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WESTERN NATIONAL FORESTS

Catastrophic Wildfires Threaten Resources and Communities

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GAO/T-RCED-98-273

Madam Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss the results of our work to date for you on the health of the national forests located in the dry, inland portion of the western United States (hereafter referred to as the "interior West"). About 60 percent of the 155 national forests and about 70 percent of the 192 million acres of land managed by the Department of Agriculture's Forest Service are located in this region of the country, which generally extends north and south from the Canadian to the Mexican borders and east and west from the Black Hills in South Dakota to the Cascade mountain range in Washington and Oregon and to the southwestern deserts and Coastal range in California. (See app. I.)

Distinct ecological processes shaped the forests in the interior West producing tree stands that differed in composition and structure from those in other regions of the country. Historically, frequent low-intensity wildfires played a major role in determining the dispersion and succession of tree stands in the interior West. Lack of rainfall also slows the decomposition of dead and downed trees and woody material. As early as the mid-nineteenth century, human activities began to affect the region's ecology, introducing changes that gradually weakened the health of today's national forests in the interior West.

My testimony today presents our preliminary observations on (1) the extent and seriousness of forest health-related problems on national forests in the interior West, (2) the status of the Forest Service's efforts to address the most serious of these problems, and (3) the barriers to successfully implementing the agency's efforts. Our observations draw on visits over the last year to six regional offices and nine national forests, as well as interviews with and reviews of data from Forest Service headquarters officials and outside experts. We will complete our work and issue a report to you in the spring of 1999.

In summary, Madam Chairman, the information that we have gathered to date suggests the following:

- It appears that the increasing number of large, intense, uncontrollable, and catastrophically destructive wildfires is the most extensive and serious national forest health-related problem in the interior West. Past management practices, especially the Forest Service's decades-old policy of suppressing fire in the national forests, disrupted the historical occurrence of frequent low-intensity fires. As a result, vegetation

accumulated, creating high levels of fuels for catastrophic wildfires and transforming much of the region into a tinderbox. The number of large wildfires, and of acres burned by them, has increased over the last decade, as have the costs of attempting to suppress them. These fires not only compromise the forests' ability to provide timber, outdoor recreation, clean water, and other resources but they also pose increasingly grave risks to human health, safety, and property, especially along the boundaries of forests where population has grown rapidly in recent years.

- During the 1990s, the Forest Service began to address the unintended consequences of its wildfire suppression policy. Recently, it announced its goal to improve the health of the forests by adequately resolving the problems of uncontrollable, catastrophic wildfires in national forests by the end of fiscal year 2015. To accomplish this goal, it has, among other things, (1) initiated a program to monitor the forests' health, (2) refocused its wildland fire management program to increase the number of acres on which it reduces accumulated vegetation that forms excessive fuels; and (3) restructured its budget to better ensure that funds are available for reducing these fuels. The Congress has supported the agency's efforts by increasing the funds for fuels reduction and authorizing a multiyear program to better assess problems and solutions.
- However, because it lacks adequate data, the Forest Service has not yet been able to develop a cohesive strategy for addressing several factors that may present significant barriers to improving the health of the national forests by reducing fuels. As a result, many acres of national forests in the interior West may remain at high risk of uncontrollable wildfire at the end of fiscal year 2015. Moreover, efforts to reduce accumulated fuels can adversely affect the Forest Service's achievement of other stewardship objectives. For example, controlled fires can be used to reduce fuels, but (1) such fires might get out of control and (2) there is concern about the effects of their smoke on air quality. As a result, mechanical methods, including commercial timber harvesting, will often be necessary to remove accumulated fuels. But mechanical removals are problematic because the Forest Service's (1) incentives tend to focus efforts on areas that may not present the highest fire hazards and (2) timber sale and other contracting procedures are not designed for removing vast amounts of materials with little or no commercial value. As a result, removing accumulated fuels may cost the Forest Service hundreds of millions of dollars annually.

The Number and Costs of Uncontrollable, Very Destructive Wildfires Are Increasing

According to the Forest Service, large areas of national forests in the interior West are not healthy. Symptoms include tree stands that are denser, with more small trees, undergrowth, and accumulated dead materials on the ground than in the past. Additionally, the proportion of trees of less fire-tolerant species has increased, as has the incidence of some disease and insect infestations. These conditions have developed in response to several factors that have generally prevented fire from playing its historical role of limiting the forests' density and clearing undergrowth and downed material. These factors include (1) extensive livestock grazing and settlement-related changes in land use since the late 1800s, which eliminated much of the grasses that historically carried fire through the forests' undergrowth; (2) past timber harvesting methods that selectively removed the larger, more valuable, and more accessible trees or removed all of the trees from a timber-harvesting site at one time (clear-cutting), allowing other species to increase; and (3) invasions by nonnative plants, insects, and diseases. However, according to several studies, the primary factor contributing to unhealthy forests in the region has been a decades-old policy of suppressing fire in the national forests, particularly in those which depend on frequent fires.

The most common type of forested lands in the national forests of the interior West are at warm, dry, lower elevations and are generally dominated by ponderosa pine. These are known as "frequent fire interval" forests because, before pioneers settled in these areas, fire historically occurred in them about every 5 to 30 years. (See app. II.) Because frequent fires kept these forests clear of undergrowth, fuels seldom accumulated and the fires were generally of low intensity, largely consuming grasses and undergrowth and not igniting the highly combustible crowns, or tops, of large trees. In contrast, fire historically occurred only about every 40 to 200 years in the cooler, moister, forests at higher elevations, such as those around Yellowstone National Park, which are generally dominated by lodgepole pine. These forests historically developed more dense stands, and fires there generally killed nearly all of the trees.

Fire suppression was first practiced to reduce the risk of uncontrollable wildfires to protect early settlements. Later it was used as an agricultural production technique to increase the number of trees available for timber harvesting. But without frequent fires, vegetation has accumulated so that many stands have become more dense and less fire tolerant tree species have become more prevalent. (See apps. III and IV.) As the forests' density and composition have changed, stands have become more susceptible to insects and disease. In some cases, invasions by nonnative plants and

diseases have exacerbated these conditions. In these denser stands, where many smaller dead and dying trees now often form fuel "ladders" to the crowns of larger trees, wildfires have increasingly become large, intense, and catastrophic. Such fires burn many more acres, destroy much more timber and wildlife habitat, and subject exposed soils to substantial erosion during subsequent rains, damaging water quality.

Our analysis of the Forest Service's data shows that the agency was highly effective in suppressing fires in the national forests for about 75 years after 1910, reducing substantially the number of national forest acres burned annually, over 90 percent of which have been in the interior West. However, more recently, the agency has been less effective because excessive accumulated fuels have made fires larger and more intense. (See app. V.) For example, since 1984, the average number of fires annually on national forests that burn 1,000 acres or more has increased from 25 to 80, and the number of total acres burned (including on nearby lands) as a result of these fires has more than quadrupled, from 164,000 to 765,000. (See app. VI.) Since 1990, 91 percent of these large fires and 96 percent of the acres they have burned were in the interior West.

