

# America's Private Forests

## Status and Stewardship

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THIS SECTION PROVIDES background and context for our recommendations for an action plan to promote the conservation of private forests in the United States. We will examine the changing nature of private forests and private forest ownership at the end of the twentieth century as a basis for understanding the major threats to the maintenance of this large and important resource as fully functioning forests in the twenty-first century.

Forests occupy an estimated 747 million acres, or one-third of the nation's land area, and 58% or 430 million acres are privately owned.<sup>1</sup> The private forests of the United States account for 30% of the world's total. U.S. forest types and forest ownership are many and varied, forming a complex whole. While much attention (and no small amount of controversy) is directed at the management of federal forests and the operations of the forest products industry, both hold relatively modest portions of the nation's total forests (figure 1). Almost half of America's forests are held by some 9.3 million nonindustrial private owners. Any serious forest conservation effort must therefore consider what is happening on these lands and why.

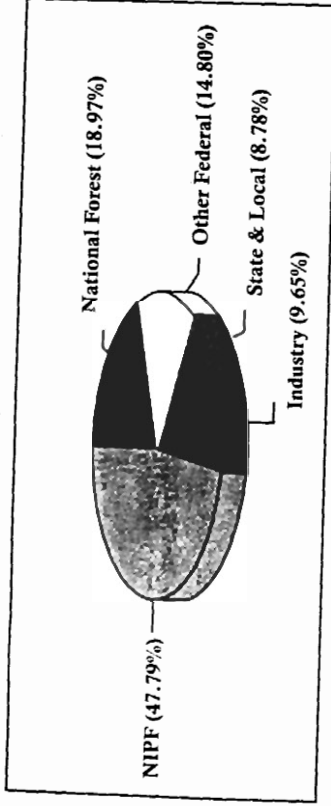
We will look carefully at the people and businesses involved in forest ownership. Today humans are the most significant force in ecosystems, shaping the forest as surely as fire does. It is humanity's collective sense of values that has guided our interactions with forests through history. And those values change. What was once seen as "good" (carving a field out of the wilderness for a family's home) may now be seen as "bad" (cutting the last old growth, or fragmenting a forest habitat). The values, needs, and goals of forest landowners must be central to our understanding of the opportunities and strategies for conservation.

We also look at the land itself, and the character of the forest ecosystems involved.<sup>2</sup> These are not the same forests encountered by explorers and pioneers, nor are they even the same as those of a half century ago. In many places, they are forests that, in an ecological sense, contain an entirely different set of species, structures, and processes than may ever

1. The forest statistics in this report are taken either from USDA Forest Service data for 1992 (Powell et al.) or from the recently released 1997 RPA.

2. We use the terms *forests* and *forest ecosystems* interchangeably, since we view a forest as a discrete piece of the landscape, complete with all living and nonliving components, affected by all energy and material flows into and out of it. For literary convenience, we avoid the longer term except when context seems to demand its use.

Figure 1  
Forestland ownership (United States, 1992)



have existed before. Where that is the case, scientists may have few guides as to how these forests will continue to change and adapt in the future.

Will this combination of human and natural changes result in a sustainable forest—sustainable in the sense that the forest will continue to maintain its ecological processes and functions—or will they result in an entirely different ecosystem, perhaps one that is grassland, or even desert? While deserts have their own intrinsic values, they are not the same values forests have, and the difference is significant to many people. Further, if that difference was created, or exacerbated, by human actions, people are responsible for what has occurred. Thus our focus is on the forest and its capacity. Can it sustain its ecological integrity under the pressures of current human activity, or is its future imperiled? Can we identify the root causes of the potential threat and affect them in a more positive way?

## Chapter One

# Who Owns the Forest and Why?

### Profile of Private Forestland Owners

The ownership of U.S. private forests is exceptionally diverse, as tables 1-1, 1-2, and 1-3 illustrate. In this chapter we will provide information that will promote understanding of the universe of owners. Those concerned with the future of private forests need to go beyond received wisdom and look closely at who owns what and why. The chapter closes with an analysis of recent trends and a discussion of implications for the future.

The data that exist to describe the nature of private forest ownership are useful to examine, but are not as complete as they could be. The primary current national source is a 1994 study led by Thomas Birch for the USDA Forest Service. This survey of private forest ownerships included in its base all of the private timberlands as well as key portions of other forests, estimating that there were around 9.9 million private ownerships holding 393 million acres of forestland (Birch 1996). The estimate of forestland acreage used by Birch is different from the usual estimate of acreage cited by the USDA Forest Service (424 million) because Birch started with the base of private timberland (358 million acres) and added to it a sampling of other forestland. Table 1-2 presents a snapshot of forest ownership by size classes of ownerships. Refer to appendix B, tables, for more ownership detail by state and region.

**Table 1-1.**  
Forestland acres (000s) by ownership in the United States, by region

Region	All Owners		Forest Service		Other Federal		State and Local		Forest Industry		Percent Total	
	138,447	71,255	26,119	5,921	2,939	2.1%	32,213	23.3%				
Inter-mountain	127,380	11,250	55,499	24,756	0	0.0%	32,213	28.1%				
Alaska	51,612	22,352	5,011	3,663	9,595	18.6%	10,991	21.3%				
Pacific NW	40,296	16,748	3,918	1,720	3,140	7.8%	14,768	36.6%				
Pacific SW	4,798	1,223	100	226	0	0.0%	3,248	67.7%				
Great Plains	84,842	9,064	1,549	15,629	3,814	4.5%	54,785	64.6%				
North Central	85,484	2,544	776	11,594	11,158	13.1%	59,412	69.5%				
Northeast	125,438	6,870	2,859	2,954	22,529	18.0%	90,226	71.9%				
South Central	88,662	5,470	4,114	3,291	14,511	16.4%	61,277	69.1%				
<b>Total U.S.</b>	<b>746,958</b>	<b>146,777</b>	<b>99,945</b>	<b>69,754</b>	<b>67,687</b>	<b>9.1%</b>	<b>362,796</b>	<b>48.6%</b>				

**Table 1-2.**  
Profile of U.S. private forestland ownership by owners and acres

	1-9 acres	10-99 acres	100-499 acres	500-999 acres	1,000+ acres	Total
Landowners	5,795,000	3,480,000	559,000	41,000	27,000	9,902,000
% Total owners	58.52%	35.14%	5.65%	0.41%	0.27%	100%
Forest acres	16,600,000	107,600,000	91,600,000	24,500,000	153,000,000	393,300,000
% Total acres	4.22%	27.36%	23.29%	6.23%	38.90%	100%

In addition to the Birch study, we utilize regional and subregional surveys and analyses of ownership characteristics from a variety of sources, which will be cited as we proceed. Unfortunately, there are many basic things that the data do not yet tell us, such as the median size of ownership, the average sizes of parcels within ownerships, and the income levels, races, and other demographic details of the individual owners. Nonetheless, a review of the literature presents us with very useful information for informing a strategy for conservation of private forests.

Private forests are generally separated into two categories: industrial and nonindustrial. This distinction can be somewhat confusing, since *industrial*

**Table 1-3.**  
Forest owners by type of entity

Ownership Type	Ownerships	% Ownerships	Acreage (000s)	% Acreage	Average Acreage
Forest industry	13,300	0.13%	79,715	20.26%	5994
Farm	2,431,300	24.55%	111,450	28.33%	46
Industrial business	30,700	0.31%	9,031	2.30%	294
Real estate	236,200	2.39%	15,948	4.05%	68
Other business	74,600	0.75%	3,986	1.01%	53
Recreation club	116,200	1.17%	7,768	1.97%	67
Public utility	800	0.01%	2,248	0.57%	2810
Individuals	6,765,000	68.32%	133,521	33.94%	20
Other	233,600	2.36%	29,722	7.56%	127
<b>Total</b>	<b>9,901,700</b>	<b>100.00%</b>	<b>393,389</b>	<b>100.00%</b>	<b>40</b>

in this context means a company that owns both forestland and mills to process forest products. Thus, industrial forestland may be held in million-acre tracts by a multinational corporation, or it may be a 160-acre parcel owned by a small local sawmill. A large oil company or institutional pension fund that owns forestland but does not own a wood-processing facility will be found in the nonindustrial category. The nonindustrial category encompasses land that may be held by an individual with 5 acres as well as hundreds of thousands of acres held by Alaska Native corporations. In some cases it is possible to tease some of these differences out of the data sets, but often the distinctions are difficult or impossible to determine.

Table 1-3, which describes ownership types compiled from the 1994 Birch study, provides some illumination on the kinds of entities that own forestland. Looking at this table, we can begin to appreciate the diversity of non-industrial owners. While individuals and farms are the largest ownership types overall, the forest industry clearly has the most concentrated control.

It may be most useful to consider forest landowners not by distinctions of mill ownership, but rather by size. Large, medium, and small ownerships, whether with or without mills, tend to share common attributes within their size categories. Therefore, we will utilize the following categories for analysis of the characteristics of private forest landowners:

### Residential Forest Owners: 1-9 Acres

This size ownership is essentially residential in nature. While these parcels retain some forest characteristics and contributions, from the point of view of ecological functionality and timber productivity they are effectively converted from forest use. Even with sporadic timber harvesting or ongoing wildlife management, very small forest tracts are dominated by residential uses, including buildings, exotic landscapes, and domestic animals. Tree management is generally more horticultural than silvicultural at this size.

