United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Public Lands, National Parks and Forests, Committee on Energy and Natural Resources, U.S. Senate

October 1994

FOREST SERVICE

Factors Affecting Timber Sales in Five National Forests

GAO/RCED-95-12

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-257771

October 28, 1994

The Honorable Dale Bumpers
Chairman, Subcommittee on Public Lands,
National Parks and Forests
Committee on Energy and Natural Resources
United States Senate

Dear Mr. Chairman:

In recent years, debate about the future of the national forest system has focused, in part, on the issue of sustained yield—that is, on ensuring that timber harvests do not exceed the forests' ability to replenish the available supply of timber. An important component of managing forests on a sustained-yield basis is each forest's "allowable sale quantity," or ASQ. As defined by the Forest Service, the allowable sale quantity is an estimate of the maximum volume of timber that can be sold from each forest over a 10-year period without impairing other uses of that forest, such as recreation or protection of wildlife habitat.

The exact role of the allowable sale quantity in setting timber sale volumes has been a source of controversy. The Forest Service, which is not required by statute or regulation to prepare the entire allowable sale quantity for harvest, views it as an upper limit on timber sales, not as a specific goal. The timber industry, however, often regards it as the volume that should be provided for sale. Meanwhile, some environmental groups maintain that the allowable sale quantity overstates the ability of some forests to produce timber on a sustained-yield basis.

The quantity of timber sold from a national forest is sometimes substantially below the allowable sale quantity. You asked us to identify the reasons for this difference. As agreed with your office, we reviewed the allowable sale quantities and the timber sales at five national forests—three in the Forest Service's Pacific Northwest Region and two in the Southern Region. The five forests were the Deschutes and Mt. Hood in Oregon, Gifford Pinchot in Washington, Ouachita in Arkansas, and Chattahoochee-Oconee in Georgia. We chose forests in these two regions primarily because these regions sold more timber in fiscal year 1993 than the Forest Service's other seven regions.

Results in Brief

The Forest Service did not meet allowable sale quantities in the five forests we reviewed for a variety of reasons, including (1) limitations in the data and estimating techniques on which the allowable sale quantities were originally based, (2) new forest management issues and changing priorities, and (3) rising or unanticipated costs associated with preparing timber sales and administering harvests. Although forest officials believed that they had used the best information available at the time to develop the allowable sale quantities, they subsequently did not meet these levels. As a result, timber sales for each of the five forests between fiscal years 1991 and 1993 were significantly below the average annual allowable sale quantity. Reasons for these differences included the following:

- Limitations in forestwide data and estimating techniques contributed to lower timber sales. For example, officials at the Deschutes National Forest found that they had overestimated the size of the timber inventory in timber harvest areas. They had based their inventory on an average volume that might have been accurate for the forest as a whole but was not accurate within the parts of the forest where they were preparing a sale.
- New forest management issues reduced timber sales. For example, in the Pacific Northwest forests we reviewed, the northern spotted owl was listed as a threatened species after the allowable sale quantities were established. Many timber sales in these forests were halted after substantial portions of the forests were set aside for spotted owl habitat.
- Costs rose or unanticipated costs were incurred in preparing and administering timber sales. For example, at the Chattahoochee-Oconee National Forest, officials said that the costs of preparing timber sales and administering harvests rose by about 36 percent between 1988 and 1993, in part because of a change in timber harvesting methods. As a result, less timber was prepared for sale than had been planned.

Background

The Forest Service, within the Department of Agriculture, manages for multiple uses 191 million acres of national forests and grasslands under a wide and complex set of laws and regulations. For fiscal year 1993, the Forest Service reported selling 4.5 billion board feet[1] of timber from the lands for a total bid value[2] of $774.9 million.

[1]A board foot, a standard measure of timber, equals the amount of wood in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

[2]Bid value is the dollar amount the Forest Service expects to receive from the timber purchaser over the life of the sale contract.

Developing ASQs is part of a legislatively required process specified in the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (16 U.S.C. 1600-1614), as amended by the National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600-1614). RPA requires the Forest Service to develop long-range planning goals for activities on rangelands and in national forests, and NFMA directs the Forest Service to develop detailed management plans for national forests and to regulate timber harvests to ensure the protection of other resources. The Forest Service has supplemented this guidance with regulations, first issued in 1979 and revised in 1982, and with a manual and handbooks for forest-level use. (See apps. I and II for further discussion of these laws, regulations, and policy guidance.)

The Forest Service also has management responsibilities that extend beyond timber production, including such other activities as protecting natural resources like air, water, soils, plants, and animals for current and future generations. The Multiple Use-Sustained Yield Act of 1960 (16 U.S.C. 528-531) gives the Forest Service authority to manage lands for multiple uses and to sustain in perpetuity the outputs of various renewable natural resources. In carrying out its responsibilities, the Forest Service must also comply with other requirements for identifying and considering the effects that activities may have on natural resources. For example, the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) requires the preparation of environmental impact statements for major actions that may significantly affect the quality of the human environment.

National forest management can be divided into three main processes—planning, budgeting, and (for timber resources) preparing timber sales. These processes are summarized below and explained further in appendix III.

