RESTORING FORESTS AFTER CATASTROPHIC EVENTS

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON FORESTS AND FOREST HEALTH

OF THE

COMMITTEE ON RESOURCES
U.S. HOUSE OF REPRESENTATIVES

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OVERSIGHT HEARING ON RESTORING FORESTS AFTER CATASTROPHIC EVENTS

Thursday, July 15, 2004
U.S. House of Representatives
Subcommittee on Forests and Forest Health
Committee on Resources
Washington, D.C.

The Subcommittee met, pursuant to notice, at 11:01 a.m., in Room 1324, Longworth House Office Building, Hon. Greg Walden, [Chairman of the Subcommittee] presiding.

Present: Representatives Walden, Renzi, Inslee, Kildee and Herseth.

STATEMENT OF THE HONORABLE GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. The Subcommittee will come to order. The Subcommittee is meeting today to hear testimony on restoring forests after catastrophic events. Under Committee Rule 4(g) the Chairman and the Ranking Minority Member can make opening statements. If any other members have statements, they can be included in the hearing record under unanimous consent.

As long as there have been forests, there have been natural events that have impacted them: wind storms, ice storms, tornadoes, hurricanes, volcanoes, and of course, fire. In fact, most of the forests we are familiar with today have been influenced or created by these disturbance events, such as the fire-dependent forests that Native Americans helped to establish by regularly setting fires to reduce brush and create habitat for game. So these are not new phenomena or necessarily bad ones. When these events, however, are extraordinarily large or disruptive, they can do enormous and I believe long-lasting damage to wildlife habitat, water and air quality, and to communities. Particularly, as of late, we have seen this in the aftermath of catastrophic fire, and especially in the West.

Since 2000, more than 23.7 million acres have burned as a result of wildfire. This includes huge mega-fires such as the B&B fire last year in Central Oregon, that burned over 90,000 acres, half of it in Northern spotted owl habitat. In 2002, in Southern Oregon, the Biscuit fire burned nearly half a million acres and demolished 80,000 acres of owl habitat.

In 2002, the Hayman fire, much of it in Mr. Tancredo's district in Colorado, not only threatened homes and communities, but devastated much of the critical watershed for the City of Denver. The largest fire in that state's history, it dumped colossal loads of mud and soot into Denver's largest supply of drinking water, costing the taxpayers millions.

Recognizing that 190 million acres of Federal lands are at a high risk of catastrophic fire, it goes without saying that these large fires are going to be a part of our lives for years, if not decades, to come. The primary question then that this hearing will address today is what can be done to rehabilitate and reforest these lands after catastrophic events, including fires, in order to restore habitat and stabilize soils, and protect watersheds and communities. We will focus primarily on case studies and what we have learned from the trials and errors of past experiences, such as the clean-up after the eruption of Mt. Saint Helens in 1982, the post-fire restoration after the Volcano Fire in Northern California in 1960, or the salvage and reforestation efforts in the forties and fifties after the Tillamook burns.

Although the science may not be complete, there is much we do know, and history can help instruct us as we face future catastrophic events and our attempts to apply our best knowledge to rebuild forests.

[The prepared statement of Mr. Walden follows:]

Statement of The Honorable Greg Walden, a Representative in Congress from the State of Oregon

As long as there have been forests, there have been natural events that have impacted them; windstorms, ice storms, tornados, hurricanes, volcanoes and, of course, fire. In fact, most of the forests we're familiar with today have been influenced or created by these disturbance events, such as the fire-dependant forests that Native Americans helped to establish by regularly setting fires to reduce brush and create habitat for game. So these are not new phenomena or necessarily bad ones. When these events, however, are extraordinarily large or disruptive they can do enormous and long-lasting damage to wildlife habitat, water and air quality, and to communities. Particularly, as of late, we've seen this in the aftermath of catastrophic fire.

Since 2000, over 23.7 million acres have burned as a result of wildfire. This includes huge mega-fires such as the B&B fire last year—burning over 90,000 acres, half of it in Northern spotted owl habitat. In 2002, also in my district, the Biscuit fire burned nearly half a million acres and demolished 80,000 acres of owl habitat.

