

National Forest Timber Management Over the Past Decade: A Change in Emphasis for the Forest Service?

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Timber output, the major commodity use of the National Forests, was tracked from 1981 to 1993, to assess changes that have occurred in the amount of timber offered, sold, and harvested. In addition, changes in the method of harvest used on the National Forests were examined to view trends in the management practices of the Forest Service. Although trends regarding changes in timber harvest methods varied from region to region, data on timber offered, sold, and harvested showed a dramatic decrease both nationally and in important timber-producing regions since the late 1980s. This reduction, when seen in the light of other recent studies, suggests that the Forest Service is changing the emphasis of its management practices, placing less priority on the traditional high level of timber output.

The issue of change in the United States Forest Service has prompted several recent studies in which analysts have assessed in myriad ways the policies and inner workings of the agency: Mohai, Stillman, Jakes, and Liggett (1994) surveyed Forest Service employees to gain views on change from within the agency; Farnham (1995) studied trends in budget requests and appropriations, finding significant shifts in funding priorities; Thomas and Mohai (1995) analyzed workforce diversification within the agency and noted how hiring practices affect management policies. However, those interested in the management of the National Forests may be concerned most with whether or not the agency has changed its actual on-the-ground management practices.

This article examines changes in the major commodity use of the National Forests—timber output. The analysis will be used to test the proposition that the agency, through its policies and practices, indeed is changing. In particular, this study focuses on timber offered, sold, and harvested and the method of harvest on National Forest lands. Although the results of this data analysis alone are not expected to prove that a significant shift has occurred in the management ethos of the Forest Service, it should elucidate how change of the agency, documented in a growing body of literature, is affecting the on-the-ground management of the National Forests.¹

Timber Offered, Sold, and Harvested

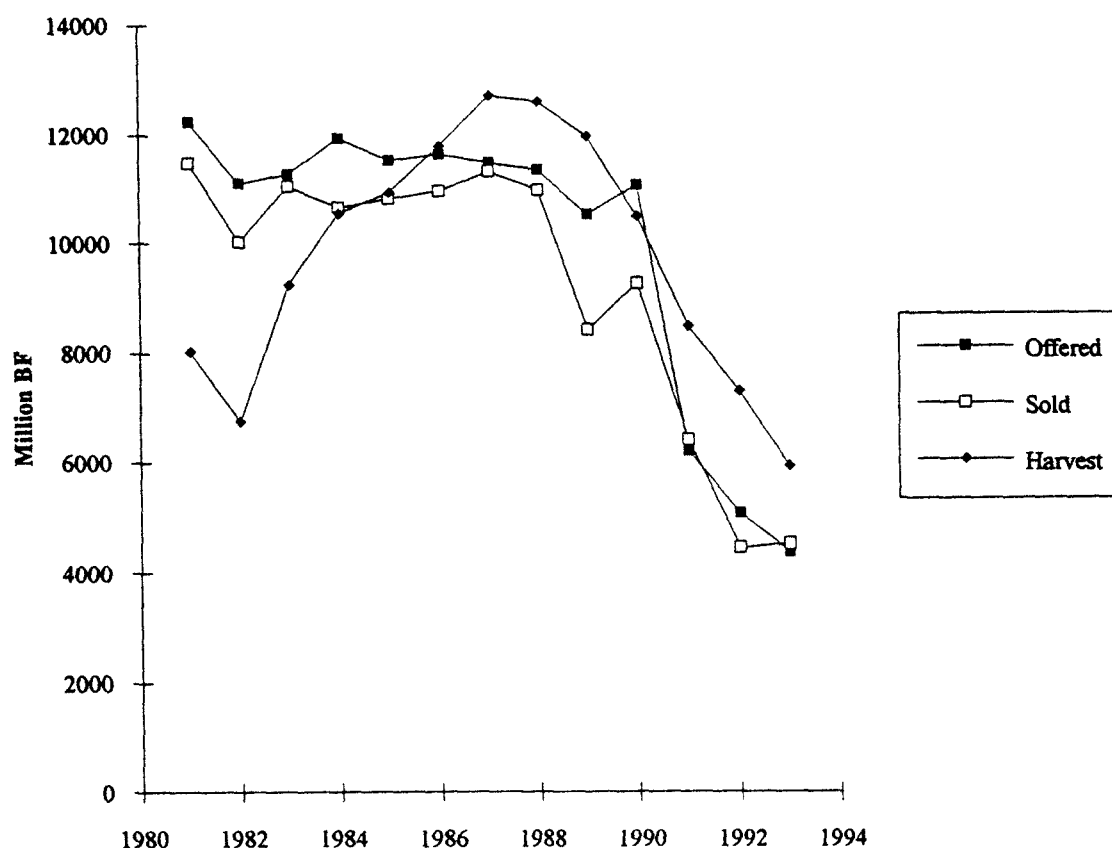
One variable that has been reported consistently over the past decade is the amount of timber offered, sold, and harvested. Timber offered represents the volume of timber offered by the Forest Service for sale (United States Department of Agriculture, Forest Service, 1981–1992). Timber sold is all timber placed under contract in a specific year, including green timber, salvage timber, and firewood. Timber harvested is the timber under contract that actually was removed from the land in a specific year. The data listed in Table 1 were collected from the *Reports of the Forest Service* (United States Department of Agriculture, Forest Service, 1981–1992) and from the Forest Service Timber Management Division.

