Testimony of
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Chairwoman Chenoweth-Hage and Chairman Hansen, distinguished members of the committee, it is a privilege to have the opportunity to present my testimony to you today.

I will present a discussion of wildland fire and the benefits and risks associated with the different methods used to reduce fire hazard in coniferous forest and in the urban-wildland intermix.

Current forests in many fire-dependent ecosystems of the United States are denser and more spatially uniform, have many more small trees and fewer large trees, and have much greater quantities of fuels than did their presettlement counterparts. Causes include fire suppression, past livestock grazing and timber harvests, and possibly changes in climate. The results include a general deterioration in forest ecosystem integrity and an increased probability of large, high-severity wildfires. Such conditions are prevalent nationally, especially in forests with historically short-interval, low to moderate-severity fire regimes.

Research conducted over the past 30 years has documented the importance of disturbance to the majority of these ecosystems and also determined the detrimental effects of fire suppression. The recent escaped prescribed fire near Los Alamos has intensified the debate of fuels management on federal lands.

Before I begin my discussion of the different methods that can be used to reduce fire hazard I want to spend a moment on what I believe is the critical issue, the definition of desired future conditions for our diverse ecosystems. Once we have this then we must decide what management tools are appropriate to achieve and maintain the desired conditions. I believe the debate on whether we should use silviculture (including logging in some cases) to manage our national forests is unproductive, the real issue is the definition of desired future conditions and how are we going to get there, and once there, how they will be maintained.

The recent report of the Sierra Nevada Ecosystem Project highlighted these issues and explained the need for large-scale strategically located fuels treatments. A fire management strategy released in 1995 by the US Forest Service seeks to reduce fire hazard by increasing the area treated by mechanical and prescribed fire treatments to 3,000,000 acres per year in fire-dependent ecosystems by 2005. The National Park Service also plans for significant increases in fuel treatments. Thus the need for large increases in the use of restorative management practices is clear. Less clear, however, is the appropriate balance among silvicultural operations, mechanical fuel treatments, and prescribed fire.

Even with the tragic example of a prescribed fire gone terribly wrong at Los Alamos, I still believe we must retain the ability to conduct prescribed fires on federal lands. Prescribed fires recycle nutrients, release seeds stored in tree crowns, prepare seedbeds for germination, reduce soil fungus populations, and the smoke from fires has been shown to be a natural pesticide to some bark beetles. The Los Alamos fire clearly demonstrates that the use of prescribed fire has associated risks but there is no no risk option in fuels management. Recent statistics summarized by the Boise Interagency Fire Center report that approximately 1 percent of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires have jumped a control line and suppression tactics were successfully used to control them. Out of the 1 percent of prescribed fires that require suppression, 90 percent are controlled without incident. Statistically this leaves about 0.1 percent of prescribed fires that require major suppression actions. I am not attempting to trivialize the recent loss experienced by the people of Los Alamos. As a person that personally witnessed and did research on the 1991 Oakland Hills Fire I know these events are absolute tragedies. I also know that federal fire management agencies have produced many more successes when using prescribed fire, good work is occurring on federal lands.

Mechanical Fuel Treatments

I believe that mechanical fuel treatments followed by prescribed fire can be used to reduce fire hazard in many areas. When discussing fuel hazards in coniferous forests we must examine three different areas:

1) Surface fuels (dead and down woody materials, herbaceous fuels, live shrubs)
2) Ladder fuels (fuels that can provide vertical continuity to move a fire into tree crowns)
3) Crown fuels (vertical and horizontal distribution of tree crowns)

Each area of the country is unique but in most forest types that historically had frequent, low intensity fire regimes the most critical fuel complex from a fire hazard standpoint is the surface fuels, followed by the ladder fuels, and then the crown fuels.