In 1995, the agency estimated that 39 million acres, or about one third of all lands it manages in the interior West—more than ever known before and more than in all other regions of the country combined—are now at high risk of large, uncontrollable, catastrophic wildfires. According to Forest Service officials, virtually all of these lands are located in the lower-elevation, frequent-fire forests of the interior West that are generally dominated by ponderosa pine. This is because, as stated in a 1995 internal report,[1] far more cycles of fire (up to ten) were suppressed in these forests than in the higher-elevation, lodgepole-pine-dominated forests—where generally only one or no fire cycle was suppressed. (See app VII.)

Catastrophic wildfires not only compromise the forests' ability to sustain timber, outdoor recreation, clean water, and other uses but also pose hazards to human health, safety, and property. For example, 14 firefighters lost their lives in the 1994 South Canyon Fire in Colorado, which—because of its size and intensity—was able to rapidly surround them. The hazard to human health, life, and property is especially acute along the national forests' boundaries, where population has grown rapidly in recent years—an area termed the "wildland/urban interface." Because smoke from such fires contains substantial amounts of fine particulate matter and

[1]Fire Economics Assessment Report, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1995).

other hazardous pollutants, the fires can pose substantial health risks to people living in this interface. (See app. VIII.)

The growing number of large wildfires and acres burned—coupled with the increasing complexity of suppression in the wildland/urban interface—has greatly increased the costs of suppressing fires. From fiscal year 1986 through fiscal year 1994, the 10-year rolling average of annual costs for fighting fires grew from $134 million to $335 million, or by 150 percent, in constant 1994 dollars. (See app. IX.) Since 1990, 95 percent of these costs were incurred in the interior West. Moreover, the costs associated with preparedness, including the costs of keeping equipment and personnel ready to fight fires, are also increasing. For the 6 fiscal years from 1992 through 1997, these costs increased from $189 million to $326 million, or by 72 percent.[2] (See app. X.)

Furthermore, these fires impose additional costs on other parties, both for fighting fires that cross national forest boundaries and for repairing the damage they do. For example, the 1996 Buffalo Creek fire, a fire that burned several thousand acres and threatened private property in the wildland/urban interface southwest of Denver, left forest soils subject to extreme erosion. Subsequent repeated rainstorms have washed what ordinarily would have been several years worth of sediment into a reservoir that supplies Denver with water. As a result, the Denver Water Board has estimated it will incur several million dollars of ongoing expenses for dredging the reservoir and treating water—an amount that is several times the cost of fighting the fire.

The Forest Service Is Taking Steps to Address the Increasing Number of Catastrophic Wildfires

In recent years, the Forest Service has taken steps to address the increasing threat of catastrophic wildfires on national forests. For instance, in 1990, the agency, along with other federal and state agencies, initiated a forest health monitoring program to better identify tree stand conditions, including outbreaks of insects and diseases and dead trees. Also, in 1995, it announced its intention to refocus its fire management program on reducing accumulated fuels. Specifically, a 1995 internal agency report recommended increasing the number of acres on which accumulated fuels are reduced annually from about 570,000 to about

[2]Federal Lands: Information About Land Management Agencies' Wildfire Preparedness Activities (GAO/RCED-98-48R, Dec. 18, 1997) and Federal Lands: Wildfire Preparedness and Suppression Expenditures for Fiscal Years 1993 Through 1997 (GAO/T-RCED-98-247, Aug. 4, 1998).

3 million by fiscal year 2005.[3] In 1997, the Chief of the Forest Service said it was the agency's intention to implement this recommendation and the agency plans to continue reducing fuels on 3 million-acres per year through fiscal year 2015. By that time, the agency believes that it will have adequately resolved the problem of national forest lands being at high risk of uncontrollable, highly destructive wildfires.

To implement its increased emphasis on reducing accumulated fuels, the Forest Service restructured and redefined its fiscal year 1998 budget for wildland fire management to better ensure that funds are available for these activities.[4] In fiscal year 1998, it announced that the funds appropriated for reducing fuels would be allocated to (1) protect high-risk wildland/urban interfaces, with special emphasis on areas subject to frequent fires; (2) reduce accumulated fuels within and adjacent to wilderness areas; and (3) lower the expected long-term costs of suppressing wildfires by restoring and maintaining fire-adapted ecosystems.[5] In addition, the Forest Service has identified reducing accumulated fuels in the national forests as a key measure of its performance in accomplishing its high-priority, long-term strategic goal of restoring and protecting forested ecosystems.[6]

In the past 5 years, the Forest Service—either alone or with the Department of the Interior and other federal agencies—has issued several reports (1) addressing the health of forests in the interior West as well as in other regions of the country, including the health effects of fire suppression and (2) proposing management approaches to more efficiently and effectively reduce accumulated fuels.[7] The agency has also

[3]Course to the Future: Positioning Fire and Aviation Management, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1995).

[4]FY 1998 Budget Explanatory Notes for the Committee on Appropriations, U.S. Department of Agriculture, Forest Service (Feb. 1997).

[5]FY 1999 Budget Explanatory Notes for the Committee on Appropriations, U.S. Department of Agriculture, Forest Service (Feb. 1998).

[6]USDA Strategic Plan 1997-2002: A Healthy and Productive Nation in Harmony With the Land, Forest Service Strategic Plan, U.S. Department of Agriculture, Office of the Secretary (Sept. 30, 1997) and FY 1999 USDA Forest Service Annual GPRA Performance Plan, U.S. Department of Agriculture, Forest Service (Feb. 4, 1998).

[7]Healthy Forests For America's Future: A Strategic Plan, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1993); Fire Related Considerations and Strategies in Support of Ecosystem Management, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1993); Western Forest Health Initiative, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1994); Fire Economics Assessment Report, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1995); and Federal Wildland Fire Management Policy and Program Review, Department of the Interior and U.S. Department of Agriculture, Forest Service (Washington, D.C., 1995 and 1996).

(1) revised its wildland fire management policy to more clearly spell out its responsibilities and reimbursable costs so that nonfederal parties can understand the consequences of not working with the agency to reduce the risk of wildfire on their adjacent lands and (2) proposed a number of pilot projects in collaboration with willing nonfederal partners to demonstrate the role of mechanical methods (including timber harvesting) of removing materials to reduce accumulated fuels.

The Congress has supported the Forest Service's efforts to reduce accumulated fuels by, among other things, increasing the funding for these activities. In addition, in acting on the agency's fiscal year 1998 budget, the House and Senate appropriations committees approved the Forest Service's budget restructuring to better ensure that funds are available for reducing accumulated fuels. The committees also earmarked $8 million in fiscal year 1998 for the agency and Interior to begin a multiyear program, called the Joint Fire Science Program, to gather consistent information on accumulated fuels and ways to reduce them. In January 1998, the agencies issued a plan for conducting this program.[8] An agency official involved in the plan's implementation said they will need 10 years to complete this plan and, as it is completed, national forests will use its findings to amend or revise individual forest plans.