Table 1
Timber Offered, Sold, and Harvested by Region—Fiscal Years 1981–1993 (million board feet)

Year	Offered	Sold	Harvest	Year	Offered	Sold	Harvest
Northern				Rocky Mountain			
1981	1145	973	784	1981	401	404	274
1982	1028	974	717	1982	390	352	250
1983	1080	1125	948	1983	376	338	306
1984	1103	917	969	1984	495	414	340
1985	1044	938	944	1985	488	490	393
1986	1044	915	1024	1986	403	314	412
1987	1024	981	1105	1987	400	433	427
1988	968	913	978	1988	385	383	456
1989	914	923	1024	1989	379	356	422
1990	786	694	1016	1990	370	368	381
1991	839	673	800	1991	330	291	401
1992	509	592	807	1992	339	270	345
1993	369	381	617	1993	205	252	261
Pacific Northwest				Southern			
1981	5488	5481	3126	1981	1240	1219	1141
1982	4857	4642	2525	1982	1202	1125	816
1983	4746	4916	3868	1983	1310	1319	1096
1984	4926	4962	4539	1984	1424	1325	1275
1985	5367	4753	4761	1985	1552	1412	1382
1986	5271	5060	4965	1986	1367	1296	1561
1987	5271	5273	5597	1987	1303	1263	1424
1988	5056	4919	5408	1988	1210	1185	1366
1989	4413	2811	5231	1989	1205	1169	1128
1990	5048	3997	3878	1990	1363	1208	1422
1991	1094	2106	3167	1991	1129	1045	1030
1992	684	741	2140	1992	1108	1009	1065
1993	598	787	1666	1993	997	987	981
Southwest				Eastern			
1981	464	410	311	1981	688	644	559
1982	378	331	176	1982	690	589	609
1983	457	414	318	1983	681	632	605
1984	511	363	387	1984	810	774	740
1985	439	343	395	1985	841	782	738
1986	411	447	486	1986	736	753	733
1987	407	433	504	1987	747	776	852
1988	373	401	495	1988	747	764	803
1989	402	357	511	1989	809	810	785
1990	329	305	433	1990	775	732	752
1991	280	282	344	1991	792	781	696
1992	183	163	292	1992	714	711	751
1993	148	180	217	1993	698	710	761
Intermountain				Alaska			
1981	424	315	323	1981	546	199	289
1982	414	348	262	1982	522	81	473
1983	428	370	362	1983	469	82	251
1984	458	396	380	1984	478	52	262
1985	432	380	434	1985	434	42	232
1986	432	484	462	1986	384	190	291
1987	415	390	455	1987	411	170	336
1988	391	374	477	1988	349	70	397
1989	358	388	420	1989	322	100	446
1990	406	415	416	1990	338	30	472
1991	339	283	360	1991	359	53	365
1992	317	316	366	1992	425	70	372
1993	338	343	360	1993	266	136	331
Pacific Southwest				Total			
1981	1849	1847	1229	1981	12245	11492	8036
1982	1639	1588	919	1982	11120	10030	6747
1983	1736	1865	1498	1983	11283	11061	9252
1984	1735	1458	1658	1984	11940	10661	10550
1985	1629	1680	1664	1985	11538	10820	10943
1986	1495	1508	1854	1986	11639	10967	11788
1987	1497	1595	2011	1987	11475	11320	12711
1988	1870	1953	2216	1988	11349	10968	12596
1989	1713	1499	1988	1989	10515	3250	10482
1990	1644	1501	1712	1990	11059	3250	10482
1991	1023	881	1313	1991	6185	6395	8476
1992	784	574	1151	1992	5063	4446	7289
1993	748	739	722	1993	4367	4515	5916

As Figure 1 shows, there has been a significant decrease in all three categories: timber offered, sold, and harvested. Through most of the 1980s, the Forest Service sold consistently at least 90% of what it had offered each year. The volume of timber offered shows a slow decline from 1984 to 1990, a large reduction in 1991, and a continuing decrease to 1993, when only 4.6 billion board feet (BBF) were offered, down from 11.1 BBF in 1990.

Figure 1
Total Timber Offered, Sold, and Harvested



However, in 1989, there was a large drop in the amount of timber sold, due primarily to timber held up because of the spotted owl controversy that arose in the Pacific Northwest (United States Department of Agriculture, Forest Service, 1981–1992). It was the first time in at least the past 15 years that the amount of timber sold dropped below 10.0 BBF. After a small increase in 1990, the volume of timber sold plummeted in 1991, falling to 6.4 BBF, eventually dropping to 4.6 BBF in 1993.

The harvest data generally are a mirror of the nation's economy: Timber purchasers will cut wood under contract when it is profitable for them; and in times of recession, when prices are low, harvest levels in National Forests decrease. The harvest data for the entire National Forest System in Figure 1 show the reaction of timber purchasers to the recession in the early-1980s, the subsequent recovery in the mid-1980s, and the start of a new recession in 1989.

Regional Trends

The regions that experienced the largest decreases in timber offered and sold were three of the top four timber producers for the Forest Service: Region 6 (Pacific Northwest), Region 5 (Pacific Southwest), and Region 1 (Northern). The Pacific Northwest, which has sold 44% of all timber that the Forest Service has sold in the last 13 years, has exhibited a tremendous decrease in timber sold over the past six years, dropping from 5.2 BBF in 1987 to 787 million board feet (MBF) in 1993. Timber offered was reduced dramatically in just a one-year period, from 5.0 BBF in 1990 to 1.1 BBF in 1991, and continued to fall to 598 MBF in 1993. In the Pacific Southwest, which was responsible for 16% of timber sold from 1981 to 1993, the changes have been more gradual, but levels of timber offered and sold have dropped considerably since 1988 (2.0 BBF), falling to their lowest levels in 1992 (574 MBF). The Northern Region, the fourth-largest timber producer in the Forest Service, selling 9% of the total timber sold since 1979, had a consistent decrease in the past decade in the amount of timber offered. Figures for timber sold were slightly more erratic, but also showed a downward trend, especially in the last five years, falling from 923 MBF to 381 MBF in 1993.

