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WESTERN NATIONAL FORESTS

Nearby Communities Are Increasingly Threatened by Catastrophic Wildfires

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Madame Chairman and Members of the Subcommittee:

We are here today to discuss the results of our work to date for you on the wildfire hazards faced by communities located adjacent to national forests in the dry, inland portion of the western United States (hereafter referred to as the “interior West”). About 60 percent of all national forests 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, the Coastal range in California, and the southwestern deserts. (See app. I.)

Historically, the tree stands in many forests of this region developed distinctive characteristics in response to frequent low-intensity fires and a lack of rainfall, which slows the decomposition of dead and downed trees. However, human activities over the last century and a half have introduced changes in the structure and composition of these tree stands. These changes have raised concerns about the resulting potential for more large, intense wildfires on national forests and about the threats that they may pose.

My testimony today presents our observations to date on (1) the extent and seriousness of threats posed by national forest wildfires to nearby communities in the interior West, (2) agency efforts to address them, and (3) barriers to successfully implementing these efforts. Our work draws on visits over the last year and a half to several Forest Service field locations, as well as interviews with and review of data provided by, agency and outside experts. We will complete our work and issue a report to you on this, as well as wildfire threats to national forest resources, in the spring of this year.

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

- During this century, two major changes have occurred in the national forests of the interior West. First, the Forest Service’s decades-old policy of putting out fires in the national forests has resulted in increased undergrowth and density of trees creating high levels of fuels for catastrophic wildfires. (See appendixes III and IV.) This has transformed as many as 39 million acres of the interior West’s national forests into a tinderbox. Second, the number of people living along the boundaries of

national forests has grown significantly. As a result, the increasing number of large wildfires, and of acres burned by them, pose increasingly grave risks to human health, safety, property, and infrastructure in these areas which are commonly referred to as “wildland/urban interface” areas.

- During the 1990s, the Forest Service began to address this problem by (1) establishing an objective of increasing the number of acres on which excessive fuel levels are reduced, (2) announcing a priority for such reductions in wildland/urban interface areas, (3) restructuring its budget to better ensure that funds are available for such reductions, and (4) proposing demonstration projects to test innovative approaches for reducing fuels. The Congress has supported these efforts by increasing funding for fuels reduction, authorizing demonstration projects, and authorizing a multi-year research program to better assess problems and solutions. However, these efforts are in a race against time and may fall short.
- These efforts may fall short because the Forest Service lacks a cohesive strategy for overcoming several barriers to effectively and efficiently reducing fuels on national forests. These barriers include (1) potential conflicts between fuel reduction efforts and other agency stewardship responsibilities, including protecting air quality, watersheds, and wildlife habitat; (2) program incentives that tend to focus efforts on areas that may not represent the highest fire hazards; (3) agency contracting procedures that are not designed for removing large amounts of materials with little or no commercial value; and (4) the high costs of such removals, which may be as much as several hundred million dollars annually.

Catastrophic Wildfires on National Forests Increasingly Threaten Nearby Communities

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. However, various human activities, but primarily the decades-old policy of suppressing fire in the national forests, have generally prevented fire from playing its historical role of limiting the forests’ density and clearing undergrowth and downed material.

Without frequent fires, vegetation has accumulated, many tree stands have become denser, and less fire tolerant tree species have become more

prevalent. (See apps. III and IV.) In these currently denser stands in the national forests of the interior West, many smaller dead and dying trees now form fuel “ladders” that conduct fire into the crowns of larger trees. Under these conditions, large, intense, and catastrophic wildfires have become increasingly numerous. For example, over the last decade, the number of acres of national forest lands burned by wildfires, more than 90 percent of which were in the interior West, has increased, reversing the trend of the previous three-quarters of a century. (See app. V.) Moreover, 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 total number of acres burned (including nearby lands) by 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 burned by them were in the interior West. According to the Forest Service, 39 million acres on national forests are now at high risk of catastrophic wildfire, and virtually all of these lands are located in the lower-elevation, frequent-fire forests of the interior West that are dominated by ponderosa pine. (See app. VII.)

In recent years, the number of people living along the boundaries of the national forests has grown rapidly. (See app. VIII.) As a result, the increasing numbers of larger, more intense fires pose grave hazards to human health, safety, property, and infrastructure. Not only have lives been lost, but because smoke from such fires contains substantial amounts of fine particulate matter and other hazardous pollutants, the fires can pose substantial health risks to people living in this wildland/urban interface. Catastrophic wildfires threaten not only human health, lives, and property, but also infrastructure vital to nearby communities. For example, the 1996 Buffalo Creek fire, which 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 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 that 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.

Finally, the growing number of large wildfires and acres burned—coupled with the increasing complexity of fire 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.¹ (See app. X.)

