United States ranges from 90 percent of the land area in Maine to only 1 percent in the Northern Plains states such as North Dakota and Nebraska. Further, the numbers reflect both the natural conditions and, to some extent, the differences in human-induced land use. For example, the abundance of "other land" in Norway results from large nonproductive mountainous areas, whereas human activity influences the proportion of "cropland and permanent pasture" in the United States. Note that the area under "forest and woodland" in table 1 does not correspond to the area of "forests and other wooded land" in table 2. The differences for Norway and the United States are

**Table 1—Land area and use, 1981-93<sup>a</sup>**

Country	Land area <i>In 1000 ha</i>	Forest and woodland	Cropland and permanent pasture	Other land
		<i>----- Percent of land area -----</i>		
Finland	30 461	76	9	15
Norway	30 683	27	3	70
Sweden	41 162	68	8	24
United States	957 311	30	45	25

<sup>a</sup> Based on The World Resources Institute et al. 1996.

**Table 2—Forest resources, 1990**

Country	Forests and other wooded land	Forests without legal, economic, or technical restrictions on wood production				
	Area	Area	Forest area per capita	Growing stock	Net annual increment	Fellings
	<i>Million ha</i>	<i>Million ha</i>	<i>Ha</i>	<i>- - Million cubic meters over bark - -</i>		
Finland	23.4	19.5	3.91	1 679	69.7	55.9
Norway	9.6	6.6	1.57	571	17.6	11.8
Sweden	28.0	22.0	2.58	2 471	91.0	57.5
United States	296.0	195.6	.78	23 092	763.7	619.6

Source: The UN-ECE/FAO 1990 forest resource assessment, in Metla 1997a.

rather high, pointing to inconsistency in data collection and differences in aggregating and reporting national and international databases. Data inconsistency is a recurring issue in this paper because it makes relevant comparisons more difficult.

Comparable to these national variations, forests and woodlands cover about 40 percent of the global land area according to the United Nations Economic Commission for Europe/ Food and Agricultural Organization (UN-ECE/FAO) forest resources assessments 1990 (FAO 1995). Of this, forests cover about 27 percent (just over 3400 million ha), and other wooded land cover the rest (some 1700 million ha). The total growing stock on forest lands in 1990 was 383 700 million m<sup>3</sup>.

Protected forests and forest withdrawn from production are not easily compared because there are inconsistent definitions and different practical implications of the classification systems. Therefore, the different protection schemes in the four countries result in numbers that are not directly comparable.

According to Finnish Forest Statistics (Metla 1997a), "of the total forested area of 23.0 million ha, 1.2 million ha (5 percent) are nature conservation areas where all forestry activities are prohibited." In Norway, some 0.2 million ha (1.7 percent) of forest lands are strictly protected in national parks and reserves, out of which less than 1 percent is productive forest. This number does not include all forest areas protected because of special environmental or recreational values. Forest areas with restrictions in landscape conservation areas and the forest surrounding the city of Oslo involves another 0.2 million ha. The Forest Act defines forests near the mountains and along the coast as "protection forests," which means forest operations are restricted but not prohibited. Three million ha of these "protection forests" are not included in statistics as protected areas in Norway. According to Swedish forest statistics (Skogstyrelsen 1997) 3.6 percent, or 0.83 million ha, of productive forest land is protected. In the United States, "about 19 million ha of forest land (6 percent of all U.S. forest land) is reserved from commercial timber harvest, in wilderness, parks and other classifications" (Smith et al. 1994).

In general, the area of forests not utilized for timber production, in both the United States and the Nordic countries, is likely to increase because of political protection and economic reasons.

The following discussion is concentrated on forests without legal, economic, or technical restrictions on wood production in the four countries.

The share of forests without legal, economic, or technical restrictions on wood production in 1990 was more abundant in Finland (83.3 percent) and Sweden (78.6 percent) than in Norway (68.8 percent) and the United States (66.1 percent) (table 2). "Forest area per capita" shows a similar pattern, with greater differences between the countries; for instance, Finland has five times more forest per capita than the United States.

Breaking down and comparing the data from table 2 illustrates the current situation and management of wood-producing forests. These numbers, however, represent the average, and aggregated numbers often hide important variations. Also, the comparison is valid



**Table 3—The resource base, growth, harvesting intensity, and harvesting ratio<sup>a</sup>**

Country	Resource base (growing stock/area)	Average growth (net annual increment/area)	Harvesting intensity (fellings/area)	Harvesting ratio (fellings/net annual increment)
----- Cubic meters over bark/ha -----				
Finland	86.1	3.6	2.9	0.80
Norway	86.5	2.7	1.8	.67
Sweden	112.3	4.1	2.6	.63
United States	118.1	3.9	3.1	.81

<sup>a</sup> Averages for forests without legal, economic, or technical restrictions on wood production in each country.

only for the period covered by the UN-ECE/FAO 1990 forest resource assessment. Comparison of other periods or different data sources would certainly change some of the results.

The growing stock, the net annual increment, and the fellings per ha of these forests give a picture of the average resource base, growth, and harvesting intensity in each country. Net annual increment (NAI) is the gross increment less natural losses over a given period. The average resource base (i.e., growing stock per area) is highest for Sweden and the United States and considerably (almost 30 percent) lower for Finland and Norway (table 3). Sweden has the highest average growth (i.e., net annual increment per area), with the United States following closely. Finland's average growth is lower than Sweden's, whereas in Norway, the average growth in forests available for wood production is more than 30 percent below that in Sweden. The resource base and the average growth are a mixed result of earlier management and forest growing potential for each country.

The United States has the highest harvesting intensity (i.e., felling per area), followed by Finland, Sweden, and lastly, Norway, which is more than 40 percent below the United States. According to the given statistics, the United States and Finland harvested 80 percent of their average annual growth, whereas Norway and Sweden harvested 67 and 63 percent of their average and annual growth, respectively. For harvesting intensity and harvesting ratio (i.e., felling as proportion of NAI), however, the average national numbers can hide both regional variations and differences between tree species.

Together with wood resources, the forests host and supply a number of other values. Unfortunately, these values are less easily measured and valued in economic terms. Together with wood fibers used for fuel and industrial products, forests can provide other valuable nontimber products (e.g., game for hunting). The forests also provide a variety of services; environmental services (soil protection, water quality and regulation, genetic and biotic conservation, pollution buffering, and carbon storage) and leisure and other services (outdoor recreation, aesthetic, and intangible) (Brooks 1993).

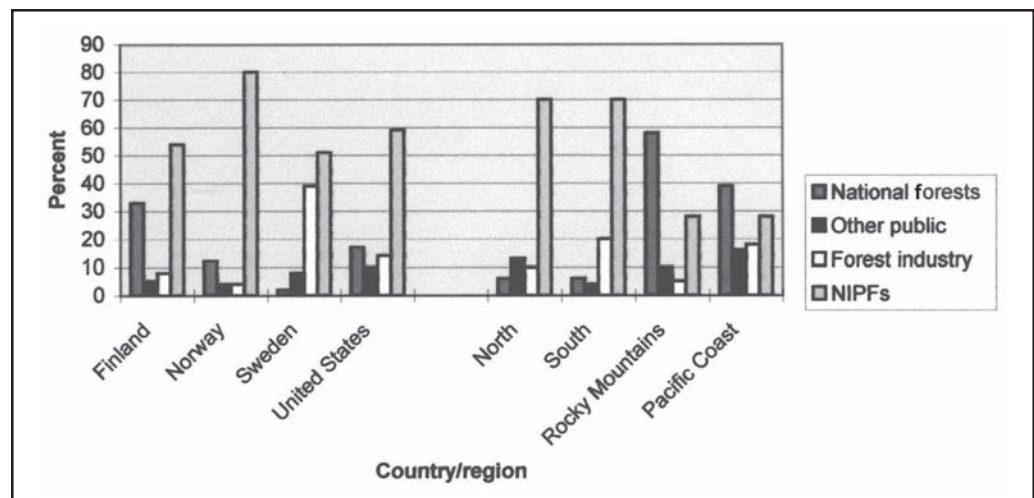


Figure 1—Timberland area by owner group (Metla 1997a, Skogstyrelsen 1997, Smith et al. 1994, Statistics Norway 1997). NIPFs = nonindustrial private forest.

## Ownership and Management

The number of forest enterprises and their size distribution must be considered when discussing a country's forest policy and management of its forest resources. The proportion of public and private forest land is also important. Management goals associated with the two types of ownership may differ, and their on-the-ground management may interact differently with forest policy. Statistics show that smaller owners are likely to manage their forests less intensively than larger owners; for example, smaller owners usually harvest timber less frequently.

The United States has an estimated 9.9 million private ownership units, defined as "persons, combination of persons or legal entities, such as corporations, partnerships, clubs, trusts, Indian tribes, and Native corporations. One person may own several parcels or partial interest in several parcels. An ownership unit has the control of a parcel or group of parcels of land" (Birch 1996). Data for total number of forest holdings in the Nordic countries are not available, but the shares of forest area controlled by the different owner groups are presented below.

Finland has a total of 439,189 nonindustrial private forest (NIPF) holdings. Of these, almost 140,000 are small holdings with an estimated annual wood yield of less than 20 m<sup>3</sup>. The number of other owner groups is not included in Metla (1997a), but the distribution of forest land is 54.2 percent owned by private, 7.7 percent by industry, 33.4 percent by the state, and 4.7 percent by "others."

There are 245,220 forest enterprises in Sweden, of which almost 180,000 are predominantly forest enterprises (having less than 2 ha of arable land). Private persons, ordinary partnerships, and estates of the deceased control almost 240,000 of the forest enterprises (Skogstyrelsen 1997).

Norway has 125,522 forest properties; the central government or other public ownerships own just over 1,000 of them. The predominant group among private owners is the 120,500 NIPF owners, including many farmers. The other private landholders are cooperative ownerships, joint companies, institutions, joint stock companies, etc. Norway's forest industry owns very little property (Statistics Norway 1997).