Planning

Forest Service officials use the guidance in federal laws and Forest Service regulations and policies to develop a forest-specific plan for managing lands and resources (forest plan) that explains how the various forest resources will be managed for the next 10 to 15 years. The planning process is complex, involving extensive surveys of forest resources, the use of computer models, the development of management alternatives, and substantial public participation. The process is also lengthy, taking generally 3 to 10 years to complete.

Part of this process involves developing the ASQ, which is the Forest Service's estimate of the maximum harvest consistent with sustaining many other uses of the forest. Although the ASQ covers the first 10 years of the forest plan, it is usually expressed as an annual average (i.e., one-tenth of the total ASQ). Timber sales in any year may fluctuate above or below the average annual ASQ as long as the cumulative sales for the 10-year period do not exceed the total ASQ—that is, the maximum amount to be sold over the 10-year period. Each forest's ASQ is affected by factors unique to that forest, such as the species of trees, the proportion of the acreage devoted to timber production (as compared with other uses), and the market demand for timber.

When the forest plan has been completed and put in place, forest officials monitor and evaluate the results so that the effects of implementing the plan can be measured, the measurements can be analyzed, and necessary changes, such as a change in the ASQ, can be made.

Budgeting

Generally, 2 to 3 years before the fiscal year in which the funds will actually be spent, each of the Forest Service's nine regions develops a budget request for its national forests. The budget requests are based partly on the overall objectives for each forest plan as well as guidance from the administration. These requests are then aggregated at the national level, where they are subject to review and change by Forest Service headquarters, the Department of Agriculture, the Office of Management and Budget, and the Congress. Yearly congressional appropriations are then passed down from Forest Service headquarters to the regions, and then from the regions to the individual forests.

Preparing Timber Sales

Preparing timber sales usually takes 3 to 8 years and consists of six steps, or "gates." The early steps involve identifying the timber to be offered for sale and conducting environmental studies of the areas to be affected; the later steps involve advertising and selling the timber. Because timber is offered for sale from most forests each year, in any given year timber sales may be found at various steps in the process; some sales are at the beginning and others are at the last step before the timber is made available for harvest.

Several Factors Caused Gaps Between ASQs and Timber Sales

Several factors contributed to bringing timber sales below average annual ASQs from fiscal years 1991 through 1993 at all five of the national forests we reviewed. At four of these five forests, timber sales also decreased over the 3-year period. (See app. IV for forest-by-forest totals.) For example, at the Mt. Hood National Forest, which had an average annual ASQ of 189 million board feet, ASQ-related timber sales were approximately 51 million board feet in 1991 and 38 million board feet in 1993. The Ouachita National Forest was the only forest whose timber sales were higher in 1993 than in 1991. Its ASQ is approximately 147 million board feet, and it had ASQ-related timber sales of about 40 million board feet in 1991 and 131 million board feet in 1993.

Factors contributing to differences between ASQs and timber sales at the five forests we reviewed included limitations in data and estimating techniques, the emergence of new forest management issues and changing priorities, and rising or unanticipated costs associated with preparing and administering timber sales.

Limitations in Data and Estimating Techniques

At four of the five forests, officials said the preciseness of the ASQ was affected by limitations in data and estimating techniques. To develop the ASQ, officials said they had used the best information available at the time and a variety of estimating and computer modeling techniques. However, they noted that these estimating and computer modeling techniques carry an inherent risk of imprecision. For example, estimates of timber volumes may be based on analysis of aerial photographs and sample tracts within a forest. More detailed, on-the-ground analysis may later reveal that actual timber volumes differ somewhat from the estimated quantities, as the following examples show:

- After estimating ASQ volumes for planning purposes, officials at the Deschutes National Forest discovered that they had overestimated the size of the timber inventory in timber harvest areas. They had based their inventory on an average volume that might have been accurate for the forest as a whole but was not accurate within specific areas where sales were planned. To correct this weakness, they redesigned the inventory process and began implementing the changes in 1993.
- At the Chattahoochee-Oconee National Forest, officials said that they had identified limitations in their original estimates of the timber yield. Forest officials had included all potentially saleable trees of all species (the forest has about 40 different species of trees) in their estimates of the timber yield during the planning process. However, as they began to implement

their forest plan, they found that buyers desired only some of the species. In addition, the ASQ included yields from some forest land—such as areas next to visually sensitive travelways—that could not be fully harvested. Forest officials acknowledged that including these possible yields lowered the accuracy of their ASQ estimate. To correct these problems, forest officials plan to adjust their yield estimates to include only timber with established markets and to develop a more precise way to identify acres available for harvest.

- Officials at the Gifford Pinchot National Forest said they believe their ASQ could have been based on an overestimate of the number of acres available for timber production. In later analyzing timber management areas, forest officials found that fewer acres were available for harvest than originally estimated. The forestwide estimates used to develop the ASQ did not consider some factors—such as wildlife habitat, sensitive plant species, or campground uses—later encountered in on-the-ground examination while preparing timber for sale. To improve the accuracy of their estimates, forest officials have proposed collecting more information before determining the number of acres available for timber production.

New Forest Management Issues and Changing Priorities

The forest plan, which incorporates the ASQ, reflects the Forest Service's determination at the time the plan is developed of how timber production and other uses of the forest will be managed over the next 10 to 15 years. After these decisions have been made and an ASQ has been established, however, new forest management issues and changing priorities often emerge that directly affect how the forest will be managed. These changes may also affect the amount of timber that can be sold.