Region 8, the South, is the third-leading timber producer behind the Pacific Northwest and the Pacific Southwest. In general, levels for timber offered and sold in the South did not change significantly from 1981 to 1993. However, it is important to note that from 1991 to 1993 there was a gradual decrease, and that 1993 was the South's lowest-volume year for both timber offered and sold, with levels falling to 997 and 987 MBF, respectively. In all four regions mentioned above, the harvest levels follow a trend similar to the national harvest numbers: low during the early-1980s, rising in the mid-1980s, and declining again in the late-1980s. Trends for the remaining five regions, which contributed a combined 20% of the timber sold from 1981 to 1993, are shown in Table 1.

Interpreting Cut Levels

It is important to emphasize that the issue of timber harvesting on National Forests—both in terms of quantity and harvest method—is at the heart of many of the controversies surrounding National Forest management (Wilkinson & Anderson, 1987). For this reason, interested parties focus on the cut levels as a primary indicator of how the Forest Service has decided to manage the lands. A former Forest Service employee turned environmentalist was quoted as saying, “We are not optimistic about any of the changes they are talking about until the harvest level comes down” (Blumenthal, 1991, p. 21). Quite simply, a decrease in harvesting is perceived as a victory for a more “environmentally friendly” management vision. In contrast, the forest products industry, including large paper companies and small mills, views a reduction in cut levels as a reduction in supply, a decrease in business, and a subsequent loss of money (Sullivan, 1989). Indeed, the industry's concern is reflected in the titles of recent articles in *Forest Industries* magazine: “Crisis Looming in Western Timber Supply” (Sullivan, 1989); “Harvest-cutting Plans Spur Countermeasures” (1990); “Timber's Darkest Days Are Now, Analysts Say” (1991). More than any other statistic in National Forest management, the cut levels from year to year indicate to the interest groups what management direction (timber-oriented or non-timber-oriented) the Forest Service is taking.

Not only are cut levels linked inextricably to the actual on-the-ground management direction of the National Forests; they also are an integral part of the appropriations process, and thus influence the funding levels for programs outside of timber. As Michael Frome writes, the budget system “links the volume of timber cut, and earnings from it, to justifications for appropriations and places the Forest Service under continuing pressure to bring in more money” (Frome, 1984, p. 103). Randal O’Toole comments on how forest managers are motivated by what he terms “misincentives” to gain funding for less lucrative non-commodity programs: “Successful managers find funds for their programs, and in the Forest Service, more funding comes from Timber Sales program than recreation, wildlife or watershed. Under management by misincentives, multiple-use managers who want money for their own resources must support timber sales to get that money” (O’Toole, 1989, p. 67). Not all funding is tied to harvesting, but raising revenue through timber sales is a proven method for managers to maintain or increase funds for all programs in future years. With such connections, it is apparent that cut levels are far from simply a symbolic number to people both inside and outside the Forest Service.

However, with the volume of timber offered and sold dropping, significant changes seem to be taking place. Former Forest Service Chief Dale Robertson points toward a substantial shift in management policy that he says has been occurring in the last three or four years. Concerning specifically reductions in cut levels, Robertson comments, “Moving from a more narrow concept of sustainability of timber to a much broader one of sustainability of all forest values is going to affect how much timber we can harvest” (Sampson, 1992, p. 14). Such a vision ostensibly is an outgrowth of the New Perspectives Program, now integrated into the body of the Forest Service as “Ecosystem Management.” It has reached even into government offices above the Forest Service. Former Secretary of Agriculture Clayton Yeutter stated, “We are looking at multiple-use management from a new perspective; ... where timber and mineral production and livestock grazing cannot be accomplished in an environmentally acceptable manner, production levels will be reduced” (Harvest-cutting Plans Spur Countermeasures, 1990, p. 42).

Central to this repositioning of policy is the directive issued by Robertson, on June 4, 1992, instructing forest managers to reduce the practice of clearcutting by 70% from 1988 levels, and to incorporate the ecosystem management philosophy into on-the-ground management practices (Sampson, 1992). As to the effect of this announcement on the cut levels of National Forest timber, Robertson stated, “... if you eliminate clearcutting and practice partial cutting methods, you may have a falldown of ten percent. The ten percent didn’t apply to the bigger picture of ecosystem management” (Sampson, 1992, p. 14). The implication, then, is that the volume of timber removed from National Forest lands will continue to drop and will stay at these lower levels into the future.

If, in fact, the drops that are apparent in levels of timber offered and sold are a result of this change in philosophy, then in fact the stated policy changes are being implemented on the ground. While the general catalyst for this change likely is the shift in policy summarized by Robertson’s June 4th directive, there certainly are many detailed factors contributing to the reductions in the volume of timber offered and sold. Further analysis will be needed to judge whether these changes are permanent.

Harvest Methods

Although it is apparent that the Forest Service has reduced cut levels over the past ten years, there still is a question as to whether the actual harvest methods themselves have begun to change. The direct effects of Robertson's clearcut policy on forest management will not be apparent until future years. However, Robertson claims that the changes have been occurring gradually for several years (Sampson, 1992). Is this an accurate assessment?

One measure that can be used to track changes in management practices is the acres of timber harvested by different silvicultural methods. The Forest Service has been criticized for allowing destructive harvesting to occur on public lands; in particular, many environmental groups have been concerned with clearcut harvesting on the National Forests (Devall, 1993). However, difficulties arise in trying to separate the different harvesting methods into categories. There are many different varieties of harvesting techniques, and often more than one technique is used for a particular sale. Simply categorizing a clearcut can be problematic; there are "clearcuts with reserve trees," "regeneration mosaics," and other variations of clearcutting (Caird, 1992). Should these all be placed into one category?