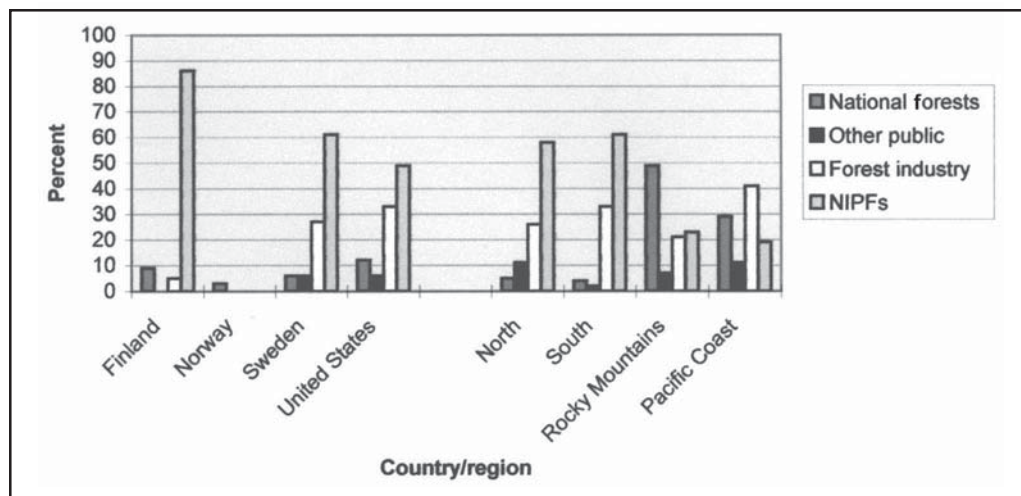


Figure 2—Annual harvest from timberland, by owner groups and regions (Metla 1997a, Skogstyrelsen 1997, Smith et al. 1994, Statistics Norway 1997). NIPF = nonindustrial private forests.

Figure 1 shows the distribution of timberland according to four owner categories in the Nordic countries and the United States. Ownerships in the United States are also shown at the regional level. The United States “national forests” refer to the National Forest System managed by the U.S. Department of Agriculture, Forest Service. In the Nordic countries, “national forests” refer to nationally owned forests, often called state forests. “Other public” timberlands are county and municipality-owned forests; for the United States, state-owned forests and federal forest land other than the national forests are also included. For Sweden, the numbers for “company forests” refer to “forest industry” although the definition of company forests is different from forest industry.

The definition of timberland differs somewhat between the countries as well. In the Nordic countries, timberland is capable of producing  $1 \text{ m}^3 \cdot \text{ha}^{-1} \cdot \text{year}^{-1}$ , whereas in the United States, timberland produces  $1.4 \text{ m}^3 \cdot \text{ha}^{-1} \cdot \text{year}^{-1}$ .

Private forests and, in particular, NIPF make up considerable shares of the timberland in all these countries. Eighty percent of timberland in Norway is NIPF; the United States, Finland, and Sweden follow in decreasing order. Sweden has the highest rate of privately owned timberlands (90 percent) when its vast company forests are included. The variation in ownership patterns between the United States regions is of interest. Almost 9 million NIPF owners east of the Rocky Mountains (in the North and the South regions) control 80 percent of the total NIPF lands in the United States.

Figure 2 shows the share of harvest from timberland, according to owner group and region. The four countries define “harvest” somewhat differently; it is a broader term in Finland and Sweden. In Finland, loss in growing stock from fellings, silvicultural measures, and natural mortality is used, whereas for Norway and the United States, the numbers correspond to the harvested volume. Figures 1 and 2 illustrate the harvesting intensity within different owner groups by region. Again, the different definitions and annual variations make these numbers unsuitable for wide-ranging conclusions about these four countries.

Brooks et al. (1996) found that in countries where data existed, the worldwide share of industrial roundwood harvested from privately owned forests (40 percent) exceeded their share of the land base by 10 percent. In data presented here, a similar comparison for the Nordic countries and the United States yields a different result; the share of harvest on private forest lands, including both forest industry and NIPFs, nearly equal its share of the land base.

In Finland, the share of private harvest is slightly higher than its share of land; this might result from data for NIPF removals that include some “other public owners.” Statistics Norway (1997) does not present harvesting data separated on these ownership categories, so comparison is not possible for Norway. Nonindustrial private forest owners in Sweden have a higher removal rate than their share of land would indicate (see figs. 1 and 2). On the other hand, the “company forests” in Sweden have lower rates of removal than their share of land.

In the United States, there are regional variations; the abundant private forest lands of the East (the North and South regions) support slightly more of the removals than their share of the area. In the Rocky Mountains and on the Pacific Coast, the smaller proportions of private forest lands support about 25 percent more removals than their share of the area. Total removals in the United States from privately owned forests in 1991 were 82 percent, compared to a 73-percent share of forest land. After 1991, restrictions on harvest on public land (both national forests and “other public”) resulted in a substantial reduction of removals on these lands, especially in the Pacific Northwest. Although likely to increase the share of harvest on private lands, increasing regulations on these lands also may cause private harvests to decline.

## **The Forest Sector in the National Economy**

Data for forestry and forest industries in each country’s national economy illustrate the diverse importance of the forest sector to the countries.

Finnish statistics (Metla 1997b) provide information for 1996 and 1960, illustrating historical changes. The value of exports of forest-related products in 1996 was 30 percent of the value of total Finnish exports, compared to 75 percent in 1960. In 1996, the share of forestry of the gross domestic product was 2.4 percent and 5.3 percent for forest industries. The corresponding figures for 1960 were 8.7 and 7.1 percent, respectively. In employment, forestry accounted for 1.2 percent (25,200 people) and forest industry for 3.5 percent (73,500 people) in 1996. In 1960, the corresponding figures were 6.6 and 5.2 percent, respectively.

In Norway, exports of forest-related products in 1995 were 11 percent of the total export value from land-based activities (excluding oil and natural gas extractions, and shipping). Employment in forestry has decreased from an average annual of 7,000 in 1986 to 5,000 in 1995 (Statistics Norway 1997). According to the Agricultural University of Norway (NLH 1998), the number of people employed by the lumber industry has steadily declined since 1990 (7,520 people) to 1995 (6,180), and in the pulp and paper industry from 10,036 people in 1990 to 9,000 people in 1995. If transportation and other forest-related employment are included, the numbers are higher.

Skogstyrelsen (1997) presents data for the export value of Swedish forest industry products for 1991 to 1995. The export value in current prices almost tripled from 1991 to

**Table 4—Value of foreign trade of roundwood and forest industry products by country, 1995<sup>a</sup>**

	World	Finland	Norway	Sweden	United States
----- Million U.S. dollars -----					
Roundwood:					
Exports	11,136	108	30	165	2,883
Imports	15,873	503	284	492	205
Forest industry products:					
Exports	129,320	11,845	2,149	10,685	15,265
Imports	130,230	479	875	1,096	22,243
Total:					
Exports	140,456	11,953	2,179	10,850	18,148
Imports	146,103	982	1,159	1,588	22,448

<sup>a</sup> Metla 1997a, based on FAOSTAT database.

1995. At the same time, the export value of industry products as a percentage of gross national product increased from 4.2 percent in 1991 to 5.7 percent in 1995. The share of forest industry products as a percentage of all exports was 18.2 in 1991 and 16.7 in 1995.

For Sweden, the forest sector employed 26,300 people in 1996. This is less than 1 percent of people employed by all branches of industry that year. The wood processing industry employed 44,400 people (1.1 percent) and the pulp, paper, and paper goods industry employed 49,200 people (1.2 percent of all branches of industry) (Skogstyrelsen 1997).

According to the National Research Council (1998), the U.S. Census Bureau estimated nearly 1.3 million people were employed in wood-based industries across all forest ownerships in the United States in 1992. The National Research Council (1998) also cites the American Forest and Paper Association's estimate that wood-based industry employed more than 1.6 million people in 1990 (4 percent in forestry, 53 percent in the lumber industry, and 43 percent in the paper industry) as evidence of the economic importance of this industry. The National Research Council (1998) uses the USDA Forest Service and the National Association of State Foresters as examples of public sector employers. The Forest Service had 31,135 permanent employees and, including seasonal and other types of positions, had an equivalent of 38,330 full-time employees. Information from the National Association of State Foresters indicates that in 1994, the state forestry agencies had 16,865 permanent employees in the 50 states plus Washington, DC, and Guam, and 7,680 seasonal and temporary employees. "Other forest-related employment can be found within counties, municipalities, private consulting firms, colleges and universities, and non-profit organizations" (National Research Council 1998).

The value of foreign trade in forest products for the four countries is compared with total world numbers in table 4. Table 4 also shows the particular importance of forests and forest industry in Finland and Sweden. Finland has less than 0.6 percent of the world's forest land, and Sweden has only 0.7 percent; their share of global growing stock is about 0.4 and 0.6 percent, respectively. Still, in 1995, Finland accounted for 9.2 percent of the world's export value of forest-related products, whereas Sweden accounted for 8.3 percent. As a result, Finland and Sweden are the world's third and fourth largest exporters of forestry-related products after Canada and the United States.

Norway, with almost 0.2 percent of the forest area and 0.15 percent of the growing stock, accounted for 1.7 percent of the export value; it also had a considerably higher share of import value than its Nordic neighbors.

The United States accounted for 14.0 percent of the export value of forest-related products, therefore, ranking second in the world after Canada, with 21.5 percent of the export value. At the same time, the United States accounted for 15.4 percent of the import value of forest-related products, making it the world's leading importer. It is followed by Japan with 13.3 percent of the import value of forest-related products.

## **Policy Measures Affecting Nonindustrial Private Forests in Norway and the United States**

I now turn to the political and administrative environment in which NIPFs are managed with particular focus on Norway and the United States. Management and investments in NIPFs are determined by legal regulations, customs, and expectations about the future, and various other factors. Through the market, NIPFs also are affected by activities of other forest owners both nationally and throughout the world. The international agenda might have an increasing influence on how NIPF owners can and will behave.

Only the most significant policy measures that influence the management of NIPF lands in Norway and the United States are described. The policy measures are compared between Norway and at federal and regional levels in the United States. When available, the effects of the various policy measures are described. Note, however, that the effects often result from a mix of policy measures and other conditions, such as customs and timber price. The outcomes of the policy measures, such as how well the effects correspond to the policy goals, are briefly discussed later in the chapter.

The difference in size between Norway and the United States makes the comparison somewhat challenging. The United States with its 9.9 million NIPF owners and 116 million ha of NIPF lands, can easily overshadow Norway's 120,000 NIPF owners with 5.3 million ha of land. To present a complete picture of the United States, it would be necessary to include all federal, regional, and state policies, but that exceeds the scope of this study.

On the other hand, regardless of size differences, there are similarities between the two countries. The countries share an increasing focus on environmental issues related to forests and forestry. The NIPF owners' attitudes, although difficult to document, also seem similar. For example, many Norwegians want to pass their land on to their next generation in better condition than it was when they received it. Similarly, in the United States, according to the National Research Council (1998), many landowners believe that land is borrowed from future generations and they are obligated to improve it before passing it along.

## **The Policy Measures and Their Interactions**

Various public policy approaches are available for influencing management of NIPF lands in Norway and the United States. For this report, these policy measures are classified into three broad groups: regulatory, economic, and information and extension services. The description is not comprehensive; it focuses on the most important measures and their effects while providing a general picture of the differences and similarities. Comparisons between Norway and the United States are done within and between the three broad groups.