### Small Forest Owners: 10-99 Acres

This size ownership represents the average current tract size. This is also the size category experiencing the greatest growth in numbers of owners and acres represented. Though very fragmented in nature, these forest properties can still provide many major forest values. They can be managed for periodic timber or other forest-based revenue, though major harvest typically occurs only once or twice in an owner's lifetime.

### Medium Forest Owners: 100-999 Acres

This class of forest ownership can form the building blocks of larger, more functional forest landscapes. As individual holdings, these parcels can be managed for regular economic return for forest products more readily than can parcels of smaller size. This size ownership is akin to the "shrinking middle class," contributing acres through increasing subdivision to the swelling numbers of small forest landowners in the last twenty years.

### Large Forest Owners: 1000+ Acres

At this threshold, forestland becomes more likely to be held for commercial timber production and decisions regarding its management are more likely to be driven by financial considerations than is the case with smaller ownerships. Although on a national basis this class of ownership has slightly decreased in extent, this trend is very regional in nature, with the North losing more large tracts to fragmentation and the South consolidating medium-sized tracts.

As shown in table 1-2, while almost 60% of forest owners own less than 10 acres, their impact on the forest landscape is a tiny 4%. At the other end of the spectrum, large forest landowners comprise just one-quarter of 1% of the total but control almost 40% of U.S. private forests.

Figure 1-1.

Forest ownerships as percent of total by size (including size categories > 9 acres)

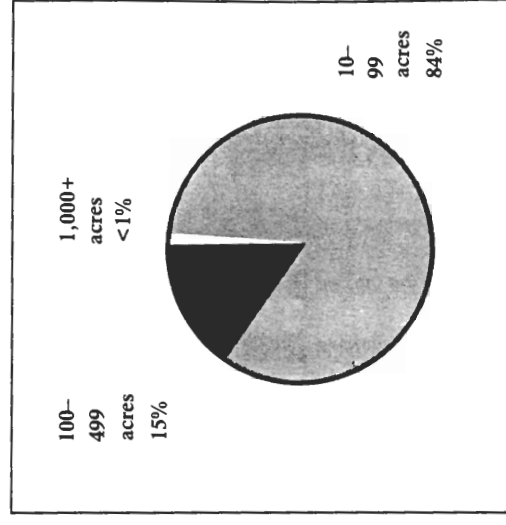


Figure 1-2.

Forestland ownerships as percent of total private forest acreage (including size categories > 9 acres)

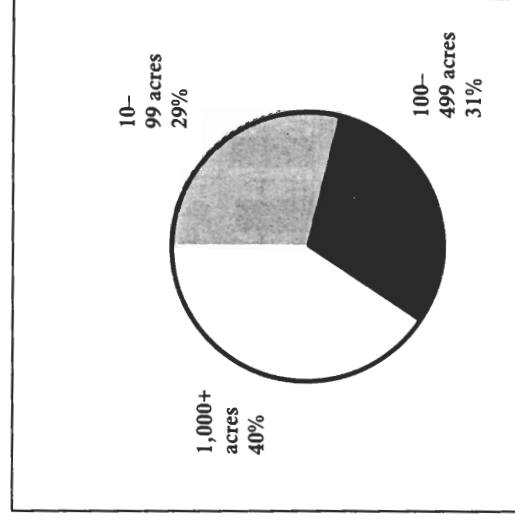


Figure 1-3.  
Primary reason for owning forestland (millions of owners)

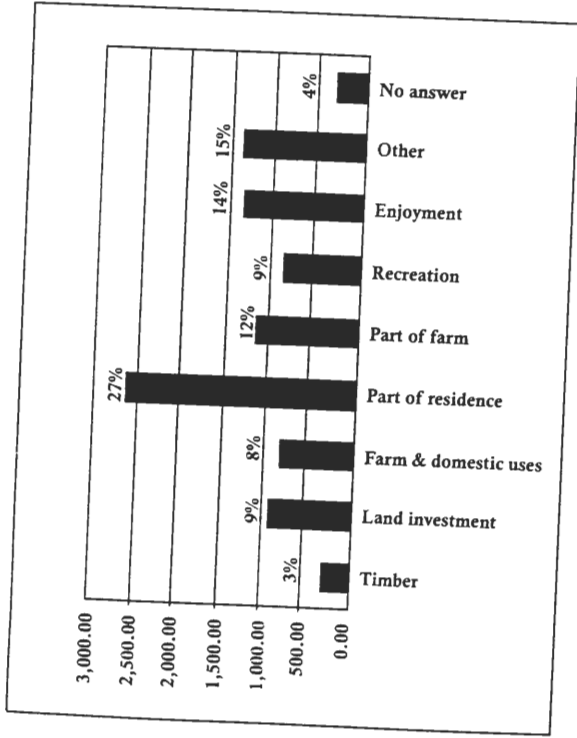
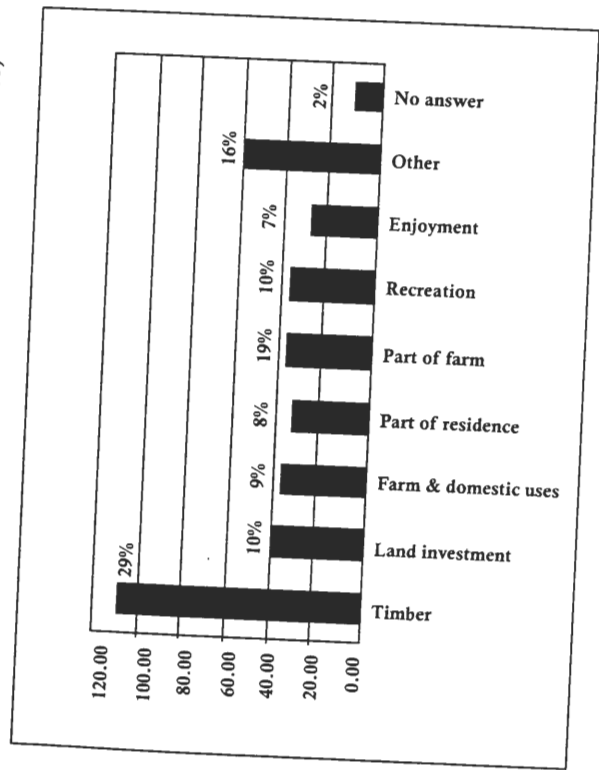


Figure 1-4.  
Primary reason for owning forestland (millions of acres)



If the residential owners' share of total private forest ownerships is excluded, the ownership picture changes to better reflect the realities of forest management and conservation. With an estimated forestland base of 376,700,000 acres having 4.1 million owners, the average parcel is 92 acres (versus 40 acres if the residential owners are included). Small landowners comprise 84% of owners and control 29% of the forest. Medium landowners comprise 15% of the total with 31% of the acres. The large landowners still number less than 1% while accounting for 40% of private forest (figures 1-1 and 1-2).

**Why People or Businesses Own Forestland**

The following charts based on the Birch 1994 data (figures 1-3 and 1-4) give us some indicators of the reasons different entities own forests. (Because of the way the Birch data is published, these and other data presented in this section include the 5.8 million residential forest owners, thereby providing some bias toward this group.) While the data are not crystal clear, they suggest that U.S. private forests are owned roughly equally by those with primarily "productive" or economic motives and those who own forests for "nonproductive" personal, cultural, and/or ecological values.

Almost 40% of owners, by far the largest block, state that their primary reason for owning forestland is simply that it is a part of their residence or farm. Another 23% characterize their primary reason as being for recreation or for the sheer enjoyment of owning forestland.

Just 20% of forest owners state that their primary reason for ownership is economic. These owners have forests either for timber (about 3%), real estate investment, or as a productive part of a farm or home, yielding timber, fence posts, or firewood. However, as figure 1-4 illustrates, this group of owners controls almost half of U.S. private forests, with timber production alone representing 30%.

Still, substantial forest acreage, often in the smaller ownership size classes, is held for its noncommercial values. In fact, included in the 16% of "other" uses is cultural use by Native Americans. (Other uses also include mineral extraction; for owners of mineral rights, the trees are incidental to other economic use.) Various surveys of forest landowners indicate that smaller landowners rank enjoyment of forest ownership highest compared with larger landowners. Although it is very difficult to generalize, it appears that as tract size and value and frequency of timber

**Table 1-4.**  
Ownership expectations of future timber harvest

Expected Future Harvest	Percent of Owners	Percent of Acres
1-10 years	31.6	63.1
Indefinite	27.7	23.1
Never	34.9	11.5
No answer	5.8	2.3

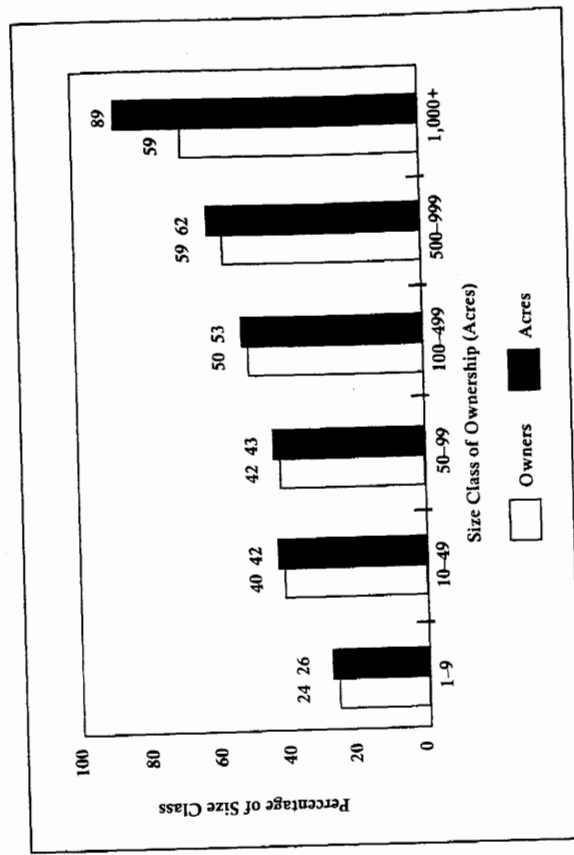
revenue increase, timber production becomes a primary reason for ownership.<sup>1</sup> Nonetheless, most of those owners also have multiple goals, combining timber production and other values.