Many experts believe that these agency and congressional efforts are in a race against time. A 1993 assessment of forest health in the interior West concluded that only a "brief window of opportunity" of perhaps 15 to 30 years exists for management intervention before damage from uncontrollable wildfires becomes widespread, setting the stage for a repeat of the current problems far into the 21st century.[9] Five of those years have already passed.

A Cohesive Strategy Appears to Be Needed for Addressing Barriers to Reducing Accumulated Fuels

Although the Forest Service is taking steps to address the increasing number of catastrophic wildfires in the national forests, it may not be able to adequately resolve the problem of the high risk of catastrophic wildfires on national forest lands by the end of fiscal year 2015. In particular, because of a lack of adequate data, the agency has not yet been able to develop a cohesive strategy for addressing numerous factors that may present significant barriers to the accomplishment of its goal.

[8]Joint Fire Science Plan, Department of the Interior and U.S. Department of Agriculture, Forest Service (Washington, D.C., 1998).

[9]Assessing Forest Ecosystem Health in the Inland West, Forest Policy Center (Washington D.C., 1994).

The Forest Service's current plans may significantly underestimate the number of acres on which fuels must be reduced annually to adequately reduce fire hazards. Our preliminary analysis of the agency's initial plans and data indicates that as many as about 10 million acres in the interior West may still have excessive fuel levels and still be at high risk of uncontrollable, catastrophic wildfire at the end of fiscal year 2015. This is largely because the Forest Service's criteria for allocating the funds appropriated to reduce accumulated fuels have apparently not been linked to the agency's actual allocation of these funds. The agency's criteria emphasize restoring the high-risk interface areas within the frequent fire forest ecosystems. However, these interface areas within the interior West have not yet been defined. Moreover, the current and planned allocations largely emphasize maintaining satisfactory conditions on lands outside these frequent fire forests that currently have low levels of accumulated fuels so that conditions on them do not also become hazardous. Because maintaining these conditions will require continued fuels reduction on about 1 million acres per year, the agency's plans to reduce fuels on 3 million acres per year appear to fall short of the levels needed to meet the agency's goals for both these lands and the interior West's frequent fire forests.

The Forest Service may be able to substantially reduce fire hazards without reducing fuels on all 39 million acres currently at high risk of catastrophic fire. For example, it might construct fuelbreaks—i.e., areas where excessive fuels have been removed—in strategic locations to isolate areas with excessive fuels and thus limit the spread of large fires. However, the Forest Service has not yet developed a strategy for doing so or for any alternative strategic approach. Until it does, it has no basis for eliminating any current high-risk areas from its fuels reduction efforts.

Methods for reducing accumulated fuels can sometimes be difficult to reconcile with other legislatively mandated stewardship objectives, including meeting clean water quality standards and protecting threatened and endangered species. According to an agency official, in the past, the Forest Service sometimes used chemicals (herbicides) to kill undergrowth, which could then be burned. Combining these two methods was often less costly than mechanically removing the undergrowth. The agency has, however, largely stopped using herbicides because of concerns about their adverse effects on water quality and human health. Additionally, as a result of selective harvesting of large ponderosa pine trees and fire suppression in the Deschutes National Forest in Oregon, ponderosa stands have been largely replaced by abnormally dense stands

of Douglas fir. The Douglas fir stands cannot be removed, however, because they now provide habitat for the threatened northern spotted owl, whose naturally occurring habitat on the western side of the Cascade mountain range has been significantly reduced by timber harvesting.

Many agency and outside experts believe that, ultimately, avoiding catastrophic wildfires and restoring forest health in the interior West will require reintroducing fire through burning under controlled conditions to reduce fuels. However, the use of controlled fire in the interior West has two limitations. First, winter snows limit the time available for burning, and dry summer weather creates a high risk that, given massive levels of accumulated fuels, controlled fires will escape and become uncontrollable, catastrophic wildfires. Second, several officials and experts we spoke with believe that emissions from controlled fires on the scale needed would violate federal air quality standards under the Clean Air Act and that the act would thus not permit the desired level of burning either immediately or possibly even in the long term. The Forest Service and the Environmental Protection Agency, which administers the Clean Air Act, are currently conducting a 3-year experiment to better determine the impact of emissions from controlled fires.

For these reasons, many experts agree that fuels must be reduced in most areas of the interior West, at least initially, by mechanical means, including commercial timber harvesting, in conjunction with controlled burning. The Forest Service currently uses its timber sales management program to reduce accumulated fuels.[10] However, the use of timber harvesting to reduce fuels has been limited by concerns about its adverse effects on other stewardship objectives. Specifically, in fiscal year 1997, timber harvesting was used to reduce fuels on only about 95,000 acres, or less than 5 percent of the acres that are projected to need fuels reduction annually to achieve the agency's long-term goal. Forest Service officials told us that it was not likely that commercial timber harvesting could be increased enough to adequately reduce fuels on the vast amount of acreage needing such reductions.

Moreover, mechanical removals under both the timber sales management program and the fuels reduction program funded by appropriations currently involve incentives that tend to focus efforts on areas that may not present the greatest fire hazards. For example, under its fuels reduction program, the Forest Service's lone performance indicator

[10]FY 1999 Budget Explanatory Notes for the Committee on Appropriations, U.S. Department of Agriculture, Forest Service (Feb. 1998).

measures the number of acres treated. Agency field staff told us that forests' funding often depends on their ability to contribute to agency acreage targets. As a result, they often focus on areas where the costs of reducing fuels are low so that they can accomplish more acres, rather than on areas with the highest fire hazards, including especially the wildland/urban interfaces. These high-hazard areas often have significantly higher per-acre costs because of limitations on the use of less expensive controlled fires as a tool to reduce the accumulated fuels.

Timber harvesting may make useful contributions to reducing accumulated fuels in many circumstances. However, reducing fuels with the funds allocated for timber sales management may also provide an incentive for forests to focus on less critical areas. The Forest Service stresses that its timber sales management program is increasingly being used for efforts to improve forest health, including efforts to prevent catastrophic fires.[11] The agency relies on timber production to fund many of its programs and activities, and all three of its budget allocation criteria for timber activities relate solely to the volume of timber produced or offered. As a result, as forest officials told us, they tend to (1) focus on areas with high-value commercial timber rather than on areas with high fire hazards or (2) include more large, commercially valuable trees in a timber sale than are necessary to reduce the accumulated fuels. Similarly, an interagency team that reviewed the implementation of the Emergency Salvage Timber Sale Program observed that some Forest Service personnel focused on achieving additional volumes of timber rather than on protecting forested ecosystems.[12]

Finally, most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value. For example, to return experimental forest plots near Flagstaff, Arizona to historical conditions, 37 tons per acre of nonmarketable materials had to be disposed of by placing them in a pit and burning them. However, the agency's largely statutorily defined contracting procedures for commercial timber sales—as well as for service contracts that do not involve selling timber but are let simply for the service of removing excess fuels—were not designed to (1) facilitate the systematic removal of large volumes of low-value material over a number of years, (2) readily combine funds for conducting timber sales with funds for reducing accumulated fuels, or

[11]National Summary: Forest Management Program Report for Fiscal Year 1997, U.S. Department of Agriculture, Forest Service, FS-627 (July 1998).