In 2002, the Hayman fire, much of it in Mr. Tancredo's district, not only threatened homes and communities, but devastated much of the critical watershed for the City of Denver. The largest fire in state history, it dumped colossal loads of mud and soot into Denver's largest supply of drinking water, costing the taxpayers millions.

Recognizing that 190 million acres of federal lands are at a high risk of catastrophic fire, it goes without saying that these large fires are going to be a part of our lives for years, if not decades, to come. The primary question, then, that this hearing will address today is what can be done to rehabilitate and reforest these lands after catastrophic events in order to restore habitat and stabilize soils. We will focus primarily on case studies and what we've learned from the trials and errors of past experiences, such as the clean-up after the eruption of Mt. Saint Helens in 1982, the post-fire restoration after the Volcano Fire in Northern California in 1960, or the salvage and reforestation efforts in the forties and fifties after the Tillamook burns.

Although the science may not be complete, there is much we do know, and history can help instruct us as we face future catastrophic events and our attempts to apply our best knowledge to rebuild forests.

To begin today's hearing, I'd like to show a ten minute video submitted by Communities for Healthy Forests, that I believe is indicative of the sentiments and hopes of local forest communities all over the country. Their message is not one of

"us verses them", but rather one that is inclusive and pro-forests. I hope you find it as informative as I have.

Mr. WALDEN. Mr. Kildee, would you like to give an opening statement since you are the Ranking Minority Member here?

STATEMENT OF THE HON. DALE KILDEE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. KILDEE. Thank you, Mr. Chairman. Just briefly to thank you for having these hearings today and we look forward to hearing the witnesses. The more we learn about our forests, the better off we are able to serve, and here is the real Ranking Member.

Mr. WALDEN. Jay, a statement?

STATEMENT OF THE HON. JAY INSLEE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. INSLEE. I just want to thank the Chair for exploring these issues, important issues, and I hope we can keep this effort up.

Thank you.

Mr. WALDEN. You are welcome. Thank you, gentlemen.

As I said, other members' statements will be entered into the record.

To begin today's hearing, I would like to show a 10-minute video submitted by the Communities for Forest Health, and I believe is indicative of the sentiments and hopes of local forest communities all over the country. Their message is not one of us versus them, but rather one that is inclusive and pro-forest. So I hope you find it as informative as I have. I thought it would be helpful. Let us go ahead and start that.

Just for the record, we do have votes coming at about 11:30. We will break and then come back, but we hope to get our first panel in before then.

Go ahead.

[Video played.]

Mr. WALDEN. That obviously gives you one viewpoint which is held by many, including, I believe, the various counties in Southern Oregon who helped underwrite the cost of that.

I would like to introduce our witness panel now. On Panel I we have Dr. Ann Bartuska, Deputy Chief for Research and Development, accompanied by Steve Eubanks, Forest Supervisor, the Tahoe National Forest, the Forest Services, USDA; and Ed Shepard, Assistant Director, Renewable Resources and Planning, Bureau of Land Management, U.S. Department of the Interior.

Dr. Bartuska, welcome. We are delighted to have you and your panelists here.

STATEMENT OF ANN BARTUSKA, DEPUTY CHIEF FOR RESEARCH AND DEVELOPMENT, FOREST SERVICE; ACCOMPANIED BY STEVE EUBANKS, FOREST SUPERVISOR, TAHOE NATIONAL FOREST, U.S. DEPARTMENT OF AGRICULTURE

Dr. BARTUSKA. Good morning, Mr. Chairman and members of the Subcommittee. It is an opportunity, and I appreciate the opportunity to be here and talk about our activities associated with restoration of forests after major events.