- Regulatory measures are legally binding instruments (conventions, laws, decrees) stating obligations or prohibitions. They can regulate the actual management of the forest resources or influence the structure of a sector (e.g., ownership). The authority and the enforcement powers are important aspects of the regulations.
- Economic measures make use of market mechanisms to orient behavior in desired directions. Financial assistance, cost shares, and taxes are used as direct or indirect monetary incentives to harmonize the private forest owners' priorities with public interests.
- Information and extension services attempt to influence people's decisions by improving their information basis. The instruments aim at the rationality or value system of a person. They are diverse, spanning from resource assessments and planning, to education, extension services, and research.

There are multiple interactions and no clear boundaries between the three broad groups of policy measures described. An issue of political concern is generally addressed by a mix of measures that, ideally, promote each other. For example, an economic tool can be authorized by law, whereas extension services might get economic support. These interactions make determining the results of each policy tool complicated. Furthermore, to separate the effects of a program from what would have happened without the program is also challenging.

## Regulatory Measures

Various regulations have implications for the protection, management, and use of forest lands in Norway and the United States. The most important ones for NIPF lands are described below, starting with Norway and followed with federal and regional regulations for the United States. Some of the differences in regulatory policy measures affecting NIPFs in Norway and the United States are then highlighted.

### Regulations in Norway—

- **The Norwegian Constitution** (May 17, 1814, as amended) protects private property rights stating if “the welfare of the State requires that any person shall surrender his movable or immovable property for the public use, he shall receive full compensation from the Treasury” (Article 105). The Constitution also states the overall objective for management of the natural resources (Article 110b), “Every person has a right to an environment that is conducive to health and to natural surroundings whose productivity and diversity are preserved. Natural resources should be made use of on the basis of comprehensive long-term considerations whereby the right will be safeguarded for future generations as well.”
- **The Forestry and Forest Protection Act; the Forest Act** (May 21, 1965, as amended and with separate regulations) is the most important regulation of forest practices on all forest lands in Norway. The overall goal is to “promote forest production, afforestation and protection of forest land while allowing for the functions of forests as sources of recreation, major landscape features, living environments for plants and animals, and as hunting and fishing grounds” (Royal Norwegian Ministry of Agriculture 1994).

The Forest Act applies to all categories of owners. It is based on the fundamental principle of freedom with responsibility for the individual owners. The law, however, contains provisions that empower the authorities to take action when necessary, and to prohibit or place conditions on afforestation, introduction of new tree species, and other activities.

Construction of forest roads is regulated by separate regulations . . . all road construction must be reported, and plans as well as finished roads must be officially approved. . .

Forest practices and operations may be subject to special restrictions in areas of particular recreational or environmental value. . .

The Forest Act contains provisions dealing with forest land where location, condition or characteristics are such that it must be managed with particular care. . .

The intention . . . is to maintain the protective or protected function of the forest stands in question while permitting economically feasible forestry operations.

Protection forest may include forest land that protects other forest or farmlands, as well as forests growing at high elevations, along the coasts or in the far north (Royal Norwegian Ministry of Agriculture 1994).

A notable aspect of the Forestry and Forest Protection Act is the establishment of the Forest Trust Fund (Oistad et al. 1992). The forest trust fund is a mandatory investment system with tax incentives for NIPFs. It is described further in the section on taxation.

- **The Building and Planning Act** (June 14, 1985 nr. 77), together with the Forest Act, contains provisions to prevent undue nonforestry development and deforestation (Royal Norwegian Ministry of Agriculture 1994). Fundamental principles of land management protect forest land from urban encroachment. In principle, all Norwegian forest lands are protected from nonforestry development through these provisions.
- **The Nature Conservation Act** (June 19, 1970 nr. 63) provides for classification of specific areas under various degrees of protection. Lands can be protected as national parks, nature reserves, landscape protection areas, nature monuments, and other protection schemes with declining grade of restrictions. The system of “Protected Conifer Forests” (total area: 200 000 ha, to be enlarged by 120 000 ha) is provided by this act.

In comparison, national parks within the United States are “extensive areas free of improvements of a technical nature. Forest operations and most types of commercial or industrial activity are banned” (Royal Norwegian Ministry of Agriculture 1994).

- **The Open Air Act** (June 28, 1957 nr. 16) provides free public access on foot throughout the year to all noncultivated land given that care and consideration are shown. With certain limitations, the general public also enjoys the right to pick berries and mushrooms. The right to free access has important health and social benefits for the public, and recreational values are emphasized in the forest policy. Newly planted forest stands, however, are closed to the public (Royal Norwegian Ministry of Agriculture 1994).
- **The Cultural Heritage Act** (*Kulturminneloven*) (June 9, 1978 nr. 50) requires preservation of specific cultural heritages, such as old stone fences, on all lands, including forests. The **Pesticides Act** (*Lov om plantevernmidler*) (April 5, 1963 nr. 50) restricts pesticide use in forests.

**Structural regulations in Norway**—Norway has long traditions of regulating the buying and selling of agriculture and forest properties as well as price settings. This makes it hard to separate the effects of traditions from those of regulations. Transfer of agriculture



and forest properties within families is common in Norway. According to statistics for Norway, 9 out of 10 new owners are close family members of the sellers (children, grandchildren, or niece or nephew).

- **The Act of Allodial Rights** (*Odelsloven*) (June 28, 1974 nr. 58, with an extensive history) is the principal regulation of “in-family” transfers of agriculture and forestry holdings. The act regulates which properties are affected by the act and the rank of the heirs; the oldest child of the current owner is ranked highest, followed by the siblings of that child, according to date of birth, and then the brothers and sisters of the current owner. The act also states the new owner’s obligations to live on the farm for at least 5 years and to keep the lands in production. One specific regulation, the *Åsetesretten*, provides children and other close relatives the right to buy the farm at below-market prices, which reduces their tax.
- **The Concession Act** (*Konsesjonsloven*) (May 31, 1975 nr. 19, with traditions back to 1909) controls ownership of agricultural and forestry holdings in Norway and applies to all trading of farms outside the immediate family (see the Act of Allodial Rights). The act regulates who can own a farm, sets conditions (they have to live on the farm for at least 5 years keeping their lands in production), and regulates prices by stating how the “legitimate” price is calculated. The price should not be higher than what the farm can generate by normal use. The act also authorizes inquiry about the boundaries, the size of the holding, and the ability of the proposed new owners to run the property. The effects of this regulation are debated and various consequences have been described; for example, two consequences may be less fragmentation of forest lands but possibly lower investments in forest management.
- **The Agricultural Land Exchange Act** (*Jordskifteloven*) (December 21, 1979 nr. 77) gives owners of forestry holdings the right to request land trades to improve their production. The act has wide provisions to trade parcels and change the structure of the holdings.

**Federal regulations in the United States**—Although the United States does not have a federal law regulating private forestry practices, some federal environmental laws influence how private forest land is managed. The Endangered Species Act of 1973 and the Clean Water Act of 1972 are the most outstanding examples.

- **The Endangered Species Act** (16 U.S.C. 1531-1543) of 1973 is “the federal statute prohibiting acts that will endanger either species threatened with extinction or their critical habitat” (Hickok 1996). The act asserts federal control over the protection of plant and animal species and provides authority for the federal government to control activities that might adversely affect the long-term viability of a species. All forest owners must protect species that are listed as threatened or endangered under the act. In addition, individual states have their own wildlife protection laws and forest practice rules for private owners (Beuter 1997).
- **The Clean Water Act** (33 U.S.C. 1251-1376) of 1972 is “the primary federal law protecting the Nation’s waters from pollution” with a fundamental goal of eliminating all discharges of pollutants into the Nation’s navigable waters by 1985 (Hickok 1996). The act provides legal framework for control of water pollution from silvicultural activities (designated as one source of nonpoint pollution, sections 208 and 404). Implementation of the act has been debated, in particular the formal regulation of

private forest practices by state forest-practice laws. A number of states outside the South have enacted specific regulatory legislation for controlling silvicultural non-point source pollution. Eight states had incorporated such control into their state forest practice acts by 1990 (Siegel 1997).

- **The Clean Air Act** (42 U.S.C. 7401-7671) of 1970 is “the primary law in the United States addressed to air pollution problems. The Clean Air Act establishes four overarching air quality goals: (1) attaining nation-wide clean air standards . . . , (2) preventing significant deterioration; (3) preserving natural visibility; and (4) avoiding significant risks from hazardous air pollutants” (Hickok 1996: 265).

According to Cabbage et al. (1993), the Clean Air Act has directly and indirectly impacted the forest manufacturing sector. It also has affected land use and management.

- **The Forest and Rangeland Renewable Resources Planning Act** (Act of August 17, 1974; P.L. 93-878, 88 Stat. 476) also influences private landowners. The act provides directions and guidelines for planning the use and development of the Nation’s natural resources. It requires a periodic assessment of the status of the renewable natural resources and the anticipated national needs for those resources (Beuter 1997).

The Forest Inventory and Analysis (FIA) program authorized by the Act and some of its effects on private forest lands, are described in the section on “information and extension services.”

In general, the United States has established a solid legal basis for regulating forestry practices on private lands. The courts have ruled that such statutes are constitutional if they do not discriminate among owners and are equally applicable to all. It is a well-established American legal principle that the society can—through its police power—restrict, for the public good, the freedom with which owners may use their land and its resources (Bosselman et al. 1973, Roberts 1974; referred to in Siegel 1997). The government though, cannot take private property without due compensation.

**State regulations in the United States**—Under the U.S. Constitution, regulating privately owned forests is generally reserved for individual states, rather than the federal government. According to Beuter (1997), most states have forest practice rules to protect environmental values on private land. The intensity and type of regulations, however, differ from state to state. In general, legislation may govern logging practices, regeneration standards, prescribed burning, chemical usage, road building, and related activities. Regulation of logging practices to protect the environment or nontimber resources is most common in both the comprehensive state laws and in local ordinances (Siegel 1997).

In their study of state regulation of private forestry practices, Ellefson et al. (1995) show the frequency of different types of programs used by state forestry agencies to influence the use and management of private forests. Of the programs studied (educational programs, technical assistance, voluntary guidelines, tax incentives, fiscal incentives, and regulatory programs), regulatory programs accounted for 11 percent of state applications nationwide. Ellefson et al. (1995) found that depending on the purpose, 16 to 54 percent of the states had such programs. Not all of the programs were focused exclusively on forestry, however. For example, authority to regulate nonpoint sources of water pollution, of which forestry might be one of many sources of concern, was a program with a broader scope.

According to Ellefson et al. (1995), “These legal regulations are among the most controversial programmatic means of addressing private forestry practices and forest resource management objectives.”

According to Siegel (1997), recent trends differ among the West, the East, and the South. In the West, most state forest practices statutes contain strong environmental provisions in addition to timber resource standards. Siegel (1997) further cites:

Timber management and environmental protection provisions of forest practices statutes have often conflicted with each other, as well as with other environmental legislation. The forest practice laws usually represent a compromise between environmental and timber production concerns—reflecting the tension between protecting aesthetic and recreational forest uses and preserving the forest industry (Hansen 1978).