The most dramatic example of such changes for the forests we reviewed occurred in the Pacific Northwest Region. In mid-1990, when the forest plans containing the ASQs for the three Pacific Northwest forests were ready to be implemented, the Department of the Interior's Fish and Wildlife Service announced its decision to list the northern spotted owl as a threatened species under the provisions of the Endangered Species Act. Much of the land inhabited by the spotted owl is managed by the Forest Service. Several environmental groups challenged the process used to implement spotted owl management, and on May 23, 1991, many timber harvests in the three forests were halted by a court injunction. Forest Service officials said this injunction and similar legal challenges were primarily responsible for the difference between ASQs and timber sales in all Pacific Northwest forests.

Sharp declines in the volume of timber sold from the Gifford Pinchot National Forest illustrate the effects of challenges and the court injunction on timber sales. This forest had an average annual ASQ of 334 million board feet. In fiscal year 1991, the forest sold 110.2 million board feet of timber that was chargeable to the ASQ and had been harvested outside the owl habitat. In fiscal year 1992, that total dropped to 19.8 million board feet, and in fiscal year 1993 it further declined to 14.8 million board feet. According to the forest's monitoring report for 1993, "the shortfall continues to be the result of the owl controversy and recent court decisions."

While the Southern forests we reviewed were not affected by an event as sweeping as the spotted owl controversy, their harvests were likewise affected by events that reflected changes in the relative priorities assigned to timber sales and other uses of the forest. These changes generally did not result in court challenges but rather in appeals filed by individuals or groups during an administrative process established by the Forest Service to review challenges to its decisions on issues ranging from the size of a forest's ASQ to aspects of a particular timber sale. Under this process, Forest Service personnel review and decide on the appeals. At the Chattahoochee-Oconee National Forest, for example, the majority of appeals challenged individual timber sales that were below cost or had been designed without proper environmental evaluations. According to a forest official, in fiscal year 1993 a total of 10 appeals challenged 8 proposed timber sales, and in fiscal year 1994 (through June 29), a total of 44 appeals challenged 22 proposed timber sales.

The Forest Service is revising its policies to respond more effectively to changing priorities for uses of the nation's forests. On June 4, 1992, the Chief of the Forest Service announced a new policy of multiple-use ecosystem management for the national forests and grasslands.[3] Four of the five forests in our review are included in pilot projects proposed for fiscal year 1995 as tests of ecosystem management's potential to better ensure the sustainable long-term use of natural resources. One project addresses common problems associated with air and water quality, conservation, biological diversity, and sustainable economic growth in the southern Appalachian highlands,[4] a region that includes the

[3]Ecosystem management is a new, broader approach to managing the nation's lands and natural resources. Ecosystem management recognizes that plant and animal communities are interdependent and interact with their physical environment (soil, water, and air) to form distinct ecological units called ecosystems that span federal and nonfederal lands.

[4]This area includes parts of Alabama, Georgia, North Carolina, South Carolina, Tennessee, and Virginia.

Chattahoochee-Oconee forest. In an August 1994 report on ecosystem management,[5] we concluded that such projects afford an opportunity to test this approach to land management.

The three Pacific Northwest forests we reviewed are included in another ecosystem management pilot project that could affect the current process for developing ASQs. In response to the spotted owl controversy, the administration created an interagency team to develop alternatives that would "attain the greatest economic and social contribution from the forests of the region and meet the requirements of the applicable laws and regulations." In April 1994, the interagency team produced a land management plan based on broad land areas, such as river basins and watersheds.[6] Forest Service officials indicated that under the new plan, although an ASQ would still be developed in order to comply with the requirements of the National Forest Management Act of 1976, individual revised forest plans might also include a "probable sale quantity" to reflect the uncertainty associated with selling timber at the ASQ. For example, for the three Pacific Northwest forests we reviewed, the new land management plan identifies an average annual probable sale quantity of 157 million board feet, as compared with the existing average annual ASQ of 621 million board feet. The difference is due primarily to the allocation of fewer acres for timber production.

Rising or Unanticipated Costs Associated With Preparing Timber Sales and Administering Harvests

Forest Service officials cite the timing of the budget process, as well as new forest management issues and changing priorities, as contributing to the shortfall in the moneys available to prepare timber sales and administer harvests at ASQ levels. According to these officials, budget requests must be prepared 2 to 3 years before the funds are actually received, and emerging issues and changing priorities may render the original request insufficient, as in the following instances:

- At the Chattahoochee-Oconee National Forest, officials estimated that the costs per million board feet to prepare timber sales and administer harvests rose by approximately 36 percent between 1988 and 1993 when the Forest Service began to reduce its use of clearcutting and increase its

[5]Ecosystem Management: Additional Actions Needed to Adequately Test a Promising Approach (GAO/RCED-94-111, Aug. 16, 1994).

[6]This plan was submitted to the courts, and the May 23, 1991, injunction was lifted in June 1994. The revised plan, however, spurred new lawsuits that will be heard by the courts beginning later in calendar year 1994.

use of other harvesting methods.[7] These other harvesting methods, such as single-tree and group selection methods, require Forest Service personnel to mark each tree planned for harvest. Because this and other activities increase the cost and time associated with preparing each timber sale, available staff and funds cannot be spread over as many sales as originally planned.