This means that if one is designing a mechanical fuels treatment strategy it must focus on reducing surface fuel loads. Commercial and pre-commercial thinning operations can reduce ladder fuels and tree overstory cover but without combining these treatments with surface fuel reductions, the overall program will not reduce fire hazard. In fact operations that lop and scatter the slash fuels produced after thinning operations will increase fire hazard for a number of years until decomposition reduces fuel loads (possibly 4-5 years in the Sierra Nevada, California). Mechanical removal of ladder fuels and reducing overstory cover will reduce the probability of crown fire in an area only if these treatments are coupled with a surface fuel treatment. One of the most effective surface fuel treatment is prescribed burning which can be used after mechanical treatments to produce the overall objective. Mechanical mastication of slash fuels is another option but this could reduce available nitrogen in the soil, reduce germination of woody plants, and could smother understory vegetation. Another limitation of mechanical treatments is the need of road networks which are not available in all areas. Remote areas with steep topography may also not be appropriate for most mechanical treatments and much of the material removed from these methods has limited commercial value.

Economics and practicability in light of current stand and landscape conditions are important considerations that are often involved in managers decisions about which tools to use. However, to achieve goals for ecosystem integrity and sustainability, we also need much better information about the ecological consequences and tradeoffs of alternative management practices. The frequent, low to moderate-severity fires that characterized presettlement disturbance regimes in many of our forests affected not only overall forest structure, composition, and fuel loads, but also a wide range of other ecosystem components and processes. What components or processes are changed or lost, and with what effects, if fire "surrogates" such as cuttings and mechanical fuel treatments are used instead of fire, or in combination with fire? For the most part, information necessary to answer such key questions is anecdotal or absent.

Joint Fire Sciences Program

The Joint Fire Sciences Program was created by Congress in 1997 to obtain answers to some of these questions (HR 105-163). Congress stated that "both the Forest Service and the Department of Interior lack consistent and credible information about the fuels management situation and workload, including information about fuel loads, conditions, risk, flammability potential, fire regimes, locations, effects on other resources, and priorities for treatment in the context of the values to be protected." Congress directed the Department of Interior and the US Forest Service to establish a Joint Fire Science Program to supplement existing fire research capabilities. The Joint Fire Science Program was designed to provide a scientific basis and rationale for implementing fuels management activities, with a focus on activities that will lead to development and application of tools for managers.

Fire-Fire Surrogate Project Created

Land managers and researchers from the Department of Agriculture (Forest Service), Department of Interior (National Park Service, U. S. Geological Survey, Bureau of Land Management), and universities are working collaboratively on a integrated national long-term study to learn the consequences of producing and maintaining one or more desired stand conditions using (1) cuttings and mechanical fuel treatments alone (i.e., without fire), (2) fire alone (via multiple prescribed burns), and (3) combinations of cuttings, mechanical fuel treatments, and prescribed fire. Untreated controls are also included.

The project has established a network of 11 sites in 9 states. Linking results across the sites will be enabled not only by common treatments, but also by a common set of response variables and measurement protocols. These core response variables and protocols were created in broad disciplinary groups including-fire and fuels, vegetation, wildlife, entomology, pathology, soils, and utilization/economics. Results from this national study will enable scientists and managers to determine, for a wide range of forest conditions and sites, which ecosystem functions of fire can be emulated satisfactorily by other means, which may be irreplaceable, and the implications for management. I applaud congress for creating this program and believe this will help move the current national debate on fuels management forward.

Urban-Wildland Intermix

Land management agencies throughout the country are increasingly aware of the difficulties of managing in the urban-wildland intermix. This is a very complicated landscape with homes, subdivisions, and towns all mixed into or adjoining wildland areas. The number of people who choose to live in this area continues to increase and many wildland fire agencies such as the California Department of Forestry and Fire Protection believe this is the area where their fuels treatments will be focused.

I believe this area requires partnerships between home owners and the public or private groups that have responsibility for the adjoining wildlands. Strategic fuel reduction zones can be created in the urban wildland intermix to allow for effective and safe suppression activities when wildfires are moving from the wildlands toward homes or from the homes into the wildlands. Mechanical fuel treatments are probably the best method of hazard reduction in this area because of the potential risks to lives and property if prescribed fire is used. Mechanical treatment followed by prescribed fire are also feasible.

Private home owners also share responsibility in this area. Homes must be built with combustion resistant roofs and siding materials. Defensible space must be created around each structure to increase the probability that it will survive a wildfire. Fine fuels and needles must be removed annually from roofs and around houses to reduce the chance of spot fire ignition during wildfires.