The Forest Service Is Attempting to Address Wildfire Threats

In recent years, the Forest Service has taken steps to address the increasing threat of catastrophic wildfires on national forests. 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 3 million by fiscal year 2005.² In 1997, the Chief of the Forest Service said the agency intended to implement this recommendation and that the agency planned 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.³ In fiscal year 1998, it announced that the funds appropriated for reducing fuels would be allocated to emphasize protecting communities at high-risk in wildland/urban interface areas. The agency has also (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.

¹Federal 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).

²Course to the Future: Positioning Fire and Aviation Management, U.S. Department of Agriculture, Forest Service (Washington, D.C., 1995).

³FY 1998 Budget Explanatory Notes for the Committee on Appropriations, U.S. Department of Agriculture, Forest Service (Feb. 1997).

The Congress has supported the Forest Service's efforts to reduce accumulated fuels by, among other things, increasing the funding for these activities in recent years. In addition, in acting on the agency's fiscal year 1998 budget, the House and Senate appropriations committees approved a restructuring of the Forest Service's budget 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 the Department of the Interior to begin a multiyear program, called the Joint Fire Science Program, to gather consistent information on accumulated fuels, methods of reducing them, the potential effects on other resources of these different methods, and their relative cost-effectiveness. The agencies currently lack adequate data in all of these areas and, in January 1998, the agencies issued a plan for conducting this research program.⁴ Moreover, as requested by the Forest Service, the Congress also authorized, in the agency's fiscal year 1999 appropriations act, demonstration projects for reducing accumulated fuels.

Many experts believe that these efforts by the Forest Service and the Congress are in a race against time. A 1993 assessment of forest health in the interior West, published in 1994, 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.⁵ More than five of those years have already passed. Furthermore, 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. Specifically, the agency's current and planned allocations of appropriated fuels reduction funding largely emphasize maintaining satisfactory conditions on lands in other regions of the country which currently have low levels of accumulated fuels so that conditions on these lands do not also become hazardous. Because maintaining current satisfactory conditions on these lands will require continued fuels reduction on about 1 million acres per year, only about two-thirds of the planned 3 million acre per year annual national fuels reduction effort will take place each year in the interior West, where virtually all of the most serious problems are located. As a result, as many as 10 million acres in the interior West may still have excessive fuel levels and may remain at risk of uncontrollable, catastrophic wildfire at the end of fiscal year 2015.

⁴Joint Fire Science Plan, Department of the Interior and U.S. Department of Agriculture, Forest Service (Washington, D.C., 1998).

⁵Assessing Forest Ecosystem Health in the Inland West, Forest Policy Center (Washington D.C., 1994).

The Forest Service, however, 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 may be able to 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 constructing fuelbreaks or implementing any alternative strategy to accomplish the same purpose. Thus, until the agency develops such a strategy, it will not have a basis for eliminating any current high-risk areas from its fuels reduction efforts or for assuring the Congress and the public that hazards to nearby communities will be adequately reduced.

The Agency Lacks a Cohesive Strategy for Overcoming Several Barriers to Reducing Accumulated Fuels

Several significant barriers must be overcome in developing a cohesive strategy to reduce wildfire hazards on the national forests of the interior West. The first of these barriers is that methods for reducing accumulated fuels can sometimes be difficult to reconcile with other legislatively mandated stewardship objectives, including meeting clean air and water quality standards and protecting threatened and endangered species. For instance, 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, winter snows limit the time available for burning, and dry summer weather creates a high risk that, given the massive levels of accumulated fuels, controlled fires will escape and become uncontrollable, catastrophic wildfires. Moreover, several officials and experts we spoke with believe that emissions from controlled fires on the scale needed to adequately reduce accumulated fuels 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.⁶ However, the use of timber harvesting to reduce fuels has been limited by concerns about its adverse effects on other stewardship objectives, including wildlife habitat and watershed conditions. 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 fuel 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.

A second significant barrier that must be overcome in developing a cohesive strategy is that both the timber sales management program and the fuels reduction program funded by appropriations currently contain incentives which tend to focus efforts on areas that may not present the greatest fire hazards. For example, under its fuel reduction program, the Forest Service's lone performance indicator measures the number of acres treated. Agency field staff told us that funding for forests often depends on their ability to contribute to the agency's annual acreage target. As a result, in order to reduce fuels on more acres, they often focus treatments on areas where the costs of reducing fuels are low, rather than on areas with the highest fire hazards, including especially wildland/urban interface areas. These areas often have significantly higher per-acre fuel reduction costs because greater care must be taken to avoid fire and smoke hazards of controlled burning, raising costs.

