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**Congressional Research Service
Report for Congress
92-607 ENR**

Clearcutting in the National Forests

Adela Backiel

Ross W. Gorte

Specialists in Natural Resource Policy
Environment and Natural Resources Policy Division

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SUMMARY

Clearcutting is a method of harvesting and regenerating trees in which all trees are cleared from a site and a new, even-aged stand of timber is grown. Clearcutting is the primary method of timber production and management on national forests. However, this method of harvesting trees has been controversial since at least the mid-1960s. Many conservation and citizen groups object to clearcutting in the national forests, citing soil and water degradation, unsightly landscapes, and other damages. The wood products industry defends clearcutting as an efficient and successful silvicultural system.

Between 1984 and 1991, clearcutting accounted for 63 percent of the area harvested in the national forests (excluding salvage and thinning), and other even-aged harvests accounted for 29 percent of the area harvested. Because of the continuing public outcry over clearcutting, the Chief of the Forest Service announced on June 4, 1992, that the Forest Service would reduce clearcutting by 70 percent from 1988 levels, and that this would reduce short-term harvest volumes by about 10 percent. Existing data show that half of the proposed reduction in clearcutting had already been accomplished by 1991, but the timber harvest volume has declined proportionally (principally because of the economic recession and litigation over spotted owls). It is unclear whether the area clearcut can be further reduced and the reduction sustained, without additional declines in harvest volume, when the economy recovers and the litigation is resolved.

The choice of clearcutting or other silvicultural systems depends on a number of factors, such as the objectives of the landowner. Clearcutting is financially efficient, with lower costs for timber harvesting than other silvicultural systems, and has proven successful for regenerating stands of certain tree species. On the other hand, clearcutting and other even-aged systems can have greater impacts on soils, water, and aesthetics, and result in different plant and animal communities than do selection harvesting systems. Foresters argue that clearcutting is a legitimate forest silvicultural system under certain circumstances, and should be used when and where it is appropriate for the particular species and specific site conditions, and on public lands when it conforms with the public's values and goals for those lands.

Congressional interest in clearcutting has increased in the past few years. Several bills have been introduced in the current and preceding Congresses to ban the use of clearcutting and/or all even-aged management systems in the national forests. The issue, however, transcends the use of clearcutting and focuses on how to assure the choice of a silvicultural system and the implementation of the management practices that will achieve the stated goals for public land and resource management. If Congress enacts specific management restrictions, such as a ban on clearcutting in the national forests, much of the professional flexibility of the agency in managing the lands entrusted to its stewardship would be taken away. If, however, public trust continues to be eroded by the use of clearcutting where it is unacceptable to the public and by recurring environmental damage from clearcutting, pressure for congressional intervention will continue and likely increase.

CLEARCUTTING IN THE NATIONAL FORESTS

Adela Backiel and Ross W. Gorte

Congressional Research Service

Report 92-607 ENR

July 29, 1992

Clearcutting is a method of harvesting and regenerating timber in which all trees are cleared from a site and a new, even-aged stand of timber is grown. Clearcutting, the primary method of cutting and growing trees in the national forests, has been controversial since at least the mid-1960s. Many conservation and citizen groups object to clearcutting in the national forests, citing soil and water degradation, unsightly landscapes, over-harvesting, destruction of diversity of plants and animals, and other damages and abuses. The timber industry endorses clearcutting because it is economically efficient and has been successful for regenerating forests of certain species. Forestry professionals argue that clearcutting is a legitimate silvicultural system for certain species and particular site conditions, and is appropriate on public lands when it conforms with the public's values and goals for those lands.

This report provides background on the clearcutting controversy, defines and describes clearcutting, and analyzes a recent U.S. Forest Service announcement to reduce clearcutting as a standard practice in the national forests. In addition, this report also discusses the biological and financial considerations in choosing to use clearcutting and some of the environmental effects of its use. This report is predominantly about clearcutting; other common methods of silviculture are defined, but are not discussed in detail.

General information about timber harvesting in this report is applicable to forest management practices on both public and private lands. Data on area clearcut and descriptions of Federal policies on clearcutting, however, apply only to those lands administered by the U.S. Forest Service in the Department of Agriculture, the largest owner of forestland in the United States; data on acres clearcut are not compiled for private lands. In addition, most of the power to regulate private forest management lies with the States. Many States have forest practice acts that provide guidelines and requirements for private forest management, although no State has banned clearcutting. Information on State forest practice regulation is beyond the scope of this report.(1)

THE CLEARCUTTING CONTROVERSY

Clearcutting, particularly on public lands, is controversial for many reasons. It is generally viewed by many environmentalists and other citizens as harmful and abusive to the forest lands and resources, despite foresters' attempts to explain the legitimate use of clearcutting to harvest and regenerate certain commercial tree species, when applied properly. The wood products industry defends clearcutting as an efficient and successful silvicultural system. Many environmental groups advocate a complete ban on clearcutting in the national forests, often supporting the use of "selection" harvesting (see definitions below) as a substitute that is viewed as less abusive to the land and resources. The timber industry is concerned that restricting or eliminating clearcutting would unnecessarily restrict timber supplies and raise the costs of harvesting, and would consequently increase timber and wood product prices.

Definitions

Silvicultural is a "process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop with a view to regeneration and...according to the type of forest thereby produced."(2)

There are four primary silvicultural systems used to harvest timber and regenerate forests in the United States: clearcutting, seed-tree, shelterwood, and selection harvesting. The first three--clearcutting, seed-tree, and shelterwood systems--are even-aged management systems, which result in stands of trees

that are essentially the same age and often, but not necessarily, the same size. The fourth system—selection harvesting—is an uneven-aged management system, resulting in stands with intermingled trees of many ages and a variety of sizes.

In clearcutting, all trees are cleared from a site and a new, even-aged stand of timber is grown naturally, from seeds from the surrounding trees, or artificially, from sown seeds or planted seedlings. With the seed-tree system, an area is generally clearcut, except that a few seed-producing trees are left to naturally regenerate the area and the seed trees are removed after the seedling stand is established. In the shelterwood system, trees are removed in a series of cuts; some trees are left for several years to provide seeds and to protect the seedlings before being removed. The selection system removes trees, either singly or in small groups, over time; regeneration of new trees is continuous. These four silvicultural systems are defined further in Appendix A.

Recently, in an effort to address some of the shortcomings of clearcutting and encourage new solutions to both technical and perceived problems, researchers have developed some new forest management techniques, dubbed "new forestry." New forestry is defined as:(3)

kinder, gentler forestry that focuses equally on commodities and ecological values. Such a "new forestry" uses ecological principles to create managed forests superior [in an ecological sense] to those created under common current forestry practices.

Although some general descriptions and guidelines for new forestry harvesting methods exist, few specifics are described for these new techniques. It is not known how or whether these new techniques will be described and classified--as even- or uneven-aged systems--within the existing silvicultural definitions. Also, "new forestry" harvests will be difficult to describe simply, because techniques are likely to depend upon the local climate, the plant and animal life present, and other local and site-specific constraints and demands. Some timber harvests, particularly in the Pacific Northwest, have been cited as following "new forestry" principles, but a complete description and evaluation of the methods and results are not yet available.

Historical Perspective

Clearcutting has been controversial for at least 25 years, since it became the dominant method of harvesting and regenerating timber in the national forests. Prior to this time, national forest timber was mostly harvested and regenerated by the selection system.(4) Today, however, clearcutting and other even-aged systems remain the primary silvicultural methods in the national forests.

Reasons for the early debate over the benefits and liabilities of clearcutting were very similar to those cited today. A Senate Committee Report, entitled *Clearcutting on Federal Timberlands*, summarizes the early history and the Senate Agriculture Committee's stance on the judicious use of clearcutting in what are commonly known as "the Church Clearcutting Guidelines," named for the Chair of the Subcommittee on Public Lands, Senator Frank Church of Idaho; a copy of this Committee Print is included in this report as Appendix B. Many of the provisions from the Church clearcutting guidelines were later incorporated into Sections 6(g)(3)(E) and (F) of the National Forest Management Act of 1976 (NFMA).(5) (These sections of NFMA are included as Appendix C.)