In addition, there is a question as to how to judge any changes in harvest method that have occurred. If we are interested in whether or not the Forest Service is shifting toward more "environmentally friendly" techniques, simply examining trends in broad harvest method categories may not be enough. In short, the category that a particular harvest falls into may tell us little about its environmental impacts. The best way to ascertain effects from harvest methods is to examine the site of every individual sale that has occurred; obviously this would be a time-consuming and expensive task. Analyzing the number of acres harvested by categorizing the different sales into harvest methods is the most practical way to examine any changes that have occurred.

As was noted earlier, the harvest data are influenced strongly by the state of the economy; thus, a decreasing or increasing trend for different harvest methods may reflect simply the overall trend in volume of timber harvested (i.e., reactions to fluctuations in timber prices). A more useful figure is the percentage of total acreage harvested by each silvicultural method. This reveals whether one harvest method is increasing or decreasing in relation to the other harvest methods.

The numbers, dating from 1984 to 1991, were provided by the Forest Service's Timber Management office in Washington, DC. For the purposes of this study, the data were broken down by region for three general harvest categories: Clearcut, Removal Cut, and Selection Cut. Unfortunately, because these categories are so broad, there are many possible definitions for each of these harvest methods. However, if one were to analyze all 29 timber harvesting classifications, the problem arises of double-counting harvest acreage. Many of the categories, such as the various prep cuts or thinning harvests, are "intermediate" harvests. These management practices occur on the same acres that later will be subject to certain "regeneration" harvests, namely those management regimes that fall into the categories of Clearcut, Removal Cut, or Selection Cut. In order to categorize harvest acres best, and not count twice, regeneration harvests were used for classification, and intermediate harvests were not counted.

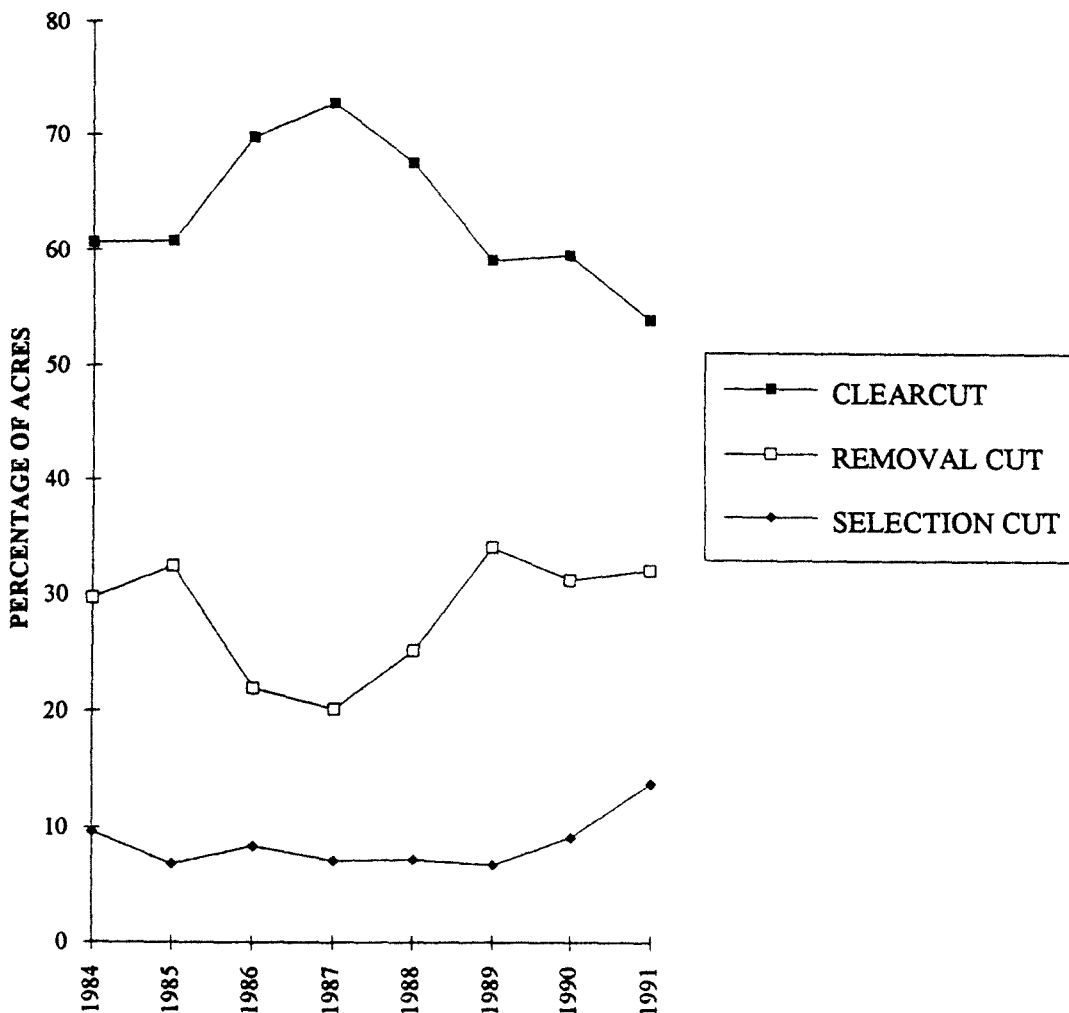
Some general descriptions help to guide one through the meaning of the numbers associated with each category. "Clearcut" describes a harvest in which the entire standing crop of trees from an area is removed at one time (United States Department of Agriculture, Forest Service, 1990). "Removal Cut" includes all even-

aged management practices other than clearcuts, including Seed Tree Cuts and Shelterwood Cuts, in which healthy individual stems are left on the site to provide a seed source for regenerating the stand after harvesting; later, these seed trees also would be removed, leaving a young even-aged stand (Society of American Foresters, 1983). "Selection Cut" is the category for uneven-aged management techniques, which leave a certain amount of forest cover while harvesting only selected individuals (United States Department of Agriculture, Forest Service, 1990).