Additionally, while timber harvesting may make useful contributions to reducing accumulated fuels in many circumstances, reducing fuels with the funds allocated for timber sales management also results in 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.⁷ However, the agency continues to rely 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 focus on areas with high-value commercial timber rather than on areas with high fire hazards.

⁶FY 1999 Budget Explanatory Notes for the Committee on Appropriations, U.S. Department of Agriculture, Forest Service (Feb. 1998).

⁷National Summary: Forest Management Program Report for Fiscal Year 1997, U.S. Department of Agriculture, Forest Service, FS-627 (July 1998).

A third barrier is that the Forest Service's contracting procedures do not facilitate the removal of the large volumes of low-value material as is necessary to reduce accumulated fuels. 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 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 (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 contracting demonstration projects proposed by the Forest Service to demonstrate the role of timber harvesting in reducing accumulated fuels could proceed under the agency's existing statutory authority. This was because 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. In the fiscal year 1999 Omnibus Consolidated Appropriations Act, the Congress authorized the Forest Service, through fiscal year 2002, to enter into 28 individual project contracts under which (1) the value of the material removed may be used by the contractor to offset the costs of removal, and (2) there is no limitation on the value of the material to be removed. However, more general 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.⁸

The fourth barrier that must be overcome in developing a cohesive strategy for undertaking effective fuel reduction efforts is their high cost. Revenue generated by the sale of many excess fuel materials will not cover the costs of their removal. Agency officials and outside analysts agree that reducing accumulated fuels in the interior West may 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 the

⁸See 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).

agency's 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 is planning to spend only \$65 million for fiscal year 1999 to reduce accumulated fuels—or less than one-tenth of the annual level that may be needed to accomplish the agency's goal—and it has not developed an identifiable strategy or priorities for applying these funds, nor has it even identified the interface areas that are at high risk.

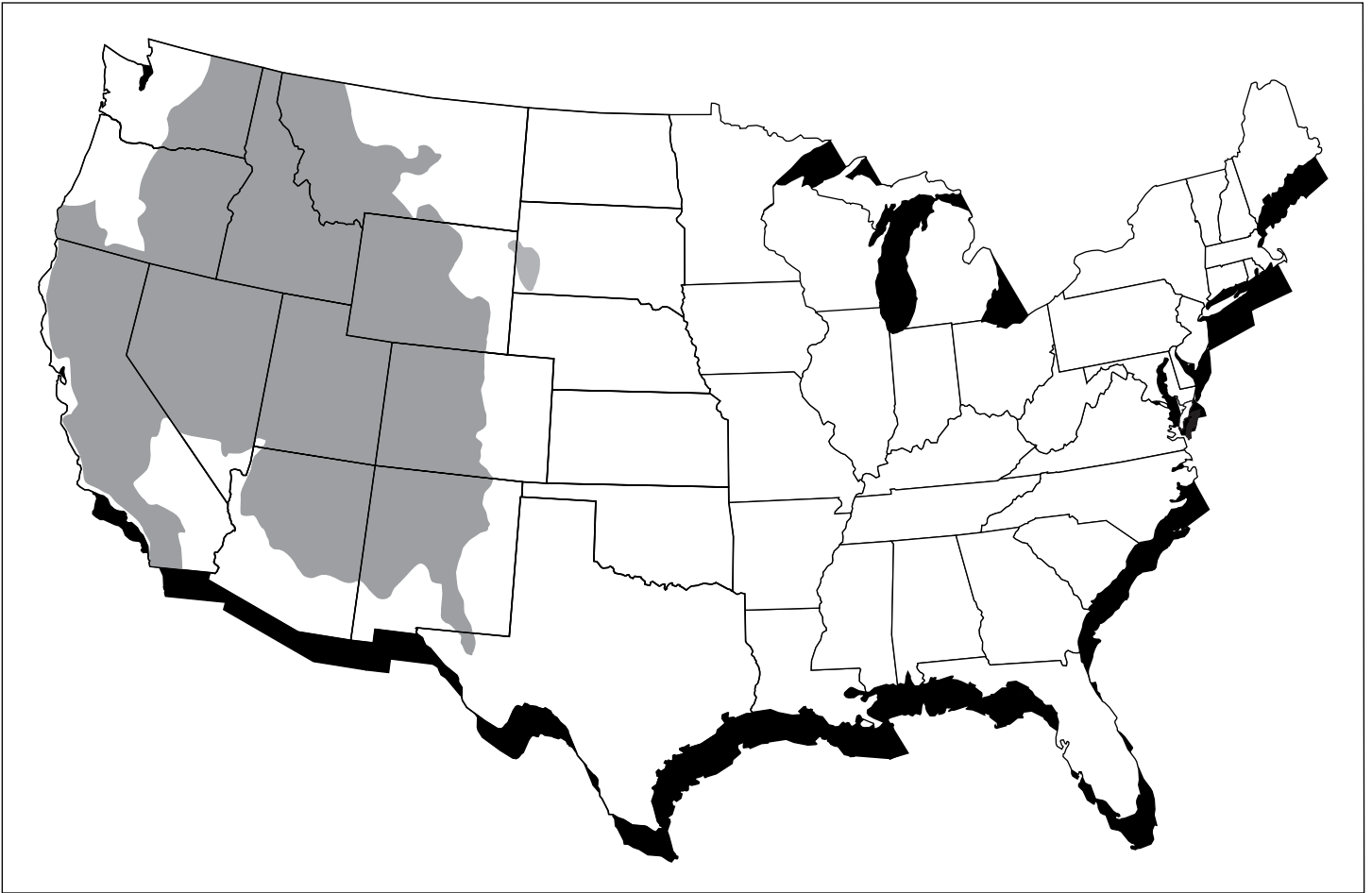
In conclusion, Madame Chairman, the increasing number of uncontrollable and often catastrophic wildfires in the interior West, as well as the significant costs to resolve the problem of increasing hazards to human health, safety, property, and infrastructure present difficult policy decisions for the 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 fuel reduction program? If enough funding is not appropriated, what priorities should be established? How can the need for reintroducing fire into frequent fire forests and conducting mechanical removals best be reconciled with the requirement to maintain air quality standards and fulfill other stewardship objectives? What changes in incentives and contracting procedures are needed to facilitate the mechanical removal of low-value materials?