Regulations at the county and other local levels also are increasing rapidly in the West. Regulations enacted more recently are often more stringent than the more traditional state statutes (Siegel 1997).

In the East, four states enacted new forest practice legislation in the 1970s and 1980s: Delaware, Maine, Maryland, and Massachusetts. In addition to state legislation, many local, eastern governments have passed ordinances in the last 15 years that regulate the harvest or transport of timber. Concerns about the effects of logging on water quality, wildlife, and aesthetics influence local regulations. Frequently, local regulations are enacted in response to a clash between urban and rural values (Popovich 1984, Wolfgram 1984, Youell 1984; referred to in Siegel 1997).

Siegel (1997) points out that only Mississippi and Virginia, with their seed tree statutes, have statewide statutes on forest practices in the South. No Southern state has enacted any type of comprehensive forest practice regulatory legislation, and none is anticipated, although it is occasionally mentioned in several states. On the other hand, each Southern state has a water quality statute that generally empowers a designated state agency to adopt standards and rules to deal with polluting activities in forested areas.

On the local level, many governments have enacted ordinances to regulate logging practices in order to protect water quality or to prevent damage to local roads. Some urban counties, particularly in Georgia, Florida, and North Carolina, also regulate logging as a means to control unbridled development, eliminate trash-covered logging sites, and protect aesthetic values. This is, according to Siegel (1997), “despite the South’s traditional conservatism” and their aversion to regulatory legislation.

Siegel (1997) expects state regulations of forest practices in the United States to increase. The increase of local regulations in many states is likely to motivate those states to consider state regulations and thus avoid clashes between different local laws. In some states, conflicts between local and state regulations have led to revisions of the state laws to explicitly declare that state forest practice acts take precedence over local zoning of forest land.

Enforcement of forest practice regulations differs greatly, ranging from informal conferences to court-ordered remedial action. Agencies may use written orders to cease violation or deliver stop work orders. They can perform corrective action and bill the landowner or timber operator. Violations generally are considered civil actions. Penalties can be severe, up to \$1,000 per violation per day and up to 1 year in jail in Washington and Oregon (Siegel 1997).

Enforcement in the future will depend on the regulations enacted, their individual power, the power balance between the different levels (federal, state, and local authorities), and the possible precedence of environmental laws over forest practice regulations.

**A comparison of regulatory policy measures in Norway and the United States—** Regulations affecting NIPF lands generally differ greatly between Norway and the United States. Depending on the objective of the regulations, either of the two countries can be said to have the most thorough regulations.

Because regulations in various states in the United States are only briefly described in this report, a complete comparison is not possible. Nevertheless, some general conclusions can be drawn:

- Norway's regulations are mostly at the national level, whereas the United States has regulations at the federal, state, and local levels. This has obvious impacts on the complexity of the regulations and on the number of agencies involved in regulation of the private forestry sector.
- Regulations in Norway influencing ownership and property structure have no analogue in the United States.
- The free access to noncultivated lands in Norway guarantees the public the enjoyment of recreational activities on private forest lands. The amount of public access in the United States differs by the regional distribution of private forest lands and the share of private forest lands that is open to the public. According to Ellefson et al. (1995), "approximately one-quarter of private forest land area is open to public recreation." Closely linked to this are the property rights to fish and game resources. Free access in Norway does not include the right to fish or hunt; this is the right of the landowners. In the United States, the respective state governments control the hunting and fishing licenses.

While discussing forest resource policy in a global context, Cabbage et al. (1993) state that few, if any, comparative studies of forest regulation in different countries have been performed and that one must thus rely on piecemeal or anecdotal information to compare forest regulation among countries. Still, they illustrate the situation by saying most of the forest regulation in Western Europe stemmed from wood shortages.

As such, most laws governing forestry in Europe are designed to ensure continuous tree cover and harvests to provide timber products and to a lesser extent, environmental protection. This can be contrasted with modern state forest practice acts, federal environmental laws, and local regulations in the United States, which have focused more on environmental protection and restriction of logging and forestry in environmentally sensitive areas than on timber production (Cabbage et al. 1993).

This comparison, on one level, is also true for Norway, but it needs some minor modification. The aspect of time, indirectly addressed by Cubbage et al. (1993), seems to be of vital importance. The focus and the goals of regulations naturally reflect the concerns and priorities of the era when they are approved. Environmental concerns became more focused in Western forest regulations after the 1970s. In Norway, legislation regarding the preservation of cultural heritages, use of pesticides, and environmental considerations for the economic support schemes are a few examples of regulations passed during a period of heightened environmental awareness.

## **Economic Measures**

Various economic policy measures are in operation both in Norway and the United States. They are divided into two groups, "taxation" and "financial assistance." For each group, the Norwegian schemes are described first, followed by the U.S. federal and general state systems, and ending with a tentative comparison between Norway and the United States. As for regulations, only the most significant and important economic measures affecting NIPFs are included.

**Taxation**—Taxation is an important but complex part of economic policy measures. The objectives of taxation schemes are diverse, most often influenced by the general tax system in a state or nation.

Taxation schemes that affect NIPF owners fall into two categories: tax-incentives (benefits) or tax levies (expenses). Indirectly, the amount of tax revenue influences the level of economic support (cost-share programs or tax reductions) a state or nation can offer forest owners.

### ***Taxes in Norway***

- **Tax incentives of the Forest Trust Fund**—The unique Forest Trust Fund affects how smaller private forest holdings are managed. The influence of the fund is limited to holdings with an average annual harvesting potential below 3000 m<sup>3</sup> in the most important forest areas. Its tax incentives are perhaps the single most important taxation scheme for NIPF owners in Norway. The history of the Forest Trust Fund dates back to 1932, when the first Forest Protection Act was passed. The mandatory investment system requires funds to be collected from private forest owners and reinvested in the forest lands according to rules established by the Ministry of Agriculture, Forest Department. When timber is sold, 5 to 25 percent of the value is deposited to the trust fund account of the forest property. Each forest owner is free to set the percentage from year to year according to his or her financial situation, investment plans, etc., but permission is required to set it below 8 percent.

The trust fund is effective because the forest owner does not pay income tax on the amount deposited in the fund. When money is withdrawn from the fund and applied to long-term investments, such as silviculture and road construction, a significant proportion of the money can still be deducted from annual income taxes. Depending on the owners' marginal tax rate, the tax effect may result in a 50- to 60-percent reduction of the total cost of the activity (Oistad et al. 1992).

Forest landowners do not receive the interest earned from their trust fund. The interest is, according to the Forestry and Forest Protection Act, for the "common benefit of Norwegian forestry." The money is distributed to forest authorities at

national and regional levels and to the forest owners' associations where it is used according to guidelines developed by advisory boards at the different levels. The interest is an important source of funding for information activities, extension services, study tours, and equipment rentals. The Norwegian Forest Society and Women in Forestry are two of the organizations supported by this fund.

- **Income tax**—Forest owners pay income tax on their average net income for the last 5 years. The net annual result is calculated as income minus costs. The most important income is usually from timber sales. Harvesting, hauling, and silvicultural treatments are all costs. Forest roads are treated differently according to their quality and expected durability. A 5-year mean was originally used to reduce the effects of progressive income tax for owners with irregular harvests, a factor that is less significant after the tax reform of 1992. The system results in a delay in tax payments, which lowers the forest owners' actual tax rate. Special regulations apply when buying or selling a forest holding, which can also inflict on the actual tax payments (NLH 1998).
- **Property tax**—Property tax of a forest holding is paid according to the value of the forest "as a durable source of income if in appropriate use," according to a system defined by tax authorities. The average annual harvesting volume is calculated according to monitored volume stock and age class distribution. This is used to calculate net value according to prices and costs, which is then capitalized (NLH 1998).
- **Inheritance tax**—When somebody is buying a farm from a close relative, he or she has to pay inheritance tax. Special regulations apply to tax rates according to value, but the tax is paid both on the estate and on a gift, which is often a part of the agreement for such transactions. As for estate tax, the value is calculated according to a continuing use for agriculture and forestry production.

#### ***Federal taxes in the United States***

- **Capital gains tax**—Legislation that allowed timber-growing income to be treated as long-term capital gains for tax purposes was based on the idea that timber growing is a long-term investment and thus, should receive the same tax benefits as long-term capital investments. Further, "It is said to help private landowners produce more timber for the future, helping to overcome any long-term market inefficiencies. It also offsets nominal increases in value that are caused only by inflation of assets held for long time periods" (Cubbage et al. 1993).

The National Research Council (1998) has a somewhat different approach. It states that the tax on capital gains from forest income can be a major disincentive for long-term forest stewardship and sustainability. Recent adjustments in tax rates and regulations are thought to correct for some of these by encouraging extended timber-harvest rotations and management of older age forest. They further highlight the need for continuing analysis of the tax reforms to determine the impacts on management of private forest lands.

- **Management cost deductions**—To claim a tax deduction for regeneration expenses (site preparation, planting, vegetative control costs), individuals and corporations must record these expenses and then deduct them from income earned when the timber is sold. According to the National Research Council (1998), this treatment of capitalizing regeneration costs discourages many NIPF owners from managing and conserving their forests for long-term private and public benefit. They suggest improvements by deducting "normal annual stewardship expenses against current



income” and that tax credits could also be considered for investment purposes other than timber and related forest products.

- **Reforestation investment tax incentive**—The Recreation Boating and Facilities Improvement Act authorized an investment tax credit for reforestation in 1980. For up to \$10,000 per year of reforestation expenses, investors are allowed a 10-percent investment credit plus deduction of the expenses over an 8-year period. The credit cannot exceed \$1,000 annually. The reforestation tax credit is widely used by NIPFs (National Research Council 1998).
- **Estate taxes**—An estate, including land, may be subject to federal estate tax when a person dies and is not survived by a spouse. Liability and the tax rate depend on the value of the estate. The estate tax must usually be paid within 1 year after the death of the owner, and it has therefore been identified as a cause for fragmentation of forest properties, which is a concern for forest management (National Research Council 1998).

### ***State tax policies in the United States***

Local governments rely on property taxes to raise revenues. The tradition of basing local taxes on land values dates back to the colonial agrarian societies. Land value in the United States is often based on the most highly valued use of land; generally, this is the assessed value of the land if it were sold on the open market for industrial, commercial, or residential development. Demands of an increasing population have raised the land values substantially over the recent decades, so the value of land for development is far greater than the value of land for agriculture or tree growing. Many forest landowners near developing areas have been forced to sell their land because annual revenue from the land could not pay the annual ad valorem property taxes. Even the most productive forest lands cannot survive as forests if property taxes exceed the break-even threshold. Moreover, the ad valorem tax penalizes landowners for holding older age trees (Northern Forest Lands Council 1994, in National Research Council 1998).

