



CAPITAL

During five of the last eight years, the Forest Services' wildfire-suppression expenditures have topped \$1 billion. And states are feeling the heat. By Krista Gebert

The high cost of suppressing wildfires is taking a toll on federal and state agencies alike. Large wildland fires are complex, costly events influenced by a vast array of physical, climatic, and social factors. During five of the last eight years, the Forest Services' wildfire suppression expenditures have topped \$1 billion, and total federal wildland suppression expenditures have been more than \$1.4 billion. Wildfire suppression has become an increasingly larger part of an already constrained Forest Service budget, accounting for more than 40% of the budget in recent years compared to 10% to 15% in the 1990s. This means less money for other Forest Service land management programs such as fuels reduction, construction, land acquisition and resource management.

The state of Montana also is feeling the effects of extreme fire seasons and rising costs. In a special session of the state Legislature held on Sept. 5, 2007, Montana's lawmakers set aside \$42 million to pay for this year's wildfires and created a new \$40 million account to pay for future wildfires for the next two years while continuing to analyze the budgetary needs for wildfire suppression.

With each high-cost year comes a multitude of fire cost reviews, suppression cost studies by federal oversight agencies, and new rules and regulations focused on containing or reducing suppression costs. But the question remains: What is causing the rising cost of suppression and what, if anything, can be done about it?

"Suppression Expenditures, Acres Burned," at right, shows the trend in Forest Service suppression expendi-

tures and acres burned over the past 35 years and illustrates well the problem facing the land management agencies. Suppression expenditures shown have been adjusted for analysis purposes to maintain consistency in the types of expenditures over the period and so may not match other published figures.

For fiscal years 1971–1986, suppression expenditures for the Forest Service averaged around \$200 million per year (all dollar figures are expressed in constant 2006 dollars). The year 1987 was used as the splitting point for the analysis because statistical tests indicated that a structural change in acres burned and suppression expenditures occurred at that time.

The annual average increased to \$600 million for the period 1987–2006, and it has climbed even higher in the past 10 years to an average of \$800 million per year.

The figure also illustrates, this same pattern holds for the number of acres burned in large Forest Service fires (those greater than or equal to 300 acres) with large increases in both the magnitude and year-to-year variation in acres burned occurring in the past two decades. In fact, acres burned and suppression expenditures are closely correlated, so accurate predictions of

how many acres would likely burn in an upcoming fire season would greatly aid in predicting upcoming fire expenditures for budgetary projections. The increase in suppression expenditures appears to be related to this increase in acres burned and not a per-acre increase in suppression expenditures. The trend for average per-acre expenditures did not increase over this period (see "Expenditures per Acre Burned," page 27.).

This tie between acres burned and suppression expenditures means that to understand why the total cost of suppressing wildfires is rising, it is important to try to understand why the amount of area burned by wildfires has been increasing in the past two decades.

Research has linked drought, rising temperatures, earlier melting of snowpack, and fuel buildups due to past fire suppression to the extreme fire seasons of recent years. These are undoubtedly important factors that have been contributing to the upward trend in expenditures and the yearly variations. However, conditions alone are not enough to cause wildfires; an ignition source is also necessary, either human or natural. Figure 3 illustrates this point. It shows suppression expenditures versus the average spring-summer temperature for the Northern Region of the Forest Service (Montana, Northern Idaho, and parts of northeastern Washington, and North and South Dakota). Below a certain threshold (15° C or 59°F), suppression costs generally fall below \$50 million. However, once the threshold has been exceeded, suppression expenditures range from as low as \$25 million to as high as \$350 million.

Though the increase in acres burned and variation in climate and weather patterns from year to year helps explain the increase in total wildfire suppression costs, they don't give the complete picture. Even after accounting for these factors, there is still a systematic upward trend in total expenditures — increasing costs not accounted for

by differences in acres burned. So what other factors are adding to the increasing costs of suppression?

One factor often blamed for the recent increases in suppression costs is a more complex firefighting environment due to expanding private development within the wildland-urban interface. In the current wild-fire environment, private resource values and public infrastructure are frequently the strategic drivers of suppression decisions both from a values-at-risk standpoint, and often, more importantly, a political standpoint. Structures, specifically homes in the wildland-urban interface, are among the most obvious values-at-risk from wildland fire. Threatened structures significantly influence suppression decisions and are potentially the most difficult, dangerous, and expensive resource to protect. In a recent report, the Office of the Inspector General stated that 50% to 95% of expenditures are directly related to protecting private property and homes in the wildland-urban interface. These estimates, however, were obtained through interviews with a small number of fire managers and were not quantitatively derived.