Such decisions should be based on a sound strategy. However, the Forest Service has not yet developed a cohesive strategy for addressing several difficult barriers to improving the health of the national forests by reducing fuels. Developing a strategy will depend in large part on data being gathered under the Forest Service and Interior's Joint Fire Science Program which, as noted earlier, are directed at correcting these deficiencies. However, a Forest Service official involved in 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 in funds for fire suppression but also in lives and damage to human health,

property, and infrastructure than would undertaking strategic actions now.

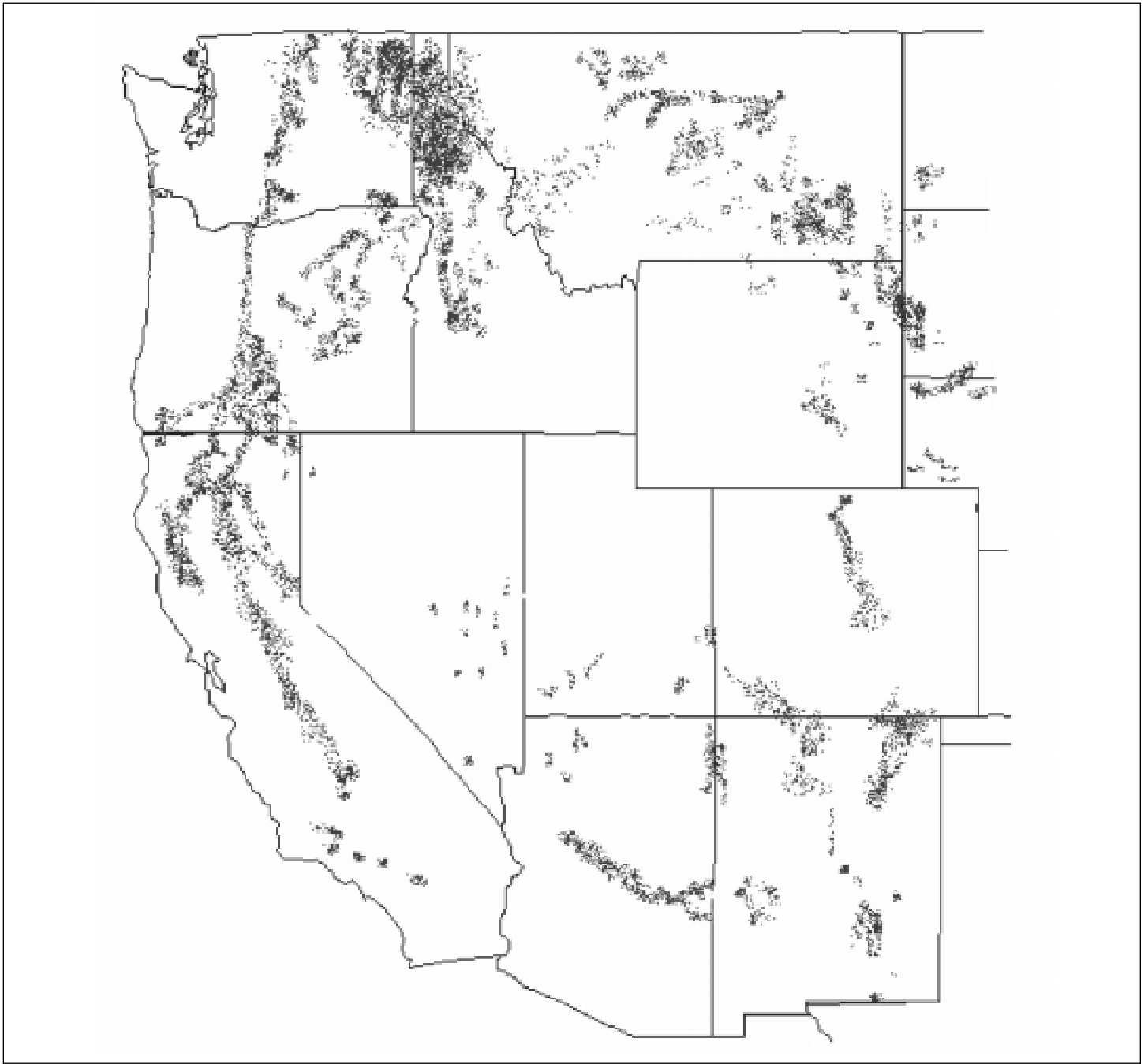
Madam Chairman, this concludes our prepared statement. We will be pleased to respond to any questions that you or Members of the Subcommittee may have.