[12]Interagency Salvage Program Review, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (Silver Spring, Maryland, Oct. 8, 1996).

(3) allow contractors to retain this low-value material to partially offset the costs of its removal. In 1998, for instance, Agriculture's Office of General Counsel determined that only 6 of 23 pilot projects proposed by the Forest Service to demonstrate, among other things, the role of timber harvesting in reducing accumulated fuels, could proceed under the agency's existing statutory authority. This was because, among other things, the remaining projects would have involved removing more material of minor commercial value than is allowed under service contracts or letting contractors keep some material in exchange for removing it. During the fiscal year 1999 appropriation process, the agency asked for, but has not received, one-time waivers to these statutory limitations so that it can conduct the pilot projects. Also, authority temporarily granted to the agency in the early 1990s to enter into "land stewardship contracts"—under which contractors were allowed to retain material they removed in exchange for achieving desired conditions in the national forests—has not been renewed.[13]

Additionally, because the materials to be removed often have low or no value, the revenue they generate will not cover the costs of their removal. Agency officials and outside analysts agree that reducing accumulated fuels in the interior West may thus likely require hundreds of millions of dollars a year in appropriated funds. Our preliminary analysis of the Forest Service's fuels reduction costs—which according to agency data average about $320 per acre for the combination of burning and mechanical removal that is necessary in the interior West—indicates that as much as $12 billion, or about $725 million a year, may be needed to treat the 39 million acres at high risk of uncontrollable wildfire by the end of fiscal year 2015. These costs might be less if the agency reduced current hazards on the 39 million acres selectively, in accordance with a strategy or set of priorities. Currently, however, the agency has requested $65 million for fiscal year 1999 to reduce accumulated fuels—or less than a tenth the annual level that may be needed to accomplish its goal—but has not developed an identifiable strategy or priorities for applying these funds, nor even identified interface areas that are at high risk.

Moreover, our preliminary analysis examined only the "first-time" costs of reducing fuels in these forests. Fuels will have to be reduced periodically in order to maintain the forests' health. For example, in 1998, the Wenatchee National Forest in Washington stated that it would have to

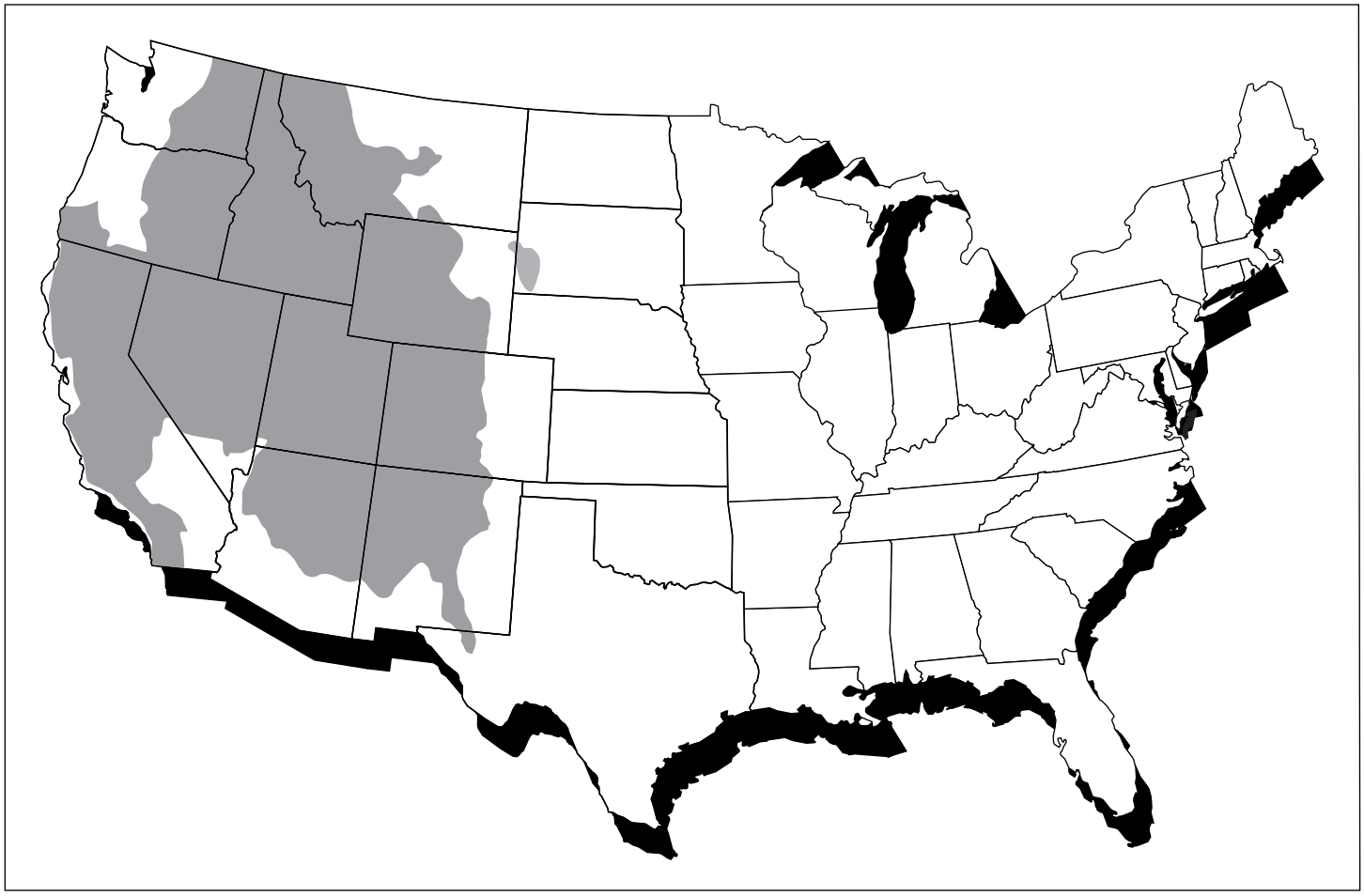
[13]See Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems, Congressional Research Service (95-1077 ENR, Washington, D.C., 1995) and M. Mitsos, Improving Administrative Flexibility and Efficiency in the National Forest Timber Sale Program: Scoping Session Summary, Pinchot Institute (Washington, D.C., 1996).

begin reducing fuels in areas treated only 10 to 15 years ago because undergrowth has accumulated in the interim, posing new fire hazards. Forest Service officials we spoke with agreed with a 1997 observation by the Secretary of the Interior that substantial efforts to reduce fuels will have to be repeated three to five times or more on these lands over many decades, although the later repetitions of this controlled burning and mechanical removal may be less costly.