Enactment of NFMA, however, did not end the clearcutting controversy. At various times since, the Forest Service has fine-tuned its clearcutting policy, but clearcutting is still used more than other silvicultural methods on national forest lands, and many conservation and citizen groups continue to object to its use.

The Current Debate

Congressional interest in clearcutting has increased in the past few years. Several bills have been introduced in the current and preceding Congresses to ban the use of clearcutting and/or all even-aged management systems in the national forests. In the conference report for the FY1991 Appropriations Act for the Department of the Interior and Related Agencies, (6) Congress noted its expectations that clearcutting would be reduced, stating that:

The managers understand that the new forest plans for the Forest Service include goals...intended to result in an average decrease of 25 percent in the amount of clearcutting. The managers expect the Forest Service to follow the forest plans in attaining these objectives. The managers also understand that the 25 percent goal is not necessarily applied to particular forests or particular sites, but rather, is an overall goal.

In addition, the current debate over reserving old growth forests as habitat for the threatened northern spotted owl has intensified the clearcutting controversy, because of the widespread use of clearcutting in the national forests of the Pacific Northwest, the fragmentation of spotted owl habitat caused by even-aged management, and the continuing decrease in the acreage of old growth forests. As research has further specified the habitat needs of the spotted owl, current Forest Service management practices also have been more closely scrutinized.

The Multiple-Use Sustained-Yield Act of 1960 (7) directs national forest management for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes...with consideration being given to the relative values of the various resources..." NFMA requires forest plans to achieve these purposes while considering the economic and environmental effects of various management alternatives and involving the public. However, some critics argue that these mandates have not been followed, because the Forest Service has given priority to timber production over the other resources and uses of the forest.

In response to these concerns, and as a result of information learned during the three-year "New Perspectives" program intended to identify and promote the integration of ecological values in forest management, on June 4, 1992, the Chief of the Forest Service announced:(8)

[a] reduction in clearcutting as a standard commercial timber harvest practice on the National Forests as a key component of a new policy that emphasizes and ecological approach to forest management. In making future management decisions, clearcutting is to be used only where it is essential to meet specific forest plan objectives and within the circumstances outlined in the attached policy paper (attachment 2).

The goal of the policy is to reduce the area clearcut by 70 percent from the 1988 level. This 1-page policy paper is included in this report as Appendix D.

Conservation groups and others question whether this Forest Service announcement will actually change the amount of clearcutting and increase the use of other silvicultural systems, because these "new" clearcutting policies are similar to those mandated in NFMA in 1976, and which, they assert, were never really implemented. Industry argues that this policy would reduce the amount of timber available from national forests more than the 10 percent estimated by the Forest Service and increase costs of timber harvesting.

BENEFITS AND LIABILITIES OF CLEARCUTTING

Financial Considerations

Clearcutting is often considered desirable by both professional foresters and the timber industry because it is more efficient than other silvicultural methods, both in harvesting timber and in regenerating stands. Efficiency in harvest and regeneration is important, because "Harvesting timber crops is usually the most expensive operation conducted in the forest..."(9) Efficiency is typically measured as average cost per unit of output (e.g., per million board feet of timber harvested). This measure, however, often excludes the non-financial cost of environmental damages, and thus efficiency incompletely accounts for economic impacts. Nonetheless, efficiency--the financial element--is one consideration in selecting a silvicultural system.

Clearcutting is more efficient for harvesting trees, because a greater volume of wood is harvested, both per acre and total, at one time, and thus the average cost is lower than under other even-aged silvicultural systems. "The cost of logging [in a shelterwood cutting system] is greater than when virtually all the trees are cut in a single operation."(10) Selection systems are even more expensive, because the variety of species and sizes in an uneven-aged stand requires a greater variety of treatments.(11)

One disadvantage that limits the use of the selection system is the complexity of all operations conducted in the intermingled mixtures of different age classes....The difficulty and expense of harvesting operations is usually greater than in even-aged stands.

Clearcutting has additional advantages in areas with steep terrain. Timber harvesting requires roads for hauling the timber to the mills (or to ports for export). Clearcutting typically requires fewer roads to be built, because cable logging systems can be used to transport harvested timber from the stump to a loading yard. "With systems using cable skidding, however, partial cutting [i.e., silvicultural systems other than clearcutting] is rarely practical, as residual trees are apt to be damaged or destroyed" during the harvesting operation.(12) Road maintenance is also reduced under clearcutting systems, because everything is completed in one operation. Other even-aged systems typically require access to the stand two or three times, while the selection system essentially requires permanent access to all timber stands. Thus, clearcutting allows roads to be returned to forest cover when harvesting is completed, reducing the financial and environmental costs of retaining the road system.

Clearcutting is also more efficient for artificial regeneration of timber stands. The cleared site allows less expensive site preparation, "because there is no need of avoiding damage to large or small residual trees" (i.e., the seed trees and seedlings).(13) Furthermore, artificial regeneration (planting seedlings) can be preferable to natural regeneration, because it allows greater control over the species and spacing of the regenerated trees and reduces the time between the harvest and the establishment of the new stand.

The significant advantages [of planting] are: (a) close control over the arrangement, composition, and genetic qualities of new stands; (b) shortening of period of establishment; (c) avoidance of dangers to which seed and new seedlings are exposed in the field; and (d) freedom from restrictions on harvesting techniques.

Planting, *if properly done*, creates stands that can be treated more efficiently and yield greater volumes and values than naturally regenerated stands.(14) (emphasis in original)

One of the most important virtues of [clearcutting] is the opportunity to avoid the delay in establishment of regeneration that frequently results if one depends on natural reseedling.(15)

One provision of NFMA makes rapid reforestation particularly important for the national forests. Section 6(g)(3)(E) requires regulations that "insure that timber will be harvested from National Forest System lands only where...(ii) there is assurance that such lands can be adequately restocked within five years after

harvest." Despite other provisions that may restrict the use of clearcutting (see Appendix C), this reforestation requirement may increase the emphasis on and incidence of clear cutting, because clearcutting increases the assurance of adequate reforestation within five years.

Environmental Consequences

Environmental effects are factors both in choosing which system to use in forest management and in assessing the consequences of the chosen system. Some of the most in-depth research on forests and the role of development in forests has been done by the Hubbard Brook Ecosystem Study in the Hubbard Brook Valley in the hardwood forests of the White Mountains of New Hampshire. The objectives of the study include linking basic research with forest management and studying the forest ecosystem through various stages of development, such as before and after clearcutting. As in any forestry research, results are site-specific. However, generalities based on research results can often be extrapolated to other cases and sites. Regarding the acceptability of clearcutting in a forest ecosystem, scientists from Hubbard Brook stated:(16)

Our studies suggest that many similarities exist between redevelopment occurring in clearcut ecosystems and in openings in the forest created by naturally occurring treefall. This suggests to us that clearcutting has the potential to work with nature rather than against it and that clearcutting may be considered as an ecologically acceptable procedure in White Mountain northern hardwood forests. However, it also is apparent that misuse of stem-only clearcutting can lead to unnecessary short- and long-term degradation of the forest ecosystem. Therefore, it should be coupled with carefully designed safeguards

Some of these guidelines identified from the Hubbard Brook Ecosystem Study include:

- clearcutting should be limited to sites with strong recuperative ability;
- roads should consume an absolute minimum amount of area;
- proper ecological weight should be given to species that have little importance as a source of wood products but play an important role by conserving nutrients, minimizing erosion, and being a source of food for wildlife;
- cuts should be relatively small (several hectares) to insure the availability of seed sources and to minimize losses via dissolved substances and eroded materials. (17)

Soil and Water

"Clearcutting produces...the largest increase in soil water and streamflow."(18) As additional trees are removed from a site, water quantity increases. A change in seasonal distribution of streamflow also often occurs for a few years following clearcutting. "The extra water derived from cutting is usually viewed as a positive effect if water quality is not degraded."(19) However, since spring snowmelt typically occurs earlier in clearcut areas, the increased flow can add to potential spring flooding and decrease summer streamflows.

"Water quality characteristics most affected by timber harvesting are: (1) sediment...; (2) dissolved nutrients...; and (3) water temperature."(20) Undisturbed forests are generally low in dissolved or suspended matter (except during floods); sediment loads and dissolved nutrients generally increase with the level of disturbance to the forest. Timber harvesting adjacent to stream channels increases sediment flows into streams, and can affect the temperature of the stream, because it removes the streamside vegetation that buffers the stream. Providing buffer strips, often suggested at 50-100 feet on either side of stream, can mitigate these effects.