Some interesting variations show up when the primary reasons for ownership are compared with owners' statements of the benefits they desire to derive from that ownership in the next ten years. Questioned in this way, more owners indicate their intent to gain income from timber harvest, increasing the acreage oriented to timber production from 29% to 33%. Strikingly, while only 9% of owners state that land investment is their primary reason for owning forestland, 20% expect to reap the benefit of increased land value in the next decade. This 20% appears to be weighted heavily toward smaller landowners. All in all, many owners are expecting greater productive uses of their forests in the coming period, increasing to 45% of ownerships and 63% of forest acreage.

It is also worth noting that expected enjoyment of forest ownership markedly increased as a primary reason for ownership, from 14% of owners to 34% and from 7% of acreage to 16%. This increase is probably attributable to the responses of many whose primary reason for owning land in the first place was incidental to ownership of a residence or farm.

1. In a study of 1,300 Virginia private forest landowners, researchers found that both harvesters and nonharvesters rated preservation of nature, scenic values, and wildlife as their top reasons for owning forestland (Hodge and Southard 1992). Similarly, a 1994 survey of primarily larger NIPFs in Indiana, Utah, and the Southeast found that the highest-rated reasons for forest ownership were preservation of wildlife habitat, maintenance of natural beauty, personal recreation, and simple satisfaction of ownership (Brunson et al. 1996).

**Figure 1-5.**  
Percentage of ownerships and acreages with intent to harvest within next 10 years by size class



### Timber Harvest Activities of Various Landowners

Looking at these data should be reassuring to those concerned about future timber supplies, as the vast majority of owners indicate their willingness to cut timber at some point. According to Birch (1996), 46% of forest owners, who own 78% of all forests, had previously harvested timber on their land. Table 1-4 shows that almost 60% of owners, with 86% of forest acreage, intend to harvest in the future. At the time of Birch's survey, only 11% of private forests were owned by people with no intent to ever harvest.

Figure 1-5 shows ownership organized by size class for both number of owners and acres in each class. We will consider timber harvesting further when we focus on the behavior and attitudes of individual nonindustrial owners in the next section.

In general, the harvest behavior of industrial and nonindustrial landowners is different. Industrial forestlands are owned primarily for fiber output to supply processing facilities; therefore fiber output is maximized to the degree possible. Nonindustrial forestlands are held for a wide variety of reasons. Ownership surveys find that in general NIPFs are not opposed to timber

harvest. In the South, for instance, historical rates of harvest for industry and NIPF owners are comparable (Alig et al. 1990a). However, current research indicates that NIPFs value their standing timber more than industrial owners. This seems to be due to the value NIPF owners put on non-timber forest resources, "receiving non market (non measured) benefits from holding timber in place" (Newman and Wear 1993). In other words, while NIPF owners will harvest timber, they also highly value the amenities provided by the forest itself.

### Degree of Forest Management Planning by Landowners

The USDA Forest Service estimates that in 1993 5% of owners had written management plans for their forests. These owners—most likely from the same group that gave timber production as a primary reason for and benefit of forestland ownership—hold 39% of private forests. Forty-three percent of them are industrial owners and 57% nonindustrial. Most forest management plans focus on timber harvest. It is not known to what degree ecological resources are included. Given that so many NIPF owners have multiple goals for their forests, with timber harvest included but not primary, there are great opportunities to expand owner engagement in forest management planning if a greater emphasis is placed on overall forest stewardship than on commercial timber harvest.

### Length of Forest Ownership

Greater ownership turnover tends to lead to reductions in parcel size and increased fragmentation of forestland. Forests are turning over faster than it takes for them to mature. As each new owner takes title, new goals for the land are set. Inconsistent forest management and even overharvesting over time can be the result. The dates forest owners of all types acquired their forestland show that more than 40% of owners acquired forestland for the first time since 1978. These recent acquisitions involved 23% of private forest acreage (Birch 1996; figures 1-6 and 1-7). Only 30% of forest acreage has been held forty-five years or more, in less than 10% of ownerships.<sup>2</sup> We will look at some of the trends apparent in recent turnover at the end of this section.

2. Some 11% of private forests or 44.7 million acres has been held in the same ownership since before 1900 by an estimated 66,600 owners. Eighty-eight percent of these owners are farmers or individuals; 0.3% or two hundred are from the forest industry.

Figure 1-6.

Private forest ownerships by date of acquisition  
(percent of owners in 1978 and 1994)

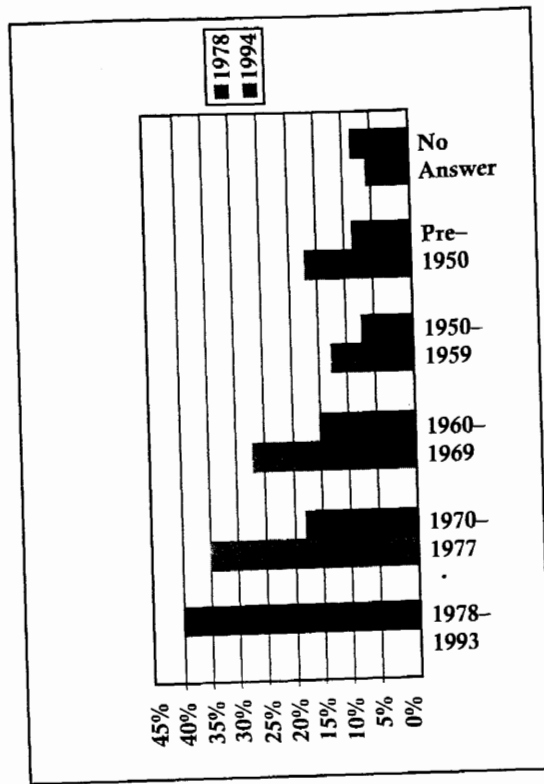
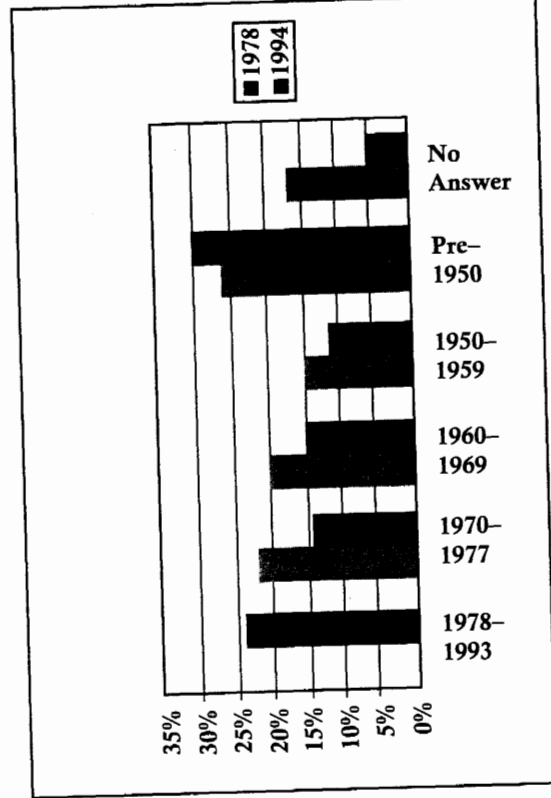


Figure 1-7.

Private forest acreage by date of acquisition  
(percent of acres in 1978 and 1994)



When the diversity of private forest landowners and the diversity of their goals in forest ownership are considered, it becomes easier to understand the impact of changing ownerships on the forest itself. Aside from the clear trend of more ownerships and smaller parcel sizes at every size class, turnover in forest ownership has other impacts. Whether large or small, industrial or nonindustrial, the land use decisions of each owner are imprinted on the forest and lasting in nature. The rate and intensity of timber harvest, road and home building, agricultural conversion, introduction of exotic species, and other activities often are compounded through time by turnover in ownership.

### Focus on Nonindustrial Private Forest Owners

As of 1997, nonindustrial private owners held about 326.8 million acres of forestland, of which 290.8 million were classified as timberland. This represents 58% of all timberland. (See appendix table B-1 for state and regional details of forest- and timberland ownerships by acres.) Some 72% of the nation's hardwood inventory and 30% of softwood are found on nonindustrial timberland. About 60% of the commercial timber stocking on NIPF land is hardwood. Statistics do not yet capture the stocks of non-commercial species or species occurring on "other forestland."