- At the Mt. Hood National Forest, officials said that in recent years they had underestimated their costs to prepare timber sales and administer harvests when developing their annual budget requests. They noted that between fiscal years 1990 and 1991, preparation and administration costs rose by about 39 percent, and between fiscal years 1991 and 1992, these costs rose by an additional 147 percent. Factors contributing to these increases in costs included requirements for (1) conducting surveys of cultural and historical resources and of threatened and endangered species that took more time and resources than had been anticipated and (2) switching from clearcutting to other harvesting methods and shifting timber harvests out of owl habitat to comply with court injunctions. While preparation and administration costs increased by only 8 percent between fiscal years 1992 and 1993, forest officials believe that they will increase by another 51 percent between fiscal years 1993 and 1995 as the new Pacific Northwest forest plan is implemented.

Observations

Given the uncertainties inherent in developing ASQs, shortfalls between ASQs and timber sales should be expected. An ASQ is, to some extent, imprecise because it is based on estimating techniques and forestwide data rather than on detailed, on-the-ground data from the timber sale area. Even more significantly, however, an ASQ represents a planning "snapshot" that can quickly become outdated as new forest management issues emerge and priorities change. As the value placed on timber production shifts toward other forest uses, ASQs established under earlier, somewhat different priorities may no longer reflect estimated sale quantities. Although forest planning allows ASQs to be updated as needed, the experience of the five forests we reviewed indicates that events may quickly overtake even revised ASQs.

Agency Comments

We discussed the facts and observations contained in a draft of this report with officials from Forest Service headquarters, including the Deputy Director, Budget Analyst, Staff Assistant, and Interdisciplinary Forester

[7]Clearcutting is a harvesting method that involves removing all trees from a timber harvest site at one time.

(Forest Plans) within the Timber Management Staff; the Planning Specialist within the Land Management Planning Staff; and the Interdisciplinary Analyst within the Program Planning and Development Staff. We also discussed the facts and observations with senior regional and forest officials from the two regions that we visited. In general, these officials agreed that the information was accurate, and we have incorporated changes that they suggested where appropriate.

Scope and Methodology

To determine why timber sales often fall short of ASQs, we met with Timber Management, Program Development and Budget, and Land Management Planning officials from Forest Service headquarters; the Pacific Northwest Regional Office in Portland, Oregon; and the Southern Regional Office in Atlanta, Georgia. We also met with Forest Service officials from the Chattahoochee-Oconee, Deschutes, Gifford Pinchot, Mt. Hood, and Ouachita National Forests. We selected these two regions because they had the largest timber sales for fiscal year 1993. We judgmentally selected the specific forests because of their geographical proximity to the regional offices. In addition, we selected the Ouachita National Forest because it had begun to practice ecosystem management before the Forest Service decided to implement this land management approach agencywide.

We reviewed documentation provided by these officials, including forest plans, budget requests, and monitoring reports. We did not, however, evaluate the ASQ calculations made for the five forests but used the figures cited in the forest plans as a starting point for discussing how the figures were determined.

We also discussed the budgeting process with officials from the Office of Management and Budget and the Department of Agriculture in Washington, D.C. We discussed forest planning procedures with representatives of the Congressional Research Service and reviewed additional documents on forest planning from the Office of Technology Assessment. In addition, to determine the role the Congress plays in the budget deliberations, we met with staff from both the House and Senate appropriations subcommittees who review the Forest Service's budget requests.

We conducted our review between August 1993 and August 1994 in accordance with generally accepted government auditing standards.

We are sending copies of this report to interested congressional committees, the Secretary of Agriculture, and the Chief of the Forest Service. We will make copies available to others upon request.

This work was done under the direction of James K. Meissner, Associate Director for Timber Management Issues, who may be reached at (206) 287-4810. Other major contributors to this report are listed in appendix V.

Sincerely yours,

James Duffus III
Director, Natural Resources
Management Issues

Contents

Tables

Abbreviations

ASQ	allowable sale quantity
FORPLAN	forest planning model
GAO	General Accounting Office
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
RPA	Forest and Rangeland Renewable Resources Planning Act

Legislation Related to Management of National Forests

Year	Title of legislation	Purpose
1891	Creative Act	To provide the President with the authority to create forest reserves out of forested public domain lands.
1897	Forest Service Organic Act	To identify purposes for creating forest reserves, including improving and protecting forests within reservations, protecting water supplies, and providing the public with a continuous supply of timber.
1930	Knutson-Vandenberg Act	To provide a constant source of funding for the reforestation of harvested lands and to protect and improve nontimber resources in timber sale areas.
1960	Multiple Use-Sustained Yield Act	To ensure the management of national forest resources and products for multiple uses and sustained yield.
1964	Wilderness Act	To preserve natural areas of national forests for recreation and other uses. Prohibits timber harvesting in these areas.
1968	Wild and Scenic Rivers Act	To preserve certain rivers and surrounding areas. Limits timber harvesting in the surrounding areas.
1969	National Environmental Policy Act (NEPA)	To require federal agencies to evaluate and document the impact on the environment of significant land management activities.
1973	Endangered Species Act	To protect plant and animal species whose survival is in jeopardy.
1974	Forest and Rangeland Renewable Resources Planning Act (RPA)	To provide guidance for establishing long-range resource planning goals for the national forests.
1976	National Forest Management Act (NFMA)	To provide guidance for developing forest plans, regulating activities, and allowing public participation in planning.
1977	Clean Water Act	To place limits on activities that would exceed federal or state water quality standards in order to enhance water quality.