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



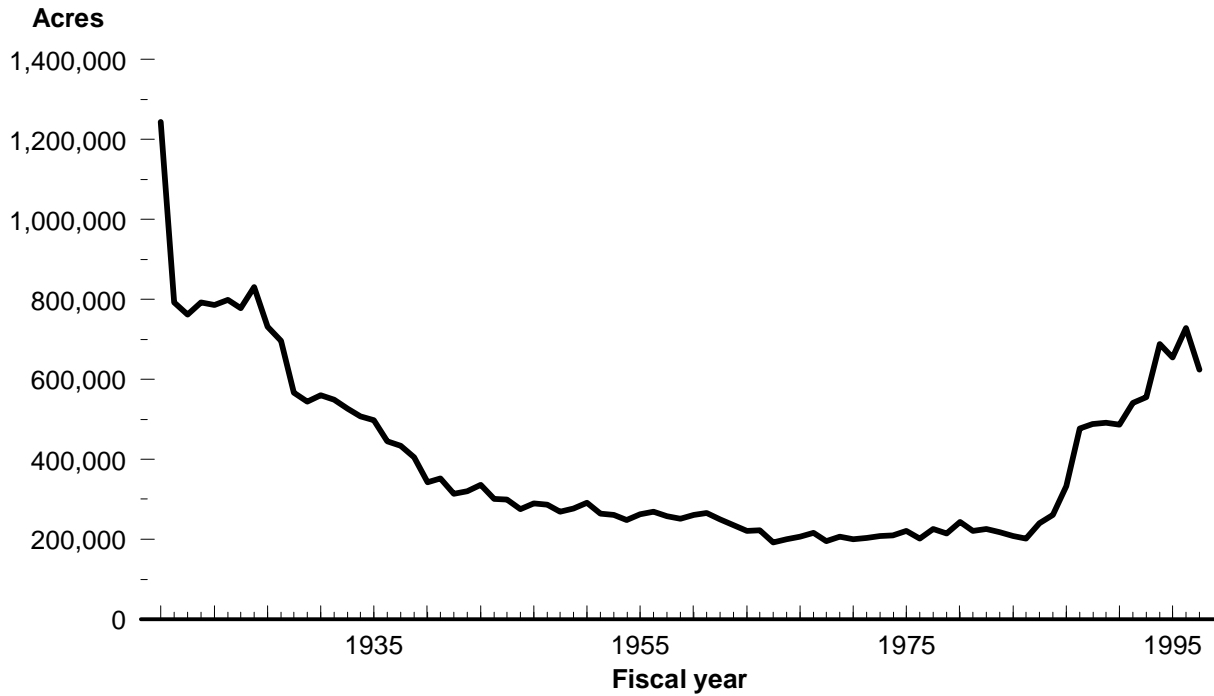
Source: Forest Service.