Nonindustrial ownerships are most numerous in the East. About 42% of the NIPF forests are in the southern regions (comprising 70% of all forestland in the South) while 32% are in the North Central and Northeast regions (comprising about 67% of forestland in these states). Viewed another way, southern NIPFs own 49% of U.S. timberland; in the North Central and Northeast regions, they own about 40%. Western NIPF ownerships are 25% of total NIPF forests; controlling about 25% of forestland in their states.

Of the nontimberland held by private owners in the United States, 36% is in Alaska, largely held by Alaskan Native corporations. Another 25% is found in the Four Corners region (Arizona, Colorado, Utah, and New Mexico), largely as pinyon-juniper woodlands; 15% is in California's woodlands; and 10% occurs in Texas, largely as mesquite woodlands. For most of the remainder of the nation, NIPF forests are almost entirely classified as timberland.

As already noted, nonindustrial forestland owners are especially diverse. This discussion focuses most of its attention on the vast majority of NIPF owners, including residential forest owners who are individuals or families.

**Table 1-5.**  
Size distribution of individual ownerships (1994)

Size class	Individual Ownerships	% Total Owners	Acreage	% Total Acres
1-9 acres	5,583,100	59.91%	15,847,000	7%
10-99 acres	3,212,500	34.47%	98,701,000	42%
100-499 acres	479,300	5.14%	77,137,000	33%
500-999 acres	28,900	0.31%	17,015,000	7%
1,000-4,999 acres	12,300	0.13%	17,051,000	7%
5,000+ acres	3,300	0.04%	6,596,000	3%
<b>Total</b>	<b>9,319,400</b>	<b>100%</b>	<b>232,347,000</b>	<b>100%</b>

Separately below we will examine two other important NIPF owner types: institutional investors and Native Americans. In understanding individual nonindustrial forest landowners, perhaps the most important thing to grasp is that they are essentially no different in their attitudes and sociodemographic profiles from Americans in general. There are some important distinctions, however. Generalizing the characteristics of some 9 million individual Americans who own forests obviously requires oversimplification, but the available evidence suggests the conclusions below.

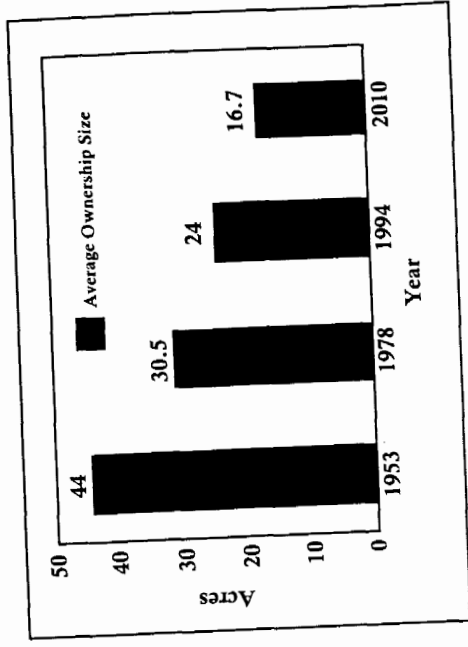
America's forest owners are, like the general population, aging (figure 1-8). In 1994, 24% of the NIPF forestland was held by individuals over 65 years of age. This was up from 19% in 1978. Between 1978 and 1994 (figure 1-8) the amount of forestland owned by retirees increased from 47 million acres to 77 million.

Also, like the rest of the population forest landowners are more urban oriented (figure 1-9) than they used to be. Between 1978 and 1994, the amount of forestland owned by farmers and blue-collar workers dropped from 90 million acres to 60 million, while the amount owned by white-collar workers increased from 49 million acres to 68 million. It is likely that the increase in retirees has been drawn from rural, farming, and/or blue-collar owners as well as from new owners retiring from the city.

The average size of individual ownerships<sup>3</sup> has been shrinking for years and is now, or soon will be, under 20 acres (figure 1-10).

3. Including residential owners but apart from nonindustrial companies, private organizations, Native American tribes, and the like.

Figure 1-10. Size of individual nonindustrial forest ownerships since 1953



The environmental attitudes of NIPF forest owners are indistinguishable from those of the general population. In a conflict between environmental and economic interests, a majority of NIPF landowners think environmental interests should prevail.<sup>4</sup> (Bliss et al. 1997)

Larger forest landowners and those with a greater financial stake in timber harvest oppose government regulation as a means of achieving environmental goals (Bliss et al. 1997; Johnson et al. 1997). As the attitudes of NIPF owners toward the environment and regulatory protection of nontimber resources are important to understand, we will discuss them further below.

**Contributions of Nonindustrial Owners to Timber Harvest**

These landowners as a class consistently provided 47 to 52% of the timber harvested in the United States for the forty years from 1950 to 1990 (Alig et al. 1990a). As discussed further in chapter 2, during the 1990s, the NIPF share of harvests rose to 60%, a dramatic increase from historic levels driven by reductions in supplies from federal and industrial sources. This increased share is expected to continue for at least the next fifty years. Softwood sup-

4. In a 1993 Pennsylvania survey, forest landowners more than the general public were found to engage in environmentally prompted actions such as utilizing environmental criteria in their buying decisions. As one reviewer commented, "The 'typical' Pennsylvania landowner is apparently an environmental 'activist'" (Jones et al. 1995).

Figure 1-8. Distribution of acreage owned by individuals by owner age class

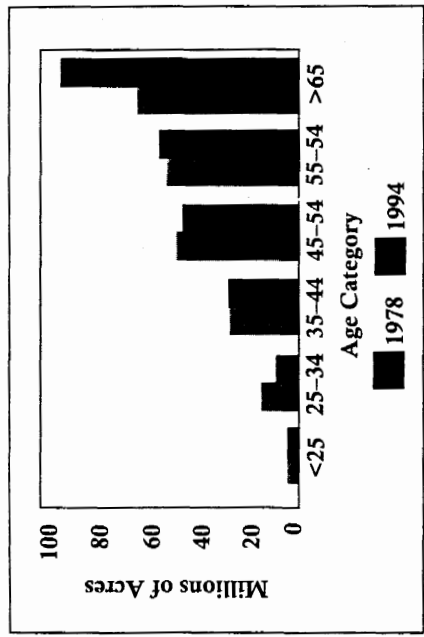
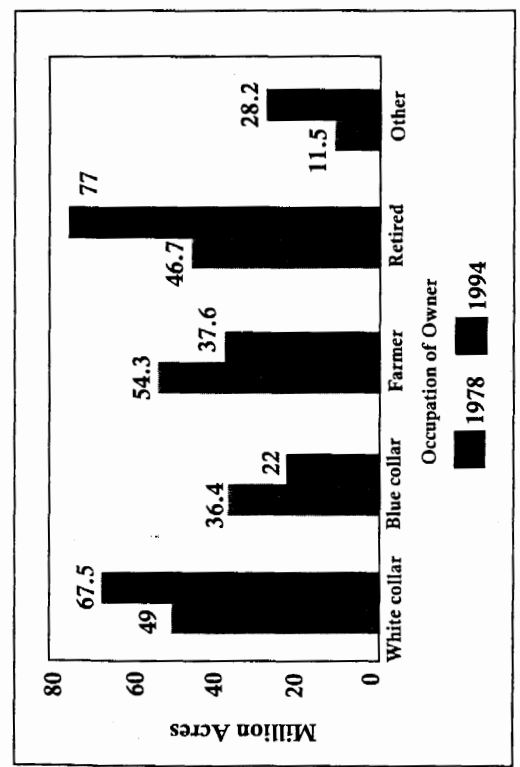


Figure 1-9. Occupational categories of U.S. forest landowners by millions of acres owned



plies from NIPF owners have declined and hardwood supplies have increased. NIPF lands, which have 70% of hardwood stocks, are providing 75% of harvests. Because NIPF lands contribute such a large percentage of the nation's timber supply, the sustainability of NIPF lands is directly linked to the sustainability of the timber supply in the United States.<sup>5</sup>

More than 80% of these harvests occurred on larger ownerships where harvests may be more regular than the episodic harvests of small ownerships. In general, NIPF owners are more likely to harvest when the current market price for timber is high or if perceived threats to tree mortality by insects, disease, or fire are increased. Since timber harvest is not a high priority for most NIPF owners, they may tend to wait out market fluctuations hoping for a high enough price to ensure an economic return on their investments. Timber sales may be dominated as much by family or financial conditions (an owner's death or a major financial need) as by a forest management plan. However, there are few hard data on the relative economic importance of timber harvests on NIPF lands to the employment and income of the owners (NRC 1998).

Interestingly, other nonforest income may be a factor in harvesting decisions. In analyses of NIPFs in the East, higher-income owners appear less likely to harvest timber than lower-income owners (Alig et al. 1990). Higher education also appears to be negatively correlated with timber harvesting by individual forest owners (Binkley 1981; Boyd 1984). At the same time, landowners with higher income and/or higher education demonstrate a greater willingness to learn and innovate. Therefore, their interest in timber harvest tends to be tied to learning about their forest property and gaining technical assistance in forest management (Hodge, pers. comm.).