We may also choose to learn from a new urban-wildland management philosophy developed in Australia (Gledhill, J.B. 1999. Prepare, Stay and Survive. Wildfire. June: pp. 8-13). Vulnerable communities are first prepared by modifying or reducing flammable vegetation around buildings, mowing grass, and raking up leaves, bark, and other fine fuels. A defendable space is created which is approximately 65 feet wide on flat ground, a larger area is needed in areas with steep topography. Structural materials are selected for low flammability and an adequate water supply and fire fighting tools such as a pump and hose, wet mops, and knapsack pump garden sprayer must be readily available to the home owners.

When people have taken these fire protection measures in accordance with local and state policies, the Tasmania Fire Service advises all able-bodied people to remain with their homes during brushfires. The very young (less than 10 years old), aged, or handicapped are advised to leave as soon as possible if a fire is in the area and people that have not taken adequate measures to reduce fire hazard are also advised to leave.

This philosophy was created from the recognition that most people who perish in Australia during high severity brushfires do so trying to escape. Frequently they are caught on roads blocked by falling trees or powerlines. In other cases they crash because of smoke or panic or both. Evacuation is frequently left until the last possible moment and then it may be too late.

An example of this management philosophy recently occurred in Australia. In February of 1967 a series of devastating fires swept southern Tasmania. Under the influence of very strong north-westerly winds, high temperatures and low humidity, brushfires burned an area of 660,000 acres and caused the death of 62 people. Most of the people who died in their house were either very old and infirm or suffered from a physical disability. Much the same can be said for the people who died within yards of their home. This was the largest loss of life and property on any single day in the history of the Australian continent.

In addition to the appalling loss of life, over 1300 houses and cottages were destroyed within the 14 municipalities affected by the fire, together with 128 other major buildings including factories, churches, halls, post offices, hotels, service stations and schools.

In January of 1998 another high severity brushfire started in a similar area. Over a 24 hour period 1000 houses in the intermix were directly threatened by the brushfire burning through drought affected eucalyptus forests under severe weather conditions. In accordance with Tasmania Fire Service Policy, prepared residents were advised through the media to remain with their homes during the fire. There were no deaths or serious injuries and only 7 houses and a number of outbuildings were destroyed. Of the houses lost, 6 were unoccupied.

Following the fire investigators demonstrated that the majority of residences heeded the advice to stay and were successful in protecting themselves and their property. Most Australian fire services have advocated this approach for years. Vulnerable communities, if properly prepared and empowered, can be effectively and safely involved in their own protection.

Summary

There currently exists tremendous variability in forest structure within the federal lands of the United States. With such diverse current conditions it is simply not possible to come up with one methodology to restore and sustain all of these areas. Prescribed fire is one very important tool that managers can use to reduce fire hazard and increase sustainability. Mechanical methods coupled with prescribed fire may be effective at reducing fire hazard but we need more information on the possible ecological consequences of these treatments and this will occur with ongoing research projects. Mechanical methods alone may also be effective in reducing fire hazard but they probably will not be successful in simulating the full ecosystem processes of fire.

The urban wildland intermix is a very complicated area for fire managers. To be successful in this area a shared partnership must occur between the private land owner and the manager of the adjoining wildlands. We may also elect to learn from some of the Australian experiences in this area.

Even with the recent tragedy at Los Alamos I am still a strong proponent of the use of prescribed fire to reduce fire hazards and increase sustainability. The National Park Service made a large mistake in this particular case and they should bear full responsibility for this event. We must understand what went wrong during this fire to reduce the chance of this ever occurring again. There is no no risk strategy when it comes to fuels management and doing nothing is not acceptable in my view. It will take 2-3 decades of active management using diverse tools and methods to begin to solve the national fuels problem. I believe we are ready to take on this very important project.

Thank you for the opportunity to speak to you today.

Dr. Scott Stephens is Assistant Professor of Fire Sciences at the University of California, Berkeley. He teaches graduate and undergraduate courses in wildland fire sciences and wildland fire behavior modeling. He was involved in the wildand fire and giant sequoia sections of the Sierra Nevada Ecosystem Project (SNEP) and has contributed to the fire behavior modeling section of the recent Sierra Nevada Framework Environmental Impact Statement. He is the principal investigator of the Fire-Fire Surrogate site in the Sierra Nevada, California. He began his faculty career at California Polytechnic State University San Luis Obispo and now is on the faculty at the University of California, Berkeley, where he conducts wildland fire research.