Clearcutting and other silvicultural practices, however, are not the primary cause of erosion or water quality deterioration resulting from timber management operations. Rather, the skidding (hauling logs to a loading site) and road construction are typically the major sources of soil and water degradation associated with timber harvesting:(21)

Felling trees alone seldom causes erosion although some soil compaction and surface gouging may occur during this operation. In contrast, road building, skidding and stacking logs, and some site preparation activities can produce major soil surface disturbance that greatly increases the erosion on a site.

Furthermore, as noted above, clearcutting may result in *less* road construction, and thus less water quality degradation, than other silvicultural methods. (However, no timber harvesting or road construction would yield the highest water quality.)

Prescribed fire is often used on sites that have been clearcut, to remove combustible fuels from the area and to prepare the site for reforestation. The effect of fire on soil and water depends primarily on the intensity of the fire. "Generally, a low-intensity fire increases the availability of nutrients to plants...[and] generally does not increase soil erosion. Intense, hot fires may completely burn the forest floor, expose mineral soil, and accelerate soil erosion in steep terrain."(22) If conducted under proper weather and fuel conditions, however, prescribed fires can avoid most problems arising from intense fires.

Plant and Animal Diversity

The diversity of plants and animals in a forest is greatly affected by the silvicultural system used for timber management. Every silvicultural decision has consequences for wildlife.(23)

Timber management is wildlife management. The degree to which it is good wildlife management depends on how well the wildlife biologist can explain the relationship of wildlife to habitat and how well the forester can manipulate habitat to achieve wildlife goals.(24) (emphasis in original)

The principal difference between uneven-aged and even-aged systems, in terms of plant and animal diversity, is the long-lasting effect of the regeneration harvest. These differences have been described by Thomas and Radtke:(25)

Uneven-aged management...tends, over time, to reduce the horizontal diversity of plants and animals in the forest. The resulting stands often have high structural (vertical) diversity because of the intermingling of the different ages and sizes of trees. But there is a gradual reduction of shade-intolerant trees and understory plants....Such forests lack the variety of distinct successional stages that ensure diversity and a myriad of habitat niches.

Uneven-aged management, however, can be a useful wildlife management technique. It benefits wildlife and plant species adapted to more mature forest conditions, and it can be used to preserve the integrity of delicate and disproportionately important wildlife habitats, such as riparian zones.

A forest under even-aged management usually has low vertical diversity because of the comparative simplicity of the stand structure....Even-aged systems...produce distinct successional stages and high degree of horizontal diversity because there are numerous stands of various age classes scattered through the forest...[that] provide a variety of habitats...[including conditions] not available in the more mature forest.

No single system of forest management can be a panacea for wildlife management. The decision about which system to use must be based on specific management goals. The forest structure must be considered, along with size and shape of the stand, its juxtaposition to other stands, the road systems, and special habitat needs. Flexibility in the use of silvicultural systems can be a key to meeting a range of wildlife goals.

Aesthetics and Recreation

Surprisingly little research has documented the effects of the various silvicultural systems on recreation patterns and levels. Research has identified public preferences for various forest conditions. In general, the least preferred conditions include:(26)

- Artificial intrusions, especially: clearcuts, slash, stumps, land] other signs of timber harvesting disturbances.
- Plantations and "monocultures".
- Standing diseased, dead, or dying trees in large numbers.
- Dense "eye-level vegetation or undergrowth; i.e., a thicket with dense sapling stands or dense forest understories over large areas.

In contrast, the most preferred conditions were natural-appearing landscapes, with a diversity of vegetation, large-diameter trees, sparse undergrowth, and natural-appearing openings.

Research has more typically focused on aesthetics, and the effects of silvicultural activities on aesthetics. Visual management is often based on visual quality objectives, ranging from no change to impacts not visible or subordinate to the characteristic landscape to impacts that dominate but are modified to appear natural from various distances.(27) In general, uneven-aged management has less effect on aesthetics than even-aged silvicultural systems. Under an uneven-aged system, "visual impacts of timber management activities may be kept to a minimum; the uneven-aged system is capable of achieving [almost any]...visual quality objective in all distance zones if it is properly applied."(28) Uneven-aged management makes it easier to achieve more stringent visual quality objectives. "The advantage of uneven-aged management in these situations results because it is small scale...random in pattern, and because it leaves the natural appearing forest character intact."(29) In contrast, even-aged silvicultural systems have greater impact on visual quality, with clearcutting being generally less desirable than other even-aged cutting systems. Nonetheless, when even-aged management is "carefully applied, it should be possible to meet [high visual quality objectives]...along less sensitive parts of viewsheds."(30)

NATIONAL FOREST TIMBER HARVESTS

Nationally, clearcutting has accounted for nearly two-thirds (63 percent) of the national forest area harvested in regeneration cutting since 1984. (31) (The data are presented in Appendix E.) The area and importance of clearcutting has declined over the past few years. The area clearcut peaked in 1988, at 283,061 acres (68 percent of the area harvested in regeneration cutting). In 1991, area clearcut was 186,584 acres (53 percent of the area regeneration harvested). Clearcutting has, thus, declined by 34 percent since 1988, about half the decline targeted by Chief Robertson in the June 4, 1992, announcement on reducing clearcutting by 70 percent from the 1988 level. This decline has been accompanied by a 33 percent decline in the volume of timber harvested; this decline in harvest volume is principally due to litigation over spotted owl protection and to the recession and market-induced decline in lumber demand. It is unclear whether this decline in clearcutting can be sustained and extended when harvest volumes rise as the economy recovers and the litigation is resolved.

Final harvests from other even-aged management systems have accounted for less than 30 percent of the national forest area harvested in regeneration cutting since 1984, although the level has climbed to nearly a third of regeneration cutting over the past 3 years. Selection cutting has accounted for less than 9 percent of the national forest area harvested in regeneration cutting, but increased in area and importance (to nearly 14 percent) in 1991.

These national data mask substantial regional variation in regeneration cutting. Region 1 (Montana and northern Idaho) is the most similar to the national average, with clearcutting accounting for nearly two-thirds of regeneration harvesting and final harvests from other even-aged management systems accounting for nearly 30 percent of the total. However, in contrast to the national data, clearcutting has increased in both

area and importance since 1984. Other even-aged management systems are more important in Region 2 (Colorado, South Dakota, and Wyoming), accounting for more than half of the regeneration harvesting, while clearcutting has accounted for about 43 percent of regeneration harvest area. Total area with regeneration harvests increased substantially since 1984, with large increases in other even-aged harvests in the past three years.

Region 3 (Arizona and New Mexico) relies almost exclusively (more than 95 percent) on other even-aged management systems, with regeneration harvest area relatively stable since 1984. In contrast, regeneration harvest area in Region 4 (Utah, Nevada, and southern Idaho) has been highly variable, with clearcutting accounting for 14 to 74 percent of regeneration harvest area, and averaging about 40 percent. Selection harvesting has accounted for a third of regeneration harvesting, on average, the highest for any Forest Service region. However, area clearcut has increased substantially in the past two years, and the importance of selection harvesting in the region has declined.

Regions 5 (California) and 6 (Washington and Oregon) show similar patterns of regeneration harvesting. Clearcutting accounts for 45 percent of the regeneration harvest area in both regions, while other even-aged management systems account for 41 percent of the regeneration harvest area in Region 5 and 46 percent of the area in Region 6. The importance of the various silvicultural systems has been relatively stable in both regions.

Clearcutting dominates regeneration harvesting in the other three regions, Region 8 (the South, from Virginia to Texas and Oklahoma), Region 9 (the North and East), and Region 10 (Alaska). In Region 10, all of the area regeneration harvested since 1988 has been clearcut. In Region 8, clearcutting has accounted for more than 90 percent of regeneration harvest area, but the area clearcut has declined by two-thirds since the mid 1980s; selection harvesting in the region has grown substantially since 1988. In Region 9, clearcutting has accounted for more than 80 percent of regeneration harvest area. As in Region 8, the area and importance of clearcutting has declined since 1988 (to 74 percent in 1991), with a corresponding increase in the area and importance of selection harvesting.

