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Testimony

Before the Subcommittee on Forests and  
Forest Health, Committee on Resources,  
House of Representatives

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## FOREST SERVICE

# Better Data and Clear Priorities Are Needed to Address Increasing Reforestation and Timber Stand Improvement Needs

Statement of Robin M. Nazzaro, Director  
Natural Resources and Environment





Highlights of [GAO-05-586T](#), testimony before the Subcommittee on Forests and Forest Health, Committee on Resources, House of Representatives

## Why GAO Did This Study

In 2004, the Forest Service reported to the Congress that it had a backlog of nearly 900,000 acres of land needing reforestation—the planting and natural regeneration of trees. Reforestation and subsequent timber stand improvement treatments, such as thinning trees and removing competing vegetation, are critical to restoring and improving the health of our national forests after timber harvests or natural disturbances such as wildland fires.

GAO was asked to (1) examine the reported trends in federal lands needing reforestation and timber stand improvement, (2) identify the factors that have contributed to these trends, and (3) describe any potential effects of these trends that Forest Service officials have identified. This testimony is based on GAO's report *Forest Service: Better Data Are Needed to Identify and Prioritize Reforestation and Timber Stand Improvement Needs* (GAO-05-374), being released today.

## What GAO Recommends

In its report, GAO recommended that the Secretary of Agriculture direct the Chief of the Forest Service to take several actions to improve the agency's ability to identify and prioritize its reforestation and timber stand improvement needs. In commenting on a draft of the report, the Forest Service agreed with GAO's findings and recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-05-586T](http://www.gao.gov/cgi-bin/getrpt?GAO-05-586T).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Robin M. Nazzaro at (202) 512-3841 or [nazzaror@gao.gov](mailto:nazzaror@gao.gov).

## FOREST SERVICE

# Better Data and Clear Priorities Are Needed to Address Increasing Reforestation and Timber Stand Improvement Needs

## What GAO Found

The acreage of Forest Service lands needing reforestation and timber stand improvement has been generally increasing since 2000, according to Forest Service officials and data reported to the Congress, as well as other studies. While the Forest Service data are sufficiently reliable to identify this relative trend, they are not sufficiently reliable to accurately quantify the agency's specific needs, establish priorities among treatments, or estimate a budget. The data's reliability is limited in part because some Forest Service regions and forests define their needs differently, and some do not systematically update the data to reflect current forest conditions or review the accuracy of the data. Forest Service officials acknowledge these problems, and the agency is implementing a new data system to better track its needs. While helpful, this action alone will not be sufficient to address the data problems GAO has identified.

According to Forest Service officials, reforestation needs have been increasing in spite of declining timber harvests because of the growing acreage of lands affected by natural disturbances such as wildland fires, insect infestation, and diseases. In the past, reforestation needs resulted primarily from timber harvests, whose sales produced sufficient revenue to fund most reforestation needs. Now needs are resulting mainly from natural causes, and funding sources for such needs have remained relatively constant rather than rising in step with increasing needs. For timber stand improvement, the acreage needing attention is growing in part because high-density planting practices, used in the past to replace harvested trees, are creating needs for thinning treatments today and because treatments have not kept pace with the growing needs.

Forest Service officials believe the agency's ability to achieve its forest management objectives may be impaired if future reforestation and timber stand improvement needs continue to outpace the agency's ability to meet these needs. For example, maintaining wildlife habitat—one forest management objective—could be hindered if brush grows to dominate an area formerly forested with tree species that provided forage, nesting, or other benefits to wildlife. Also, if treatments are delayed, costs could increase because competing vegetation—which must be removed to allow newly reforested stands to survive—grows larger over time and becomes more costly to remove. Further, without needed thinning treatments, agency officials said forests become dense, fueling wildland fires and creating competition among trees, leaving them stressed and vulnerable to insect attack and disease. While agency officials expressed concern about these potential effects, the agency has not adjusted its policies and priorities for the reforestation and timber stand improvement program so that adverse effects can be minimized. Forest Service officials did, however, acknowledge the need to make such changes.