Analysis Of Harvest Methods

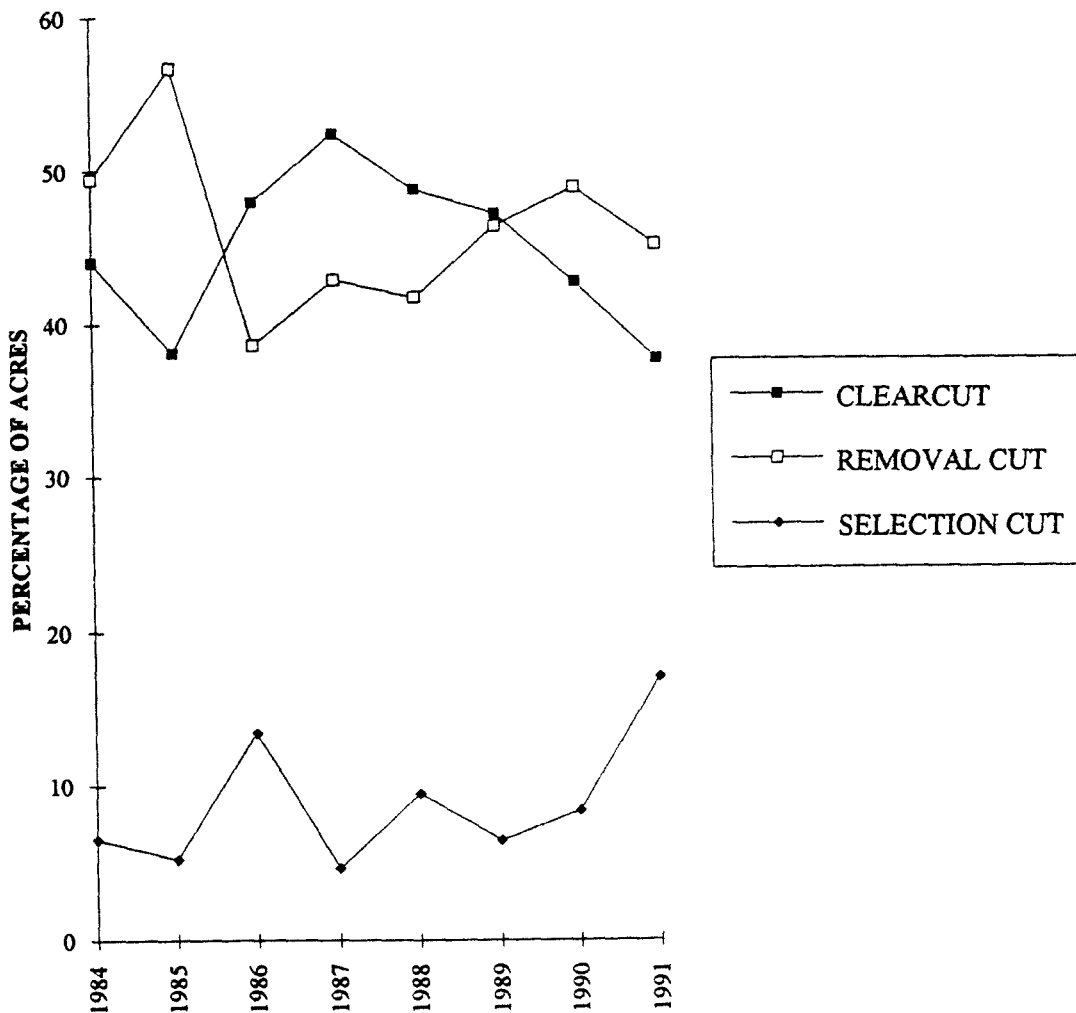
As Figure 2 illustrates, clearcutting is the most common method of harvest on National Forest lands. However, there has been a decrease in recent years, with the percentage of clearcut harvest acres falling from 73% in 1987 to 54% in 1991. This drop, however, is not very far below the clearcut percentages in 1984 and 1985. The trend for removal cuts, meanwhile, almost mirrors the trend for clearcuts, with percentages dropping when clearcut percentages increase, and rising when clearcut percentages decrease. This trend implies that there may be a direct tradeoff between clearcuts and other even-aged harvest methods. Selection cuts have shown a small increase recently, but their percentage is small compared to even-aged harvest methods.

Figure 2
Harvest Acres by Method—Total National Forest System



The largest timber producer, the Pacific Northwest (Figure 3), divides harvests more evenly between clearcuts and removal cuts than do the national totals, but shows similar trends in that the clearcuts decreased from 1987 to 1991 while removal cuts generally have increased. Once again, however, a clear trend for the entire eight-year period is not obvious, because clearcut percentages in 1984 and 1985 were almost as low as in recent years. This makes it difficult to assess whether any real change has occurred. Selection cuts, similar to the national trend, showed an increase in 1991, but the variation in percentages throughout the decade does not preclude this occurrence from being a one-year anomaly.