Legal and Regulatory Guides for National Forest Management

The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976, provides the basic legislative guidance to the Forest Service for planning and managing resources in the national forests. RPA requires the Forest Service to develop long-range planning goals for activities on rangelands and in national forests, and NFMA directs the Forest Service to develop detailed management plans for national forests and to regulate timber harvests to ensure the protection of other resources. NFMA also required the Forest Service to develop regulations for implementing the planning goals established in RPA and NFMA.

Required Forest-Level Planning Under RPA

RPA makes resource management unit plans a statutory requirement through which the Forest Service will provide comprehensive information on the forest's abilities to produce resources, such as fish and wildlife habitat, and goods and services, such as wood for lumber and opportunities for recreation. RPA directs the Forest Service to establish long-term resource planning goals for rangelands and forests. It requires the Forest Service to (1) assess the renewable resources on all lands every 10 years, (2) recommend a program for renewable resource activities on Forest Service lands every 5 years, and (3) annually report on the implementation of the recommended program and the accomplishments of the program relative to the assessment. RPA also requires the President to submit to the Congress, together with the assessment and the recommended program, a statement of policy that will guide the Forest Service's budget requests for implementing the 5-year recommended program.

Strengthened Forest Planning Under NFMA

In 1975, the Circuit Court of Appeals for the Fourth Circuit affirmed a 1973 district court decision constraining the Monongahela National Forest in West Virginia to sell only individually marked "dead, physiologically mature, and large growth" trees. The Forest Service decided to extend this decision to all nine national forests under the circuit court's jurisdiction. The Forest Service estimated that the decision, which was based on the circuit court's interpretation of the Organic Act of 1897, would reduce national forest timber harvests by 50 percent if applied nationwide. To preclude this reduction and to ensure the use of scientifically accepted forestry measures to sustain the yield of natural resources, the Congress enacted NFMA.

All but 1 of the first 12 sections of NFMA amend RPA. For example, NFMA provides more specific guidance to the Secretary of Agriculture and the Forest Service for developing and implementing long-range planning goals for national forests.

NFMA goals include improving the management of national forests and facilitating the public's involvement in and congressional oversight of the process. Specifically, NFMA requires that the Forest Service (1) develop integrated land and resource management plans (forest plans) for national forests using interdisciplinary teams, (2) regulate timber management activities in order to protect other resources, and (3) allow the public to participate in the development, review, and revision of the forest plans. In addition, NFMA requires that the Forest Service limit the sale of timber from each national forest to no more than an amount that could be harvested annually on a long-term sustained-yield basis.

Forest Service Regulations Developed to Implement NFMA Planning Goals

NFMA also requires the Secretary of Agriculture to develop and issue planning regulations to assist Forest Service regions and national forests in developing and maintaining forest plans. The regulations—completed in 1979 and revised in 1982—establish a process for developing, adopting, and revising forest plans. The regulations also provide guidance on the type of information to be included in the plans, such as multiple-use goals and objectives. In addition, they establish 14 principles to guide planning, including the following:

- Recognize that the national forests are ecosystems and their management for goods and services requires an awareness and consideration of the interrelationships among plants, animals, soil, water, air, and other environmental elements within such ecosystems.
- Protect and, where appropriate, improve the quality of renewable resources.
- Preserve important historic, cultural, and natural aspects of our national heritage.
- Provide for the safe use and enjoyment of the forest resources by the public.
- Use a systematic, interdisciplinary approach to ensure coordination and integration of planning activities for multiple-use management.
- Encourage early and frequent public participation.
- Respond to changing conditions of the land and other resources and to changing social and economic demands of the American people.

The regulations also define the allowable sale quantity (ASQ) as the amount of timber that could be planned for sale from the area of suitable land during the first period of the forest plan—one decade. Essentially, the ASQ is the amount of timber that could be sold and harvested during the first decade without exceeding the amount of timber that could be harvested on a long-term sustained-yield basis.

The Forest Service developed and included guidance in its manual and handbooks to provide national forest personnel with further direction for implementing RPA and NFMA. The manual contains general policy rules for forest planning, while the handbooks provide detailed instructions for developing and implementing forest plan activities. For example, the Forest Service manual requires that national forests use FORPLAN, a Forest Service analytical model, as the primary analytical tool for assessing management activities during forest planning, while the resource inventory handbook provides standards, definitions, and specifications for conducting timber inventories.

Each Forest Service region provides additional guidance to the forests under its jurisdiction to clarify general guidance from headquarters and to suggest ways of incorporating factors that are unique to the region and its forests. For example, the Pacific Northwest Region provides the forests with guidance on identifying spotted owl habitat within their boundaries and on ensuring that Columbia Basin forests have a consistent approach in developing habitat capability indicators for smolt (young salmon migrating to the sea).

National Forest Planning, Budgeting, and Timber Sale Processes

National forest management can be divided into three main processes: (1) planning, (2) budgeting, and (3) for timber resources, preparing timber sales. In addition, forest managers monitor and evaluate the results of their activities and use this information to determine whether changes in their management plans are needed.