The National Research Council (1998) found that nonfederal forests have experienced increases in funding from nontraditional sources. In some cases, the source can be a tax providing revenues specifically dedicated to forest and natural resource activities. For example, the Oregon severance tax on harvested timber supports programs in the Oregon Forestry Department, and in Missouri and North Carolina, natural-resource programs are partially supported by a dedicated portion of general state sales taxes.

Ellefson et al. (1995), in their study of state regulation of private forestry practices, found that tax-incentive programs represented only 6 percent of the applications, less than any of the other program types studied. Depending on the purpose, only 6 to 32 percent of the states had such programs. Also, tax incentives were used more for general forestry or conservation purposes on private timberland than for influencing specific forest practices.

### ***A comparison of taxation in Norway and the United States***

Many of the same taxation schemes are in force in Norway and the United States, as are the discussions about tax rates and the fairness between the different groups of society. Even if some of the taxation schemes are different, their consequences for management of NIPFs are similar. Both countries treat forest investments as long-term

investments and offer them special tax reductions. Even if the systems for tax reductions are arranged differently, NIPFs are similarly impacted on either side of the Atlantic.

Below are some general conclusions about the effects of tax measures on NIPFs in Norway and the United States.

- The tax schemes through the Forest Trust Fund seem to have a more direct influence on specific forestry practices in Norway, whereas tax incentives in the United States play a more minor and less specific role in the forest policy.
- The fragmentation resulting from the estate tax observed in the United States is not a concern in Norway. This is partly explained by the system for calculating the tax; the land value based on growing trees is used instead of the most valued use of the land. Other differences are also important in fragmentation, such as the regulatory measures. This points to a practical problem encountered when trying to compare the individual results from each of three broad groups of policy tools.
- The federal information program on income taxes, the National Income Tax Servicing, is part of the landowner assistance provided by the Cooperative Forestry in the State and Private Forestry unit of the USDA Forest Service. It might tell its own story of the complexity of taxes in the United States. National forest authorities in Norway offer no such programs, but the forest owners' and other organizations (i.e., local accounting companies) have documentation and human resources to assist forest owners on tax questions.

**Financial assistance**—The measures described in this section include different financial assistance and cost share programs that affect NIPFs in Norway and the United States.

***Financial assistance in Norway***—The major economic measures for Norwegian NIPFs are supported through the national budget and the Agricultural Development Fund. Although tax deductions are significant, no-interest loans and municipal support schemes are of limited use.

Generally, support schemes contain specific provisions requiring economic and ecological feasibility of the activities receiving funding. The Agricultural University of Norway (NLH 1998) argues that Norway's economic incentive programs are directed toward wood production, but that attention to environmental values is emphasized in the specific regulations for the programs.

The programs are partly targeted at individual forest owners and partly at measures for the forestry communities. Broad regulations are set by the Ministry of Agriculture, the national forest authority. Local forest authorities (county and municipal governments) decide the more detailed regulations. Examples of local adjustments are the different systems of support (per area or as a percentage of costs) and variation in supported activities according to local needs and priorities.

The National Budget offers support for long-term investment projects (silviculture, forest roads, etc.) and environmental projects. The total budget for these cost-share programs in 1997 was close to NKr 130 million, or US\$ 17.3 million. Parliament approves annual



spending, whereas the Ministry of Agriculture distributes support according to priorities and regional activity plans.

The Agricultural Development Fund provides support for building forest roads, forest management plans, extension services, organizing timber trading, and others activities. In 1997, this fund contributed NKr 120 million, or US\$ 16 million, to forestry activities. This was 15 percent of the Agricultural Development Fund's NKr 780 million budget in 1997.

The objective of the Rural Community Development Fund is to contribute to the development of profitable, rural, small-scale enterprises. Total annual budget is NKr 512 million, or US\$ 68.3 million; of this, the spending on forest-related projects in 1997 was NKr 65 million, or US\$ 8.7 million. This is 12.75 percent of the total budget. The county governments allot most of the funds. Most of the support goes to development projects. Since 1995, the centrally administered Rural Community Development Fund has provided annually, NKr 15 to 20 million, or US\$ 2 to 2.7 million toward cost-share programs for forest thinning, harvesting in difficult terrain, and construction of secondary roads.

Economic support for various forest management activities are summarized below.

- Planting and silviculture in 1997 received public support of NKr 83 million, or US\$ 11.1 million for investments totaling NKr 243 million, or US\$ 36.7 million. This gives an average public support through cost-share of 34 percent. The total area planted was 20 000 ha. The area of other silvicultural activities was 39 000 ha.
- Building of forest roads in 1997 received NKr 68 million, or US\$ 9 million in public support. With total investments equaling NKr 170 million, or US\$ 22.7 million, the public cost-share averaged 40 percent.
- The public supports production of forest management plans through a cost-share program within the Agricultural Development Fund. The annual planning efforts in 1997 covered some 380 ha, with public support of NKr 38 million, or US\$ 5 million. Between 1987 and 1995, the forest owners' annual share of the costs has been between 34.2 and 41.4 percent.

**Financial assistance in the United States**—The U.S. Department of Agriculture is the major federal agency managing programs for use, management, and protection of NIPFs. Other federal agencies include the U.S. Environmental Protection Agency, the U.S. Department of the Treasury, and various agencies within the U.S. Department of the Interior (see fig. 3, modified from National Research Council 1998).

The USDA Forest Service, state and private forestry unit is the principal source for assistance to NIPF owners. The state and private forestry's expenditure in 1997 was \$156.5 million, or 4.5 percent of total Forest Service expenditure (\$3,400 million) (USDA Forest Service 1998b).

According to the USDA Forest Service (1998a), the budget for state and private forestry in 1998 was divided with one-third for forest health management, 12 percent for cooperative fire protection, and the rest (54 percent) for cooperative forestry.

**Federal Agencies Involved in Administration of Major  
Programs for Use, Management, and Protection of Nonindustrial  
Private Forest Lands in the United States**

**U.S. Department of Agriculture**

- Forest Service: Forest Research Program and Information Management Program, and State and Private Forestry programs such as Rural Forestry Assistance, Forest Stewardship Program, Stewardship Incentives Programs, Forest Legacy Program, Forest Health Protection Program, and others.
- Cooperative State Research, Education, and Extension Services.
- Natural Resources Conservation Service: Funding of the Forestry Incentives Program (technical assistance is provided by USDA Forest Service in cooperation with state forestry agencies), Wildlife Habitat Incentives Program.

**U.S. Department of the Interior**

- Fish and Wildlife Service: Endangered Species Protection Program.

**U.S. Department of the Treasury**

- Internal Revenue Service: Federal tax system, including estate taxes, capital gains tax, management tax deductions, and reforestation investment tax incentive.

**U.S. Environmental Protection Agency (EPA)**

- EPA programs: Clean Water Act Programs.

Figure 3—Modified summary of box 4-1, National Research Council 1998.

Cooperative forestry includes the incentive programs described below, Urban and Community Forestry, Economic Action Programs, and the Pacific Northwest Assistance Program. The incentive programs for NIPFs made up \$34 million, or 21 percent of the 1998 state and private forestry unit budget.

The Forestry Incentive Program (FIP) and the Environmental Quality Incentives Program (EQIP), which replaced the Agricultural Conservation Program (1936 to 1996), provide cost-share payments to private landowners for conservation practices. They are administered by the Natural Resources Conservation Service. The principal objective of FIP is timber production, while EQIP funds are used to promote soil and water conservation. Technical assistance to landowners is provided by State Forestry organizations through the Forest Service/State Forester delivery system.

The Stewardship Incentive Program (SIP) is authorized by the Forestry Title of the 1990 Farm Bill to enhance the management of all resources on private forest lands. The SIP offers technical assistance and cost-share assistance for tree planting, forest improvement, recreation, wildlife, aesthetics, and soil and water conservation. The Forest Service/State Forester delivery system assistance provides assistance to landowners, whereas the USDA Farm Service Agency assists with making payments to owners.

The Conservation Reserve Program (CRP) was authorized in the Conservation Title of the 1985, 1990, and 1996 Farm Bills. The CRP offers long-term rental payments and cost-share assistance to establish permanent vegetative covers on cropland that is highly erodible or contributes to a serious water quality problem. The CRP is administered by the Farm Service Agency with forestry assistance provided through the Forest Service/State Forester delivery system.

Moulton and Snellgrove (1997) summarize tree planting and timber stand improvement on all forest lands for all owners in the United States. For NIPF owners, they also provide data on the area supported by the USDA forestry assistance programs. The numbers thus show the percentage of area supported by the programs, but not the percentage of the costs covered by these programs.

Nonindustrial private forest owners planted 438 060 ha of trees in fiscal year 1996. The USDA forestry assistance programs contributed to 30 percent of this planting, a major drop from 41 percent in 1995. Timber stand improvements were completed on some 220 250 ha of NIPF in 1996. Of this, 26 percent was completed with contributions from USDA forestry assistance programs (up from 20 percent in 1995). Data on the actual cost shares provided by USDA are not included.

According to Moulton (2001), maximum federal cost share rates prescribed by law and regulations range from up to 50 percent for the Conservation Reserve to a maximum of 75 percent (65 percent in the instance of FIP) of total practice costs of the other programs. The states, in turn, may lower, but not increase, these rates.

***State programs for financial assistance in the United States***—In their study of state regulation of private forestry practices, Ellefson et al. (1995) found that fiscal incentive programs composed 15 percent of program applications nationwide in 1992. Depending on the program objectives, fiscal incentive programs existed for 26 to 78 percent of all states. Management objectives receiving financial assistance included timber production, stand improvement, fish and wildlife habitat management, reestablishment and management of forested wetlands, establishment and maintenance of windbreaks and shelterbelts, aesthetics management, management of recreational opportunities, and management of native vegetation (Ellefson et al. 1995).

Data on state support, in total or as a share of the management costs, are not easily available in compiled form. According to Moulton (2001), most of the 13 southern states, where most tree planting on private lands occurs, limit cost sharing for the planting of loblolly and slash pine to 40 to 50 percent of total cost. However, they allow the maximum rate of cost sharing for planting of other tree species and other practices, such as timber stand improvement, buffer strip establishment, and wildlife habitat improvement.

***A comparison of financial assistance in Norway and the United States***—Again, incomplete information on public spending in the United States makes it impossible to do an extensive comparison with Norway. Still, the available information suggests that public financial assistance and cost share programs play a more significant role in the forest policy in Norway than in the United States.

Interestingly, the incentive programs for NIPFs through the USDA Forest Service, state and private unit, and the total appropriation for forestry incentive programs through the Forestry Department and Agricultural Bank of Norway, are almost identical (US\$ 34 million in 1997-1998). Although other funding is available in the United States, and not all the support in Norway is going to NIPFs, the differences in magnitude are significant when the forest area and the number of NIPF owners in the two countries are taken into consideration.