In sum, clearcutting is the principal regeneration harvest system used in the national forests, and is particularly important in Regions 8, 9, and 10 (the eastern half of the country and Alaska). There is much regional variation, but only Region 3 (Arizona and New Mexico) has virtually eliminated clearcutting. Half of the Forest Service goal of reducing clearcutting by 70 percent from 1988 levels, announced on June 4, 1992, and outlined in the attachment in Appendix C, has already been achieved. Clearcutting in 1991 was 34 percent below the 1988 level, largely as a result of the decline in clearcutting in Region 8 (the South) and smaller declines in other regions. However, the area clearcut has increased in the two central Rocky Mountain regions (Regions 2 and 4). The decline in clearcutting has coincided with the litigation over spotted owls (in Regions 5 and 6) and red-cockaded woodpeckers (in Region 8) and with the current recession, and has been matched by an equal decline in the volume of timber harvested. Although the Forest Service has estimated that the 70-percent reduction in clearcutting will reduce harvest volume by only about 10 percent, it is uncertain whether the decline in the area clearcut can continue, or even be sustained, when the litigation is resolved and the economy recovers, without significant constraints on the volume of timber harvests.

THE CHOICE OF SILVICULTURAL SYSTEMS

Forest management is both a science and an art. Although there are principles and guidelines that can be followed in managing a forest, whether it be for timber production or wilderness recreation, each site is a unique composition of many factors that must be considered and which respond in many different ways to silvicultural systems. As described by one well-known forest silviculturalist:(32)

Logical programs for the long-term management of particular stands or kinds of stands are not devised by making judicious selections from classifications and schematic descriptions of silvicultural systems. This book, for example, and in spite of certain superficial resemblances, is not a cookbook from which such choices can be made and applied. A good silvicultural system is not chosen but formulated as a solution to a specific set of circumstances.

But other factors besides the biological ones also affect the decision of which silvicultural system to be used on a particular site.(33)

The human demands placed on forests are so variable that it is fortunate that forest vegetation usually is flexible and resilient. Because of this, silviculture can be quite variable. Natural factors set limits on what is possible, but after these natural limitations are taken into account, the next considerations are the management objectives that society and ownership, public or private, have set for a given tract of forest land.

In addition to landowner objectives, "the choice of a silvicultural system...involves analysis of social, economic, and managerial considerations,"(34) as described above under financial considerations and environmental consequences.

Biological Factors

As stated above, certain natural factors set limits as to what management techniques can be applied to a tract of forestland without impairing the long-term productivity of the land. Many biological factors influence the choice of silvicultural method used on an individual site. Other factors are perhaps not limiting, but are usually considered in selecting management and silvicultural systems to be applied to a specific site. Although the combination of factors found on each site is likely to be unique, general guidelines can be developed for practices that can be applied on sites with similar characteristics:(35)

- existing stand conditions: size, age, health, species composition, quality and species of vegetation, quality of seed source;
- reproductive habits and requirements of the desired and competitive tree species;
- climate;
- soil and topography;
- erosion hazard;
- existing water quality and quantity;
- threat from damaging agents (e.g., insects, diseases, wind);
- animal habitat requirements;
- availability of water and nutrients; and
- history and use of fire.

Even-aged management is often described as an attempt to mimic natural disturbances, particularly patterns of damage by fires or insects. Because fire sometimes threatens human life and property, rapid fire suppression has been a priority for many decades. This practice, however, has decreased the natural role fire has historically played in opening up stands of trees, particularly for species that do not tolerate shade and/or depend on fire for propagation.

Landowner Objectives

Harvesting techniques chosen for public land private forestlands are linked to the landowners' goals for the lands being managed, and those lands may have a variety of objectives. The objectives may depend in part upon whether the land is publicly owned or is in private ownership--owned by an individual (such as a farmer), or by a corporation. A wood products company may have timber production as the primary objective for its forestlands. A farmer may plant trees as a windbreak or to protect the soil from erosion, and then decide to harvest the trees to put the land back into crop production or to generate cash. Alternatively,

an individual owning a small plot of forestland may decide to manage the land primarily for camping and/or hunting and choose to harvest certain trees that would enhance a particularly beautiful view or increase habitat for a certain game species.

Publicly-owned forestland is not all devoted to timber harvesting. Many laws and regulations help determine which Federal forestlands are available for timber harvesting. For example, some land has been designated by Congress as wilderness, where timber harvesting is prohibited. Section 6(k) of NFMA requires the agency to designate lands that are not "suited for timber production, considering physical, economic, and other pertinent factors." And, as noted earlier, national forest lands and resources are managed for a variety of purposes under the Multiple-Use Sustained-Yield Act of 1960.

Objectives for the national forests are determined in land and resource management plans developed for each forest, a planning process mandated by NFMA. Because the national forests are essentially owned by the public, NFMA requires public involvement in the planning process to better enable the Forest Service to understand the values and goals the public envisions for the national forests. These objectives differ for various tracts of land, with some areas managed for more than one resource and objective at the same time. Objectives can include producing and/or protecting: water, timber, minerals, and forage; wildlife, fisheries, and other animal habitat; biological diversity; recreation and aesthetics; wilderness; research; and other resources and values.

Public views over how public forestland should be managed change over time and have become a greater influence in selecting silvicultural systems in recent years.

Public attitudes especially with regard to clearcutting have become a factor...that can no longer be ignored by the land manager...[T]he selection of a silvicultural system is guided by what people think they want as well as by what is biologically possible, technically feasible, and economically realistic.(36)

An introductory forestry textbook describes silviculture as "all the manipulating operations that go into the development and maintenance of a *socially* determined form of forest stand" (emphasis added).(37) This emphasizes that, particularly for publicly-owned forests, the person carrying out the activities on the ground is not necessarily the decisionmaker regarding what type of operation should be applied. Management goals for the land and its resources are determined by the landowners, in this case the public, and the acceptable silvicultural system, and other management operations, are then chosen and applied to achieve those specific objectives.

APPLYING CLEARCUTTING AS A SILVICULTURAL SYSTEM

Many of the concerns over clearcutting result because the damages caused by abuses of clearcutting are more apparent than are the damages caused by misuse of other regeneration harvesting systems, as discussed in a study on the use of clearcutting in Maine and cited extensively below. Although written about forest practices in Maine, many of the sentiments discussed in this report also explain views about clearcutting throughout the United States:

[It] is a reaction against abusive, overused clearcutting and intensive, industrial monoculture of trees. It is based on the belief that most nontimber values of forests are best fostered by eliminating clearcutting from consideration.(38)

Abuses of clearcutting are highly visible, while abuses of other cutting methods are not. Logging a selection cut on wet soil with poor skidtrail layout can result in as much erosion as clearcutting. Mishandled selection cutting over several rotations can undermine stand productivity and eliminate desirable species. Managing without clearcutting and cutting the same total volume means that more acres must be logged to obtain a given harvest volume, and more roads constructed. Selection cuttings, when poorly managed, often lead to root and stem damage that can sap future productivity.(39)

Furthermore, "There is no way to deny a fresh clearcut is *ugly*....like a new haircut, the clearcut is embarrassingly evident. For this reason, it has become a symbol of man's injury, real and fancied, to the natural world."(40)

Also, much of the reason for the reaction against clearcutting appears to come not only from objection to the tool itself, but from poor application of the tool. Some of this concern appears to be warranted:

Shoddy, exploitive clearcutting is clearly one of the more destructive forest management practices....It is not forestry and it is certainly not land stewardship....Clearcutting in these cases is simply cheap logging and not a planned silvicultural practice.(41)

Clearcutting is a financially efficient silvicultural method for harvesting timber and regenerating stands. As described above, the environmental effects of clearcutting are no worse than under other silvicultural systems, *if properly planned and administered*. Silvicultural treatments--under clearcutting or other systems--can only be judged by how well they are applied on the ground.

Planned, supervised clearcutting has an important role to play in modern forestry. When due regard is given to the [specific] conditions...clearcutting contributes to forest management objectives without significant environmental damage. To meet this test, however, cutting must be carefully planned and coordinated with other resource values.