Individuals with small- to medium-sized acreages appear more likely to engage in active forest management when they understand its role in the context of their forest stewardship goals and not simply as logging for financial remuneration (Bourke and Luloff 1994). Frequently the timber

5. It is worth noting that almost all the many studies of nonindustrial forest landowners are oriented to understanding why they do or do not cut timber. As the authors of one study in Pennsylvania noted in the *Journal of Forestry*, "These studies have often been framed in the context of solving the NIPF 'problem'—generally referring to the role of NIPFs in contributing what is perceived to be their share of wood products to society. Until recently such investigations have rarely been motivated by sociological interests, the objectives of the private landowner, or the noncommodity and ecological values of their forests" (Egan and Jones 1993).

harvest goals for these owners reflect their multiple goals for their property: they desire some revenue, but they also want to enhance amenity, wildlife, and recreational values. Perhaps also reflecting the precedence of environmental and amenity goals, most NIPFs—even in the South—dislike or even oppose clear-cutting (Jones et al. 1995). However, even though timber harvest is not their main purpose in owning forestland—and they may have different silvicultural preferences than industrial owners—clearly NIPF owners do not oppose harvesting per se and intend to harvest at some point.

### *Attitudes of NIPF Owners toward Environmental Protection and Environmental Regulation*

In reviewing the literature of NIPF research, it becomes clear that owning and managing forestland does not strongly influence attitudes toward forest management and forest policies. However, NIPFs appear to be slightly more conservative than the public at large (Bourke and Luloff 1994). While NIPF support for environmental protection is generally strong, using regulation as the means to that end is not supported by those owning larger forest properties.

As summarized by Bliss, NIPFs "share the public's concerns about clearcutting and herbicide use, support regulating forest harvesting practices where necessary on private land to protect environmental values, and generally value environmental protection highly relative to both private property rights and economic development" (1997). The data suggest this is true regardless of gender, income, or residence.

In Bliss's Tennessee Valley study of NIPFs, strong majorities agreed that private property rights, while important, were secondary to environmental protection and that rights should be limited where necessary for the environment. However, as tract size increased, and with it timber orientation, property rights sentiment increased. When the sample was limited to landowners with 100 acres or more, only 27% supported regulations as a means to protect water quality, threatened species, and scenic beauty.

These findings were corroborated by Johnson et al.'s survey of nonindustrial landowners in the Pacific Northwest (1997). They found that the strong majority of landowners were not influenced by the threat of future regulation in their recent harvest decisions. Yet as their financial stake in the forestland increased (larger tracts, majority of income from timber, long-term hold, mature trees), they became more concerned about the

impact of possible future regulatory restrictions on their investments. About 75% of the larger landowners (those with more than 100 acres) felt that no additional restrictions should be put on private lands to protect riparian ecosystems or endangered species. A majority indicated they would harvest sooner than planned if they felt such new regulations were imminent. Nonetheless, 58% of larger and 70% of small landowners agreed with the statement, "I would be willing to alter the amount and time of my harvest if it is necessary to maintain a healthy ecosystem."

These insights into NIPF characteristics will be especially important as we consider the trends in forest ownership and their implications for a conservation strategy.

### *The Nature and Goals of Institutional Forestland Owners*

Institutions such as pension funds, foundations, university endowments, and the like are a small but growing class of large, nonindustrial landowners that control an estimated 5 to 7 million of the 352.5 million acres of NIPF forests. Since the passage of the federal Employee Retirement Income Security Act (ERISA) in 1974, pension fund ownership of forestland has grown as an investment asset included for diversification within these owners' huge portfolios. When the Hancock Natural Resource Group first organized a timber investment fund for large institutional investors in the mid-1980s, total institutional investment in forests was an estimated \$300 million. It grew to an estimated \$7 billion in 1999. This represents some 1% of pension fund assets and a similar percentage of the estimated total U.S. private forestland market value. CalPERS, the huge California public employee pension fund, and Ohio State Teachers Fund are among the largest of this class of owners, acting through their timber investment managers. A handful of managers represent institutions. In addition to Hancock, the major ones include UBS Brinson, Wachovia, Prudential, the Forestland Group, Forest Investment Associates, Wagner Woodlands, and the Campbell Group. Collectively, these managers are called timber investment management organizations (TIMOs).

Institutional owners have been drawn to forest ownership because of the perceived characteristics of forestland as an asset class within their portfolios. Economists have analyzed the behavior of forestland compared with other financial assets and found that it can provide relatively high risk-adjusted returns, especially with holdings that diversify commercial

species and regions. Pension fund investors, by far the largest institutional forest landowners, are in a fiduciary role, representing the many beneficiaries of their institution. They generally take a longer-term view of their investments and have historically been very averse to risk. To generate the highest possible returns while mitigating risk, institutions have developed very sophisticated financial models to guide their acquisition and disposition of a wide range of assets.

The most basic goal of institutional forest landowners is to deliver a desired rate of return from the sale of timber and land while minimizing risk. They do not have mills or other processing facilities to supply. Therefore, although among the largest landowners, they have relative flexibility in merchandising their timber and land. Like smaller NIPF owners, but with much greater scale and sophistication, they can choose to sell or not sell commercial tree species and different kinds of timber for particular products as they read the markets. Similarly, they will move in or out of a specific forest type, region, or, as is now happening, country to fit their financial models.

There have been no studies of these owners to better understand their actual forest management behavior or the importance of nonfinancial goals relative to financial ones in their decision making. In general, institutional owners have tended to manage forests on an industrial model, although there are exceptions. As fiduciaries, their ability to invest in activities that do not bring direct returns is limited. As managers for high-profile, quasi-public institutions—with the retirement funds of many individuals in their care—good government, community, and public relations are important for them to maintain. Therefore, institutional owners engage in forest stewardship activities to demonstrate good citizenship and mitigate risk at the same time. We will discuss the growing institutional ownership of forestland further as we consider overall trends in forest ownership below.

### **Focus on Industrial Private Forest Owners**

About 67.6 million acres or almost 9% of U.S. forestland are owned by the timber industry, of which 99% is timberland (USDA, Forest Service 2000). This represents 13% of all timberland. (Birch estimated almost 80 million acres in 1994 using a somewhat different definition.) Between 1952 and 1992, the forest industry acquired 11.5 million acres of private forestland from larger NIPFs (whose ownership acreage decreased by 16.8

million). Industrial ownership is greatest in those regions with highly valued commercial timber species and highly productive soils. In the Pacific Northwest, South Central, and Southeast regions, industrial owners control 18 to 19% of all forests. Industrial owners are especially significant in Maine, where they own 46% of forest area. Industrial ownerships include almost 14% of U.S. softwood inventory and 9.5% of hardwoods. About 70% of the commercial stocking on industrial lands is softwood. During the 1990s, forest industry lands produced one-third of the total timber in the United States.

U.S. forest products companies are among the world leaders, both in the highly competitive pulp and paper business and in the timber-products business.<sup>6</sup> This section looks at the attributes of larger industrial forest landowners, from publicly traded transnational companies to regional private companies.

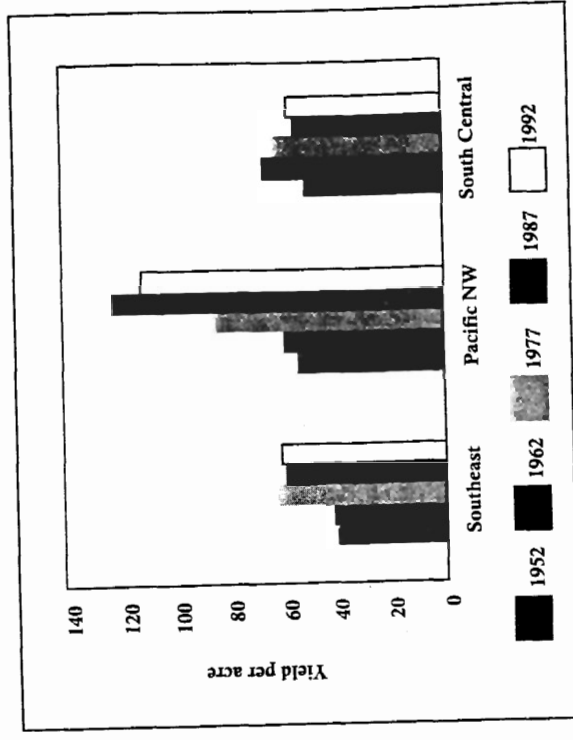
As with other ownership types, the nature of the industrial forest is dictated by the management objectives of its owners. These objectives are somewhat more easily quantified than with nonindustrial owners. By definition, the primary goal of industrial forest ownership is production of wood and fiber to supply owners' mills. Therefore, forest management is geared to increasing yields per acre. This is accomplished through increasingly intensive management, as well as by buying and selling forestland to maximize the ownership of highly productive and easily operable lands—in the process divesting lands less suited to high-yielding timber production. Although they do not own mills, the largest nonindustrial owners generally engage in similar practices.

The forest management practiced on industrial lands is influenced greatly by the processing facilities owned by each company. Within this category of forest ownership there are two basic types: sawtimber producers and pulp producers. Although many paper-oriented companies have both divisions, the relative weighting within a company can often affect its forest management goals. Simply put, sawtimber companies tend to manage for desired dimensions of trees so as to increase yields of par-

6. Already by 1991, according to *Pulp and Paper International*, U.S.-based companies accounted for seven of the top ten pulp and paper companies with international holdings. These included International Paper, Champion (now combined), and Georgia-Pacific. As of the late 1990s, five U.S. companies dominate the world sawmilling capacity as well: Weyerhaeuser, Georgia-Pacific, International Paper, Sierra Pacific, and Louisiana-Pacific (Crossey and Points 1998).