The Forest Planning Process

Timber is one of many resources assessed in a forest's land and resource management plan (forest plan). Besides timber, a forest plan includes such other resources as (1) outdoor recreational facilities (for example, campgrounds and hiking trails), (2) rangelands for providing forage to livestock and wildlife, and (3) wildlife and fish habitat for the various species dependent on the forest environment. The plan specifies how these multiple resources are to be managed so to maximize net public benefits in an environmentally sound manner.

To develop forest plans, the Forest Service follows a complicated process set forth in the laws, regulations, and policies discussed in appendixes I and II. A plan's development rests mainly with an interdisciplinary team of biologists, foresters, soil specialists, and others. The forest supervisor—the person in direct charge of a forest—also provides considerable direction in determining what issues and concerns the team will address. In addition, public participation is sought at various stages throughout the process.

For planning purposes, the ASQ is the maximum amount of timber that can be sold from the forest for the next 10 years on a sustained-yield basis. However, in day-to-day usage, the ASQ is usually expressed as an average annual ASQ—that is, as one-tenth of the total. Actual timber sales, however, can fluctuate above or below this average annual amount as long as the sales for the 10-year period do not exceed the total ASQ.

To develop the ASQ, the interdisciplinary team determines such information as the species, age, size, number, and location of the trees in the forest. This information helps the team identify land capable of producing trees of commercial value within the period covered by the plan. Because Forest Service regulations require the team to have access to the best available inventory data in preparing the ASQ, the Forest Service may have to conduct special inventories or studies to assemble adequate information.

Identifying land suitable for timber production is part of an overall analysis that considers timber production in relation to other forest resources. This analysis responds to the legal requirement to maximize net public benefits—that is, the long-term value to the nation of all outputs and positive effects (benefits) minus the associated inputs and negative effects (costs). As specified in Forest Service planning regulations, lands are not considered suitable for timber production if (1) less than 10 percent of the area has trees, (2) the area cannot begin regrowing trees within 5 years of the harvest, (3) irreversible damage will occur to the land or other resources if the trees are harvested, or (4) land has been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service.

Because maximizing net public benefits often involves making choices between various goals, the initial outcome of this overall analysis is a broad range of alternatives describing the different ways the forest can be managed to address and respond to major public issues, management concerns, and resource opportunities. The primary purpose in developing alternatives is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits. Under these criteria, the alternatives list (1) the multiple-use goals and objectives that describe the desired future condition of the forest, (2) the goods and services expected to be produced, (3) the standards and guidelines for managing resources, and (4) the conditions and uses that result from the planned activities, such as timber sales. As part of its discussion of land management objectives, each alternative includes an ASQ.

Each alternative specifies a particular emphasis, such as protecting wildlife habitat or promoting recreation, and each alternative may have a different ASQ. For example, an alternative that emphasizes wilderness protection will have a lower ASQ than an alternative that emphasizes timber production. The ASQ for each alternative is calculated using a forest planning model called FORPLAN. The model will help analyze such factors as the forest's ability to supply goods and services in response to society's demands, as well as each land management alternative's effects, such as present net value, social and economic impacts, and outputs of goods and services. The team supplements the FORPLAN results, as needed, with input from forestry experts and from the public.

The planning process culminates in the selection of an alternative for implementation. The team estimates and compares the physical, biological, economic, and social effects of implementing each alternative.

The team looks at such things as the expected outputs for the planning periods, the direct and indirect benefits and costs, and the resource trade-offs and opportunity costs associated with achieving the objectives. The team then makes recommendations to the forest supervisor, who reviews the recommendations and forwards a preferred alternative to the regional forester, who is in charge of all of the forest supervisors in the Forest Service region. Once the regional forester approves the preferred alternative, the forest plan is completed, and the ASQ is established for the next 10 years.

Although this process has clearly defined requirements, it is also open-ended in that the ASQ as well as other elements of the forest plan can be changed at any time during the 10-year period if the forest supervisor determines that a change is necessary. Changes are made through amendments or revisions to the forest plan to accommodate such things as shifts in land management policy or other significant changes.

The Budgeting Process

Before forest officials develop their budget requests, they receive written instructions from Forest Service headquarters on what to include in their requests. These instructions communicate the agency's priorities in light of such factors as the administration's guidance on the agency's budget targets. The administration's guidance can be as specific as a letter from the President or as general as a forecasted budget total for the agency. The instructions are also formulated with input from regional foresters, who recommend to the Chief of the Forest Service which program goals should be emphasized—for example, ecosystem management or the operation and maintenance of recreational facilities. Regional foresters also identify levels of data to be collected and (until fiscal year 1996) specific resource targets. For fiscal year 1996, specific resource targets were eliminated.

After receiving these instructions, forest officials develop their budget requests. The budget process actually begins 2 to 3 years before the fiscal year in which the funds will be spent. For example, the process for developing a forest's fiscal year 1995 budget request probably began in fiscal year 1993 or earlier.

Forest officials also develop their requests as a range of funding alternatives in accordance with headquarters guidance. For example, fiscal year 1995 budget submissions from Pacific Northwest forests included three funding levels: (1) a base level equal to the fiscal year 1992 appropriation, adjusted for inflation; (2) a reduced level, 5 percent lower

than the base level; and (3) an increased level, 20 percent higher than the base level. Budgets prepared for fiscal years up to 1995 also included a funding level based on the amount the forest supervisor believed would be necessary to implement the forest plan's objectives.