But to say that clearcutting, properly applied, has a role is to beg a major question. That question, for land stewardship as well as for public policy, is: "how many clearcutting operations actually are properly done?" The answer, unfortunately, is not known in any statistical sense, for clearcutting or for its alternatives.(42)

Much of the public outcry against clearcutting, and demand for reducing its use in the national forests, has its basis in section 6(g)(3)(F)(i) of NFMA, which directs the use of clearcutting only where "it is determined to be the optimum method....to meet the objectives and requirements of the relevant land management plan." When written, these guidelines were thought to have been specific enough to prevent the over-use and abuse of clearcutting, while still allowing the agency the flexibility to choose when and where to use it. Despite such direction and continuing public objections, the use of clearcutting in the national forests has apparently increased since 1976, and appears to have peaked in 1988. Given this history, many do not believe the Forest Service can be trusted to comply with public desires and congressional guidelines for the proper use of clearcutting and seek to ban clearcutting from use on the national forests. In citing apparent continued abuses--and implying that clearcutting is not the optimum method for achieving objectives and has not always been properly planned and implemented--they argue that the Forest Service should not be allowed to use this useful but potentially abusive silvicultural tool.

However, a ban on clearcutting would not necessarily stop abusive and harmful land management practices. As stated above, many of the problems associated with clearcutting result from its implementation on the ground; clearcutting may have been an appropriate silvicultural choice for the species, the setting, and the site to achieve the stated goals, but the sale and road layout and design were inconsistent with the goals or were applied without enough environmental safeguards. Or, clearcutting may be publicly acceptable in one area, but not another. Such potential conflicts can happen not only with clearcutting, but with any silvicultural method. Selection harvesting was used widely in the early development of our forest resources, and led to much high-grading of the forests--harvesting the desired high-quality timber while leaving the less desirable species and unmerchantable trees as the source for natural regeneration. As a result, the character of many forestlands, including public forests in both the East and the West, now differs from the original conditions. Also, more roads often are required for selection harvesting systems than for clearcutting, and since road building can be a major cause of soil erosion and stream siltation, substituting selection harvesting for clearcutting potentially could cause more environmental degradation.

The issue is how to assure the choice of a silvicultural system and the implementation of the management practices that will achieve the stated goals for public land and resource management. If Congress enacts specific management restrictions, such as a ban on clearcutting on national forests, much of the professional flexibility of the agency in managing the lands entrusted to its stewardship would be taken away. If, however, public trust continues to be eroded by the persistent use of clearcutting where and when the public objects, and by the continued environmental damage from clearcutting, pressure for congressional intervention will continue and likely increase.

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APPENDIX A

DEFINITIONS OF SILVICULTURAL SYSTEMS

The following definitions describe the four primary silvicultural systems used to harvest timber and regenerate forests in the United States: clearcutting, seed-tree, shelterwood, and selection harvesting. The first three--clearcutting, seed-tree, and shelterwood systems--are even-aged management systems which result in stands of trees that are essentially the same age and often, but not necessarily, the same size. The fourth system--selection harvesting--is an uneven-aged management system, resulting in stands with intermingled trees of many ages and a variety of sizes.

• THE CLEARCUTTING SYSTEM

"Clearcutting is the harvesting in one operation of all trees with the expectation that a new, even-aged stand will be established either from advanced reproduction or through natural seeding, stump sprouting, direct seeding, or planting of seedlings....Clearcutting is aesthetically the least desirable of the harvest methods. However, the undesirable appearance of the harvested area is temporary and can be improved through careful location of boundaries to fit the landscape, minimizing the acreage to be cut, appropriate cleanup of logging debris, and prompt establishment of reproduction. (a)

• THE SEED TREE SYSTEM

"In the seed tree method, the area is clearcut except for a few seed-producing trees selected to naturally regenerate the harvested area. When feasible, the seed trees are harvested after regeneration is established. In contrast to the shelterwood method, not enough seed trees are left per unit area to significantly shelter or compete with the newly established seedling....This method is not commonly used because of the unreliability of seed crops when they are needed; rapid invasion of competing vegetation; seed tree mortality from insects, diseases, and windthrow; and the inefficiency of harvesting relatively few trees after the area is regenerated. (a)

• THE SHELTERWOOD SYSTEM

"The essence of the shelterwood system is that the next stand of trees is established through natural and/or artificial regeneration before the old one is completely removed. In a series of cuts trees are removed, leaving the more desirable species and healthier trees to provide seed, protect the young seedlings, and increase in volume for the final cut. The shelterwood process may involve a series of three operations: (1) preparatory cutting designed to stimulate seed production and prepare the seedbed; (2) seed cuttings to establish the new crop of trees; and (3) removal cutting to release the established seedling and harvest the overstory trees. This system provides an almost continuous tree cover, making it desirable from the multiresource protection and use standpoint. In practice, the three cuts are not always needed, and in fact, most shelterwoods in the United States consist of just the seed production and removal cuts."(a)

• THE SELECTION SYSTEM

"The selection system involves the removal of mature and immature trees either singly or in groups at intervals. Regeneration is established almost continuously. The objective is maintenance of an uneven-aged stand, with trees of different ages or sizes intermingled singly or in groups. When properly applied, the system is aesthetically pleasing, but is difficult to apply successfully in most forest types."(a)

"In the individual tree selection method, the evaluation of each tree is based on its silvicultural condition--age, merchantability, health, seed production capability, and potential to increase in volume and quality. The selection and removal of single trees creates relatively small openings in the stand similar to those resulting from natural mortality. This condition favors reproduction of the species that can grow in the

shade (shade tolerant) over those that require direct sunlight (shade intolerant) for survival and satisfactory growth. Therefore, the single tree method is not appropriate for regenerating shade-intolerant species.

"In the group or modified selection method, small openings are created in the stand for new regeneration by removing groups of trees. The resulting openings are generally less than one-quarter of an acre in size, but can be as large as 2 acres, especially in the West. These openings permit more direct sunlight to reach the forest floor than with single tree selection, resulting in the regeneration of more shade-intolerant species. The size, shape, and placement of openings can be varied to meet the light requirements of the species being regenerated. Also, opening size is determined by the silvical characteristics of the trees, their size, and the ease in which they can be removed without damaging other vegetation." (a)

When group [selection harvests] are of maximum size, they resemble small clearcut patches. The group selection system is distinguished from clearcutting in that the intent of group selection is ultimately to create a balance of age or size classes in intimate mixture or in a mosaic of small contiguous groups throughout the forest."(b)

APPENDIX B

COMMITTEE PRINT
CLEARCUTTING ON FEDERAL TIMBERLANDS

REPORT BY THE SUBCOMMITTEE ON PUBLIC LANDS
TO THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE
MARCH 1972

[to be inserted]

APPENDIX C

National Forest Management Act of 1976

• Act of October 22, 1976 (P.L. 94-588, 90 Stat. 2949 as amended, 16 U.S.C. 472a, 476, 500, 513-516, 518, 521b, 528(note), 576b, 594-2(note), 1600(note), 1601(note), 1600-1602, 1604, 1606, 1608-1614) section 6(g)3

"(E) insure that timber will be harvested from National Forest System lands only where--

"(i) soil, slope, or other watershed conditions will not be irreversibly damaged;

"(ii) there is assurance that such lands can be adequately restocked within five years after harvest;

"(iii) protection is provided for streams, stream-banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat; and

"(iv) the harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber; and

"(F) insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate and even-aged stand of timber will be used as a cutting method on National Forest System lands only where--

"(i) for clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan;

"(ii) the interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area;

"(iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain;

"(iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: *Provided*, That such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack or windstorm; and

"(v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource.