In conclusion, Madam Chairman, the increasing number of uncontrollable and often catastrophic wildfires in the interior West, as well as the significant costs to resolve the problem of increasing hazards both to human health, safety, and property and to natural resources in national forests, present difficult policy decisions for the Forest Service and the Congress: Does the agency request, and does the Congress appropriate, the hundreds of millions of dollars a year that may be required to fund an aggressive fuels reduction program? If enough is not appropriated, what priorities should be established? How can the need for reintroducing fire into frequent fire forests and mechanical removals best be reconciled with air quality standards and other stewardship objectives? What incentives and changes in statutorily defined procedures are needed to facilitate the mechanical removal of low-value materials? Such decisions should be based on a sound strategy that, in turn, depends in large part on data being gathered under the Forest Service and Interior's Joint Fire Science Program. However, a Forest Service official involved with implementing the program told us that the agency may need a decade to complete many of the research projects under the program. It may also take another decade or longer to revise or amend forest plans to incorporate the program's findings and begin implementing individual fuels reduction activities. Many experts argue that the tinderbox that is now the interior West cannot wait that long. They also believe that inaction—or simply allowing nature to take its inevitable course—will cost more not only for fire suppression but also in damage to natural resources, human health, and property, than would undertaking strategic actions now.

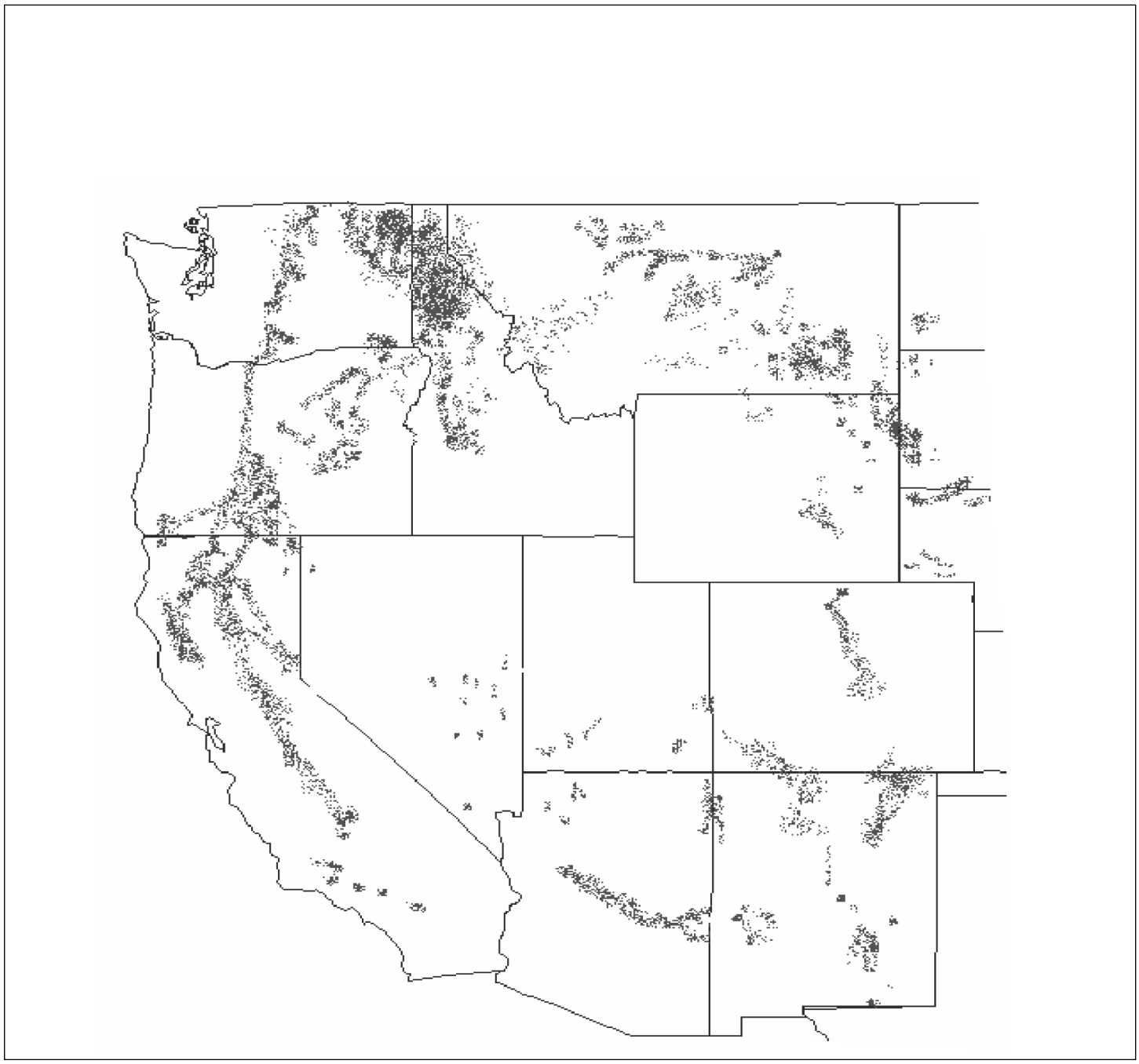
Madam Chairman, this concludes our prepared statement. We will be pleased to respond to any questions that you or Members of the Subcommittee may have.