The budget request for each forest is subject to levels of internal Forest Service review. The request is first forwarded to the regional office, where it is reviewed for conformity with budget instructions and regional priorities. The regional office makes any changes it deems necessary, consolidates the request for the forest with those for other forests in the region, and adds the regional office's own estimated costs for supporting the forests and implementing the regional office's own actions and program initiatives. The completed request, which displays the request for each forest as well as the aggregated numbers, is forwarded to headquarters. There, a similar review of regional requests is conducted. The regional budgets approved by headquarters are aggregated, and headquarters adds the costs it expects to incur in carrying out its administrative and monitoring activities and in initiating any national programs. This process results in an overall Forest Service request.

This request may be changed by the Department of Agriculture (the Forest Service's parent agency), the Office of Management and Budget, or the Congress through the appropriations process. However, budget reviewers at these levels do not have forest-level data to determine the funds needed to attain the goals for the individual forests; instead they review overall agency goals. For example, according to an official from the Department of Agriculture, the agency considers such things as the number of Forest Service employees, the agency's programs, and national goals like implementing ecosystem management in the Pacific Northwest. According to an official from the Office of Management and Budget, the agency considers whether, in areas such as timber production, the budget reflects policies that are consistent with the administration's broader policies and objectives. The Office of Management and Budget also reviews the cost-effectiveness of the Forest Service's production of timber for sale by comparing projected cost estimates with the most recent actual costs. At the congressional level, the administration's request is subject to change in the committee process and in floor debate.

Once a funding level for the Forest Service is approved, the appropriations information is then passed in reverse, from the Congress down to headquarters, along with congressional directives specifying how some of the funds will be spent. Headquarters divides and allocates the funds to

the regions, and, in turn, each region allocates funds to each forest, usually well into the fiscal year. Until the actual funding is received, forests will use the region's estimated appropriation level as a base, as well as the forest plan's priorities and historical trends.

Before fiscal year 1993, in providing funds for preparing and administering timber sales, the Congress also specified the volume of timber it expected the Forest Service to offer for sale. Now, the expected volume is based on each forest's ability to sell and harvest timber.

The Timber Sale Process

Regulations require that each forest plan contain a 10-year timber sale schedule identifying the quantity of timber planned for sale from an area of suitable forest land in order to attain the ASQ. Individual timber sales are prepared using a six-step process, referred to as the timber sale gate system. Table III.1 summarizes the six gates.

Table III.1: The Timber Sale Gate System

Gate number	Gate name	Description
1	Position statement	The timber the forest intends to sell is identified, and a position statement is developed setting forth the purpose and reasons for the timber sale.
2	Decision	For continuing sales, timber sale design alternatives are developed, a site-specific environmental and economic analysis is completed for the proposed sale, and the approving official decides whether to proceed with the proposed sale.
3	Timber sale preparation report	The sale area is physically marked, and data are collected to help prepare the timber appraisal, contract, offering, and sale area improvement plan.
4	Advertisement or notice	The timber is appraised and advertised, and a sample contract is prepared.
5	Bid opening date	Bids by potential buyers are reviewed, and an auction is held if required.
6	Sale award	The contract is signed by both the timber purchaser and the Forest Service.

The entire gate process for selling timber normally takes 3 to 8 years, depending on the size, location, and complexity of the sale; access to the area; and the design of the transportation system. Basic decisions about whether to continue the sale occur both at gate 1 and gate 2. Gate 1

generally occurs in the first year; gate 2 usually occurs between the second and fifth year of sales that continue beyond gate 1. Public comments are actively sought by the Forest Service throughout gates 1 and 2. Comment after a decision has been made comes through the administrative appeal system, once a decision notice has been signed by the approving official at gate 2. According to a forest official, administrative appeals or lawsuits can add 4 months to 4 years to the entire process. Gate 3 usually occurs during the third to eighth year of the sale, depending on the complexity of the sale. The remaining gates generally take place during the last year of the sale process. Once the timber contract is awarded in gate 6, the timber purchaser prepares the site to harvest the timber—a process that can take 3 to 5 years to complete.

Monitoring and Evaluation Activities

Timber management is not completed when the timber is sold. Forest officials track the results of their planning and timber management activities so that the effects of implementing the plan can be measured, the measurements can be analyzed, and necessary changes can be made.

Within the Forest Service, forest supervisors use monitoring information—as well as Forest Service reports and special studies or litigation and appeal results—to evaluate whether the implementation process has achieved the forest plan's objectives. If the evaluation indicates that the implementation process has failed to achieve the plan's objectives or if new information—such as a decrease in wildlife habitat—indicates that the plan's objectives should be revised, then the forest supervisor may amend or revise the forest plan. If the forest supervisor decides that an event—such as a decrease in the forest's ability to produce the ASQ—is significant, then forest officials must follow the same procedure as is required to develop and approve a forest plan. If the event is insignificant—such as the acquisition of additional forest land—then such an extensive effort is not required and the amendment can be implemented after the public has been properly notified and NEPA procedures have been satisfactorily completed.