APPENDIX D

United States
Department of
Agriculture

Forest
Service

Washington
Office

14th & Independence SW
P.O. Box 96090
Washington, DC 20090-6090

Reply to: 1330-1 Date: June 4, 1992

Subject: Ecosystem Management of the National Forests and Grasslands

To: Regional Foresters and Station Directors

Attachment 2

Reduce Clearcutting on the National Forests

The Objective of this new provision is to reduce clearcutting on National Forest System lands and make greater use of individual tree selection, group selection, green tree retention, shelterwood, seed tree, and other regeneration cutting methods which collectively provide for a more visually pleasing and diverse vegetative appearance on a forest-wide basis

This policy would reduce clearcutting where it has been used as a standard timber harvest practice on the National Forests. Clearcutting would be limited to areas where it is essential to meet forest plan objectives and involve one or more of the following circumstances:

1. To establish, enhance, or maintain habitat for threatened, endangered, or sensitive species.
2. To enhance wildlife habitat or water yield values, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar development.
3. To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.
4. To preclude or minimize the occurrence of potentially adverse impacts or insect or disease infestations, windthrow, logging damage, or other factors affecting forest health
5. To provide for the establishment and growth of desired trees or other vegetative species that are shade intolerant.
6. To rehabilitate poorly stocked stands due to past management practices or natural events
7. To meet research needs

This clearcutting policy combined with the new USDA Forest Service ecosystem management can reduce clearcutting by as much as 70 percent from FY 1988 levels. The reduction on timber volume over the short-run is likely to be about 10 percent. There would be little reduction in timber volume over the long-term. There will be increases in timber sale costs and some areas will not be harvested because local timber industries do not have appropriate logging equipment to use other methods on steep slopes. However, judicious use of alternative harvest methods can be substituted for clearcutting on most areas of the National Forests.

APPENDIX E
Forest Service Data on Acres of Regeneration
Harvests in the National Forests, 1984-1991
(area in thousands of acres)

	1984	1985	1986	1987	1988	1989	1990	1991	AVG.
National									
	Forest	System	Total						
Clearcut	243	250	236						
Removal	119	133	74	257	283	257	229	187	243
Intensive	39	28	28	71	105	148	120	115	111
Selection	400	410	338	25	30	29	35	48	33
Total				353	418	434	384	349	386
Region 1									
		Montana	and	northern	Idaho				
Clearcut	--								
Removal	8.2	10.1	14.1	18.8	16.6	27.6	25.8	20.2	16.7
Intensive	9.1	6.9	7.7	5.9	6.8	7.8	7.8	8.2	8.0
Selection	3.1	2.7	2.1	1.9	1.0	.8	.8	.7	1.6
Total	20.4	19.7	23.9	26.6	24.3	39.7	34.5	29.2	27.3
Region 2									
		Colorado	and	Wyoming					
Clearcut	--								
Removal	1.9	2.7	2.9	3.8	4.9	5.8	7.9	6.5	4.6
Intensive	2.6	2.1	3.0	2.1	4.2	6.3	10.7	12.4	5.4
Selection	.6	.1	.5	.3	.7	1.1	.9	.8	.6
Total	5.1	5.0	6.4	6.2	9.9	13.2	19.5	19.7	10.6
Region 3									
		Arizona	and	New	Mexico				
Clearcut	--	.2							
Removal	.3	13.3	.0(b)	.0	.0(b)	.4	.2	.4	.2
Intensive	14.0	.1	12.9	4.3	4.4	21.1	12.5	16.0	12.3
Selection	.9	13.6	.0(b)	.0	.0(b)	.1	.9	.4	.3
Total	15.2		13.0	4.3		21.6	13.6	16.8	12.8
Region 4									
		Utah, Nevada, and	southern	Idaho					
Clearcut	--								
Removal	2.5	1.2	2.6	2.8	1.9	1.5	9.3	11.3	4.1
Intensive	6.2	.8	1.0	1.3	4.5	3.2	2.6	2.0	2.7
Selection	9.1	.9	3.3	6.3	1.0	1.6	2.9	2.0	3.4
Total	17.9	2.8	6.9	10.4	7.4	6.3	14.8	15.2	10.2

Region 5		California							
Clearcut	--								
Removal	14.4	22.0	12.9	18.5	35.8	11.1	12.4	12.0	17.4
l(a)	21.5	34.0	4.8	5.8	20.2	19.7	10.8	10.7	15.9
Selection	9.8	11.1	2.2	2.7	6.7	3.7	3.9	3.5	5.5
n	45.8	67.1	19.9	27.0	62.8	34.5	27.1	26.2	38.8
Total									

Region 6		Oregon and Washington							
Clearcut	--								
Removal	42.5	41.3	42.1	51.4	68.5	81.5	59.5	49.7	54.6
l(a)	47.8	61.3	33.9	42.1	58.7	80.1	68.0	59.6	56.4
Selection	6.3	5.0	11.8	4.6	13.3	11.1	11.6	22.5	10.9
n	96.6	8.3	87.9	98.0	140.5	172.6	139.1	131.9	121.9
Total									

Region 8		The South							
Clearcut	--								
Removal	106.9	108.7	97.8	97.0	90.3	66.2	55.1	34.1	82.0
l(a)	13.6	10.8	8.5	6.2	3.6	2.5	3.9	2.6	6.5
Selection	.0	.0	.0	.0	.6	1.3	4.5	6.6	1.6
n	120.5	119.6	106.2	103.3	94.5	70.0	63.4	43.3	90.1
Total									

Region 9		The North and East							
Clearcut	--								
Removal	59.4	54.8	54.7	56.1	55.2	50.0	44.9	41.6	52.0
l(a)	4.1	3.6	2.4	3.4	3.0	3.8	3.8	3.3	3.4
Selection	7.8	7.0	8.1	9.0	6.7	9.7	9.6	11.3	8.6
n	71.3	65.4	65.3	68.5	64.9	63.1	58.3	56.2	64.8
Total									

Region 10		Alaska							
Clearcut	--								
Removal	8.6	8.6	6.8	8.9	9.8	13.5	14.0	10.7	10.1
l(a)	.0	.0	.0	.0	.0	.0	.0	.0	.0
Selection	.3	.3	.8	.2	.0(b)	.0	.0	.0	.2
n	7.6	8.9	8.8	9.0	9.8	13.5	14.0	10.7	10.3
Total									

- a. Final harvest acres in the specified year from even-aged silvicultural systems other than clearcutting.
b. Less than 50 acres.

Source: USDA Forest Service. Reply to: 2490 records and reports--Subject: National Forest System, Reforestation and Timber Stand Improvement report for Fiscal Year 1991. Memorandum to: Regional Foresters and Station directors. Washington, DC: Feb. 6, 1992. 1p., plus attachments.

Footnotes

1. See: Russell K. Henly and Paul V. Ellefson. 1986. *State Forest Practice Regulation in the U.S.: Administration, Cost, and Accomplishment*. Station Bulletin AD-SB-3011. St. Paul, MN: University of Minnesota Agricultural Experiment Station.
2. USDA Forest Service. 1983. *Silvicultural Systems for the Major Forest Types of the United States*. Agriculture Handbook No. 446. Washington, DC: U.S. Government Printing Office, p.185. (Hereafter referred to as USDA Forest Service, *Silvicultural Systems*.)
3. Jerry F. Franklin. 1989. "The 'New Forestry.'" *Journal of Soil and Water Conservation*, Vol. 44, #6 (Nov-Dec): 549.
4. For more information on the history of clearcutting and other timber harvesting and regeneration methods in this country, see: A.P. Mustian. 1978. "The History and Philosophy of Silviculture and Management Systems in Use Today." *Uneven-Aged Silviculture and Management in the United States*. Washington, DC: USDA Forest Service, pp. 1-17.
5. Act of Oct. 22, 1976; Public Law 94-588, 90 Stat. 2949. 16 U.S.C. 1604.
6. U.S. Congress, House. 1990. *Conference Report, Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1991, and for Other Purposes*. House Report 101-971; 101st Congress, 2d Session, dated October 27, 1990. Washington, DC: U.S. Congress, House, p. 53.
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10. Smith, *Practice of Silviculture*, p. 455.
11. Smith, *Practice of Silviculture*, p. 500.
12. A.E. Wackerman, W.D. Hagenstein, and A.S. Michell. 1966. *Harvesting Timber Crops*. 2d ed. New York, NY: McGraw-Hill Book Co., p. 41.
13. Smith, *Practice of Silviculture*, p. 392.
14. Smith, *Practice of Silviculture*, p. 307.
15. Smith, *Practice of Silviculture*, p. 392.
16. F. Herbert Bormann and Gene E. Likens. 1979. *Pattern and Process in a Forested Ecosystem*. New York, NY: Springer-Verlag, p. 225. (Hereafter referred to as Bormann and Likens, *Pattern and Process*.)
17. Bormann and Likens, *Pattern and Process*, p. 226. These are just a few of the guidelines identified by the study. Also, according to these scientists, the Forest Service has already implemented most of these guidelines.