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Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss several issues related to the reforestation and timber stand improvement program within the Department of Agriculture's Forest Service. Last March, the agency reported to this Subcommittee that it had a backlog of nearly 900,000 acres of land needing reforestation. Reforestation, whether it is achieved by planting trees or letting them naturally regenerate, is critical to restoring and improving the health of our national forests after timber harvests, as well as after natural disturbances such as wildland fires, outbreaks of disease, or insect infestations. The success of reforestation efforts, as well as the overall health of the forests, often depends upon subsequent timber stand improvement treatments, such as removing competing vegetation to allow seedlings to survive. In some parts of the country, without active intervention, it may take decades for disturbed land to return to a forested condition. In other parts, trees may naturally return soon after a disturbance, but the type of regrowth may not be consistent with the Forest Service's program objectives, such as improving wildlife habitat, enhancing recreational opportunities, and ensuring timber production.

My testimony summarizes the results of our report being released today on the (1) reported trends in federal lands needing reforestation and timber stand improvement, (2) factors that have contributed to these trends, and (3) potential effects of these trends that Forest Service officials have identified.<sup>1</sup> In conducting our review, we analyzed Forest Service data for 1995 through 2004, interviewed agency officials at all levels, and visited four regions with the largest reported reforestation or timber stand improvement needs. We focused on the Forest Service's reforestation and timber stand improvement program because this program, which covers 155 national forests, is the largest one administered by a federal land management agency. In 2004, for example, the Forest Service reported reforesting more than 150,000 acres nationwide, while the Bureau of Land Management (BLM) within the Department of the Interior, which has the second-largest program, reported reforesting less than 20,000 acres. While our work included a limited review of BLM's program, my testimony today centers on our findings about the Forest Service's program because we found no significant issues to report concerning BLM.

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<sup>1</sup>GAO, *Forest Service: Better Data Are Needed to Identify and Prioritize Reforestation and Timber Stand Improvement Needs*, [GAO-05-374](#) (Washington D.C.: April 15, 2005).

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## Summary

The acreage of Forest Service lands needing reforestation and timber stand improvement has been generally increasing since 2000, according to Forest Service officials and data reported to the Congress, as well as other studies. Much of the increase in reforestation needs occurred in western regions, where needs associated with natural disturbances, such as wildland fires, began to increase dramatically in 2000. While the Forest Service data are sufficiently reliable to identify this relative trend, they are not sufficiently reliable to accurately quantify the agency's specific treatment needs, establish priorities among treatments, or estimate a budget. The data are limited in part because Forest Service regions and forests define their needs differently, and some do not systematically update their data to reflect current forest conditions or review their data's accuracy. Forest Service officials acknowledge these problems, and the agency is implementing a new data system to better track its needs. However, while helpful, taking this action alone will not resolve the data problems we have identified without making changes to agency policies and practices to standardize how reforestation and timber stand improvement needs are defined, reported, and validated.

According to Forest Service officials, reforestation needs are accumulating because of the increasing acreage of land affected by natural disturbances—such as wildland fires, insect infestation, and diseases. In the past, reforestation needs resulted primarily from timber harvests, and timber sales produced enough revenue to pay for most of the related reforestation needs. Since 2000, however, needs have been resulting mainly from natural disturbances, and funding sources to pay for such needs have remained relatively stable rather than rising in step with the increasing needs. For timber stand improvement, agency officials said that needs are increasing in part because managers in some Forest Service regions do not emphasize these treatments. They believe reforestation treatments—which generally must be completed within 5 years after harvesting trees—are more important than timber stand improvement treatments. Another reason for the reported increase in the acreage needing attention is that high-density planting practices, used in the past to replace harvested trees, are creating needs for thinning treatments today.

If future reforestation and timber stand improvement needs continue to outpace the Forest Service's ability to meet these needs and treatments are delayed, agency officials believe their ability to achieve forest management objectives, such as protecting wildlife habitat, may be impaired; treatment costs could increase; and forests could become more susceptible to fire, disease, and insect damage. For example, forest

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management objectives could be impaired if an area previously dominated by forests became dominated by shrub fields, compromising wildlife habitat, recreation, and timber value. While Forest Service officials expressed concern about these potential harmful effects of delaying projects, the agency has not adjusted its policies, practices, and priorities for the reforestation and timber stand improvement program to reflect this concern and the current environment of constrained budgets. Forest Service officials did acknowledge the need to make such changes.

In our report, we recommended that the Secretary of Agriculture direct the Chief of the Forest Service to take several actions to improve the agency's ability to identify its reforestation and timber stand improvement needs and ensure funding for its most critical projects. In commenting on a draft of our report, the Forest Service agreed with our findings and recommendations and stated it was preparing an action plan to address the recommendations.