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



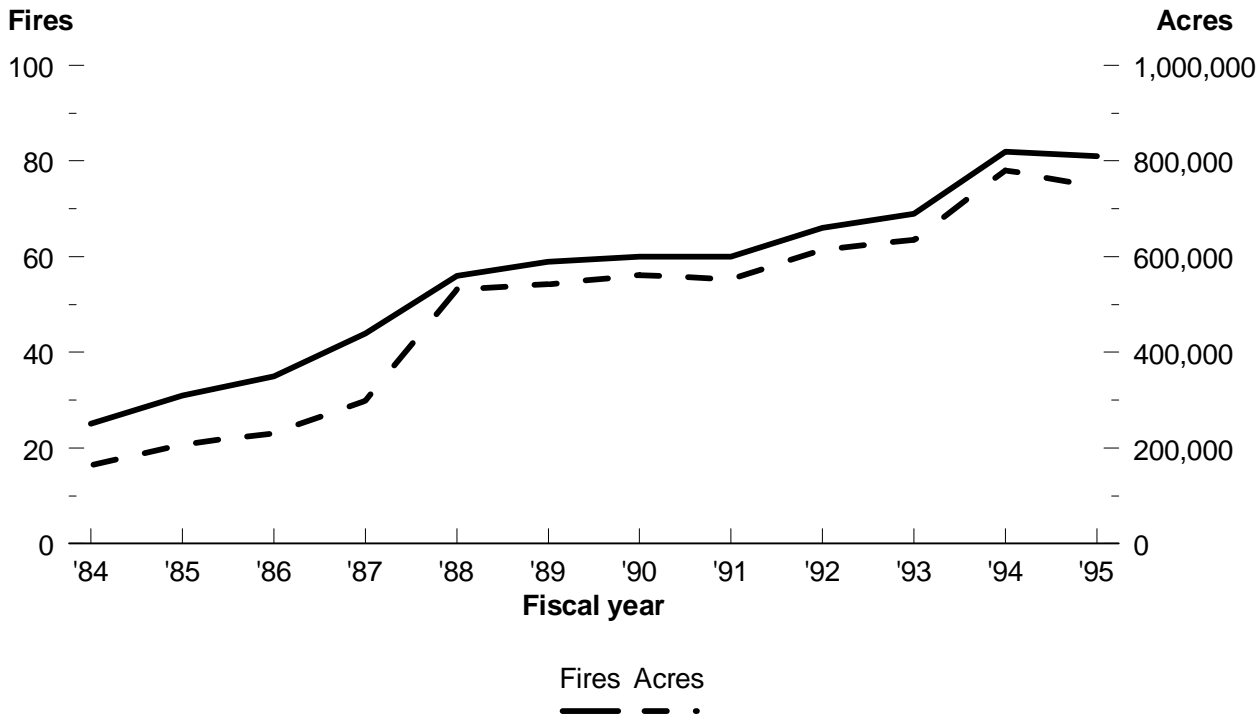
Source: Forest Service.

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.

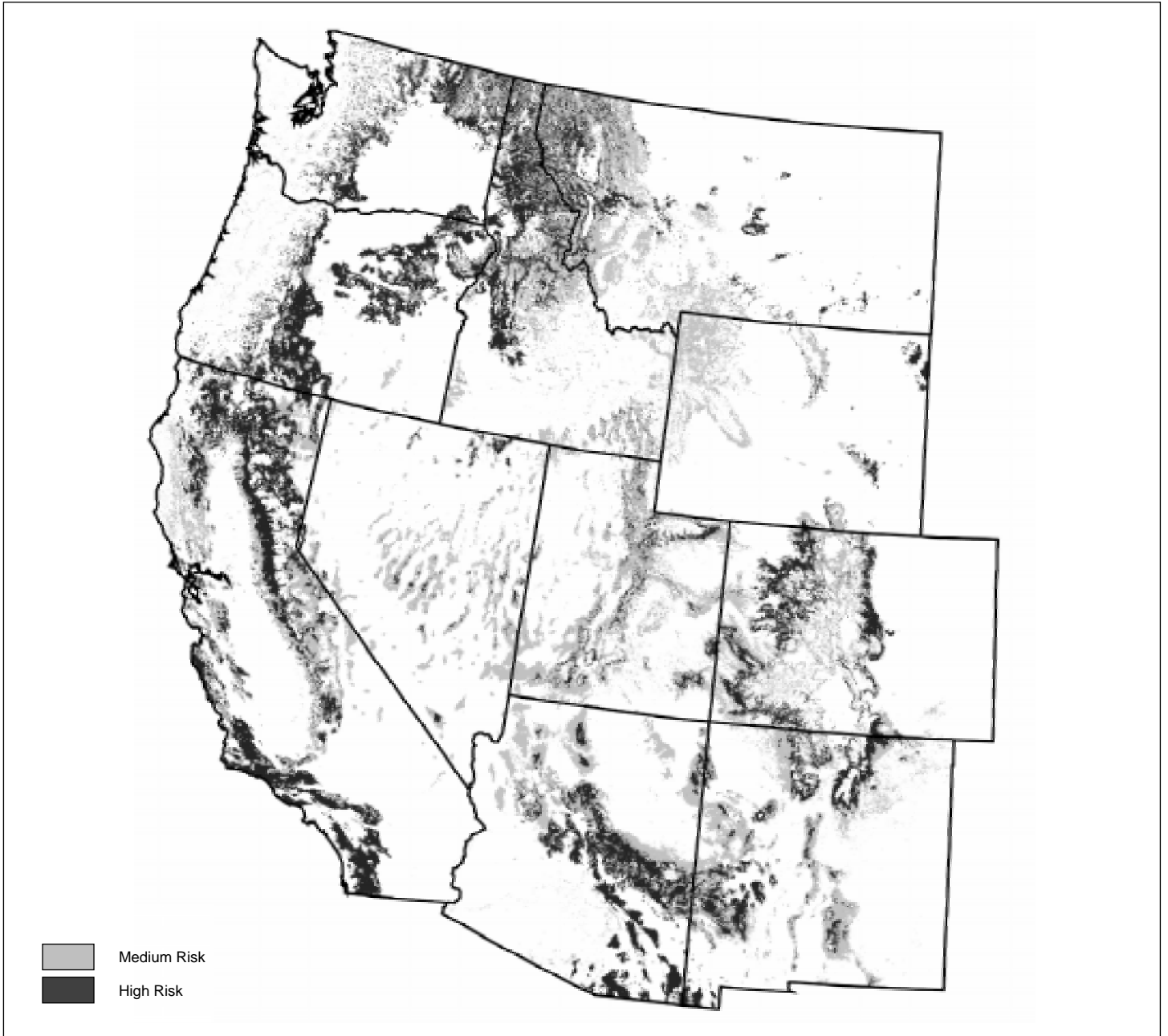
Number of and Total Acres Burned by Large Wildfires on All National Forests, 1984-95