The Interior West



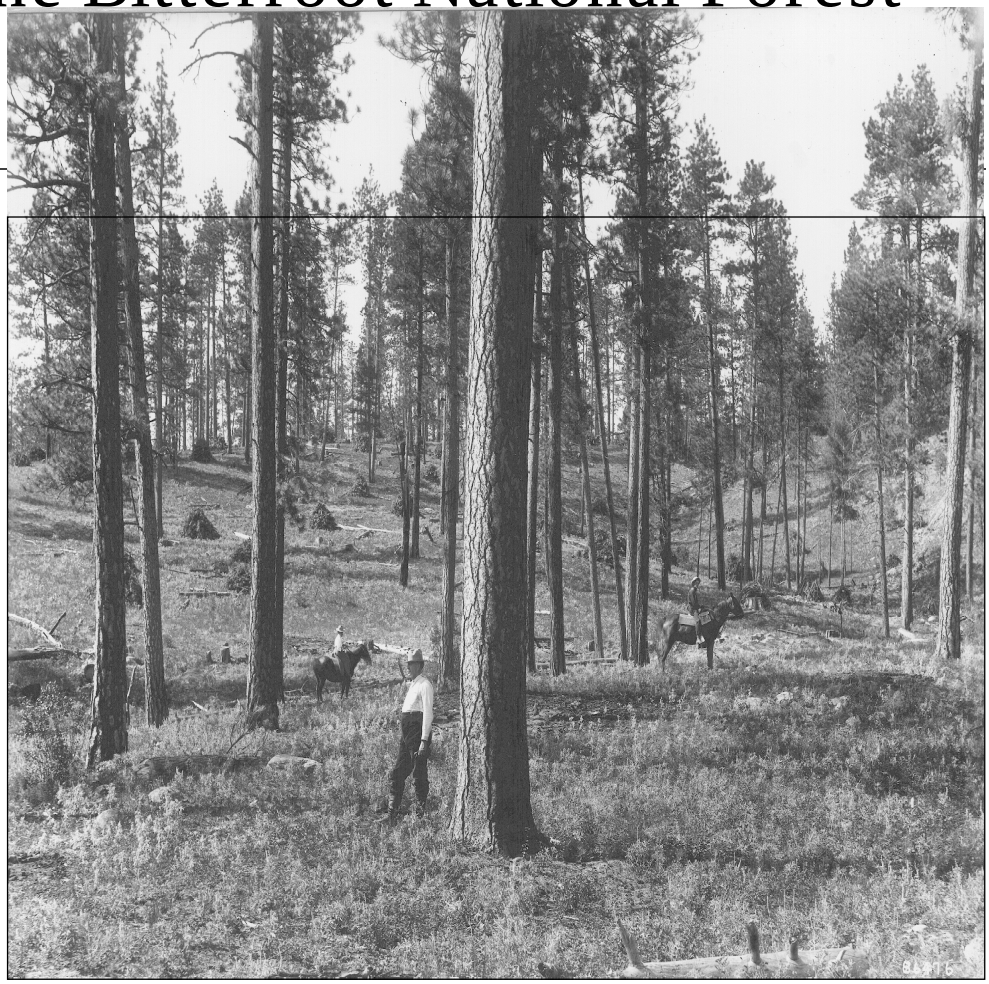
Source: Forest Service.

Location of Frequent Fire Forests in the Interior West



Source: Forest Service.

1909 Photograph of Typical Open Ponderosa Pine Stand in the Bitterroot National Forest in Idaho

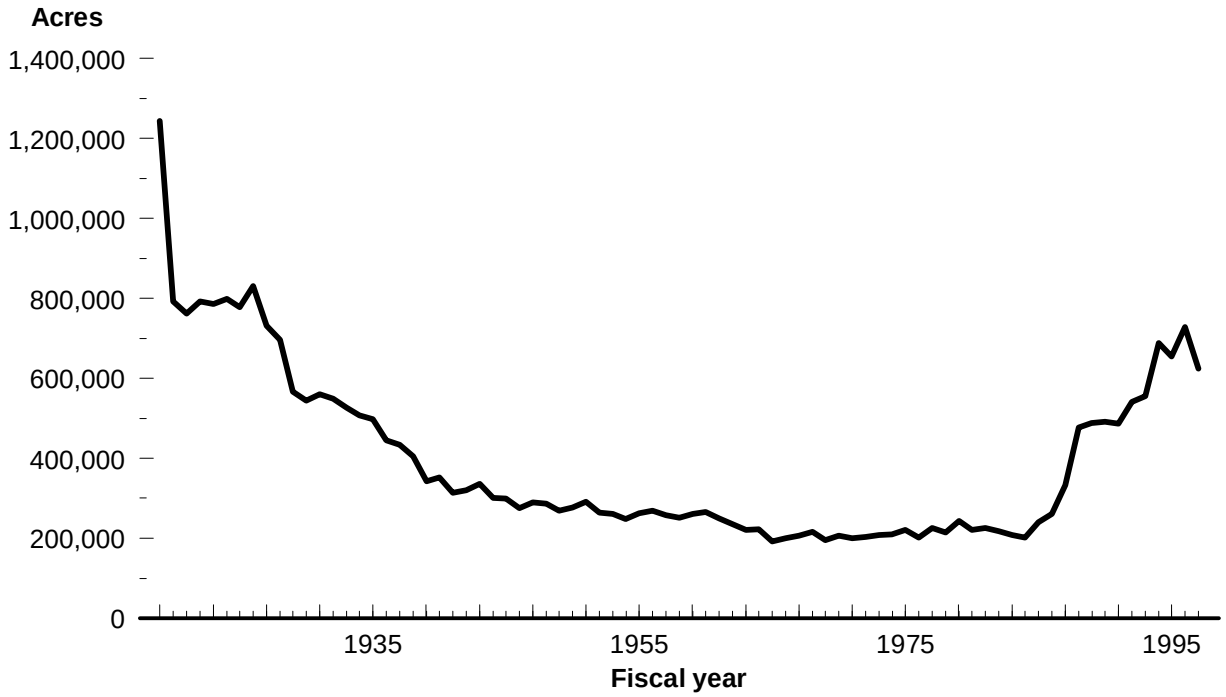


Source: Forest Service.

1989 Photograph Taken From the Same Spot in the Bitterroot National Forest in the Same Direction

Source: Forest Service.