Figure 1-11.

Average timber growth on industrial lands in three regions (1952–1992) (cubic feet/acre per year for all species)



ticular lumber products, while pulp and paper companies tend to manage for cubic footage of fiber per acre.

The forest products industry is very capital intensive. Manufacturing facilities and forestland both require hundreds of millions of dollars to build or acquire. The pressure to provide a return on such substantial capital investment is enormous. Bricks and mortar, as well as biological resources, are not very liquid; therefore the business challenge of building cash flow is preeminent.

The age of a forest and the sizes of its trees are determined through the owner's manufacturing needs and desired rate of return. In general, an industrial forest that has been produced is younger, with smaller trees and a simpler species composition relative to its biological capacity. Correspondingly, industry has reengineered to focus wood production on a new suite of products that can utilize low-quality wood or fiber in ways that mimic the characteristics of now-scarce high-quality, older trees. Engineered wood products, such as laminated beams, medium-density fiberboard, and

oriented strandboard, are rapidly supplanting plywood and larger-dimension lumber. Many companies that formerly managed for sawtimber have therefore shifted their management orientation to fiber.<sup>7</sup> With quality built at the factory and not in the forest, increased utilization of formerly less commercial tree species is possible. Engineered wood products also diminish processing waste, allowing industry to complete utilization of harvested trees.

Faster growth rates mean better fiber flows and improved financial results for shareholders. Investments by the forest industry in improving tree growth include species selection, plant breeding, and genetic engineering to produce significantly faster-growing trees. For instance, plantations of genetically altered loblolly pine can produce 26% greater yields than those grown from wild seed (Guldin and Wigley 1998). The forest products industry also uses other intensive management practices such as matching species and genotypes to specific soils during tree planting, controlling competing vegetation, timely thinning to keep stands free to grow, and fertilization. The effects of these practices can be seen in figure 1-11, which illustrates the trends in average annual timber growth of all species on the industrial lands in three regions since 1952. Note that, while plantation forestry featuring loblolly pine has been gradually changing southern growth rates, the conversion of older natural forests to younger, and therefore faster-growing, Douglas-fir plantations along with the introduction of "super trees" has had a dramatic effect on average annual timber growth in the Pacific Northwest. In 1992, timber growth in the Pacific Northwest was twice the national industry average, and five times the national average. We will discuss timber productivity and the sustainability of supplies in chapter 2.

Plantation forestry is increasingly preferred by the forest industry and other large commercial forest ownerships. Over the last twenty years, remaining older natural forests are being converted to short rotation management to increase fiber flows and improve financial returns by tying up capital on the ground for shorter periods. Management

7. Interestingly, after a trend toward reducing harvest age, pulp and paper companies in the Southeast are beginning to expand their rotations from twenty to thirty years in order to build in flexibility to capture the value of both fiber and small-dimension sawtimber utilization (C. Owen, pers. comm. 1999). Meanwhile, some sawtimber companies in the Pacific Northwest have been reducing rotation ages from fifty-five to sixty years to forty and now thirty years.

inputs have been intensified as described above. According to recent USDA Forest Service data, about 36% of forest industry softwood acreage was in plantation, accounting for 21% of volume. This compares with 12% of NIPF acreage and 7% of inventory (Haynes 2001). Plantations account for almost all industrial (and large nonindustrial) Douglas-fir forests under fifty years old in the Pacific Northwest. The USDA Forest Service projects that the total area of industrial plantations will increase by 76% and the share of inventory will triple (Haynes 2001).

Some information about the management activities of industrial private forest owners is available through the Sustainable Forestry Initiative Program (SFI), operated by the American Forest & Paper Association (AF&PA), the largest trade association for the industry. Information is provided by companies on activities such as the extent of different harvesting practices, reforestation, and compliance with water quality best management practices (BMPs). As of 1998, some 120 companies were listed as SFI program participants, representing about 56 million acres of forestland (AF&PA 1999). On those lands, SFI participants reported harvesting about 1.3 million acres in 1998. These harvest acres include all types of harvest, including partial thinning and salvage. Reforestation (both natural and planted) was carried out on about the same amount of land. SFI program standards call for fully restocked reforestation by appropriate means within two years, and the industry is able to realize that target more than 98% of the time, according to the SFI progress reports.

Some industrial forest landowners have developed recreational revenue sources from their lands as a complement to timber production. This is true for other large forest landowners as well. There is also increasing development of special forest products revenues, especially from the production of items for the floral industry. In certain regions, such as the Great Lakes and New England, public access for recreation is either a tradition or a requirement of preferential forest property tax treatment.

Although the financial incentives are compelling for industrial forest landowners to intensify forest management and simplify the species composition and structure of forests to maximize commercial outputs, active stewardship of noncommodity forest values is on the rise. Government regulation of private forests has increased dramatically in the

Table 1-6.

Forms of Native American forest title

Type of Ownership	Acreeage	Title Status
Tribal trust	14,488,000	U.S. government
Individual trust	865,000	U.S. government
Individual restricted fee title	868,000	Native American with U.S. government restrictions
Tribal restricted fee title	6,000	Tribe with U.S. government restrictions
Tribal fee simple	820,000	Tribe without restrictions

last twenty-five years, since the passage of the Endangered Species Act (ESA), Clean Water Act, and other state environmental legislation. The public has expressed its desire to sustain wood and fiber production within the context of ecological sustainability. Operating at or above the stewardship standards set by law has become paramount for industrial operations to maintain their "social license to operate." Building positive regulatory and community relations is essential to mitigating risk and maintaining consistent production in their operations. Most industrial forest companies understand that private property rights come with responsibilities.

With the historic legacy of public mistrust, industrial forest products companies are more positively engaged in activities to protect or restore habitat and water quality than ever before. AF&PA reports that in 1998 12.3 million acres of land in its SFI program were covered by some kind of cooperative fish and wildlife management agreement with a government agency or conservation organization. The forest products industry has a clear preference for voluntary approaches to protecting and enhancing environmental values on its lands.

Similarly, over the last eight years the forest products industry has increasingly utilized Habitat Conservation Plans (HCPs) to meet the requirements of the ESA while maintaining its forest management. According to a review of HCPs performed by PFT in October 1999, approximately thirty-one incidental take permits on forestland had been approved under Section 10 of the ESA, covering management of more than 8.5 million acres. Much of this is industrial forestland, including property owned by International Paper, Potlatch, Weyerhaeuser, Simpson, Union Camp, Crown Pacific, Plum Creek, and Pacific Lumber.

In terms of land use dynamics, industrial forestlands are generally considered more stable than many other private lands as they are usually owned in large tracts for the express purpose of producing long-term timber supplies. Most acquisitions and dispositions are between industrial owners, or between industrial owners and large nonindustrials. That does not mean, however, that industrial lands are insulated from significant change. Corporate takeovers, mergers, and land sales occur regularly. The increasing rate of turnover in this ownership class is discussed at the end of this section.

In the course of these transactions, sellers typically analyze what portions of their property may have highest and best use development value other than as timber. Such sales can be highly profitable. While it is difficult to track, anecdotal data gathered by PFT suggest that some 5 to 15% of divested lands were sold as real estate. These conversion transactions tend to occur in the expanding edge of the urban-wildlands interface and in regions where forest properties have high recreational value (especially along rivers and lakes, and in coastal areas).

### Focus on Tribal Forest Owners

It has been estimated that in the continental United States, 193 Native American reservations<sup>8</sup> in twenty-three states contain some 16.8 million acres of forestland. Of these, 5.7 million acres are managed for timber production, 1.7 million acres are noncommercial timberland, 4.4 million acres are commercial woodland, and 4.2 million acres are noncommercial woodland (Morishima 1997; Intertribal Timber Council 1993). Native American ownership takes the five forms shown in table 1-6.

Ownership fragmentation is a major problem on the forestland owned by individual Native Americans, often held in trust by the federal government. These lands were distributed to native individuals in small allotments (often 160 acres) under the 1887 Dawes Act. As each generation passes, and those allotments are divided up among heirs as undivided property interests, administration of federal trust responsibilities becomes more of an administrative nightmare. The U.S. Department of the Inte-

8. *Forested Landscapes in Perspective* (NRC 1998) puts the number of reservations at 214 in 1992.

rior, charged with collecting fees and redistributing them to the appropriate owners, has been unable to carry out that responsibility for decades, in spite of legal action demanding that the situation be rectified. It is uncommon for these fragmented ownerships to be divided up and sold for development, as is often the case with non-Native American forests. Such ownership fragmentation makes decision making and management increasingly difficult.

Tribal leaders have opposed the adoption of certain aspects of private property principles that are typical of non-Native American U.S. ownerships. While it is difficult to generalize across a wide diversity of native peoples, tribes typically do not want tribal members to sell land without permission of the tribal government. They also prefer that the lands held by Native Americans be held by the tribe and not by individuals. Both preferences are rooted in cultural traditions (NRC 1998).