Some recent research studies, however, have found evidence of the link between increasing values at risk, especially in terms of private property and suppression expenditures. In a study designed to estimate Forest Service

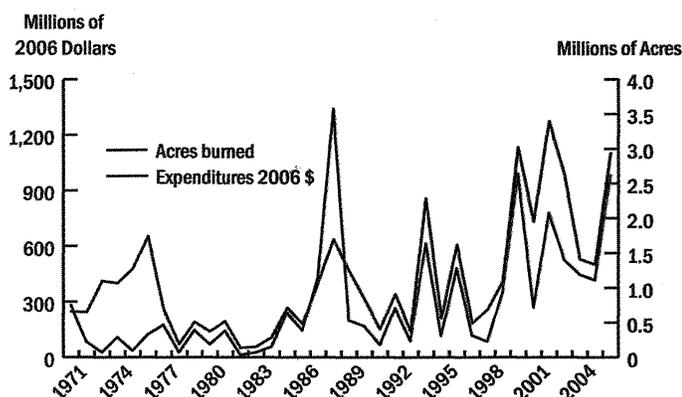
suppression expenditures, Gebert et al. (2007) found that higher home values within 20 miles of a fire ignition are related to higher suppression expenditures for individual large fires (those greater to or equal to 300 acres). In a study of recent large fires in the Northern Region of the Forest Service, Liang et al. (in review) found fire size and private land to have a strong effect on suppression expenditures.

Human factors, largely ignored in both research and administrative studies, also contribute to cost differences among fires and may be contributing to rising costs of suppression. In a recent study, the researchers conducted 48 in-depth interviews with Incident Management Team command and general staff members from all federal agencies and geographic areas to gather their impressions of the factors that affect costs on large wildland fires. This study highlights several factors associated with the human aspects of wildland fire fighting that are believed to be adding to the costs of suppressing wildfires.

In the views of those interviewed, there is an increasing tendency toward risk aversion on the parts of both Incident Management teams and agency administrators. Reasons given by many interviewees for this change were:

- 1] Increasing agency safety concerns,
- 2] Perceived lack of agency support with accompanying increased risk of personal liability, and

Suppression Expenditures, Acres Burned



3] Excessive rules and regulations.

Increased risk aversion may lead to higher costs because it is less risky to throw resources at a fire than to withhold resources in an attempt to control costs and then have the fire get out of control.

The dwindling experience level of agency administrators (the district

ranger or forest supervisor) is also seen as leading to an increase in risk aversion. Interviewees stated that agency administrators with little or no experience with wildland fire tend to be more risk averse and want to use more resources than perhaps necessary to avoid possible bad outcomes. The trend toward agency administrators with

little or no fire experience was seen as growing because fire suppression is no longer viewed as part of an employee's job as it was in the past. Therefore, administrators now coming up through the ranks don't have the fire experience that their predecessors had.

Another major factor seen as increasing the cost of many large fires is pressure from those outside the agency concerning the types of resources or firefighting strategy to use on a particular fire. Although Congress and government-oversight agencies put pressure on the land-management agencies to constrain the costs of fighting fires, it is often a matter of "not in my backyard." Local politicians, when faced with wildfires in their own district, often exert pressure on the teams to use resources, strategies, or tactics that interviewees suggested would not have normally been used and that, in many cases, they knew would be ineffective.

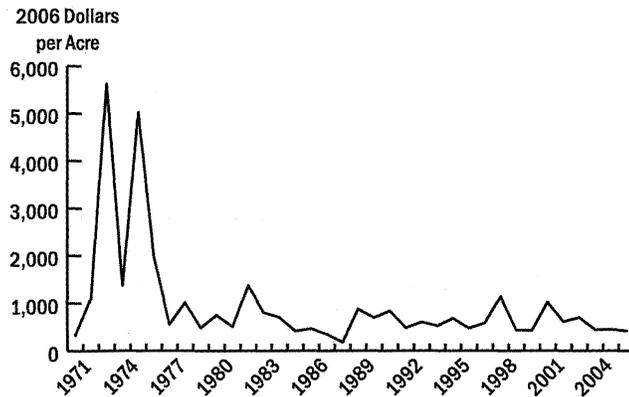
Resource constraints, particularly regarding human resources, are also taking their toll on the ability to control the costs of suppression efforts.

First, is the recent centralization of Forest Service budget and finance personnel. These personnel, who have been moved out of regions and forests and into the Albuquerque Service Center in New Mexico, are unavailable for fire assignments. This leaves the teams fighting the fires with unfilled finance positions that are needed to help monitor the costs of fire.

Second, there is a decreasing availability of employees to serve on teams due to the changing culture of the agency, increased risk of personal liability, and reluctance on the part of supervisors to release employees for team assignments. This reluctance stems from shortages of personnel for accomplishing necessary non fire-related work and meeting agency performance targets.