Public support for planting is a good example of the complexity in comparing data for different countries. Norway has data on the total costs and public support, and the average cost share can be calculated (34 percent in 1997). With numbers for area planted with and without public support (75 to 80 percent and 20 to 25 percent, respectively), the average support on areas that are actually given support can be calculated. The United States, on the other hand, has numbers for the total area planted, and the area supported by public funding (30 percent), but no data on the share of the cost provided by the USDA or by the public in total. Although public support from other sources might have contributed to the same areas, the share of area supported by the public in Norway (75 to 80 percent) and the United States (30 percent), indicates that public support for planting is more common in Norway than in the United States. Also, the focus of the incentive programs is quite different. For example, in the United States, the emphasis is on forest health and fire protection, whereas the emphasis in Norway is on long-term investments such as planting and road construction.

## **Information and Extension Services**

This group of policy measures includes a variety of measures, which are extensive both in objectives and methods. The presentation here should not be regarded as comprehensive. The discussion is focused on government policies and activities.

To make comparison easier, similar programs in Norway and the United States are described simultaneously. The description shows that although many of the same programs are in force, the compiled data do not support any conclusions about which country relies mostly on these policy measures in their forest policy.

**Monitoring and assessments of forest resources**—There are a number of reasons why knowledge of forest resources is important to authorities, forest owners, industry, and the general public. Assessments and monitoring are used to provide information on available resources and changes over time, which is crucial for resource management. Increasingly, these data are required for international reporting and as a followup for national, regional, and international initiatives. Peck et al. (1996) highlighted the importance of harmonized terms and definitions and a common system for collecting data to ensure comparability of national data and to provide an international framework within which to set national policy and management objectives. As seen in the section on policy, there is still room for improvements on this point.

Both Norway and the United States have various programs that provide information about the forest lands and the forest resources. Only the most relevant programs for the forest authorities are described here.

In Norway, the Norwegian Institute of Land Inventory is responsible for forest monitoring and assessment. They are currently working on the seventh nation-wide assessment; the first was finished in 1925. The Institute of Land Inventory collaborates with the Ministry of Agriculture, Forestry Department, about improvements in registration and future needs, and with Statistics Norway for presentation of the results.

In the United States, forest surveys were first authorized by the McSweeney-McNary Act of 1928. The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) broadened the surveys to include other resources. The RPA authorizes preparation of decennial assessment documents, including the resource conditions on all forests and rangelands in the United States, private and public, as well as 5-year strategic plans for the USDA Forest Service's activities and responsibilities. According to the USDA Forest Service 1997 report, forest inventory was conducted that year on 17 million ha (42 million acres) of forest lands across all land ownerships, and 90 reports were prepared relating to status and trends of the resources inventoried (USDA Forest Service 1998b: 27).

**Management plans**—Management plans are a useful tool for NIPF owners. In Norway, assessments for management plans exist on approximately 80 percent of the productive forest area. The area covered by management plans or the share of forest owners having plans, however, is not easily accessible. Over the years, plans have changed to include more information about nontimber resources and environmental values. The public supports production of management plans through a cost-share program within the Agricultural Development Fund (see Financial Assistance in Norway section).

Birch (1996) found that only 5 percent of the private forest land owners in the United States have a written management plan but that these owners control 39 percent of the private forest land. Of the 5 percent of private forest land owners with written management plans, more than half a million of them are NIPF owners. This NIPF segment controls 57 percent of private forest lands that have management plans; the rest is owned by forest industry. Of the management plans written, NIPF owners drafted plans that addressed 19 percent of the area, consultants prepared plans for 29 percent of the area, industrial foresters made them for 10 percent of the area, state service foresters made them for 19 percent of the area in 37 percent of the plans, and others prepared plans for 33 percent of the area. The figures sum to more than 100 percent because owners listed more than one agency or person as preparing their management plan (Birch 1996).

A goal of the USDA Forest Service is to encourage more landowners to create quality land management plans to better manage their lands. The number of landowners enrolled in the Stewardship Program in 1997 was 15,357, somewhat lower than planned owing to reduced funding (USDA Forest Service 1998b). The budget for 1998 was 25 percent higher than the 1997 funding (USDA Forest Service 1998a).

**Research and development**—Research is an important part of forest policy both in Norway and the United States. Forest research is important for forest management, although the effects on NIPFs are indirect. The annual federal and state spending for forestry research in the United States totals US\$ 300 million (Brooks 1993). In Norway, public spending on forestry research and development is approximately Nkr 80 million (US\$ 10.6 million).

Some research and development programs within the USDA Forest Service have similar counterparts in Norway. For example, Forest Products Conservation and Recycling, Rural Community Assistance, and the Wood in Transportation Program (USDA Forest Service 1998a) have aspects in common with programs supported by the Agricultural Development Fund and the Norwegian Research Council.

**Technical assistance**—Technical assistance allows forest authorities to ensure desired private forest management. In Norway, the municipality employee in forestry (required by the Forest Act: “a person with knowledge of forestry”) spent time sharing technical advice with forest owners. According to current municipality employees, however, their workload has changed, and many no longer spend much time in this capacity. There are regional variations and differences according to personal priorities and the local administration. The municipalities have sovereignty to organize the work in the manner they find suitable. Independent forest consultants in Norway are almost extinct, but technical staffs of the forest owners’ associations are taking over some of these functions in many areas. Although the total sum of technical assistance is impossible to estimate, there are probably strong traditions for technical assistance for NIPF owners in Norway.

Similarly, the United States also has long traditions of offering technical assistance to farm woodland owners (Cubbage et al. 1993). The cooperation between federal and state agencies started in 1924 and has changed its client groups and scope to become the Forest Stewardship Act of 1990, title XII of the 1990 Farm bill.



According to National Research Council (1998), state and private industry have assumed the key role in technical-assistance programs over the years. “Service foresters are the primary means of delivering technical assistance; states employed nearly 3,500 service foresters in 1995” (National Association of State Foresters 1995, in National Research Council 1998).

In a study of state regulation, Ellefson et al. (1995) found technical assistance to private forest owners was used more than any other type of program. Technical assistance made up 28 percent of program applications nationwide in 1992 and existed in 88 to 96 percent of all states, depending on the forestry objectives.

**Extension and Education**—Extension services and education programs are, like technical assistance, important for ensuring desired management of private forests. The discussion here, however, does not include forest education within the school system.

The Norwegian Forestry Extension Service Institute is an important player in forestry extension and education. The purpose of the institute is to provide continuing education in forestry and fields related to forestry, to heighten public awareness of the importance of forestry, and to improve methods and technique in forest operations on a small scale and a practical level. The institute arranges seminars and courses on relevant forestry issues at various levels (for forest owners, forest workers, and people within the forest service) and at different locations. The annual public support to the institute is about Nkr 8.5 million (US\$ 1.1 million). The Forestry Extension Service Institute annually serves some 2,000 people. Norway also has a general program for short, locally arranged courses including forestry topics.

According to the National Research Council (1998), the major federal responsibility for extension programs with implications for nonfederal forests in the United States is the USDA-Cooperative State Research, Education, and Extension Services. Among its many educational programs, the most discernible for nonfederal forests are those authorized by the Smith-Lever Act and the Renewable Resources Extension Act. In 1996 and 1997, appropriations in each year to implement these programs totaled US\$ 3.291 million. These funds, partnered with state funds, enable more than 300 cooperative extension forestry specialists and agents to implement the programs.

In a study of state regulation of private forestry in the United States, Ellefson et al. (1995) identified educational programs as the second most common type of program, after technical assistance. Educational programs made up 27 percent of program applications in 1992, and existed in 84 to 94 percent of all states depending on their defined objectives.

**Institutional organizations**—The way the public organizes its agencies, regulations, and responsibilities affects the success of forest policy. The topic is complex and depends largely on factors outside of forestry; traditions and current administrative structure are probably the most important ones. Because there is such a size difference between the United States and Norway, however, comparing their institutions is not productive.

**Voluntary guidelines**—Voluntary guidelines accounted for 13 percent of the program applications in the United States (Ellefson et al. 1995). Voluntary guidelines existed in

30 to 68 percent of the states, varying according to forestry activity. The voluntary guidelines distributed by state forestry agencies provided information about best management practices for protecting timberland aesthetics, wildlife, and water quality. According to Ellefson et al. (1995) “voluntary guidelines for forest management practices are generally favored over regulation due to their unobtrusive effect on private property rights.”

The Norwegian counterpart is the standard for sustainably managed forests agreed to by the Living Forests project. The project was conducted as a joint effort between forest owner groups, forest industry, environmental and recreational organizations, and the authorities from 1995 to 1998. In 1999, Parliament preferred the Living Forests voluntary standards over legally binding regulations for achieving sustainable forest management in Norway.

## **Comparison of Policy Measures Affecting Nonindustrial Private Forests in Norway and the United States**

The previous sections discuss and compare regulatory measures, economic measures, and information and extension services as they relate to forest policy in Norway and the United States. This section provides an overview of the variations in the three groups between the two countries.

The findings presented for the three groups of policy measures indicate that financial assistance to NIPFs is more common in Norway, and comparatively more money is involved than in the United States. For regulations and taxation, there are more variations depending on the issues discussed and in the United States, greater regional differences. The information and extension services described are too diverse to support functional comparisons.

Political and administrative traditions, which differ between and within the two countries, influence the public opinion of appropriate policy measures. The status given to private property rights in the United States makes regulations affecting these rights less favorable, especially in the South. Long traditions of watershed management and other public values in Western forests generally make people, including NIPF owners, less hostile about regulations.

On the contrary, Norway, with a share of privately owned forests similar to that in the Southern United States, has regulations more similar to the Western United States. These regulations generally apply to both private and public forest lands. The long traditions of ownership regulations probably make regulations more accepted in Norway.

Generally, many aspects of the policies aimed at NIPF owners are similar in Norway and the United States. For example, the United States attitude that “carrots are better than sticks” (Cubbage et al. 1993) is similar to the Norwegian principle of freedom with responsibility. The voluntary programs (economic support, information, etc.) are thus favored over mandatory regulations.

The importance of the forest sector and possibly traditions for use of economic incentive programs, explains the greater use of financial incentive programs toward NIPFs in Norway. Again, data presented are not complete, and financial support does not necessarily tell the whole story. Studies of the situations of forest owners, effects of taxation, timber prices, and costs of management is needed to identify differences. To study the contributions from NIPF lands on each country’s economy, a total economic



assessment must be considered. These include, but are not limited to, environmental nonpriced values, forest commodities, and regional forestry employment.

Their dominating role makes NIPF owners a target group for the forest policy in Norway, unlike in the United States. The Norwegian Forest Practices Act, regulations, economic incentives, and information programs were all derived with NIPFs in mind. In the United States, it is argued that the focus on national forests management has left out important aspects of other forest ownerships, such as NIPFs. The United States also has greater regional variations in number of NIPF owners and their share of the ownership; e.g., in the West and the South.