Figure 3
Harvest Acres by Method—Pacific Northwest Region

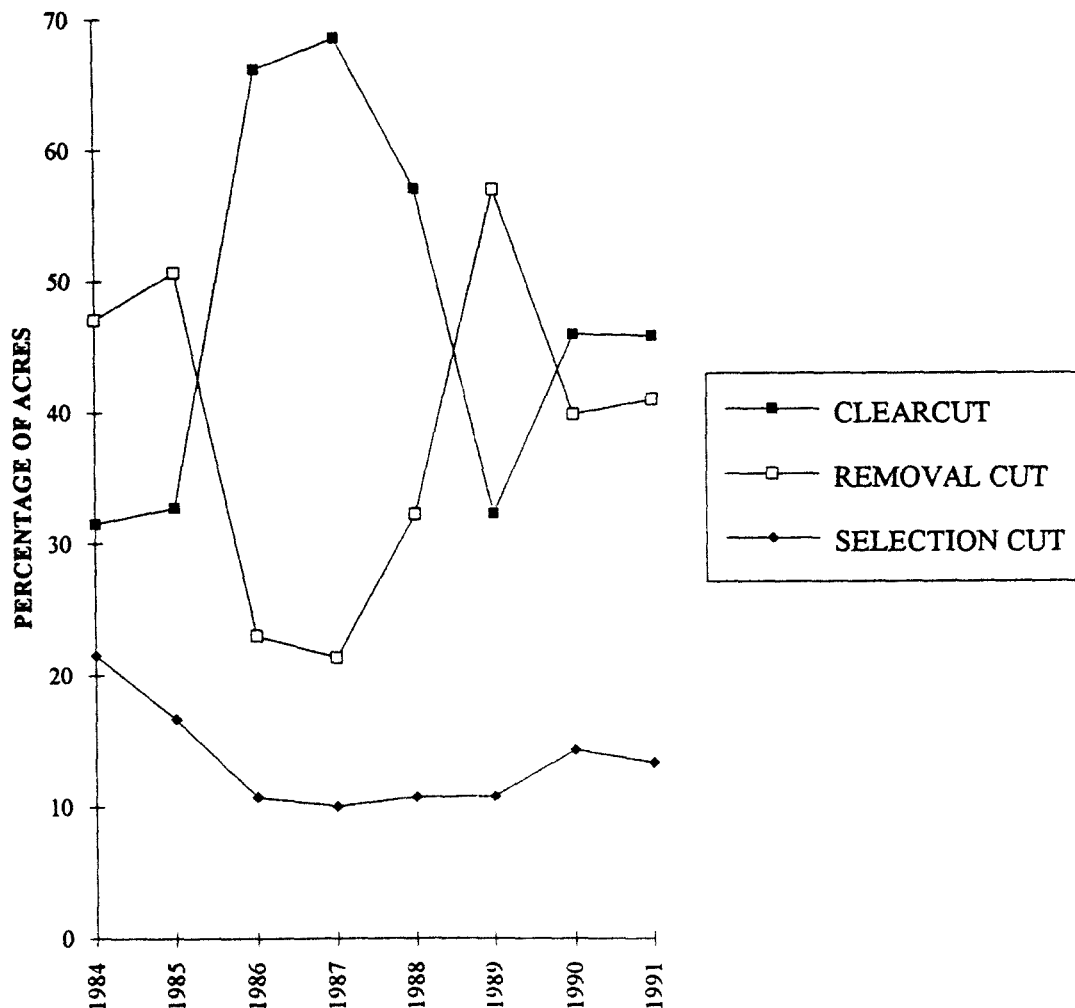


The second-largest timber producer, the Pacific Southwest (Figure 4), experienced a large increase in clearcutting from 1986 to 1988, followed by a large drop-off, with clearcuts falling from 57% of total harvest acres in 1988 to 32% in 1989. Removal cuts, similar to the national trend, mirrored the clearcut percentages, indicating that one was used to replace the other when decreases or increases occurred. Selection cuts fell sharply in the mid-1980s, from 21% in 1984 to 10% in 1987, and never recovered fully, finishing in 1991 at 13% of total acres harvested.

The South (Figure 5) showed strong reliance on clearcut methods, but clearcutting has fallen recently, dropping from 95% of total harvest acres in 1989 to 78% in 1991. In contrast to the other timber-producing regions, it seems that selection

cuts, rather than removal cuts, are replacing clearcuts in the Southern region. While removal cuts have shown a gradual decline since 1984, selection cuts grew from 0% in 1987 to 15% of the total harvest in 1991. Increases in recent years may indicate an important future role for uneven-aged management techniques.