Finally, and perhaps most importantly, is the retirement of experienced fire personnel, with most command and general staff team members nearing the ends of their careers. Due to

Expenditures per Acre Burned



some of the issues noted above, there is a large shortage of replacement personnel with sufficient fire experience. Many interviewees predicted that as federal agencies increasingly lose their fire suppression capabilities, costs will increase, and, once lost, these capabilities may be difficult or impossible

to restore. Other issues raised during the interviews include increasing use of contracted resources, which are viewed as more expensive and of lower quality in many instances, and substantial increases in technology and associated expenditures.

So what, if anything, can be done to

stem the tide of rising expenditures? Though the federal land management agencies cannot control the weather or climate, they are taking steps to try to affect some of the other factors contributing to the surge in suppression costs. Mentoring and certification programs have been established for agency administrators who lack wildland fire experience. Also, efforts are underway to institute greater oversight and accountability of fire suppression expenditures. The Chief's Principal Representative Program has been developed and is being implemented for the first time during the 2007 fire season. The program's intent is to improve national oversight of certain fires, conserve resources during the wildfire season, and increase application of a national perspective on resource allocation to incidents. A new wildland fire decision support system is also being developed and will be tested

this summer. The new system provides agency administrators and Incident Management Teams with spatially explicit information on fire spread probabilities and values at risk, as well as estimates of suppression expenditures, to aid in decision-making.

Community fire plans intended to mitigate wildfire risks are being developed and implemented throughout the country. Included in their action plans are capacity building for local fire departments, hazardous fuel reductions in the wildland-urban interface, and restoration of fire-adapted ecosystems. Successful implementation of these plans may help agency administrators and Incident Management Teams feel more comfortable pursuing limited rather than full suppression objectives, which could reduce suppression costs.

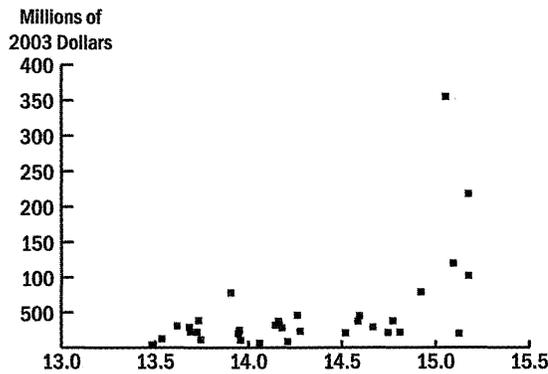
The federal firefighting agencies are also recognizing that current firefighters' ability to react to complex

and dangerous incidents is becoming compromised by burgeoning rules and regulations associated with safety and cost containment objectives. Therefore, steps are also being taken to simplify the sets of rules and regulations firefighters are expected to observe. In 2005, interagency participants were brought together at the Pulaski Conference to develop a foundational doctrine for fire suppression. This doctrine was intended to be "definitive enough to guide specific operation, yet adaptable enough to address diverse and varied situations" characteristic of wildland firefighting. The implementation process has begun, and Forest Service manuals related to fire suppression are currently being revised to incorporate foundational doctrine principals. Efforts are also under way to improve oversight of contract resources and more closely monitor contract development and implementation.

Perhaps the most difficult problem to address is that of the increasing population within the wildland-urban interface. Whose job it is to protect property within the wildland-urban interface is a controversial subject that is not easy to resolve. In a recent report, the Office of the Inspector General recommended having non-federal entities pay an equitable share of wildfire protection costs, stating that:

The [Forest Service] perceives states as unwilling to voluntarily expand their protection responsibilities to include a greater share of WUI protection costs and because political and public expectations compel [the Forest Service] to make protecting property its highest priority. Consequently, [the Forest Service] has borne much more than its share of the expenses associated with fighting wildfires, which causes its costs to escalate while losing valuable natural resources in favor of private structures.

Northern Region Expenditures Vs. Average Temp



Increasing the share of suppression expenditures spent by the state and local governments would decrease the amount of federal spending on wildfire suppression. However, unless the current trend in spending changes, it would only transfer the burden from the federal to state and local governments. If, because of this transfer,

tighter zoning regulations were passed that make it harder or more expensive to build houses in the wildland-urban interface, the behavior of people building the houses or of the companies insuring such houses could change, thus having an effect on overall spending for structure protection. However, it is unclear whether state and local

governments are willing or even financially able to increase their shares of suppression expenditures. The issue of whose responsibility the fire is if it starts on federal property and then crosses over onto state, private, or local lands is unclear at best.

Though steps are being taken to address some of the issues connected with the rising costs of suppression, severe wildfire seasons seem to be becoming the norm rather than the exception. The challenge for the land management agencies, whether federal or state, is learning to deal with these fires in a cost-efficient and equitable manner, somehow balancing the concerns of both the federal oversight agencies and society. **W**

Krista Gebert is an economist with the U.S. Forest Service Rocky Mountain Research Station. This article is reprinted with permission from the Montana Business Quarterly.