## **Evaluations of Policy Measures**

Although known effects and impacts of the different policy measures are described in the previous sections, the quantifiable results, such as area of planted trees and the number of management plans, do not address whether the policy measures met the political goals of regeneration and better forest management.

This section reviews some policy evaluations and shows the variation in how the outcomes are analyzed. Evaluating the outcomes is often complex because the outcome depends on both the understanding of the goal and the effects in regard to the goal. With ambiguous policy goals, results of different evaluations might vary, which could bias the outcome toward the viewpoint of the evaluator. With a diverse group of stakeholders such as forest owners, industry, and environmental groups, there is a greater chance that evaluators of the same policy will reach different conclusions.

An analysis of subsidy effects on forest activities, based on Norwegian census-data for 1988 for about 41,500 properties, suggests that the subsidies generally have positive effects on timber supply and other silvicultural activities (Loyland et al. 1995).

Framstad (1996) studied the environmental effects of public forestry incentives in Finland, Norway, and Sweden. He found that legislation and economic measures constitute a more investment-friendly and less harvesting-friendly forest policy in Norway than in Finland, whereas the Swedish situation is intermediate. According to the study, Norway has the largest increase in standing volume and the largest percentage of mature forest. Sweden, through detailed regulations and direct subsidies, has undertaken the greatest number of measures to directly enhance biodiversity and amenity. It is, however, too early to measure any effects on the indicators of environmental effects used in this survey.

In an analysis of the evolution of forest policy study, Cabbage et al. (1996) list several policy and program evaluations conducted in the United States. They comment that most of these studies found large positive returns to public forestry programs but that studies with less positive results took more time to be released or were not published formally. As examples of the latter, they mention Newman (1990) for forest management research, and Salazar and Barton (1988) in technical assistance (Cabbage et al. 1996).

Cabbage (1995) indicates that changes in policy and the increasing complexity might make it even more difficult to carry out and to evaluate public programs in the future, by stating, "We have spent the better part of this century trying to inveigle first forest industry, and then nonindustrial private forest landowners, to improve the timber productivity of their lands. These public programs have met with only modest success

and suggest that coercing owners to manage for some as-of-yet undefined ecosystem management state will be even more difficult.”

The National Research Council (1998) has discussed program effectiveness and different ways to evaluate it in the United States. Depending on the goals or priorities, effectiveness is evaluated on biological results, economic effects, influence on landowner behavior, or by program administrators’ judgments. Results of these different approaches differ.

The National Research Council (1998) reports, “Although several studies have shown that fiscal incentive programs have been effective in increasing timber production on private nonindustrial forest lands (Gaddis et al. 1995, Mills 1976, Risbrudt and Ellefson 1983), there continues to be concern over their role in augmenting investments in timber production.” Some main concerns are the substitution of public incentive monies for private capital, effective coordination between involved agencies, predicting the appropriate size for a program, sufficient reporting, and improving the targeting and flexibility of a program.

The National Research Council (1998) cites multiple evaluations of the technical assistance programs, which in general, have shown service foresters to be efficient and effective in positively influencing the forestry activities of landowners. According to the National Research Council (1998), Cabbage and Hodges (1988) found assistance by both private consultants and state foresters likely to be complementary rather than competitive. Nevertheless, there has been concern about the low numbers of NIPF owners seeking assistance from any source in some states (Cabbage and Hodges 1988, and Hodges and Cabbage 1990; referred to in National Research Council 1998).

Also, according to the National Research Council (1998), there is some concern that tax policies might unintentionally lower investments in forests and forest property. The difficulties of tax incentives often relate to questions of policy effectiveness, fairness among forest and nonforest sectors, and the long-term outlook for stability in forest investments, which can potentially affect the integrity of forest ecosystems (for example, fragmenting ecosystems). At a minimum, the tax systems in forestry should promote savings and long-term investments, foster equity with nonforestry investments, be easy to administer and understand, and remain stable over adequate periods to encourage long-term investments.

## **Closing Remarks**

This paper describes the forestry situation in Finland, Norway, Sweden, and the United States, and by way of example, the policy measures affecting NIPF owners in Norway and the United States. Tentative comparisons are made, but the varying definitions and the different data collected make this a difficult task. Standardized definitions and data collected and presented for similar issues would improve comparisons, resulting in a better picture of the real differences between the countries.

Although the Nordic countries and the United States probably have more comprehensive information on forest resources than many other countries, they lack data on important aspects of forests and forestry (e.g., nonwood goods and services). New issues, such as carbon sequestration in forest soils in connection to the Kyoto Protocol, create the

need to revise existing data. There is also the need to improve the understanding of how different parts are functioning together (e.g., ecosystem or landscape approach in planning, and interactions between production of wildlife and timber).

With the limitations described, the preliminary comparison of Finland, Norway, Sweden, and the United States reveals the significance of forests in general, and NIPFs in particular, to the countries of concern. The data presented support a conclusion of forests and forestry as an important sector for cultural traditions and in the national economies.

Our discussion of important forest policy measures affecting NIPFs in earlier sections compares those of Norway and the United States. Because this comparison is more complex than the issues discussed in earlier sections, Finland and Sweden are not included. The complexity in policy measures result from various measures, administrative levels, goals, and target groups. In the United States, the federal measures are better covered than those of state and local governments.

Initial conclusions for Norway and the United States show areas of both similarities and differences. A few examples are highlighted here.

Norway regulates property structure and ownership more thoroughly than does the United States. In the United States, regulations at the federal, state, and local level increase the complexity of regulations affecting NIPFs. The rights of the public to use private forest lands for recreation are more similar between Norway and the Western United States than they are between the Western and Southern regions of the United States.

For economic measures, the discussion is divided between taxation and financial assistance. For taxation, the Forest Trust Fund was found to influence specific forest practices in Norway, whereas in the United States, the tax incentives play a more minor and general role in forest policy. Further, the complexity of taxation schemes in the United States by far overrides the system in Norway.

Financial assistance to NIPFs seems to play a greater role in Norway than in the United States when taking into account the number of owners and the forest area. This comparison is done with incomplete information of state and local support in the United States, but the magnitude of difference is so great that a more complete investigation would most probably give the same result. The data collected here show the same annual support for 9.9 million private forest owners in the United States as for 120,000 forest owners in Norway.

The comparison of information and extension services shows many similarities in types of measures and goals. Assessments of forest resources, management plans, and technical assistance are important in both countries. An obvious difference is the importance of independent consultants in the United States; these are almost nonexistent in Norway.

A comparison of the three broad groups of policy measures affecting NIPFs in Norway and the United States and results of evaluations of these policies are briefly discussed.

The discussion shows how challenging the comparisons are and points to areas for future improvement. The complexity of separating the effects of the forest measures from the bigger picture, varying traditions, the different cultures, and the tax system of each country are also briefly discussed.

The following issues, raised throughout this paper, need further consideration to strengthen the initial comparisons made here.

There is a general lack of knowledge about the effects of policy measures. It is difficult to separate the consequence of a policy tool from those of traditions, expectations, or the market situation and determine its effect. There are also interactions between the different policy measures. To separate the effects completely is impossible, but tracking effects of various changes can uncover more information on some of the relations. The lack of information and the insufficient understanding of the complex interactions point to a need for further improvements, both to make progress in forest management and to increase the awareness of regional differences. For example, a relevant topic is the changes in land use and ownership structure over time in Norway and the United States, given the great differences in regulations.

The outcomes of the policy measures can be defined as the effects of the different measures connected to the policy goals. For example, How do effects correspond to the policy goals? Both a better understanding of the effects and a clear picture of the policy goals are necessary preconditions for evaluating the policy outcomes. With ambiguous policy goals and a complex mix of policy measures, finding the outcomes of each of the policy measures and comparing them between different countries is demanding.

The overall objectives of the policies described are to ensure that NIPFs are managed in ways consistent with public interests. The public costs of the policy measures (direct payment, cost of administration and control) must be lower than or equal to the positive effects (as valued by the public) granted by each tool. Better knowledge of both the costs and outcomes of the various policy measures will make it easier to check this condition and to prescribe necessary changes.

A more thorough comparison of changes in forest policies over time would provide a deeper understanding of both the similarities and differences between the countries. The situation at present, concerning forest resources, ownership, management, and the importance of forestry, is a result of traditions, culture, and earlier forest policies. At the same time, the current situation in each particular region or country must be taken into account when improvements in existing policies or other emerging issues are discussed. A better understanding of the link between the actual situation and the effectiveness of various policy measures in the different areas is needed for further development of forest policies across regions and countries.

Based on the topics covered in this study, I recommend the following for further study.

- Many forest resources are well assessed in Norway and the United States. Still, the differences in definitions applied and data collected, the lack of data on some resources (e.g., nonvalued goods and services), and the complex interactions between the different resources (e.g., timber and tourism) provide considerable

challenges in improving the understanding of similarities and differences both within and between countries. To structure and synthesize relevant information so it addresses emerging issues and is available to the various stakeholder groups will likely become greater challenges as the complexity in both issues and stakeholders increases.

- Management is influenced by ownership and many other factors. A closer look at variation in forest management as related to ownership, changed management objectives on private versus public forest lands, and differences in priority given to various aspects of the forests over time in different countries could improve the understanding of the importance of ownership. The increased understanding of important relationships between ownership and management could be used to improve the policies and programs for both private and public lands.
- The importance of the forestry sector to community well-being, including ecological, economic, and sociocultural contributions, is not fully understood. The value of the different parts (wood products, outdoor recreation, water quality) and their interlinks could be investigated at a local, regional, and national level as a basis for a more comprehensive comparison between countries. Relative changes in valuation of the different parts over time should be tested and taken into account in relevant policy decisions.
- Given the increased international focus on sustainable forest management, a comparison of environmental awareness and measures to protect and develop environmental values between countries would be interesting. This could include changes in regulations, economic support programs, and extension services. A closer look at differences in forest management over time as compared to the stated policy goals in different countries could improve the understanding of the effects of different policies in various countries. Other examples of country-specific changes in environmental attitude worth investigating are recycling of paper, share of certified forest land and products, and use of wood for energy.
- For a more complete comparison between policy measures affecting NIPFs in Norway and the United States, some of the preliminary findings in this paper must be checked more thoroughly. The indication of a stronger use of economic incentives in the Norwegian forest policy must be tested. The actual spending on various measures must be detected in both countries and compared to the respective activity levels. Also, the scale of regulations and variation in issues regulated need to be investigated further both within the United States and as compared to Norway. Regional variations in the United States and the differences caused by different definitions in the two countries could be further elaborated.
- A more comprehensive comparison could possibly detect the effects of cultural differences between the regions in the United States and between the United States and Norway. Culture is likely to influence the position of the different policy measures in each area, as well as the responses to changes in policy measures. Better knowledge of responses to former changes and expectations about the future could provide important information in developing effective measures to meet new policy goals. Also, awareness of all the variations might increase the understanding between countries in international negotiations.
- To further increase the understanding of the composition and effectiveness of the various policy measures, a broader approach could be taken. The measures could be

investigated at different steps of their development, for example, when an issue is first on the policy agenda, through the policy formulation, adoption, implementation, and evaluation. If this can be done in a consistent way across boundaries, the results would provide a much better basis for comparisons both between countries and within countries.