As sovereign nations, tribal reservations govern themselves and are not subject to land use or forestry regulation by the states. They are, however, subject to relevant federal laws, either directly or through the Bureau of Indian Affairs (BIA). Given the history of European settlement and conflicts with Native Americans, tribes are very concerned with establishing and maintaining control of their land and resources. It is important to remember that treaty terms are still being litigated by tribes for enforcement of their rights. Fishing and hunting rights based on customary tribal use have been upheld in the courts and through statute in several states. There are many controversial issues on the relationship of tribes to federal and state governments, as well as to surrounding nontribal communities.

As with other forest landowners, tribes have various goals for their forests, both cultural and economic. While Native American timber makes only a modest contribution to the national totals, it is an extremely important source of revenue for the tribes, generating some \$465 million and 40,000 jobs for tribal communities in 1991 (Morishima 1997). In addition, many other commercial and noncommercial uses of Native American forests and woodlands are important contributors to both cultural and subsistence needs. Fish, wildlife, medicine, native foods, and firewood are of prime importance to most Native American communities.

Forest management on Native American lands was, for many years, carried out almost entirely by the BIA, which was subject to serious and

consistent underfunding from Congress. A 1993 study by independent forestry experts concluded that Native American forests were receiving 37% less funding for timber production than national forests, and only 50% of what was being invested on private lands (IFMAT 1993). That report concluded that the federal government should turn primary responsibility for management of Native American lands over to tribal forestry programs, a move encouraged by federal laws and supported by the Intertribal Timber Council (ITC), a consortium of seventy-three Native American tribes and Alaska Native organizations (Morishima 1997). According to a 1997 assessment by the original IFMAT team (Gordon et al. 1997), however, there is still much to be done in implementing the report.

Tribal-based forestry programs for Native American lands have evolved considerably over the last decade as tribes assert more control over their resources. Nonetheless, even within tribes there are conflicts among leaders with economic development goals and those with cultural or ecological goals. Some Native American tribes have a long tradition of commercial forest management that includes strong ecosystem values. For instance, the Menominee of Wisconsin and the Yakima of Washington have been cited for their outstanding forest management programs, demonstrating in many cases that production of vital timber supplies does not preclude excellent ecosystem management, species protection, and protection of cultural values. The Menominee Tribal Enterprises and the Hoopa Tribe of California have, for example, been certified under the Forest Stewardship Council's (FSC) program. They report that forest certification has opened up markets for new secondary products, increased the value of some less marketable species, and led to more forest jobs and products.

### Trends in Forestland Ownership

Several large undercurrents in U.S. private forest ownership deserve to be highlighted. Just as forest ownerships, both public and private, form an interconnected mosaic, these trends interact as well. Their cumulative effects compound each individual trend. We will examine in turn the growing fragmentation, sprawling development, and de facto conversion of forest ownerships; the aging of individual forest owners; the restructuring of the forest industry; and the rise of financial owners. We will also note the emergence of conservation ownerships. The implications of these

Table 1-7.

Comparison of private forestland acres and ownerships in the United States, 1978 and 1994, by size of ownership (acreage category)

Acreage Category	1978			1978 to 1994			1978 to 1994			Percent Change
	Owners	1994 Owners	Change	1978 Acres	1994 Acres	Change	1978 Acres	1994 Acres	Change	
1-9	5,765,000	5,686,000	(79,000)	11,457,000	16,022,000	4,565,000	11,457,000	16,022,000	4,565,000	39.8%
10-49	1,213,000	2,644,800	1,431,800	29,164,000	57,848,000	28,684,000	29,164,000	57,848,000	28,684,000	98.4%
50-99	477,000	685,000	208,000	34,371,000	45,296,000	10,925,000	34,371,000	45,296,000	10,925,000	31.8%
100-499	566,000	527,000	(38,600)	106,933,000	87,635,000	(19,298,000)	106,933,000	87,635,000	(19,298,000)	(18.0%)
500-999	40,000	37,800	(2,200)	28,122,000	22,952,000	(5,170,000)	28,122,000	22,952,000	(5,170,000)	(18.4%)
1,000+	24,000	23,600	(400)	144,139,000	139,213,000	(4,926,000)	144,139,000	139,213,000	(4,926,000)	(3.4%)
<b>Total</b>	<b>8,085,000</b>	<b>9,604,600</b>	<b>1,519,600</b>	<b>354,186,000</b>	<b>368,966,000</b>	<b>14,780,000</b>	<b>354,186,000</b>	<b>368,966,000</b>	<b>14,780,000</b>	<b>4.2%</b>

trends will be discussed in the context of threats to America's forest resources in chapter 3.

#### Forest Ownerships Are Fragmenting

According to an analysis prepared for this book by Thomas Birch, the lead ownership researcher for the USDA Forest Service, and summarized in table 1-7, total numbers of forest owners increased by an estimated 15% in the fifteen years between the 1978 and 1994 USDA Forest Service studies. During this period there were dramatic increases in ownerships and forestland held by the smallest owners (those with less than 50 acres): approximately 116% more owners and 138% more forestland. In general, there has been a downsizing of all ownership classes of 100 acres and larger. Although the medium forest owners (those with 100-999 acres) were most affected, with 24.5 million acres being lost to smaller parcels, even the largest landowners were reduced in numbers and extent.

To create table 1-7, Thomas Birch worked with us to analyze and provide a better statistical match between the data from the 1978 and 1994 studies of private forestland owners. Before this effort, a simple comparison of ownership data for the two studies showed an increase of some 60 million acres of forestland that is merely an artifact of two different forest definitions used in the studies. Although even the new

analysis shows some increase in the total forestland base, it is minimal. We believe the comparison used in table 1-7 more accurately describes the changes in private forest ownership that can be deduced from available data.

To accomplish more of an "apples-to-apples" comparison between the studies, the apparent increase of 60 million acres of forestland in 1994 than in 1978 had to be addressed. Although 10 million acres of this total were due to changes in the classification of Native American lands, most of the difference lay in how "other forests" were treated in the two surveys. Further complicating a comparison, in 1978 the study used the estimate of forest landowners developed by the NRCS's National Resources Inventory, while the 1994 base dataset came from the USDA Forest Service's Resource Planning Act Assessment. In table 1-7, Birch used the RPA landowner numbers in both years, added Native American lands, and limited the inclusion of nontimber forestlands from the 1994 numbers. Native American forests increased by 7 million acres in 1978 and 17 million acres in 1994, almost entirely in the 1,000 acre-plus category. This was due to the (continuing) disposition of Alaskan forestland as part of the Native Claims Settlement Act.

Unfortunately, it is very difficult to completely reconcile the datasets, and "other forests" east of the Great Plains states were still included in the 1994 data. The inclusion of the "new" Native American forests and the eastern "other forests" gives the appearance of increasing forestland by some 14.7 million acres or 4% over 1978. The new Native American forests add ownership and acreage at the larger size categories, while eastern nontimber forests tend to increase ownerships and acreages at the smaller. These statistics illustrate the continuing shift to smaller, more residential ownerships and the concurrent reduction in the mid-sized, mostly nonindustrial ownerships. There are growing numbers of individual owners. While there is no clearly georeferenced data, it is evident from regional analyses that these parcels are growing along the urban-rural interface and in the accessible rural areas, especially along rivers and lakes.

Given the characteristics of individual forest landowners, it is likely that today more forestland is owned by individuals and families who are less interested in timber harvesting as an important revenue source than was the case in the past. Many of the new forestland owners are likely to be more urban in orientation than owners of the past, given the increasingly urbanized nature of our society and the growing white-collar occupations

of forest owners. These new owners may also be more concerned with the ecological and amenity values of their forests than were previous owners, given the rough correlation between size of ownership and primacy of timber-related goals.

Regardless of the characteristics of the many new ownerships, smaller parcels and varying landowner goals in and of themselves create new issues for forest conservation. With more small parcels comes a denser and more extensive patchwork of built infrastructure and other nonforest features that alters larger-scale forest ecosystem functions. These include impacts to hydrological functions, fire regimes, and habitats for interior and wider-ranging native species. At a certain point the impact is great enough to consider the parcel to be converted from forest.

The sprawling nature of most urban development in the United States exacerbates the reach of the impacts, pushes the leading edge of nonforest development, and accelerates fragmentation of larger, intact properties. Large-scale fragmentation limits the ability of interested individual landowners to realize certain environmental goals within the patchwork of small parcels.

#### ***Individual Landowners Are Aging***

As illustrated in figure 1-8 earlier in this chapter, as of 1994 an estimated 2.5 million individual forest owners were 65 years and older (27% of all individuals) and held 92.6 million acres or 23.5% of the total privately owned forests. At that time, another 2 million owners were estimated to be 55 to 64 years old, controlling an additional 54 million acres. Virtually all of the former and some of the latter properties will go through some sort of intergenerational transfer in the next twenty years. Any property transfer is a moment when tracts can be broken up and parcel sizes reduced. In the context of an estate settlement, this is all the more likely because of the host of succession issues: too many heirs, no heirs, heirs' competing interests in property, no interest in property; and/or insufficient nonforest funding for estate taxes.