18. Wayne T. Swank, Leonard F. DeBano, and Devon Nelson. 1989. "Effects of Timber Management Practices on Soil and Water." *The Scientific Basis for Silvicultural and Management Decisions in the National Forest System*. [Russell M. Burns, Technical Compiler] USDA Forest Service General Technical Report W0-55. Washington, DC: U.S. Government Printing Office, p. 81. (Hereafter referred to as Swank, et al., "Effects of Timber on Soil and Water.")
19. Swank, et al., "Effects of Timber on Soil and Water," p. 81.
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21. Swank, et al., "Effects of Timber on Soil and Water," p. 80.
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JARGON

is useful, specialized language that helps peers talk to each other. Jargon can help save time and add precision to conversation with others who already share an understanding of your field.

But, jargon is bad news for outsiders, like the general public. Instead of making communication easier, jargon gets right in the way. Talk too much jargon and people wonder what you're hiding since you're obviously covering up, what with all the smoke you're puffing out.

Make a New Year's resolution to keep jargon where it belongs: Inside, with your peers. When you write or speak for a general audience, never assume they understand your terms. If you must use them, always define them. And, don't assume your audience will remember what the terms mean!

The worst part about jargon is that after a while you feel that without it you're being imprecise, or worse, unprofessional, or worst of all, just simple. So, phrases like "forage utilization" seem perfectly natural. Yet, for laymen, what you probably mean is "how much the cows eat," or some variation. True there are some ideas not included in "how much the cows eat," but then again, maybe your audience doesn't care or need to know all the nuances.

Here, then, is a dictionary of commonly used Forest Service jargon. Please suggest your favorites and we'll add them.

Agency, the: See "outfit, the."

Beans: Statistics, little annoying details, especially those foisted on "us" by administrative people who are called "bean counters."

Bells, whistles, flags, smoke, and snake oil: Any kind of B.S. or empty rhetoric.

Biting us: Problems do this to us, but we never say where!

Bottom line: A nice image from accounting that has become overused and slang. It means "the result."

Bring up to speed: Bring someone or something up to date, make sure they're informed. Opposite of blissful ignorance.

Buy in: We "buy in" when we enthusiastically accept an idea or program. Usually, though, there's no charge!

Cadre: A group, but a group with a special quality.

Capture: We mean record, especially at a meeting when we're trying to "capture" the main points of different speakers.

Color of money: means federal appropriations come with different restrictions on how particular funds can be spent. The "wrong color of money" means you have money in an account you can't use the way you want.

Compliance checking: We mean we're checking to be sure a contractor or permittee is complying with the rules. But, to some, it sounds like we're out checking compliances, whatever they are.

Country: This area or part of the United States we're in. We often say "since I came to this country . . ." which to others means you came here from Nicaragua or something. (Editor's note: my mother DID come to this country from Nicaragua!)

DG: This shorthand for the Data General computer is unknown outside the Forest Service. It's becoming a verb, as in "DG me a message."

Dispersed recreation: We mean camping all over the place, but not in campgrounds. What sounds really strange though is a "dispersed site." How big could that be?!

Eat our lunch: This expression means a problem nearly "got" everybody involved. It's often used as a warning, as in, "This is really going to eat our lunch unless we watch it." Used in the past tense ("ate our lunch"), the phrase is used to talk about how something either nearly or did wreck an effort.

Elk security: To the uninitiated this suggests elk wearing badges and carrying guns, not providing for habitat that protects elk.

Entry: This is what happens when we sell timber and a contractor goes into the stand of trees to cut them. To an outside, our use of the idea of "entering" is odd. It connotes violating the forest.

Fleet: Not a bunch of ships, it's just our bunch of cars and trucks.

Flip: Sending a message on the "DG" is often referred to as "flipping" the message. Comes from the acronym for "Forest Level Information Processing System." That's what we called the idea of getting computers all over the place. To the outside world, flipping is done to pancakes and sometimes, the middle finger when an insult is being communicated.

Flying a job: Somehow the verb "to fly" has come to mean "to advertise" when we tell people about job vacancies, as in "This job will be flown as a GS-11."

FORPLAN: Not the blueprint of a house.

Frontliner: Someone who works as a receptionist; the first person to greet a member of the public coming into an office.

Green rig: Means a vehicle owned by the Forest Service and painted a green like no other green.

Greenspeak: Language spoken in and by the Forest Service.

Hard targets: Goals for projects or for selling forest products that actually have numbers associated with them. Rarely, however, do we talk about "soft targets." We often speak of hard targets as if they're hard on us. To outsiders this is another odd phrase with an adjective from nowhere in it.

Hazmat: Hazardous materials; hardly a welcome mat.

Heartburn: Said of something that bothers the speaker, as in "I have heartburn over this timber sale."

Herd bull: A leader, but this term is probably best not uttered to the leader's face.

Hit the street: Our reports do this when they are released to the public. Be sure to keep this phrase for "internal use only," since we don't want people to think we throw things off tall buildings.

Honcho: (verb) To shepherd or guide or serve as a leader for: "He's honchoing that initiative." The noun, "honcho," meaning chief or boss comes from the Japanese han (squad) and cho (leader). This is another example of turning a noun into a verb without checking to see if the rest of the world understands.

ID team: To us, this of course means "interdisciplinary team," but to the outside world, it means nothing. The "ID" part of this expression might suggest "identification" to many. Never use this one with persons outside the agency without defining it.

Impact: (verb) The dictionary still has not accepted this word as meaning what we want it to, namely, "affect." To impact means "to collide with" in common speech.

Impacts: (noun) This is what we use when we mean "effects."

In the field: "She's in the field today." Six feet under it? Lolling in the dirt or just picking flowers? Don't forget to catch yourself when talking to members of the public about being outside the office, in the national forest!

Interface: A term that tries to express the idea of contact or meeting between two things. It's as impersonal as you can get when used for people. "This training will facilitate the interface between rodeo managers and Forest Service employees." Gross! Don't use this word like this.

Jackpot: In the field, a fire in a slash pile, especially one piled by hand; in the office, a nasty piece of work that will eat your time and your heart.

Jargon: Noun. 1. The language, esp. the vocabulary, peculiar to a particular trade, profession, or group. 2. unintelligible or meaningless talk or writing; gibberish. 3. pidgin. 4. speech or writing characterized by pretentious terminology and involved syntax.

Kicking open anthills: This phrase describes what we do when we make our own crises. Often we make a decision or announcement at the wrong time and create political upheaval when maybe we didn't need to.

Line officer: This term means the people who are in charge: the Chief, the Regional Forester, the Forest Supervisor, and the District Ranger. It's borrowed from the military and so doesn't mean much to non-military people. Its companion is "staff officer"--the people who do what the line officer tells them or who carry out the directions they themselves write for the line officer to approve.

LP stands: As with other acronyms, LP needs to be defined with its first occurrence in a report, otherwise, one is left to wonder what Louisiana Pacific is standing around for.

Manage: Many outside the Forest Service are surprised at our use of this word. It sounds benign but can mean we "cut the blue blazes out of" a forest. Not all share this view, but it's good to realize that even the seemingly benign word "manage" is a loaded term to many of our listeners.

McCullough's warbler: A chainsaw.

Mitigate: This really means "to make less severe, intense, or painful." Legally it means "compensate for." Often we use it to mean "fix" or "don't worry, we'll take care of it."

MMBF: Million board feet. To those ignorant of our Latin roots, MBF might mean million board feet, if it meant anything at all. As with all acronyms, always define the first occurrence in a report.

Monitor: While we use this word a lot, most of the rest of the world doesn't. This is one of those scientific-sounding words that sometimes is used in a scientific context, but too often isn't. We mean we'll watch, count, keep track of, or follow something when we say we're going to "monitor it." In many cases, we should probably use the more common terminology.

NEPA: An acronym for National Environmental Policy Act, pronounced "NEE-pah." As a spoken word, it's meaningless to anyone outside the Forest Service except those who study the agency.