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## Background

Historically, the Forest Service's reforestation and timber stand improvement program focused on maximizing timber production. Now, however, the program is intended to achieve a variety of objectives, such as improving wildlife habitat, maintaining water quality, and ensuring sustainable timber production. To achieve these objectives after timber harvests or natural events that damage forests, Forest Service staff identify sites needing reforestation and plan specific treatments. For reforestation, staff either plant seedlings or allow the sites to regenerate naturally as existing trees reseed the area. The latter approach sometimes requires the sites to be prepared by removing unwanted vegetation that could compete with young seedlings. As with reforestation, Forest Service staff identify areas of a forest needing timber stand improvement and plan specific treatments. These treatments are intended to provide better growing conditions for trees and include activities such as removing competing vegetation and thinning forests when trees are too crowded.

In 1974, the Forest Service reported a reforestation and timber stand improvement backlog affecting 3.3 million acres of forested lands. To address this backlog, the Congress included a provision in the National Forest Management Act of 1976 (NFMA) requiring the Forest Service to annually report the estimated funding needed to prevent the recurrence of

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a backlog on lands available for timber production.<sup>2</sup> The Forest Service primarily uses moneys generated from the sale of timber to reforest areas where timber has been harvested, whereas it relies primarily on annual appropriations to reforest areas affected by natural disturbances. In 1980, the Congress created the Reforestation Trust Fund, which is funded through tariffs on imported wood products, to provide dedicated funding for reforestation and timber stand improvement treatments and to help eliminate the backlog. In 1985, the Forest Service declared that it had virtually eliminated the backlog reported in 1974.

The Forest Service's implementation, management, and oversight of the reforestation and timber stand improvement program are decentralized. Its headquarters and 9 regional offices establish policy and provide technical direction to 155 national forest offices on various aspects of the program. District office staff within these national forests are responsible for assessing reforestation and timber stand improvement needs, planning treatments to address the needs, and accomplishing the treatments. Although the Forest Service's Director of Forest Management in headquarters is responsible for reporting agency-wide reforestation and timber stand improvement needs to the Congress, the standards and procedures for collecting and reporting these data are decentralized.

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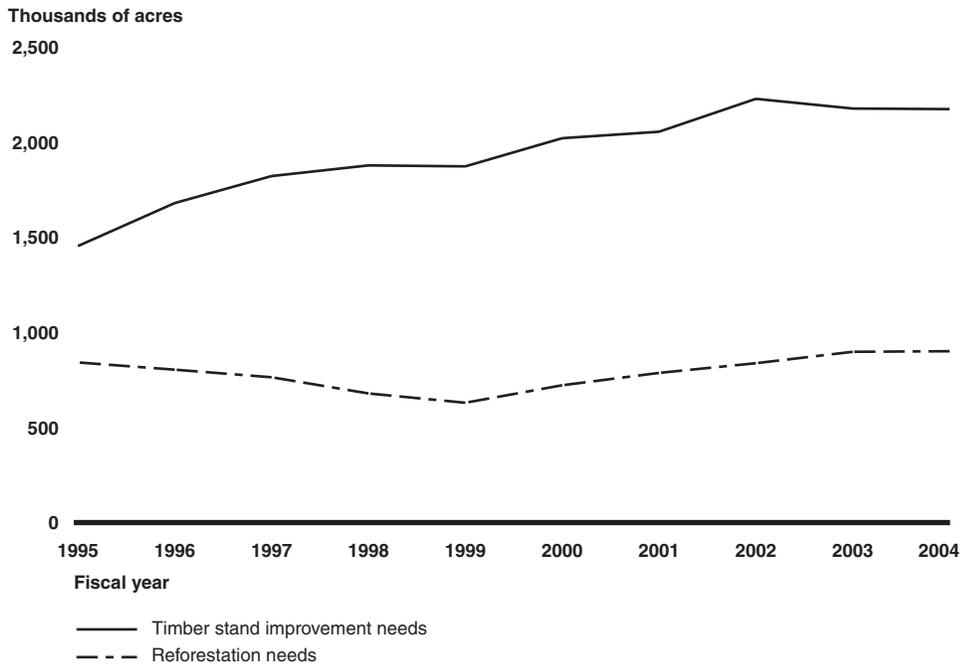
## Forest Service Reports Increasing Reforestation and Timber Stand Improvement Needs, but Inconsistent Definitions and Data Make It Difficult to Accurately Quantify Its Needs

Forest Service reports to the Congress show a generally increasing trend in reforestation and timber stand improvement needs during the last 5 years, as shown in figure 1. While the Forest Service data are sufficiently reliable to identify this relative trend, they are not sufficiently reliable to accurately quantify the agency's specific needs, establish priorities among treatments, or estimate a budget. Although the Forest Service is developing a new national data system, the agency does not anticipate making significant changes to its policies and practices to improve the quality of the data.

