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Before the Committee on Energy and Natural Resources
U.S. Senate

Hearing on Forest Health Problems in the National Forests

July 22, 2003

Chairman Domenici, and members of the Committee, thank you for this opportunity to testify on forest health problems and to offer some solutions. Many of you have seen me before this Committee in the past. I look forward to the day when my testimony will no longer be needed because we are implementing restoration treatments at the pace and scale commensurate with the problem.

My name is Wallace Covington. I am Regents' Professor of Forest Ecology at Northern Arizona University and Director of the Ecological Restoration Institute. I have been a professor teaching and researching fire ecology and restoration management at NAU since 1975. I am a member of Governor Janet Napolitano's Arizona Forest Health Advisory Council. My role on that committee is to help develop guiding principles for the design and implementation of restoration-based fire fuel reduction and forest health projects based on the best available science. In addition I am a member of the National Commission on Science for Sustainable Forestry.

I have a Ph.D. in forest ecosystem analysis from Yale University and an M.S. in ecology from the University of New Mexico. Over the past 27 years I have taught graduate and undergraduate courses in research methods, ecological restoration, ecosystem management, fire ecology and management, forest management, range management, wildlife management, watershed management, recreation management, park and wildland management, and forest operations research. I have been working in long-term research on fire ecology and management in ponderosa pine and related ecosystems since I moved to Northern Arizona University in 1975. In addition to my publications on forest restoration, I have co-authored scientific papers on a broad variety of topics in forest ecology and resource management including research on fire effects, prescribed burning, thinning, operations research, silviculture, range management, wildlife effects, multiresource management, forest health, and natural resource conservation.

I will focus my remarks on two important changes that are needed to reverse the trend of increasing catastrophic wildfires.

- **First, we need to move forward with large scale restoration-based fuel treatments that are commensurate with the threat of catastrophic fire**

- **Second, we need to use comprehensive restoration-based treatments as opposed to just thinning trees. If we don't we are merely treating a symptom, condemning ourselves to be plagued by continuing problems in the future, and will lose the opportunity to solve many of the problems associated with degraded forest ecosystems—including bark beetles and disease**

<u>We need to move forward with large scale restoration-based fuel treatments that are commensurate with the wildfire threat</u>

The accelerating increase in the severity and size of wildfires in the West indicates that average annual losses over the next two decades will be in excess of 5-10 million acres per year. Using the reasonable assumption that preventative restoration treatments should at least be at the pace and scale of losses to severe stand replacing fire, one would conclude that we should be treating 5-10 million acres per year. Our current pace and scale is woefully inadequate given the scope of the problem. Unless we accelerate treatments rapidly and immediately we will never get ahead of the problem.

The fires of 2000, 2002 and now 2003 have focused policy attention on the need to create defensible perimeters around communities in the wildland/urban interface. Without a doubt communities should be a priority for protection. However, defining a community as only homes misses the whole reason why people live in forest communities.

My hometown, Flagstaff, Arizona is a tourist dependent community. In the summer it is a cool haven for people from Phoenix to escape oppressive heat. In the winter it is a playground for skiers and snow-based recreation. The town is populated by people who often choose to make less money in return for the non-monetary value of living in an exquisitely beautiful place. A fire of the magnitude of the Rodeo/Chediski fire—almost half a million acres—would destroy one of the communities most important natural assets. The aesthetic and economic value of the forest is immeasurable. Imagine Flagstaff, Santa Fe, New Mexico, Durango, Colorado or any other mountain town surrounded by a sea of blackened trunks. The spiritual, social and economic value of being there is gone.

Besides the inextricable link of people to the forest, there are many important environmental and resource benefits provided by forests, such as water, wildlife, recreation and wood fiber. To protect these values will require landscape scale treatments in the greater forest.

The need for landscape assessments to identify key elements of the landscape for protection

The logical and efficient way to strategically and comprehensively address the threat of unnatural wildfire is to look at the problem from a landscape perspective. Using a collaborative community process with a definite timeframe, we can identify important elements of the landscape for protection, identify the location and type of restoration fuel breaks that would reduce the risk of unnatural fire, and prioritize areas for treatments. Areas that are at highest risk or where we can gain the greatest advantage for fire protection would logically be treated first. This type of approach is not widely used but should be so that limited resources are used effectively.

Adaptive management provides the proper framework for action

Working at the landscape scale concerns some individuals and organizations. However, there is an approach that will ensure that we are learning from and evolving treatments based on best available information—it is a "learning by doing" approach known as active ***adaptive management***. No one is talking about tinkering here and this isn't just some new fangled academic idea. Adaptive management is rooted deep in theory and practice, having sprung from the evolutionary operations approach long used in optimizing complex chemical engineering problems. Crawford S. Holling (University of Florida) and Carl Walters (University of British Columbia) and their intellectual "offspring" have developed this approach as a tried and true procedure for solving complex resource management problems, monitoring and evaluating a range of policy options, and then feeding resulting knowledge back into the ongoing resource management endeavor.

There are quantifiable approaches to adaptive management. However, a "soft systems" approach might be most appropriate for restoration of ponderosa pine and related frequent fire landscapes. This is an approach used by the Greater Flagstaff Forests Partnership. The Partnership is attempting to plan and implement restoration-based fuel reduction projects on 100,000 acres in and around Flagstaff. The Partnership is engaged in planning for its third major treatment—an area of 30,000 acres. Information learned from the monitoring of earlier treatments applied in 1998 is being used to design the next series of treatments.