NFMA: Another acronym, for National Forest Management Act. Interestingly, there are different pronunciations of this acronym. In the Northern Region, the North Idaho dialect pronounces this "en-ef-em-ay." Northwestern Montanans say "nafmah," and southern Montanans drawl out a "nifmah."

Off Forest: This means you're away from your home base, as in, "We're going off Forest to the XYZ Fire."

Off the Flathead: This expression is used to tell someone where you work when you're not there, as in "I'm off the Flathead."

On fire: No, this doesn't mean an employee is enveloped in flames, it means she or he is off on fire duty somewhere. The Forest Service is the only agency on earth where its people are gone because they're "on fire" but return unscarred.

On board: A nautical term, indicating you're on a ship. In Forest Service jargon, you're "on board" when you know something somebody else does or you "come on board" when you go start work at a particular office.

On the Beaverhead: This expression, along with its derivatives, "the fire is on us," "she's on the Lolo," or "he's a permittee on us," is language that expresses membership in the Forest Service family. It's a curious expression to outsiders, however, who think more about being "in" a forest rather than "on" it. Interestingly, you can be "on" a forest without being "in" it. People in the Supervisor's Office (see SO) are said to be "on" a forest even though the actual trees may be some distance away.

On the ground: A Forest Service expression meaning "actually in the national forest" or "on the land" or "out of the office, in the forest." Outsiders may wonder if besides operating "on the ground" we're also up in the air!

Open house: We use this expression to mean we're holding an informal meeting, often with stations, where the public can visit with Forest Service employees individually. To the rest of the known world, however, this is just a weird way of saying "public meeting." To us "public meeting" is a room full of angry people who stand up and make speeches denouncing us and our policies. We probably will never convince newspaper editors that an "open house" is anything but a "meeting."

Organic closing: Dumping slash on a road to close it.

Organization, the: See "outfit, the."

Outfit, the: The Forest Service. A term used for group bonding purposes.

Out year: Future years, comes from the budget people who talk about "current year" and "out years."

Prescribed natural fire: This phrase has an unintended arrogance in it, that we can create natural fires and then turn them off when they do things we don't want. Not everyone shares our confidence nor our philosophy, so our phrase can create more static than meaning to the layman.

Polygon: What has geometry got to do with the Forest Service? Polygons are "units" of land and, we guess, since they have many sides, the technocrats decided to show off their vocabulary. Units, however, are things with many sides, too, and some people never heard of them or may wonder why we worry about "polliwogs."

Private ground: Private property or private land.

Process, the: The steps we follow to complete a job. Some of us are very enamored of the process, which many in the public don't believe in, trust, or understand. They're more interested in the result than in the process.

Publics: (no such word). The singular noun, public, refers to a community as a whole. When we use the plural word we're often trying to say "groups," or trying to indicate special segments of the public. Sometimes, incredibly, "publics" is used to mean "persons," as in "I met with three of our publics today." In this context, we invariably use the possessive pronoun "our."

Punkins: Trees that would make nice lumber. Derived from "pumpkins," this term makes an analogy between desirable material and sweets like pumpkin pie.

R1, R2, R3, etc.: This is the ultimate Forest Service secret code for regional offices. Only insiders have the mental map or understand which numbers go with which regions or even, what a "region" is!

Respond: For some reason, we can't "answer" or "reply." We have to "respond." Maybe "responding" sounds more responsive. For those who are used to simpler words, though, we sound stilted when we "respond." Just answer the question!

Retention: Inside the Forest Service we like "retention" because when we achieve it people stay on the job longer. For most people, though, this is an awkward word that conjures up images of people who are pregnant or who have bad kidneys.

Rig: A vehicle, usually a pickup truck.

Scoping: High school kids do this to each other, but we too often do it to the public, assuming they understand we really mean "finding out what people think the issues are."

Sensing: Finding out what people think, or surveying. We use sensing I guess because it makes us seem "sensitive" or else suggests our nerves are sticking out.

Sideboards: The limits of a situation or project. Has nothing to do with sailing or attachments on a vehicle.

Spatial disaggregation: Apparently this term means a calendar of proposed projects, but don't bet anybody outside your "space" understands that.

SO: Not the smart remark of a teenager, as in, "So?!" Rather, this is an acronym that stands for "Supervisor's Office." That's the office of the officer in charge of the national forest. It also means "Sheriff's Office" to some and "State Office" to those in BLM, which has led to some interesting confusion over meeting locations.

Soft linkage: This means if there's a policy and there's only "soft linkage" between it and what we really do, we really don't have to pay attention to the policy. RPA in 1985 called for a level of timber harvest nobody met, so there was "soft linkage" between RPA and the cut.

Strategize: English is a marvelous language: you can create new verbs from nouns. The trouble is they don't always work. Strategize is a grating word that means "to plan strategy."

Sunset: To most people this means the time when the sun goes down, but we've adopted legal jargon that refers to laws or jobs that last for a limited time. And, we've made it into a verb we want to mean "to end." Example: "His job sunsets in two years." This conjures images of flaming orange and oceans and it's all too confusing. Avoid this one!

T&A reports: T&A stands for "Time and Attendance," and isn't a shorthand for parts of anyone's anatomy. Instead, T&A reports are the forms you use to report your time so that you can get paid.

Targets: (see also "hard target") For the outside world, targets are things you shoot at. In the Forest Service targets often shoot at you! On the outside, people use ammunition to shoot at targets; very often we don't (as in, meet your target, but don't expect any money to do it). Targets are quotas for miles of trail built, board feet of timber sold, and so on. Remember, we may confuse by talking about "meeting" targets. You have to know what we mean by "target" before you can understand how it's possible to meet one.

Tiers: Verb. The real word that's spelled like this means, "a person or thing who ties" as in, "I saw three fly tiers at the fly-fishing convention." As used in the Forest Service, the word is an attempt to turn the word "tier" into a verb. Tier refers to layers or rows of seats in a theater. We may really mean "to dovetail," meaning to join or fit together harmoniously. We may also mean that a particular report is based on another one.

Timber beast: A person from the "old school" of forestry who would rather cut trees than worry about silly things like streams, fish, birds, other wildlife, soil, or what it looks like to fern feelers, forest fairies, and tree huggers.

TSPIRS: Sounds, to the uninitiated, like something to do with tea and riding equipment. Never use with people outside the agency without defining it.

Treatment: This means burning, cutting, killing, plowing, or any number of other things we might do to plants. For most people, though, a treatment is what you get at a health spa. To many others, it's a Forest Service euphemism for doing something bad to the land.

Tweak: Adjust or change. Doesn't have anything to do with unsolicited amorous advances

Umbrella: Here's another noun we try to make act as a verb. When we "umbrella" something, we mean we include it. Sorry, gang, few other speakers of English "umbrella" much of anything.

Viewshed: A word that's trying to use the wonderful qualities of the word "watershed" but really means "what we can see from here," wherever "here" happens to be. This word makes no sense to mere mortals and should be avoided except when talking to visual management junkies. When you think about it, most sheds are nothing to view for very long!

Visit on: One of the many ways we say we talk about something. We "visit on," "share," and "discuss" all kinds of things we really just talk about.

Wash: "How it washes" means "how it turns out," and probably derives from the expression, "How it comes out in the wash."

Wheels falling off: Said of a project that's falling apart; often asked by a worried supervisor, as in "Are the wheels falling off?" It's best to answer, "No," unless it's not your fault.

White hat: If the bad guys wear black hats, then the good guys wear white hats. So, a "white hat" project, for example, is one where the agency is seen as doing good by everybody. One theory is that enough "white hats" will make up for the "black hats" we seem to wear most of the time in somebody's eyes. Unfortunately, this theory usually doesn't work.

Whippin' and spurrin': Words that mean you're really working hard on something, but often used as a smokescreen to cover the fact that you haven't really started!

Wreck: Used to describe personal mishaps like, "I had a wreck coming over here." In this case, the speaker may mean he dropped something, fell down and ripped his pants, or some other minor event.

Zone: Here's a classic term that could mean one of two things, depending on a context only those "in the know" are aware of. A "zone geologist" could be one who works for two districts OR could work for two or more forests. Unfortunately for the masses, these zone relationships are about as well known as counties in Yugoslavia. Furthermore, you could get confused trying to figure out how zone geology differs from oil geology and other geologic specialties.