Figure 4
Harvest Acres by Method—Pacific Southwest Region

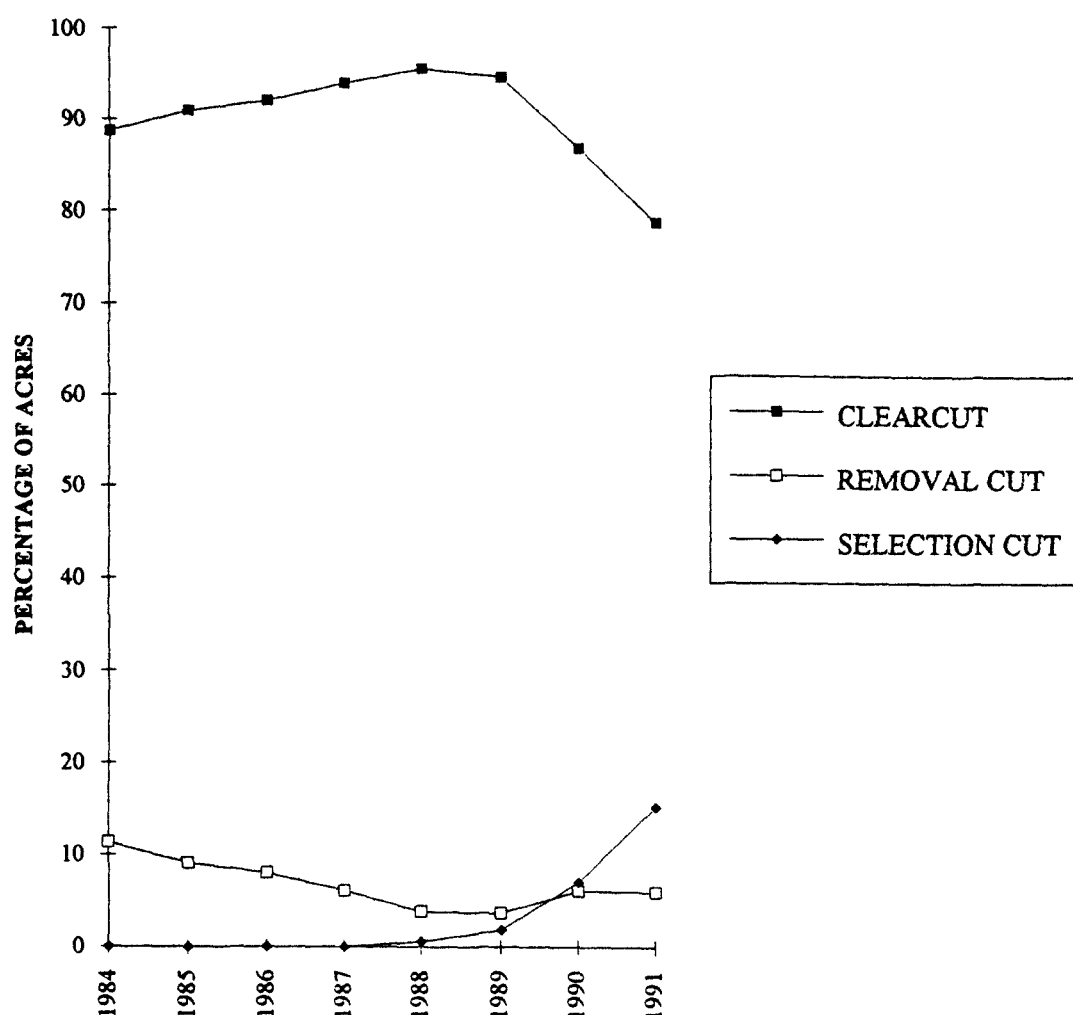


The Northern region (Figure 6), the fourth of the big timber regions, relies heavily on clearcut harvesting. In contrast to the first three regions examined, the North has experienced a significant increase in the percentage of acres clearcut, from 40% in 1984 to 69% in 1991. Both removal cuts and selection cuts have decreased significantly; most notably, selection cuts fell from 15% in 1984 to 2% in 1991. Essentially, then, the Northern region is using almost all even-aged management techniques as “regeneration” harvesting methods.²

Summary and Conclusions

The amount of timber being removed from the National Forests is decreasing. Numbers for timber offered, sold, and harvested have been at record lows in recent years. Cut levels are an extremely important indicator of future management directions, and

