TESTIMONY

TO THE SUBCOMMITTEE ON FORESTS AND FOREST HEALTH, COMMITTEE ON RESOURCES, U.S. HOUSE OF REPRESENTATIVES

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Thank you

Thank you for the opportunity to testify on this important topic. We hope that the discussion today will encourage and support the federal fire managers in addressing the growing fuels and fire risk problem across the country. Following a brief summary of our expertise, we make four major points and then some recommendations.

Our expertise

We speak from our experience as researchers in fire ecology and teachers of fire management. Dr. Neuenschwander is a professor the College of Natural Resources at the University of Idaho with more than 25 years of experience since earning his Ph.D. at Texas Tech University. He has taught prescribed fire, fire ecology and fire management. He has been recognized with both national and state awards for his innovative research on prescribed fire and managing fire risk. Dr. Morgan is also a professor at the College of Natural Resources at the University of Idaho. She is an expert on fire ecology and succession in forests of the Interior West. Over the last 20 years, she has taught fire ecology, fire management and prescribed burning to students at the University of Idaho and the University of Arizona, as well as to practicing natural resource professionals. Dr. Swetnam is an Associate Professor at the University of Arizona where he directs the internationally recognized Laboratory of Tree-Ring Research. He has done extensive fire history work throughout the western United States, and was born and raised in the Jemez Mountains of New Mexico, not far from Bandelier National Monument. All three of us often advise federal and state agencies, nongovernmental agencies and environmental organizations about fire risk, prescribed fire, fire effects, and land management issues.

Four main points

We extend our sympathy to the people who have lost their homes and been threatened by fires. Losses from the Cerro Grande fire are intolerable – clearly there is a problem to be addressed. We owe it to those people and to those of future generations, to learn from recent fire events and to work together proactively to address fire risk. Thus, as we look to the future, we wish to make four main points.

First, wildfires will continue to threaten people and their property throughout the West. More homes WILL be lost. The only question is WHEN? Unless we adjust the forest conditions to reduce the accumulated fuels, the risk to people and their property will continue. Further, intense fires can threaten ecosystem integrity, water quality, and long-term productivity of our forests. The problem is widespread, but differs greatly for the diverse, and complex forest and non-forest ecosystems of the United States.

All conifer forests have a history of fire. Fire frequency varied greatly, but fire history data show that throughout the West, fire was a frequent visitor. Wherever the rate of biomass production exceeds decomposition, the accumulated biomass fuels fires ignited by lightning or people whenever it is dry. Fires consume fuels, thus recycling nutrients and encouraging new plant growth. Fires also alter the structure and composition of forests, thereby reducing the risk of catastrophic wildfire and protecting human life and property, timber, water quality, fish and wildlife habitat, and long-term air quality. Thus, fires are an integral part of many forest ecosystems, and they play important ecological roles.

Excluding fires forever is not an option. Fires will inevitably occur when we have ignitions in hot, dry, windy conditions. If there is fuel to burn, it will burn intensely. It is one of the great paradoxes of fire suppression that the more effective we are at fire suppression, the more fuels accumulate and the more intense the next fire will be. We MUST learn to live with this reality. We should seek to maintain and manage for the forest structures and species compositions that are resilient to future fires. Compared to crown fires, low-intensity, surface fires kill few big trees and pose less risk to people and their property. In fact, many surface fires stimulate grasses, forbs and shrubs to grow in abundance; these plants hold the soil in place when the rains come. Understory plants can be slow to recover from severe fires, particularly if it was a dense forest that burned. Without abundant understory plant cover, soils are prone to erosion, particularly where they have been subjected to severe soil heating. Intense fires and the soil losses they triggered are without historical precedent in Southwestern ponderosa pine forests before the late 20th century.

The question then is how to create forests that are both resilient and resistant to fires – ones where the big trees will survive and the understory plants (those shrubs, forbs, and grasses) will rapidly recover. In many, but not all cases, this requires active management – actively cutting small trees or burning accumulated fuels to alter forest structure. Active management can include prescribed burning, logging, or a combination. This brings us to our next point.

Why ignite prescribed burns?

In fire-dependent ecosystems, like the ponderosa pine forests of the American Southwest, periodic prescribed fire…

- Reduces accumulated forest debris and small trees, thereby reducing the risk of catastrophic wildfire and protecting human lives and important resources such public and private property, timber, water quality, fish and wildlife habitat, and long-term air quality.
- Kills small trees, prunes lower branches and favors large trees, thereby creating open forests and a more fire-safe environment for forest visitors and inhabitants.
- Recycles nutrients and water tied up in forest litter, thereby naturally fertilizing surviving plants.
- Rejuvenates grasses and shrubs, thereby improving wildlife forage.
- Often enhances structural and species diversity
- Enhances the survival of large trees currently threatened by competition from dense small trees and by crown fires fueled by small tree “ladder fuels”
- Restores the natural role of fire as an ecological process and the historical structure and function of fire-dependent ecosystems where fire has been suppressed, thereby maintaining natural forests.