Number of National Forest Acres Burned by Fire, 1910-97

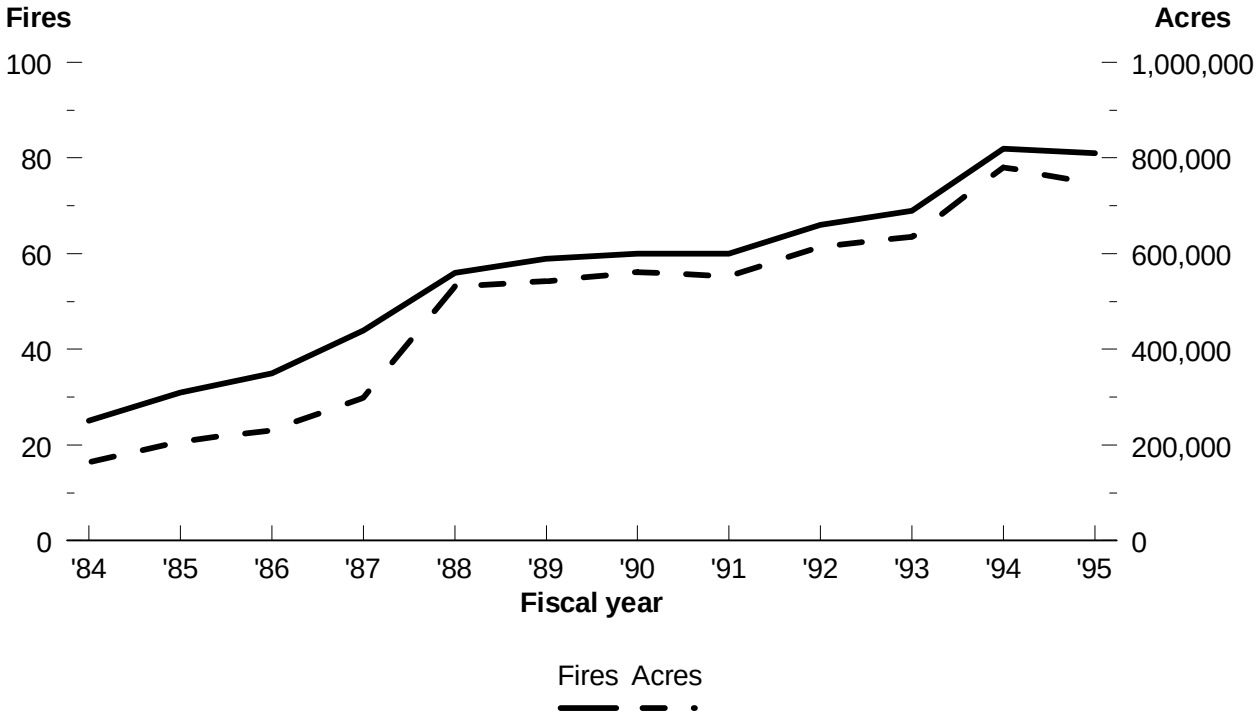


Notes: 1. The number of acres represents the 10-year rolling average at each point.

2. Since 1990, 90 percent of national forest acres burned by fire were in the interior West.

Source: GAO's presentation of data from the Forest Service.

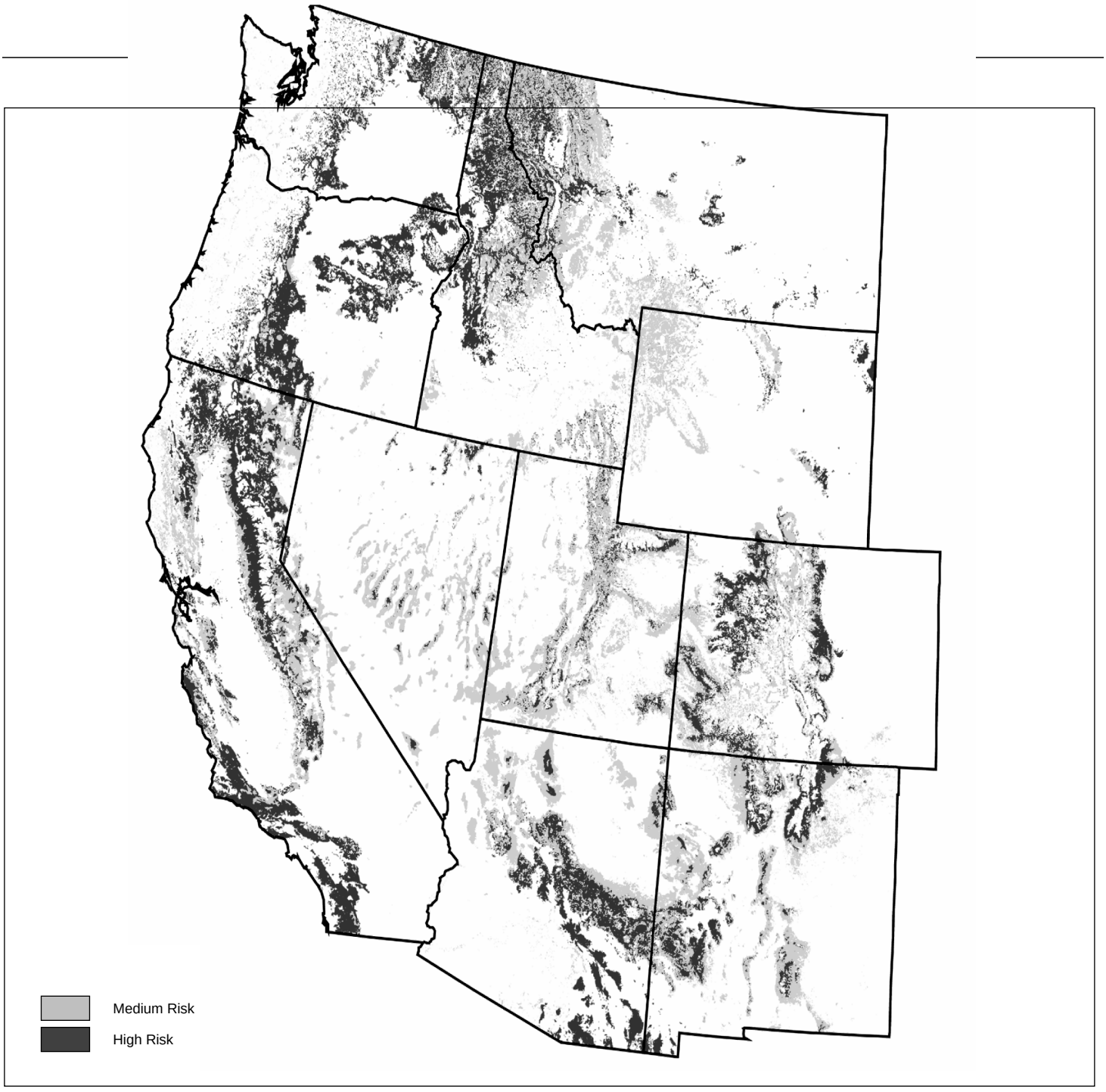
Number of and Total Acres Burned by Large Wildfires on All National Forests, 1984-95



Note: Since 1990, 91 percent of large fires, >1000 acres, and 96 percent of the acres burned were in the interior West.

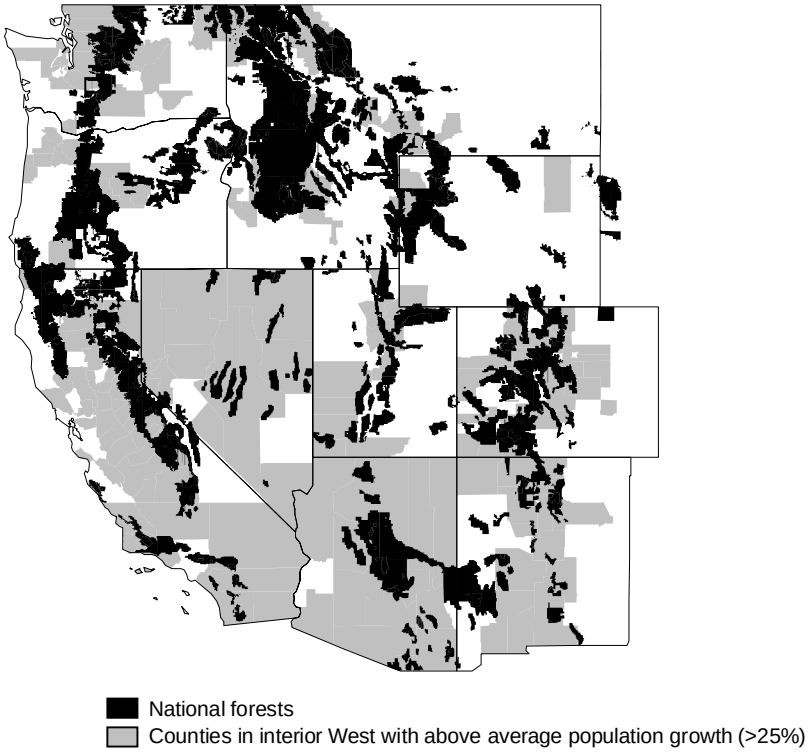
Source: GAO's presentation of data from the Forest Service.