NFMA requires that a forest plan be revised at least every 15 years; however, the plan can be revised at any time. A forest supervisor can request a plan's revision when forest conditions or demands have changed significantly or when changes in RPA policies, goals, and objectives significantly affect the forest's programs. Revisions have to be in accordance with the requirements for developing and approving a forest

plan, through the completion of the entire forest plan process, and must be approved by the regional and headquarters offices.

Comparison of Average Annual ASQ and ASQ-Related Timber Sale Volumes for Forests in GAO's Review

Table IV.1 shows the volume of timber sold (not including sales of forest products such as Christmas trees and firewood) and the average annual ASQ for the two Southern Region forests we reviewed. These two forests implemented their ASQs in 1986 and 1987. Timber sales were below average annual ASQs in all years since the ASQs were implemented except (for the Ouachita National Forest) in fiscal years 1987 and 1988.

Table IV.1: Comparison of Average Annual ASQ and ASQ-Related Timber Sale Volumes for Southern Region Forests in GAO's Review

Volume in millions of board feet

Forest	Average annual ASQ	Volume of timber sold							
		1986	1987	1988	1989	1990	1991	1992	1993
Chattahoochee-Oconee (1986[a])	101.5[b]	66.1	52.9	66.9	73.5	46.4	63.3	54.1	49.2
Ouachita (1987[a])	146.7[c]	[d]	210.4	188.0	118.7	98.8	39.8	95.8	131.2

[a]Fiscal year in which the ASQ was implemented.

[b]As a result of an administrative appeal, forest officials agreed in 1986 to limit average annual timber sales to 87 million board feet.

[c]When the forest plan was amended in 1990, the ASQ was lowered from 159.0 million board feet to 146.7 million board feet.

[d]Not applicable because the ASQ was not implemented until 1987.

Table IV.2 shows the volume of timber sold (not including sales of forest products such as Christmas trees and firewood) and the average annual ASQ for the three Pacific Northwest Region forests we reviewed. These forests implemented their ASQs in 1991. Timber sales were below average annual ASQs in all years since the ASQs were implemented.

Table IV.2: Comparison of Average Annual ASQ and ASQ-Related Timber Sale Volumes for Pacific Northwest Region Forests in GAO's Review

Volume in millions of board feet

Forest	Average annual ASQ	Volume of timber sold		
		1991	1992	1993
Deschutes (1991[a])	97.8	18.3	26.7	12.7
Gifford Pinchot (1991[a])	334.0	110.2	19.8	14.8
Mt. Hood (1991[a])	189.0	50.6	28.2	38.1

[a]Fiscal year in which the ASQ was implemented.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.	Linda L. Harmon Timothy J. Guinane
Seattle Regional Office	Araceli C. Contreras Stanley G. Stenersen

Glossary

Allowable Sale Quantity (ASQ)	The maximum volume of timber that may be sold on a sustained-yield basis from the area of suitable land covered by the forest plan for a time period specified by the plan. This volume is usually expressed on an annual basis as the "average annual allowable sale quantity."
Board Foot	A board foot, a standard measure of timber, equals the amount of wood in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.
Clearcutting	Clearcutting is a harvesting method that involves removing all trees from a timber harvest site at one time.
Ecosystem Management	Ecosystem management is a new, broader approach to managing the nation's lands and natural resources. Ecosystem management recognizes that plant and animal communities are interdependent and interact with their physical environment (soil, water, and air) to form distinct ecological units called ecosystems that span federal and nonfederal lands.
Endangered Species	Any species of animal or plant as defined by the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Forest Land	Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use.
Forest Plan	A land management plan designed and adopted to guide forest management activities on a national forest.
Group Selection Harvest Method	A method of harvesting timber in which small groups of trees are removed from an area annually or periodically.
Interdisciplinary Team	A group of people trained in different scientific disciplines assembled to solve a problem or perform a task. The team is assembled out of recognition that no one discipline can provide the broad background needed to adequately solve the complex problem.

Multiple Use	The management of the various renewable resources of the national forest system to ensure their use in a combination that will best meet the needs of the public.
Probable Sale Quantity (PSQ)	A best assessment of the average amount of timber likely to be available for sale annually in a planning area over the next 10 years.
Renewable Resource	A resource that may be used indefinitely if the rate of use does not exceed the resource's ability to renew the supply.
Sale Schedule	The quantity of timber planned for sale, by time period, from an area of suitable land covered by a forest plan. The first period, usually a decade, provides the allowable sale quantity.
Single-Tree Harvest Method	The harvesting of selected individual trees of all sizes.
Suitability	The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and of the alternative uses forgone.
Sustained Yield	The volume of timber that a forest can produce continuously from a given intensity of management.
Threatened Species	Any species of animal or plant as defined by the Endangered Species Act that is likely to become an endangered species throughout all or a significant portion of its range within the foreseeable future.
Timber Harvest Administration	Administering sale or use conditions, monitoring effects, and harvesting and removing forest products.
Timber Inventory	A listing of the location, quantity, condition, and growth of trees on forest lands.

Timber Sale Preparation	Preparing and offering timber for sale and awarding a sale.
Timber Yield Estimate	The volume of timber expected to be produced under a certain set of conditions.

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (301) 258-4066.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (301) 258-4097 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

United States
General Accounting Office
Washington, D.C. 20548-0001

Bulk Mail
Postage & Fees Paid
GAO
Permit No. G100

Official Business
Penalty for Private Use $300

Address Correction Requested