Our second main point is that logging and fires have very different ecological effects, and therefore logging alone cannot be used as a sole alternative to prescribed burning. We can mechanically thin overly dense forests to approximate the structure and composition created and maintained by fires in the past. However, recycling of nutrients and many other ecosystem functions depends upon fires. Cutting of trees – whether it is termed "logging" or "thinning" – cannot adequately substitute for the many ecological benefits of fire. For example, logging does not rejuvenate grasses, forbs, and shrubs in ways that will favor soil and water retention. Prescribed fire alone, without tree cutting, can be used in many circumstances, particularly in large roadless areas, parks, and wilderness areas where human lives and properties are not at direct risk from spreading or escaped fires. Indeed, economical, practical and politically acceptable treatments in such areas are most likely to be accomplished with judicious and patient treatments with prescribed fire alone over periods of decades. Elsewhere, mechanical treatments will have to be done first in order to allow the burns to be conducted safely and to accomplish desirable ecological effects.

Let us share with you some graphics representing forest conditions with and without active management. These will illustrate the choices before us. (Please refer to the boxed text and the series of figures at the end of our testimony).

This is our third major point. It is VERY IMPORTANT to leave the large trees in the forest when we thin or burn. These trees are the "insurance" for the future – they are critical to ecosystem resilience. Foresters call the needed prescription "thin from below" because it removes the smaller trees and their crowns while leaving the bigger trees. As you can see from our second to last figure, forest stands often have high bulk density of crowns both near the treetops and near the ground. Bulk density is the weight per volume of the needles and twigs in tree crowns. If there are few tree crowns (low bulk density) near the ground and there is little vertical continuity between the crowns of the small and big trees, forests can often withstand surface fires even in dry, windy conditions. This will limit the development and spread of crown fires, particularly if the horizontal continuity of the crown bulk density in the principal canopy layer is also broken. It is the small trees that contribute the most to fire risk, as they provide "ladders" for the fires to climb from the surface into the crowns.

The increasing fuel load and fire ladder effect that has placed forests at risk to catastrophic fire is in the smaller, not the larger trees. In the Southwest, U.S. Forest Service data indicate that trees greater than 16 inches in diameter have been declining in number at least since the 1960s, while smaller trees have increased dramatically in density. Trends are similar in other regions. U.S. Forest Service, U.S. Fish & Wildlife Service, and university biologists have determined that trees 16 inches and greater are important for sensitive wildlife species such as the northern goshawk. Targeting thinning toward the smaller trees and leaving both large trees and snags standing, therefore, addresses the core of the fuels problem, without degrading ecosystem integrity. This approach is in line with a 1999 Government Accounting Office report that recommended thinning to reduce fire hazards, but warned that it must be integrated with wildlife, soils, watershed, and recreation needs. It is also in line with the recent request by Mike Dombeck, Chief of the U.S. Forest Service, for an emergency appropriation to thin small trees and conduct prescribed burns throughout the West. His proposal would direct action to areas with the greatest fuel loading, greatest threat to human life and property, and would preserve all trees over 12 inches in diameter.

Our fourth and last major point is the need to improve the planning and scheduling of prescribed burning through the use of new scientific understanding of climate and fire occurrence. Regional fire events related to droughts, for example, have been a recurrent phenomenon across the western United States over many centuries. In the 20th century, fire-fighting resources were stretched thin during these events (e.g., 1956, 1971, 1973, 1974, 1988, 1989, 1994), allowing some fires to achieve enormous sizes and intensities. Many of these conflagrations defied all fire fighting efforts and burned until fuels or weather limited them. Such events often account for a majority of the total area burned over time, and resource losses, as well as threats to people and their property (see our last figure).

Seasonal climate forecasting tools based on El Niño/La Niña patterns are now available for anticipating regional precipitation and temperature trends --

and associated regional fire years -- more than three months before the spring and summer wildfire season. Wet/dry cycles occurring on time scales of months and years are involved in fire occurrence patterns in many parts of the semi-arid West – not just short-term weather changes. For example, most of the largest Southwestern fires in 20th century occurred during dry La Niña conditions that followed, within a few years, a wet El Niño event. According to Dr. Thomas Swetnam, a fire history expert from the Laboratory of Tree-Ring Research at the University of Arizona, this pattern is evident in Southwestern tree-ring records for the past 300 years. (Note that El Niño and La Niña events tend to have an opposite effect on precipitation and temperature in the Pacific Northwest relative to the Southwest, as shown in our last figure. Hence, during La Niña years, increased fire activity is expected in the Southwest and decreased fire activity in the Pacific Northwest. Although these broad-scale patterns are not entirely consistent, they are still useful at regional to national scales for strategic allocation of fire fighting resources and for scheduling of prescribed burning.)

The current extraordinary wildfire situation in the Southwest corresponds precisely to this historical pattern of extensive wildfires during La Nina conditions (1999-2000) that have followed within three years a major El Niño event (1997-1998). The high fire hazard this season in the Southwest and Florida was forecasted and discussed by climatologists, meteorologists, and regional fire managers from the western U.S. and Florida in a meeting in Tucson, Arizona in February of this year. This forecast apparently had little impact on the planning for prescribed burning because such long-term and broad-scale conditions are not regularly incorporated in prescribed fire planning procedures. There is clearly a need, however, to factor in current and anticipated climate patterns when planning for increased or decreased emphases on prescribed burning versus fire suppression capabilities for specific fire seasons and regions.