And as you already mentioned in your opening remarks, clearly there are some really significant disturbance events out there, not only wildfire. Hurricanes, ice damage, insect and disease and invasive species, in all totality, affect millions of acres of our forests in the United States annually. When this occurs on national forests, we believe very strongly that we need to address those particular events by addressing the need for restoration, looking at both the ecological condition and the characteristics of the landscape, but also the economic and social factors associated with it, and time it to the land management objectives as determine by the forest plans. So in totality, we can take the same approach for all those disturbances, but I would like to really focus on what we do following wildfire and really emphasize that in today's remarks.

When we approach restoration of forested ecosystems following a large-scale disturbance, we usually think of three stages, the first one being emergency stabilization, usually completed within the first year following the event. The second stage would be rehabilitation of key resources, especially when they are unlikely to recover without human intervention, when, for example, if you have had some major ecological disturbance. Then the third stage would be longer term forest restoration which includes reforestation and other treatments. In all three of those stages, research findings and tools developed by scientists provide important methods of evaluating both the need for the work to be done, as well as evaluating the effectiveness of the treatments, and we believe that continual link between science and management really helps us improve both the science and the management that we do.

Immediately after a catastrophic event, we go through emergency stabilization treatments through the Burned Area Emergency Response Program, usually referred to as BAER. Through that process we have actually been very active in the years in really highlighting where the most important work needs to be done. Last year we treated approximately 78,000 burned acres where there was a clear demand for immediate response.

In using the BAER program, we require that treatment measures provide a essential and proven protection at minimum costs in order to qualify for funding and also treat the most important issues. For example, in many of our major severe fires where we have soil disturbance, we know that initial green-up may be with invasive species rather than the native species that we prefer. So our treatments would then be focusing on what kinds of things we can do to minimize the impact and establishment of those invasive species that is driven by severity of the fire, soil condition, and which species are present. In those situations information provided by our researchers help the managers to determine which are the most appropriate treatments to use.

The second stage, rehabilitation, focuses on the lands unlikely to recover from fire through natural processes. The goal is to produce a functioning ecosystem that meets our management objectives. Again, these activities are carried out using the best available science so that we can maximize the benefits and minimize the negative impacts of treatments. Choices are made on the knowledge that we have from the science that is produced, as well as our past management experiences, again, an ongoing process.

Then the third stage where we have longer-term restoration goals which we like to achieve through the application of prescriptions designed to achieve the long-term objectives of the land. In this situation there are two prescriptions that I would like to talk a little bit more about. One is the removal of trees affected by disturbance, and then those that are designed to facilitate reforestation. For tree removal following catastrophic disturbances, this may occur for both ecological and economic reasons. Our prescriptions are developed based on the science that we have and the conditions at the particular site. Some harvest prescriptions are designed to couple the objective of leaving large tree structures like snags, coarse woody debris, in place while removing the other dead and dying trees to expedite the establishment of a new forest.

There also will be situations where removing dead and dying trees primarily is for economic and social benefits. We recognize that. We know that timber salvage operations can provide jobs in the woods and to the mills in nearly communities, and it is an important part of our analysis.

We also know that the removal of dead trees must be done promptly if economic benefits are to be derived because deterioration does follow so quickly after death, and you will be hearing more about specific cases from Steve Eubanks shortly.

The other tool for long-time restoration is reforestation. Immediately following a disturbance event a preliminary diagnosis is made to determine the areas that will require reforestation treatment to restore forest cover and a detailed prescription with a specific sequence of treatments is developed consistent with the land management objectives.

The silvicultural prescription provides direction for how many trees must be reestablished, the proper mix of vegetation, and the target structure and composition for the reforested area. Again, these prescriptions have evolved over time as a continual discussion between our scientists and managers, and I think we have improved our understanding and our way to focus those prescriptions based on that knowledge.

For the idea of using logging after fire, we have put in several studies to really evaluate what we know to date and where we are going in the future. In a study by two of our scientists, looking at 21 post-logging practices, the major conclusion was that the practice of salvage logging is controversial, and the debate is carried on, unfortunately without full benefit of scientific information.

Because of that, we are enhancing our programs to ensure that we try to minimize and close those gaps, reduce the uncertainty associated with what those logging practices and post-fire restoration work does, but not to stop work entirely, but instead, to continually build our knowledge. As an example, we are very excited that the Biscuit Fire Recovery Project includes 10 research projects that will, over the long run, give us a really solid base for what you do following a major event like that.