## Acknowledgments

This report is a result of 3 months work by Berit Hauger Lindstad in the United States in 1998 financed by the Norwegian Ministry of Agriculture, Forest Department and the Development Fund for Forestry, Norway. The financial support is greatly appreciated.

Special thanks go to David J. Brooks, USDA Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, Corvallis, OR, U.S.; Birger Solberg, Agricultural University of Norway, Aas, Norway; and Knut Oistad, Ministry of Agriculture, Oslo, Norway, for their contributions.

The comments from three anonymous technical reviewers of earlier drafts of the paper are also sincerely acknowledged.

## English Equivalents

<b>When you know:</b>	<b>Multiply by:</b>	<b>To find:</b>
Cubic meters (m <sup>3</sup> )	35.315	Cubic feet
Hectares (ha)	2.47	Acres
Krone (Nkr)	.113	U.S. dollars (\$) [Exchange rate on October 17, 2001]



## References

- Agricultural University of Norway [NLH]. 1998.** Virkemidler for økt verdiskapning i skogen og skogbaserte næringer. Rapport fra et utredningsoppdrag for Landbruksdepartementet og Nærings- og handelsdepartementet: To increase the value adding in forests and forest based enterprises. A task report requested by the Norwegian Ministry of Agriculture and the Norwegian Ministry of Trade and Industry. Department of Forest Sciences. 80 p. [plus appendices].
- Beuter, J.H. 1997.** The evolution of forest management and timber policies in the United States. In: Schmithusen, F.; William, C.S., eds. Developments in forest and environmental law influencing natural resource management and forestry practices in the United States of America and Canada. IUFRO Secretariat Vienna and Chair of Forest Policy and Forest Economics, ETH Zurich 1997: IUFRO World Series Vol. 7, Selected Contributions submitted to the IUFRO research Group 6.13.00 Forest Law and Environmental Legislation: 16-28.
- Birch, T.W. 1996.** Private forest-land owners of the United States, 1994. Resour. Bull. RB-NE-134. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 183 p.
- Bosselman, F.; Callies, D.; Banta, J. 1973.** The taking issue. Washington, DC: U.S. Government Printing Office. 320 p.
- Brooks, D.J. 1993.** United States forests in a global context. Gen. Tech. Rep. RM-GTR- 228. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 24 p.
- Brooks, D.J.; Pajuoja, H.; Peck, T.J. [et al.]. 1996.** Long-term trends and prospects in world supply and demand for wood. In: Solberg, B., ed. Long-term trends and prospects in world supply and demand for wood and implications for sustainable forest management. European Forest Institute, Research Report No. 6. Joensuu, Finland. 150 p.
- Cubbage, F.W. 1995.** Forest resources, ecosystem management, and social science education: promises, problems, and prospects. *Journal of Natural Resources and Life Sciences Education*. 24: 116-125.
- Cubbage, F.W.; Cortner, H.J.; Bruke, S. 1996.** Evolution of the study of forest policy in the United States. *Journal of Forest Economics*. 2(3): 233-256.
- Cubbage, F.W.; Hodges, D.G. 1988.** Public versus private provision of forest management assistance: a Georgia case study. *Resource Management Optimization*. 6(2): 103-120.
- Cubbage, F.W.; O’Laughlin, J.; Bullock, C.S., III. 1993.** Forest resource policy. New York: John Wiley and Sons, Inc. 562 p.
- Ellefson, P.V.; Cheng, A.S.; Moulton, R.J. 1995.** Regulations of private forestry practices by state governments. Station Bull. 605-1995. St. Paul, MN: Minnesota Agricultural Experiment Station, University of Minnesota. 225 p.
- Food and Agricultural Organization (FAO). 1995.** Forest resources assessment 1990: global synthesis. Forestry Paper 124. FAO, Rome. 44 p.
- Framstad, K.F. 1996.** Environmental effects of public forestry incentives in Finland, Norway and Sweden. *Journal of Forest Economics*. 2(3): 289-313.

- Gaddis, D.A.; New, D.B.; Cubbage, F.W. [et al.]. 1995.** Accomplishments and economic evaluations of the forestry incentives program: a review. Southeastern Center for Forest Economics Research Working Paper No. 78. Research Triangle Park, NC: Southeastern Center for Forest for Forest Economics Research. 52 p. [plus appendices].
- Hansen, B.L. 1978.** Protection of recreation and scenic beauty under the Washington Forest Practices Act. *Washington Law Review*. 53: 443-470.
- Hickok, H. 1996.** Introduction to environmental law. San Francisco: Delmar Publishers. 404 p.
- Hodges, D.G.; Cubbage, F.W. 1990.** Adoption behavior of technical assistance foresters in the southern pine region. *Forest Science*. 36(3): 516-530.
- Loyland, K.; Ringstad, Y.; Oy, H. 1995.** Determinants of forest activities: a study of private nonindustrial forestry in Norway. *Journal of Forest Economics*. 1(2): 219-237.
- Metla. 1997a.** Finnish statistical yearbook of forestry 1997. Finnish Forest Research Institute, Metla. Helsinki, Finland. 348 p.
- Metla. 1997b.** Forest Finland in brief 1997. Finnish Forest Research Institute, Metla. Helsinki, Finland. 48 p.
- Mills, T.J. 1976.** Cost-effectiveness of the 1974 forestry incentives program. Res. Pap. RM-175. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. [Pages unknown].
- Moulton, R.J. 2001.** Personal communication. Economist (retired), U.S. Department of Agriculture, Forest Service, Southern Research Station, Forestry Sciences Laboratory, Research Triangle Park, NC 27709.
- Moulton, R.J.; Snellgrove, J.D. 1997.** Tree planting in the United States 1996. Washington, DC: United States Department of Agriculture, Forest Service, State and Private Forestry, Cooperative Forestry. 17 p.
- National Association of State Foresters. 1995.** 1994 report. State Forestry Statistics Committee. 35 p.
- National Research Council. 1998.** Forested landscapes in perspective: prospects and opportunities for sustainable management of America's nonfederal forests. Washington, DC: National Academy Press. 249 p.
- Newman, D.H. 1990.** Shifting southern softwood stumpage supply: implications for welfare estimation from technical change. *Forest Science*. 36(3): 705-718.
- Northern Forest Lands Council. 1994.** Finding common ground: conserving the northern forests. Augusta, ME: Maine Department of Conservation. 98 p.
- Oistad, K.; Eid, J.; Ellefson, P.V. 1992.** Norway's forest trust fund: innovative support for nonindustrial private forests. *Journal of Forestry*. 90(6): 17-20.
- Peck, T.J.; Brooks, D.J.; Pajuoja, H. [et al.]. 1996.** Implications for sustainable forest management. In: Solberg, B., ed. Long-term trends and prospects in world supply and demand for wood and implications for sustainable forest management. European Forest Institute, Research Report No. 6. Joensuu, Finland. 150 p.
- Popvich, L. 1984.** Whither regulations? *American Tree Farmer*. 3(3): 9.



- Risbrudt, C.D.; Ellefson, P.V. 1983.** An economic evaluation of the 1979 forestry incentives program. Station Bulletin 550-1983. St. Paul, MN: Agricultural Experiment Station, University of Minnesota. [Pages unknown].
- Roberts, E.F. 1974.** A basic introduction to land use control and doctrine. In: Proceedings of the conference on rural land-use policy in the Northeast. Ithaca, NY: Northeast Regional Center for Rural Development, Cornell University: 13-53.
- Royal Norwegian Ministry of Agriculture. 1994.** Norwegian forest management. Oslo, Norway: Norway Information. 6 p.
- Salazar, D.J.; Barton, A. 1988.** Measuring the value of technical forestry assistance: the Washington case. (Mimeo) Seattle, WA: University of Washington, College of Forest Resources. [Pages unknown].
- Siegel, W.C. 1997.** Legislative regulation of private forestry practices in the United States: recent trends. In: Schmithusen, F.; Siegel, W.C., eds. Developments in forest and environmental law influencing natural resource management and forestry practices in the United States of America and Canada. IUFRO Secretariat Vienna and Chair of Forest Policy and Forest Economics, ETH Zurich 1997: IUFRO World Series Vol. 7, Selected Contributions submitted to the IUFRO research Group 6.13.00 Forest Law and Environmental Legislation: 305-316.
- Skogstyrelsen. 1997.** Statistical yearbook of forestry 1997. Official statistics of Sweden. Jonkoping, Sweden: National Board of Forestry. 349 p.
- Smith, W.B.; Faulkner, J.L.; Powell, D.M. 1994.** Forest statistics of the United States: 1992 metric units. Gen. Tech. Rep. NC-GTR-168. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 147 p.
- Statistics Norway. 1997.** Forestry statistics 1995. Official Statistics of Norway, C 394. Oslo-Kongsvinger. 96 p.
- U.S. Department of Agriculture, Forest Service. 1998a.** Connecting forestry to people in 1999: the state and private forestry programs. State and Private Forestry. 8 p.
- U.S. Department of Agriculture, Forest Service. 1998b.** Report of the Forest Service: fiscal year 1997. Washington, DC: U.S. Department of Agriculture, Forest Service. 147 p.
- Wolfgram, S. 1984.** Regulations grow in New York. American Tree Farmer. 3(3): 13-14.
- World Resources Institute; United Nations Environment Programme; United Nations Development Programme; World Bank. 1996.** World resources 1996-97. Oxford University Press: 365 p.
- Youell, C.E. 1984.** Connecticut forests are ready: the citizens aren't! American Tree Farmer. 3(3): 71.

This page has been left blank intentionally.

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

#### **Pacific Northwest Research Station**

<b>Web site</b>	<a href="http://www.fs.fed.us/pnw">http://www.fs.fed.us/pnw</a>
<b>Telephone</b>	(503) 808-2592
<b>Publication requests</b>	(503) 808-2138
<b>FAX</b>	(503) 808-2130
<b>E-mail</b>	<a href="mailto:pnw_pnwpubs@fs.fed.us">pnw_pnwpubs@fs.fed.us</a>
<b>Mailing address</b>	Publications Distribution Pacific Northwest Research Station P.O. Box 3890 Portland, OR 97208-3890

---

U.S. Department of Agriculture  
Pacific Northwest Research Station  
333 S.W. First Avenue  
P.O. Box 3890  
Portland, OR 97208-3890

---

Official Business  
Penalty for Private Use, \$300