National Forest Lands at Medium and High Risk of Catastrophic Fire



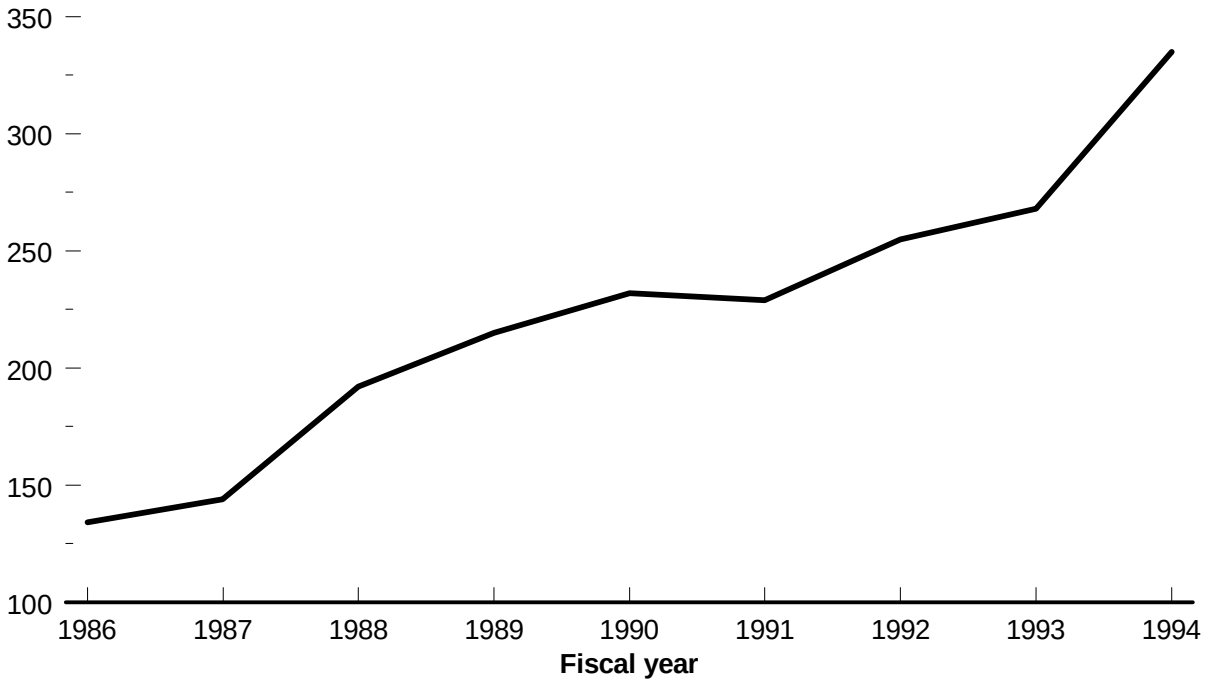
Source: American Forests.

Population Growth in Relation to National Forests



Source: GAO's presentation of data from the Forest Service and the Bureau of the Census.

Forest Service's Expenditures for Fire Fighting, Fiscal Years 1986-94

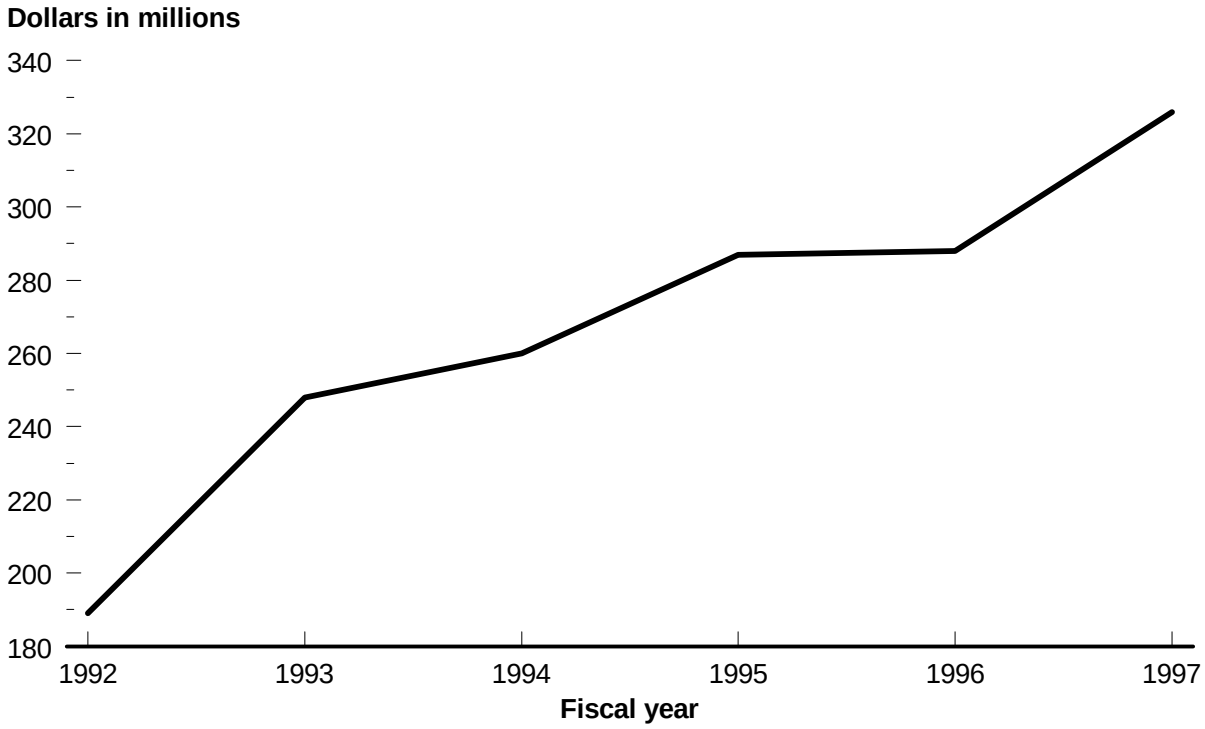


Notes: 1. The expenditures for each year represent the 10-year rolling average expressed in 1994 dollars.

2. Since 1990, 95 percent of these expenditures have been in the interior West.

Source: GAO's presentation of data from the Forest Service.

Forest Service's Expenditures for Wildfire Preparedness, Fiscal Years 1992-97



Note: For 1994, the last year figures by region were available, over 90 percent of these expenditures were in the interior West.

Source: GAO.

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