The scope of impact of intergenerational succession issues will vary from family to family, depending on the size and value of the forestland and its relative value within the estate. At current estate tax rates, and assuming a proportional representation of senior owners across size classes, our analy-

sis suggests that unfunded estate taxes could force some degree of subdivision or unplanned timber harvest in the not too distant future of perhaps 5.5 million acres in the 1,000-acre-plus size class, owned by 4,000 people or families. This represents an estimated 1.5% of U.S. forestland. An additional 7,300 owners with 4 million acres in the 500- to 999-acre size class could also be affected, depending on timber stocking and value.<sup>9</sup>

Of the various age classes of individuals, Birch found aging forest owners to be the most likely to have harvested in the last decade and to have harvested the most acreage. Given that most of these people are retired, their harvest behavior is not unexpected as a source of supplemental income. A study of individual forest landowners in California by Romm et al. (1983) found that landowners over 65 years of age were also the least likely to make stewardship investments in their timber or other forest resources. Once more, however, it may be dangerous to extrapolate too broadly from the available data on private owners. A countertrend of increased stewardship activities by seniors might be under way if one concludes that retirees today include better educated, wealthier individuals who overall show a greater interest in active stewardship.

#### ***The Forest Industry Is Restructuring***

Most of the decade of the 1990s was characterized by very poor performance of pulp and paper companies. The industry was barely covering its cost of capital and generating little if any free cash flow. Pulp prices were wildly volatile. Wall Street was not happy and bid down the stocks of publicly traded forest products companies, demanding improved returns to shareholders. Even the expanding economy was not solving these major structural problems. The result has been an acceleration in industry consolidation and turnover in U.S. industrial forestland, both part of company strategies to improve shareholder returns and compete successfully in an increasingly globalized business sector.

9. This is based on an estimated average value per acre of \$2,000. Therefore, at current levels of estate tax and a unified credit of \$1 million for a family business or for individuals (as is being phased in for individuals through 2006), single owners of more than 500 acres begin to incur tax liability, exclusive of residential value or other assets and assuming no estate plan is in place. The ability of landowners to pay the estate liability will, of course, depend on both the nature of their timber and nontimber assets.

of the northern forest, notably J. D. Irving's purchase of the Sappi lands, making it the largest non-U.S. forest owner in the United States.)

When all kinds of dispositions are taken into account, an estimated 28% of industrial forestland—or some 20 million acres, an area four times the size of Massachusetts—changed hands in the 1990s. Approximately 18% of the state of Maine turned over in two years. Virtually all major forest products companies have sold major U.S. tracts in recent years. Pulp and paper companies have been net sellers. The majority of the lands have been acquired by other industrial owners, as well as institutional investors. For example, Georgia-Pacific spun off all its lands into a separate letter corporation, and then over three years sold its timberlands completely, with the California portion bought by a TIMO on behalf of a pension fund and the remainder acquired by Plum Creek. Louisiana-Pacific has also sold its California holdings.

### *Financial Ownership of Forestland Is on the Rise*

Forestland has chiefly been a personal and industrial asset. It is now evolving into a financial asset, owned for its value as a portion of a diversified investment portfolio. Secondary markets are developing for units of forestland partnerships or similar entities. As discussed earlier, this is occurring for a variety of reasons. In addition to increased understanding of the role forestland can play in institutional portfolios, this ownership type is increasing as investors seek greater tax efficiency and liquidity in their holdings. By reducing the level of tax applicable to forestry profits, after-tax returns increase. Financial investors, with no ties to forest products processing, have great incentive to use various pass-through investment structures that are not subject to the double-tiered taxation to which investors in the conventional corporation are. Moreover, pension funds—the largest financial owners of forestland—are tax-exempt investors. Another financial advantage that some institutional ownerships derive from their form of organization is the ability to annually capture the increased appreciation in their land and timber through an appraisal process that allows them to include this unrealized appreciation in their calculation of internal rates of return. Corporations, especially publicly traded ones such as many pulp and paper companies, are unable to utilize this valuation method, being constrained by generally accepted accounting procedures to valuing their forest assets at their basis.

A number of factors are at work here. As has historically been the case, once more forest products capital investment is migrating to regions with lower costs and cheaper resources. To compete with low-cost producers in Asia and South America, U.S. companies have been upgrading the efficiencies of their processing facilities. In the course of this process, many older mills have been closed. For instance, Louisiana-Pacific "shuttered half its 40 woods products mills during the past three years" (Starkman 1999). Companies also are seeking out the highest-yielding soils and species worldwide to grow fiber as fast as possible. U.S. forestland that is being retained is usually the highest site class and the most operable. These forests can be managed most intensively, yielding more fiber on less acreage. Others have found it cheaper to import pulp than to own U.S. forestland. This has fueled some of the dispositions of forests described below.

Historically the sector has been characterized by numerous local, regional, and international companies. Over time it has come to suffer from global overcapacity. Now larger companies have taken the course of industrial consolidation to gain efficiencies and greater control over the resource and markets. A wave of mergers has swept this sector in the last five years. Industry giant International Paper's acquisition of Union Camp and its purchase of prime rival Champion epitomizes the trend. Other notable recent combinations include Jefferson Smurfit and Stone Container's merger (Smurfit-Stone Container) and Weyerhaeuser's acquisition of MacMillan-Bloedel. "The big forest products companies are getting bigger. The middle-sized players are disappearing. The small players must be nimble, flexible, and entrepreneurial to compete effectively" (Collins 1999).

Timberland is carried at cost on the balance sheets of public forest products companies. Many of them have experienced great appreciation of these assets over the last twenty years, yet they have not been able to fully capture that value for their shareholders. To unlock the increased market value of their forests, many large industrial companies are divesting themselves of these lands or restructuring the ownership in such a way as to gain greater investor value. A series of huge transactions have been occurring and are expected to continue as companies sell off or otherwise monetize forests that are no longer strategically important to own directly. In the course of these dispositions, portions of the properties have gone into residential and recreational uses. At the same time, U.S. companies are expanding their holdings in Canada, South America, New Zealand, and Australia. (Meanwhile, Canadian companies are acquiring large tracts

A variety of financial vehicles and products are available or evolving for those who want to make a pure play in forestland ownership, but in a way that is more diversified, with lower risks and greater potential liquidity than direct ownership allows. These include large private limited partnership funds organized by TIMOs; publicly traded master limited partnerships (MLPs), such as Crown Pacific; and, with the reorganization of Plum Creek, publicly traded timber real estate investment trusts (REITs).

With growing investments by pension funds and with the advent of more publicly traded, tax-efficient forest investment vehicles, it is likely that financial ownership of U.S. private forests will accelerate. Many of the forestlands from which industrial corporations have divested themselves in the South, Northeast, and coastal California have gone into financial ownerships.

Large-scale financial ownership does not in and of itself further forest conservation and sustainable management versus other forms of ownership. These owners are distinguished by not being tied to supplying a particular mill. They also have other management and marketing flexibilities that both large industrial and small nonindustrial owners generally lack.

Financial ownership has the potential to provide forest landowners with more consistent cash flows and investment liquidity than is possible through smaller, less diversified ownership or through other ownership structures. For smaller ownerships, liquidity is obtained through selling the timber or property. Sometimes the demand for liquidity leads to parcelization or overharvest. By assembling a large and diversified portfolio of forest holdings, cash flows can be smoothed while still harvesting timber sustainably. A secondary market for ownership units is also becoming available, preventing disruption of the forest due to change of ownership and thereby potentially promoting more consistent forest management.

On the other hand, more retail and indirect ownership of forests centralizes management control with financial managers, not with foresters, families, or communities. There is no guarantee that the demands of the capital markets for return from these forests will be any different than the demands experienced by the forest industry. Investment managers are evaluated by their ability to achieve certain benchmarks of return. Therefore, there is no reason these owners would have a longer-term perspective in their forest management than other large forest owners such as forest products companies.

Further, the market success of MLPs and REITs is driven by their distributions to unitholders. This puts pressure on forest managers to schedule timber harvests to meet the distribution objectives.<sup>10</sup> For publicly traded timber entities, markets will still be especially challenged to provide sufficient recognition of the value of standing timber and other forest assets versus timber harvest cash flows (Best and Jenkins 1999).

### *Conservation Ownership of Managed Forestlands Is Emerging*

There is a small but noteworthy emergence of ownership of private, managed forestlands by conservation organizations. Traditionally, nonprofits have acquired environmentally valuable lands for transfer to public agencies. The Nature Conservancy and the Trust for Public Land are major examples of this kind of organization and transaction. Fee title lands held by conservation organizations have typically been managed as ecological preserves or quasi-public parklands. In the late 1990s, The Nature Conservancy, the Conservation Fund, and the Vermont Land Trust acquired private "working" forests in the Northeast. While portions of these acquisitions are going into public ownership, the remaining forestlands are either (1) being held and managed for sustainable forestry and conservation purposes as demonstration forests; or (2) being resold to other forest landowners subject to conservation easements that restrict subdivision and guide forest management to protect ecological values.

In three transactions, approximately 506,000 acres of forest were acquired. Although only a small percentage of recent forest transactions, these high-profile acquisitions may be creating a new model of forest ownership that combines high standards of forest resource protection with commercial forestry operations. See the appendices for more information on these transactions.

10. The experience of U.S. Timberlands, a publicly traded partnership founded in 1996, is a case in point. As of 1999, the partnership owned 673,000 acres of forestland in Oregon and Washington. Its unitholders had rights to distributions of \$.50/unit per quarter. In order to maintain this level of cash flow, the company had to log at a much higher level than described in its offering prospectus. According to filings with the SEC, the company in fact logged at higher levels than its own estimated annual sustained yield of 110 million board feet. Its reported actual harvest levels have been 139 million board feet in 1997 and 145 million in 1998, with a planned 202 million board feet in 1999.