Our recommendations

We need an aggressive program of fuels management including BOTH prescribed fire and mechanical treatments. A natural reaction in the aftermath of the Cerro Grande fire is to sharply limit prescribed burning for fear of other escaped fires threatening people or their property. There are many places where the economic and ecological costs of mechanical treatments are not needed prior to prescribed burning. Whether the fuels are reduced mechanically, by prescribed burning, or by use of both tools, enough of the small trees and accumulated fuels must be removed to accomplish the objective, BUT THE LARGE TREES SHOULD REMAIN UNCUT.

There is an urgent need throughout the West for “fire-safe” forests, especially in urban-interface areas and in municipal watersheds. In “fire-safe” forests, fires can burn with low fire intensity, trees are fire-resistant by virtue of their diameter and species, and there is a low probability that crown fires will spread through the forest.

Federal land managers must listen to and work with the public and the many stakeholders to ensure sound decisions that balance ecological, economic, and social risks. The job of the federal fire managers is challenging. More than 30 million acres are at risk to catastrophic fires across the continental US, according to a recent General Accounting Office report. Decisions must include consideration of past changes in land, the choices before us, and the consequences of inaction.

No amount of training can overcome poor judgement in prescribed burning. Good judgement comes with experience in planning, conducting and evaluating prescribed burns, especially local experience, as well as from adequate training. We recommend that federal fire managers review and strengthen prescribed burn training programs, work to develop professionals that are both skilled and experienced with prescribed burning, and ensure that when specific plans for prescribed burns are written that they are reviewed by competent senior-level prescribed fire experts before the fires are ignited.

We recommend that Geographic Information Systems be used in planning for both prescribed burning and fire suppression to address ecological, social, and economic concerns. Very few people within the federal agencies are trained to do landscape-level fuel treatments. To be effective fuel treatments must be strategically placed on the landscape where they will do the most good, and they must be large enough to make a difference. Further, every treatment must consider long-term and broad-scale conditions not regularly incorporated in prescribed fire planning procedures.

Federal fire managers must think strategically, using what we know about drought and climate to identify when prescribed burns can be conducted safely. For instance, in the Southwest, we can use the forecasts of winter and spring precipitation to decide whether to concentrate on fuels management or on fire suppression, as we described above. Strategic thinking requires looking at the bigger picture – beyond the boundaries of the area to be burned.

Last, we must be careful not to jump to the conclusion that the same kinds of treatments are needed everywhere. There are no simple answers, so single kind of management is called for everywhere. The ecological integrity of many forest, shrubland and grassland ecosystems is threatened by the combined effects of past fire exclusion, fire suppression, past intensive grazing, past logging practices, and ongoing climate change. Restoring ecological integrity will require thoughtful planning to ensure management that is ecologically appropriate and socially acceptable. Fire suppression, logging, prescribed fire, and other treatments have their place in managing forests and fuels, but they are not cure-alls for all circumstances. Federal land managers need all of these tools and more available to manage public lands.

Thank you, this concludes our testimony.

Comparing fire effects in forests subjected to logging, thinning, and no fuels management

These figures will illustrate the choices before us. They were produced by Calvin Farris, using the Forest Vegetation Simulator.

Plate 8. This is a dense forest that developed where fires historically occurred every 15 years, but fires have now been excluded for more than 70 years. In this forest, the tallest and oldest trees are ponderosa pine. The smaller and more abundant Douglas-fir and grand fir are less fire-resistant than ponderosa pine. This illustrates a typical acre in forests near McCall, Idaho, but forests like these are widespread in the West.

Plate 9. Here is the same dense forest following wildfires. The fires climbed up through the vertically continuous fuels (the fuel “ladders”) into the crowns of the largest trees, killing them all. All trees have died.

Plate 10. Here the same dense forest shown in Plate 8 has been subjected to logging that removed the largest (those >20 inches in diameter) and highest quality trees from the stand. In the past, this logging practice was common, and has contributed to the condition of many forests over the West -- forests choked with densely packed small trees.

Plate 11. If the forest shown in Plate 10 burns, fires kill the majority of the trees. Because they are small, even low-intensity fires often kill the shorter, smaller-diameter trees. Crown fires that developed when surface fires raced up the fuel “ladders” made by the smaller trees killed the remaining larger trees.

Plate 12. Restoration thinning has greatly reduced the risk of crown fires in this forest. The same stand in Plate 8 has been subjected to “thinning from below” that removed many, but not all, of the trees less than 20 inches in diameter. Notice that the crowns are no longer vertically continuous – the ladder is broken.

Plate 13. This forest can readily withstand fires. This forest is now both resistant and resilient to fire occurrence. Most of the larger trees survive surface fires. Crowns are no longer continuous vertically or horizontally (at least between groups of trees).