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<sup>2</sup>Shortly after the Forest Service reported its backlog, the Congress enacted the Forest and Rangeland Renewable Resources Planning Act of 1974, requiring the Forest Service to annually request funds for an orderly program to eliminate backlogs in all Forest Service renewable resource programs. This act was amended by NFMA, which contains more specific direction to address the elimination of reforestation backlogs.

**Figure 1: Forest Service's Reported Reforestation and Timber Stand Improvement Needs for Fiscal Years 1995 through 2004**



Source: Forest Service data.

Note: This graph is presented only to illustrate trends in reforestation and timber stand improvement needs reported by the Forest Service. Although the Forest Service data, in combination with other information, are sufficiently reliable for this purpose, these data cannot be used to accurately quantify the agency's reforestation and timber stand improvement needs.

## The Forest Service Reports Increasing Needs

Forest Service reports to the Congress show that the acreage of agency lands needing reforestation declined steadily between fiscal years 1995 and 1999 but then steadily increased from 2000 through 2004. Much of the recent increase in reforestation needs occurred in Forest Service regions located in western states. Officials from three of the four regions we visited (the Northern, Pacific Northwest, and Pacific Southwest Regions) expressed concern about the increasing level of their reforestation needs relative to their future ability to meet these needs. With respect to timber stand improvement needs, the Forest Service reports that the acreage of its lands needing such treatments increased most years since 1995. While nationwide timber stand improvement needs generally have been increasing, some regions have reported stable or decreasing trends. For example, the Pacific Southwest Region has reported slightly decreasing

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needs since 1995, which agency officials attribute in part to an emphasis on thinning treatments associated with the National Fire Plan.<sup>3</sup>

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### Forest Service Data Are Not Sufficient to Accurately Quantify the Agency's Needs

The Forest Service's reforestation and timber stand improvement data, when combined with other information from Forest Service officials and nongovernmental experts—as well as data on recent increases in natural disturbances such as wildland fires—are sufficiently reliable for identifying relative trends in needs. However, we have concerns about the use of these data in quantifying the acreage of Forest Service lands needing reforestation and timber stand improvement treatments for several reasons.

- First, Forest Service regions and forests define their needs differently. For example, the Pacific Southwest Region reports reforestation needs in areas where it anticipates a timber harvest, even though the forest is still fully stocked with trees, while other regions we visited do not report a need until after the timber is harvested.
- Second, differences in Forest Service data among locations are compounded because the reforestation and timber stand improvement needs reported are a mixture of actual needs diagnosed through site visits and estimates. In cases where the needs are based on estimates—for example after a wildland fire—the reported needs may not always be adjusted after the actual needs are known.
- Third, Forest Service regions do not always update the data to reflect current forest conditions or review the accuracy of the data. Moreover, some regions cannot link reported needs to distinct forest locations, making it difficult for them to detect obsolete needs and update the data.
- Finally, Forest Service headquarters staff have not conducted reviews in the last decade to ensure that the data reflect on-the-ground conditions.

These inconsistencies in data and data quality mean that the needs reported at the regional level may be understated or overstated and cannot be meaningfully aggregated at the national level. Moreover, many of these

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<sup>3</sup>In 2001, the Departments of Agriculture and the Interior developed a National Fire Plan with state and local agencies and tribal governments to provide technical and financial resources to reduce the risk to communities and ecosystems from wildland fire, in part, by reducing hazardous fuels by thinning trees—one type of timber stand improvement treatment.

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data problems are long-standing and may not be adequately addressed when the Forest Service implements a new data system later this year. Although the new system will replace individual district, forest, and regional systems for reporting needs with a modern agency-wide database, the quality of the data used in the new system will not improve unless the Forest Service addresses how reforestation and timber stand improvement needs are defined, interpreted, and reported. Forest Service officials acknowledge these problems and are preparing an action plan to address them.