Figure 5
Harvest Acres by Method—Southern Region

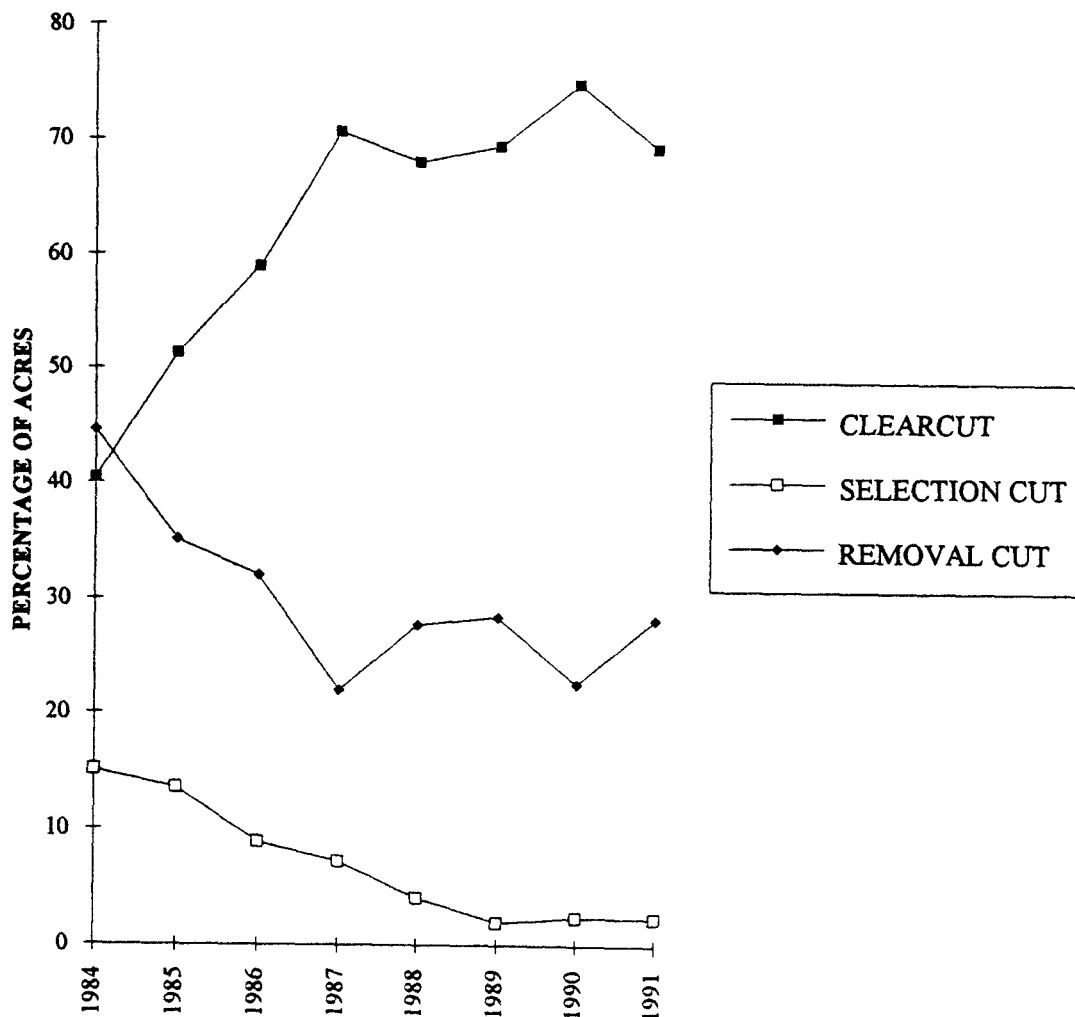


the decrease in timber sales might indicate a shift away from commodity values in Forest Service management practices.

However, it is unclear whether any shift in methods of harvesting timber has occurred in the last decade. While the percentage of clearcut acres is at its lowest at the end of the eight years of data, it remains to be seen whether this significant change will be permanent. In addition, it is apparent that any shifts in harvest methods that appear to be happening on a national level may be different from what is occurring on the regional level. It is important to look at the data from different regions, and perhaps even from different Forests, in order to ascertain patterns of change within the national trends.³

Given former Forest Service Chief Robertson's directive to reduce clearcutting by 70%, there is some question as to which harvest methods will supplant clearcutting if it continues to decrease in future years. It is possible that removal cuts, because they are more similar to clearcuts than to selection cuts in their even-aged management approach, will become a much more commonly-used harvesting method. This prediction is supported by the recent increase in removal cuts nationally. Selection cuts, or other forms of uneven-aged management, also may increase because of concern for the environmental impacts of timber harvesting.

Figure 6
Harvest Acres by Method—Northern Region



In summary, hypotheses of change are supported by these Forest Service timber management data. However, while the numbers for timber offered, sold, and harvested show definite trends in recent years, data for harvest methods are less revealing of change. Perhaps with new data, a more complete view of changes in the timber program will be revealed in future years.

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employees' views about change and the need for change in the agency. He also is a past principal investigator of the University of Michigan's Detroit Area Study, which in 1990 examined black and white differences in concerns about environmental quality issues. He teaches courses in environmental sociology and natural resources policy at the University of Michigan and has published widely on the topics of environmental attitudes and activism, natural resource agency decisionmaking, and environmental justice.

Notes

¹ Data for analysis of changes in timber management are difficult to obtain. There is huge variability among the National Forests in how much and what types of data are recorded about the timber resource. For example, the Northern Region (Region 1) was able quickly and easily to provide information in harvest methods going back to 1945. Their data base is very large and easily accessible. However, when the same request was made to the Southwest Region (Region 3), their Timber Management Division had information back only to 1984, and even those data were difficult to find. In all fairness, the different Regions have National Forests with different priorities. The Northern Region produces large volumes of timber, and therefore keeps more complete records than a region like the Southwest, which sells only one-third the amount of timber as the North. However, it is difficult to perform any historical analysis when the data needed are not recorded nor reported in a consistent fashion throughout the agency.

² It should be noted that harvests for one particular year can include timber that was sold in contracts in the same year or several years before the harvest actually occurs. A more immediate measure of change in harvest methods may be to look at the number of acres *sold* by harvest method. These data could be obtained from the sale reports of each Forest, in which the contracts between the Forest Service and the contractor specify what type of harvest method will be used. The drawback with using such numbers is that not all timber sales end up being harvested; some are held by appeals, and are even changed because of public pressure or changing conditions in the situation surrounding a specific sale. However, any trend in the data for harvest methods as they are prescribed for timber sales would indicate changes in the way the Forest Service is directing timber purchasers to remove trees from the National Forests.

These data, in response to the growing interest among policymakers in future methods of harvest, have begun to be collated for each Region for the last four years. However, the information on harvest method by timber sold, especially before 1989, is still inconsistent and incomplete. Even the most recent data are suspect because of the lack of a formal reporting system common to the whole National Forest System. Because of the short time span for which data were available and because of questions of accuracy, trend analysis was not used to evaluate this information. However, if the Forest Service begins to keep reliable records on the method of harvest for timber sold, such data will be most valuable in measuring changes in the different methods of harvest that the Forest Service prescribes in its sales.

³ It is important for any agency wishing to assess its program that records be kept consistently within all divisions. Although it is understandable that the various regions of the Forest Service keep some records more carefully than do others because of differences in management priorities, still there should be uniform reporting methods for data that can be used to measure important outputs and management activities. The regions must report their numbers with similar detail and accuracy in order for proper monitoring to occur. Otherwise, information is not as easily accessible and reliable for the entire National Forest System. This is true particularly for timber management data. Systems of data collection have evolved differently in each region because of the diversity of techniques and of the preferences and goals of forest managers who want to manage their National Forest in the most efficient way possible. The Forest Service should work toward establishing a common data base for all regions, such that information is gathered consistently and reported in a way that allows easy compilation into accurate national numbers. This system also would guarantee that numbers from different regions could be compared to one another without the worry of inconsistencies. Such a process is essential for accurate monitoring of Forest Service programs and management activities.

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