The safest way to advance treatment design and implementation is to apply scientifically rigorous adaptive management principles. By scientifically rigorous I mean that the design of landscape scale restoration treatments must be based on:

1. Comprehensive awareness of solid science (not ideologically driven, selective citation of existing knowledge).
2. Implementing large-scale, adaptive management experiments to test ideas.
3. Monitoring fundamental parameters to determine treatment effectiveness.
4. Objective scientific analysis of the results.

5. Further adaptation of management experiments suggested by these monitoring observations.
6. Sharing, publicizing and publishing results for lay audiences, policy makers, resource management professionals, and the scientific community.

We need to use comprehensive restoration-based treatments as opposed to just thinning trees. If we don't we are merely treating a symptom, condemning ourselves to be plagued by the problem again in the future, and will lose the opportunity to solve many of the problems associated with degraded forest ecosystems

I am gravely concerned that in our urgency to treat forests quickly, we will do it incorrectly by focusing solely on removing trees. If we do that we will squander the opportunity to provide a comprehensive solution to all the problems confronting degraded forests.

We have been in open revolt against nature in the dry forests of the West since settlement. It is time to start managing in harmony with natural tendencies. Science-based forest restoration treatments are consistent with natural tendencies. Comprehensive restoration is superior to forest thinning alone for one significant reason—restoration treatments simultaneously improve forest health (the underlying cause of catastrophic fire) while reducing fire risk. Restoration treatments permit the safe reintroduction of low intensity ground fire that we can let burn without threatening people and homes and most importantly plays a vital role in restoring the forest.

Restoration has many benefits

The benefits of ecological restoration and diligent land stewardship in ponderosa pine and related ecosystems are many and they are sustainable indefinitely. Ecological restoration:

1. Eliminates unnatural forest insect and disease outbreaks—such as the current bark beetle epidemic
2. Enhances native plant and animal biodiversity
3. Protects critical habitats for threatened or endangered species
4. Improves watershed function and sustainability
5. Enhances natural beauty of the land
6. Improves resource values for humans, not just for current, but also for future generations

Designing restoration treatments

There is no "one size fits all" restoration treatment. Intelligent restoration treatments are based on the historic conditions of the land. We know that ponderosa pine forests in the Southwest burned frequently with the net effect of killing small trees and enhancing fewer, large trees. We know that the real diversity of the ponderosa pine forest is below your knees in the grasses and shrubs and that they need fire and light to survive. We also know that the Southwest is prone to periods of sustained drought and that there are only so many trees per acre that can be sustained in an arid climate.

Ecological restoration should strive towards emulating, insofar as is practical natural ecosystem patterns and processes. In the discipline of ecological restoration we refer to these natural conditions as "reference conditions". In most cases for ponderosa pine forests this includes fewer trees per acre; retaining older trees and removing the excess trees thus opening up the forest canopy to promote increased numbers and species of plants and grasses.

Research across the Intermountain West has shown that restoration treatments substantially reduce fire hazard by thinning trees to decrease tree canopy density, break up interconnected canopy fuels, raise the crown base height, and then reduce accumulated forest floor fuels and debris with prescribed fire. Where tree density is great, fire alone is inadequate. Without thinning, fire can lead to increased mortality, especially among old growth trees. This is the typical case over most of the ponderosa pine type throughout the West.

Restoration thinning enhances the productivity (growth) of trees, allowing young trees to develop old-growth characteristics such as large size and full crowns. Perhaps most importantly, restoration has been shown to increase rapidly the productivity of native understory grasses and herbs, the species that make up 90-99% of the plant biological diversity in western fire-adapted forests. The resources provided by abundant understory vegetation—seeds, flowers, fruits, and cover—translate into key wildlife habitat components. For example, the number of butterfly species and individuals increased within two years in Arizona sites that had received ecological restoration treatments.

Our research in cooperation with land management agencies and community groups shows that restoration treatments are operationally sound. There are some very simple restoration-based sideboards for designing alternative prescriptions that are straightforward and well supported. They include:

1. Retain all trees which predate settlement
2. Retain postsettlement trees needed to re-establish presettlement structure
3. Thin and remove excess trees
4. Rake heavy fuels from base of trees
5. Burn to emulate natural disturbance regime
6. Seed with natives/control exotics

We know what to do and it makes economic sense

I have great faith in our scientific understanding of how to restore degraded forest. Yet I am frustrated that with so much knowledge at hand we remain mired in ideological disputes. Recently, the School of Forestry at Northern Arizona University completed an economic study analyzing the cost of restoration versus taking no action in ponderosa pine forests. This preliminary analysis shows that it is cost effective to spend up to $505/acre to restore forests to prevent catastrophic fire and avoid associated fire suppression costs. In other words, if we spend money to restore forests now, we will avoid spending that much on just suppression, rehabilitation and lost timber value in the future. This figure doesn't even take into account what is spent on lost property, lost property taxes, lost fire fighter lives and the full reality of losses associated with catastrophic fire. Based on this figure, a back of the envelope assessment shows that to treat the condition class 3 lands identified in the Intermountain West (and we really wouldn't want to treat all those acres of different forest types) it would cost $6 billion dollars. With our annual suppression costs rising to above $1 billion per year, and an annual federal budget that exceeds two trillion dollars the logic to spend the money and get this done is overwhelming.

In conclusion I want to say exactly what I have said to Congress before. Knowing what we now know, it would be grossly negligent for our generation not to move forward with large scale restoration-based fuel treatments in the dry forests of the West. Inaction is clearly the greatest threat to the long-term sustainability of these western ecosystems.

Thank you for the privilege to speak before the Committee.

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