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

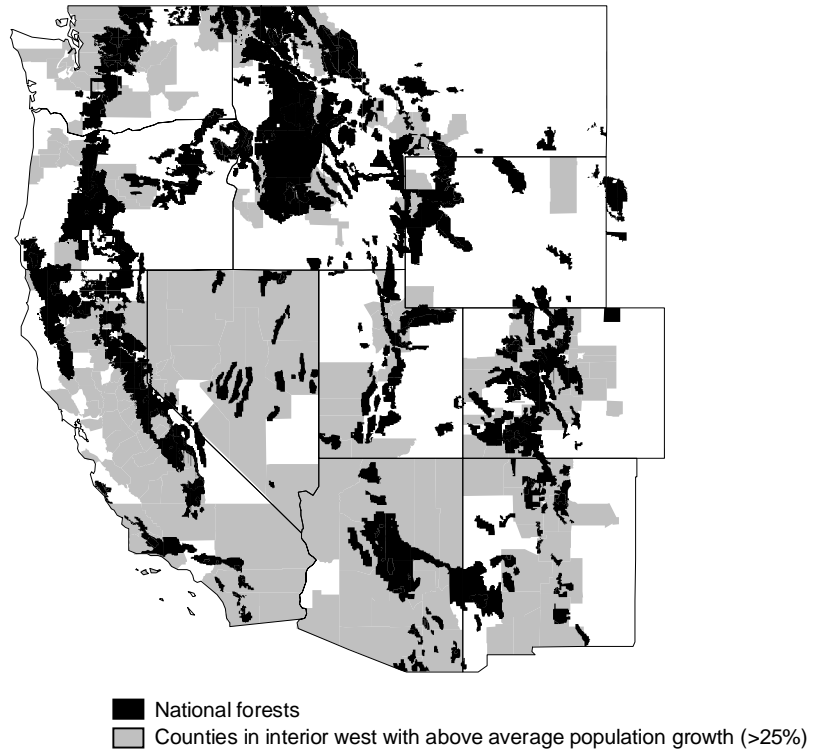
Source: GAO's presentation of latest data available from the Forest Service.

National Forest Lands at Medium and High Risk of Catastrophic Fire



Source: American Forests.