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## Agency Officials Link Natural Causes and Management Decisions to Increasing Reforestation and Timber Stand Improvement Needs

Forest Service officials told us that reforestation needs have been rising largely because such needs have increasingly been generated by causes other than timber harvests, and funding to address these needs has not kept pace. During the early 1990s, the agency shifted its management emphasis from timber production to enhancing forest ecosystem health and, as a result, harvested less timber. Timber harvests, which provided sufficient revenue to pay for related reforestation needs, are no longer the main source of such needs. According to Forest Service reports, beginning around 2000, the acreage burned in wildland fires and damaged by insects and diseases annually began to increase significantly, leaving thousands of acres needing reforestation. Nationally, wildland fires burned over 8 million acres in 2000, compared with about 2.3 million acres in 1998.<sup>4</sup> Similarly, the amount of land damaged by insects and diseases increased significantly, with over 12 million acres of forest affected in 2003, compared with less than 2 million acres in 1999.<sup>5</sup> As the acreage affected by these natural disturbances increased, so did reforestation needs. However, funding allocated to pay for reforestation did not increase at the same rate, so needs began to accumulate.

For timber stand improvement, agency officials said that management practices have been the primary factor contributing to the increase in acreage needing treatment. For example, some regions prioritize funding for reforestation treatments over timber stand improvement treatments and consequently do not treat timber stand improvement needs as quickly as they are accumulating. These regions follow this practice in part

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<sup>4</sup>These numbers include lands under federal and state ownership, not just Forest Service land.

<sup>5</sup>These numbers include all forested lands under federal, state, and other ownership, not just Forest Service land.

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because they are required to complete reforestation treatments within 5 years of harvesting, whereas for timber stand improvement, there is no such requirement. National timber stand improvement needs also are increasing because the Forest Service has expanded the scope of the program, now identifying lands where timber stand improvement work is needed to meet objectives beyond maximizing timber yield, such as improving wildlife habitats or thinning hazardous fuels to reduce fire danger. As the objectives of timber stand improvement have expanded, needs have expanded accordingly. Finally, nationwide timber stand improvement needs are increasing because reforestation techniques favored in the 1980s and 1990s recommended planting trees much more densely than may be currently recommended so that as the trees grew, the agency could keep the largest and healthiest of them for cultivating, and thin out the others. Consequently, many stands that were planted 15 or 20 years ago now need thinning, according to agency officials.

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**Agency Officials Cite Adverse Effects That Could Result If Needs Are Not Addressed, but Have Not Positioned the Agency to Manage Such Effects**

If reforestation and timber stand improvement needs continue to accumulate in the future and the Forest Service is unable to keep pace with the needs, the agency will likely have to postpone some treatment projects. According to agency officials, the agency's ability to achieve forest management objectives may consequently be impaired; treatment costs could increase; and forests could become more susceptible to fire, disease, and insect damage. While Forest Service officials expressed concern about the potential harmful effects of delaying projects, the agency has not clarified its direction and priorities for the reforestation and timber stand improvement program to reflect this concern and the current context in which the program operates.

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**Achievement of Management Objectives Could Be Impaired; Treatment Costs Could Increase; and Forests Could Become More Vulnerable to Fire, Insects, and Disease**

The Forest Service's ability to meet the management objectives defined in its forest plans<sup>6</sup>—such as maintaining a variety of tree species in a forest or appropriate habitat for certain wildlife—could be impaired if reforestation or timber stand improvement treatments are delayed. For example, an area previously dominated by forests could become dominated by shrubfields, compromising wildlife habitat, recreation, and timber value. Such a situation developed in the Tahoe National Forest, where about 750 acres were cleared by a 1924 wildland fire and replaced by shrubs that remained until agency officials replanted the area in 1964—40 years later.

If reforestation and timber stand improvement needs are not addressed in a timely manner, treatment costs also could increase because removing competing vegetation, which is required for most reforestation and timber stand improvement projects, will become more costly as the vegetation grows. In addition, forests would likely become more susceptible to severe wildland fires and damage from insects and disease, according to agency officials. When reforestation needs are left unattended, brush can grow in place of forests, providing dense, continuous fuel for wildland fires. When thinning needs are left unattended, experts believe the tightly-spaced trees fuel wildland fires, causing the fires to spread rapidly and increasing the likelihood of unusually large fires that create widespread destruction. In addition, densely populated forests tend to be stressed because the trees compete with one another for sunlight, water, and nutrients. When insects or diseases infect such forests, they can spread rapidly.