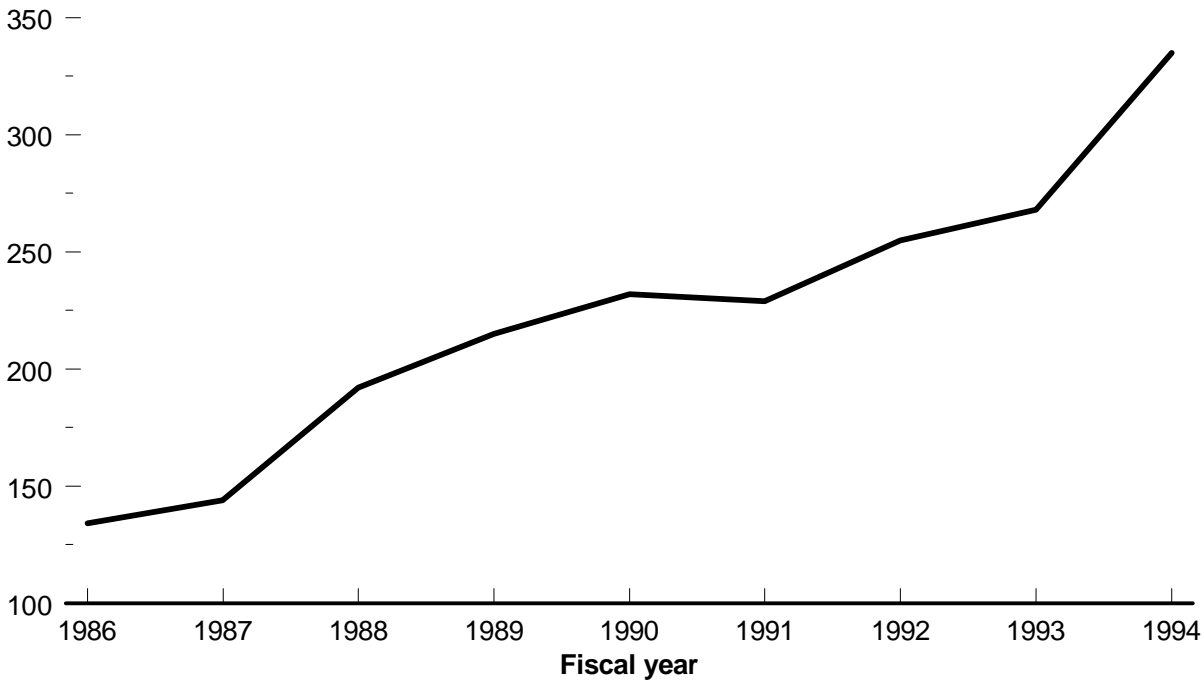
Population Growth in Relation to National Forests (1980-96)



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

Dollars in millions



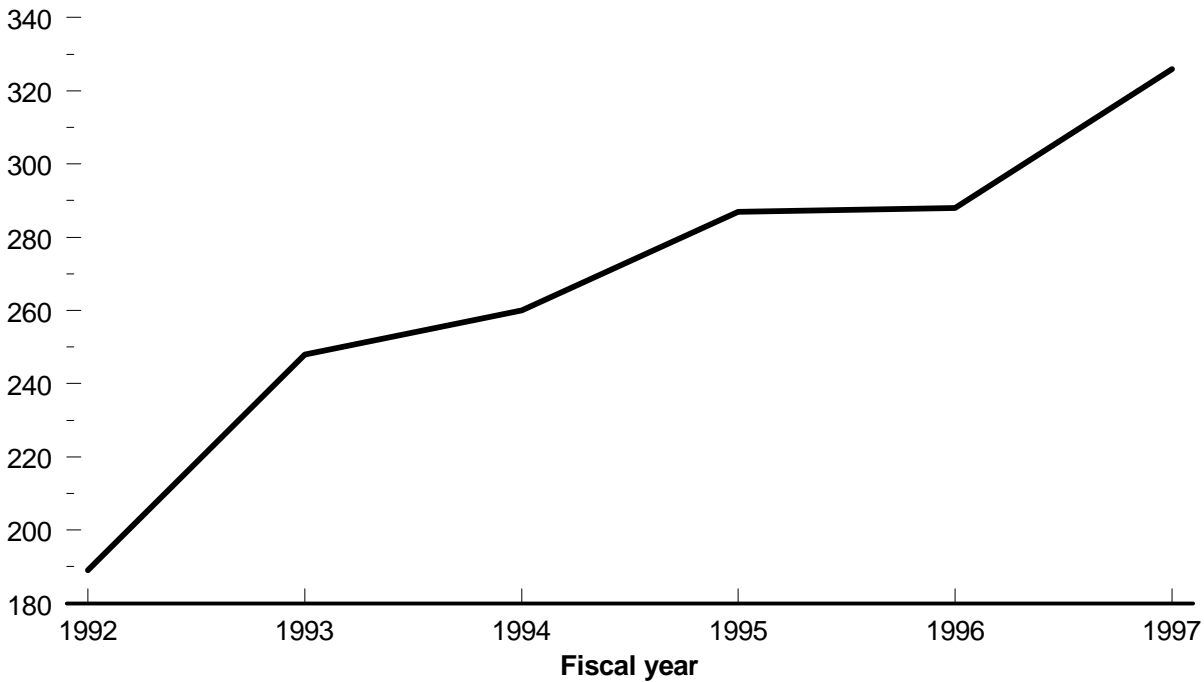
Notes: 1. The expenditures for each year represent the 10-year rolling average expressed in 1994 dollars.

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

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

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

Dollars in millions



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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