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**Forest Service Is Not Well Positioned to Manage Potential Effects of Increasing Needs**

Although Forest Service officials expressed concern about the potential effects of leaving reforestation and timber stand improvement needs unattended, the agency has not made sufficient adjustments to address these concerns and adapt to the present context in which the program operates. Over the past decade, the Forest Service has shifted its management emphasis from timber production to ecosystem management, sources of reforestation needs have shifted from timber harvests to natural causes, and budgets have become increasingly constrained. The agency, however, has not adjusted the program's direction, policies, practices, and

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<sup>6</sup>Under NFMA, each national forest is required to have a forest management plan describing the agency's objectives for the forest, including those related to reforestation and timber stand improvement.

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priorities in keeping with these changes, although agency officials acknowledged the need to do so.

While the Forest Service formally shifted its management emphasis from timber production to ecosystem management in the early 1990s, there remains a lack of clarity about agency mission and goals, and more specifically, about the direction and goals for the reforestation and timber stand improvement program, according to agency officials. When timber production was the emphasis, program direction was clearly focused, whereas in the current environment, it is less so. Reforestation and timber stand improvement projects now are done for multiple purposes—such as improving wildlife habitat, protecting streams, and reducing susceptibility to wildland fires—but it is unclear which purposes are more important, if any, and how to allocate limited funds to support such diverse purposes. The lack of clarity is apparent in forest management plans, where objectives are expressed in vague or contradictory language, according to agency officials. The plans are intended to help guide decisions, such as which reforestation techniques to use, but agency officials said it can be difficult to interpret the plans because of the problematic language.

In the absence of clear, up-to-date program direction, there are priorities, policies, and practices remaining in place that reflect outdated management emphasis. For example, a 2001 report had recommended that the Pacific Northwest region change its priorities by diverting some of its reforestation funds to pay for timber stand improvement. Doing so could help reduce the impacts of wildland fire, and thereby reduce the reforestation needs created by such fires, the report argued. Nevertheless, regional officials we talked with did not all agree with the recommendation, and the region has instead continued to prioritize reforestation over timber stand improvement as it has done since the inception of the timber program. Similarly, in the Pacific Southwest region, when officials reforest an area, they almost always rely on planting—a more expensive method than natural regeneration. This approach may have been appropriate when timber production was the emphasis and timber revenues were higher, because natural regeneration can be slower and less productive than planting. However, the region continues to avoid natural regeneration because they have always done so and, according to agency officials, this practice has been reinforced by the regional culture.

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## Conclusions

Although the Forest Service annually reports its reforestation and timber stand improvement needs to the Congress, the agency has not developed a

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tally of these needs that accurately reflects the condition of our national forests. While we recognize that the systematic collection of accurate data may take resources away from reforestation and timber stand improvements in the short-term, such an investment could lay the foundation for the Forest Service to provide a credible picture of our forests' needs to the Congress. With the advent of a new agency-wide data collection system, the Forest Service has the opportunity to improve the consistency and accuracy with which its data reflect on-the-ground conditions in our national forests. Consistent, accurate data would help the agency to build a well-founded budget case for funding reforestation and timber stand improvement needs.

However, the Forest Service must recognize that in the current, fiscally constrained environment, even well-supported needs may not always be funded. The agency needs to update its goals and policies for the reforestation and timber stand improvement program to reflect the current fiscal environment, as well as its current emphasis on ecosystem management. Until it does so, it will be difficult for the Forest Service to identify the best investments to minimize adverse effects on the lasting health and productivity of our national forests.

To address these issues, we recommended in our report that the Secretary of Agriculture direct the Chief of the Forest Service to standardize guidance for reporting data on reforestation and timber stand improvement needs and improve the data's accuracy in time for congressional deliberation on the Forest Service's 2007 appropriations request. We further recommended that the Secretary direct the Chief to clarify the program direction and policies, and establish criteria for prioritizing the agency's use of program funds. The Forest Service, on behalf of the Department of Agriculture, concurred with our findings and recommendations.

Mr. Chairman, this completes my prepared statement. I would be pleased to respond to any questions you or other Members of the Subcommittee may have at this time.

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## GAO Contacts and Staff Acknowledgments

For further information about this testimony, please contact me at (202) 512-3841 or at [nazzaror@gao.gov](mailto:nazzaror@gao.gov). Bill Bates, David P. Bixler, Christy Colburn, Sandy Davis, Omari Norman, Cynthia Norris, Jena Sinkfield, and Jay Smale made key contributions to this statement.

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