We have several other comprehensive studies looking at soil erosion and soil processes, building on both the Hayman Fire of 2002 and the Cedar Fire in 2004, again, trying to make sure we learn from our practices.

So as we increase the knowledge by the actions of scientists, we are also looking at the action of our manager, and I would like to turn it over to Steve to carry on and give you his experiences.

Mr. WALDEN. We are going to go ahead and take your testimony. We can go another eight or 9 minutes here. Then we will break, take our votes, and come back.

Mr. EUBANKS. Actually, mine is going to be less than the eight or 9 minutes, so that is good.

Mr. Chairman and members of the Subcommittee, I too appreciate the opportunity to be here today to share with you the results of two case studies that we completed on the Tahoe National Forest to look at post-fire restoration activities. We specifically looked at two fires that occurred in the year 2001, the Gap Fire and the Red Star fire, and we wanted to take a look particularly at the issues that we faced in planning and implementing post-fire activities, and actually, particularly even more focused on the impacts of delaying the implementation of salvage and restoration activities.

I think it is important to start with a little bit of background on the projects themselves and the areas, and particularly, the fact that both Gap and Red Star were located in Forest Land Management allocations that called for the perpetuation of large old forests, the typical conifer forests of the west side of the Sierras. Since most of the old forests in these areas that were burned, burned catastrophically, our focus was really on restoration, than of old forest conditions, and getting that old forest back in the soonest time that was practicable.

I think it is also important to note that in the case of both the Red Star and the Gap Fires, we focused only on those areas that had at least 75 percent of the trees that had been killed by the fire. That was because of the constraints of the Land Management Plan allocation that we were working under at the time, the framework, which was an amendment to the forest plans in the Sierras. We have got some photos that show here what the forests typically look like where it was catastrophically burned and at least 75 percent of the trees were dead. Particularly, in the case of the Gap Fire we were dealing with 737 acres of area that we actually proposed for treatment, and 1,038 acres on the Red Star Fire.

I think many of you are aware that post-fire restoration projects typically include in these days extensive environmental analysis and documentation, and that is intended to respond to what we anticipate as challenges through administrative appeals and formal litigation. In the case of the Gap Fire restoration, the environmental assessment was completed and a decision was signed by June of 2002, which was about 10 months after the fire began. The operations on that particular fire restoration started in October 2002 after the administrative appeal process was completed.

The decision notice for Red Star Project was approved in November 2002, more than a year after that fire. After the appeals were completed, work actually began on the project in June of 2003. I think it is important to note that in contrast most of the area in the Gap and Red Star Fire areas that burned on private land were treated without comparable environmental analysis or public participation, and they were actually completed by November of 2001, which was only a couple months after the fires.

One of the key issues—and I think you saw that in the video—that we must deal with is merchantability of dead trees. Normally in our area trees greater than 10 inches in size are commercial in value. By the time, however, that we actually started operations on the Gap Fire and the Red Star Fire, deterioration was very significant in those smaller trees, and their value was no longer high enough to pay for their removal. So deterioration also was less significant only in the very large trees, and therefore, rather than a 10-inch minimum size of trees that could be removed, we had to increase the size to 18 inches. Then as a result of that, of course you would recognize that many fewer trees were removed when the projects were completed, and this in turn meant that there was less monetary return to the treasury from the timber sales, and in the case of Gap Fire, that equated to $1.3 million in lost revenue, and in the case of Red Star Fire it was $4 million of lost revenue.

I think it is important to look beyond just the economic cost because there is an ecological cost that we also have to consider. The Red Star and Gap Fires are within a fire regime that experiences frequent fire return intervals, and by that I mean, in this case, we can expect that fires will return on an average of less than 30 to 35 years. So by delaying restoration in these areas, the trees that were killed by the fires may remain standing for a decade, maybe two, but they will eventually fall to the ground and create a significant dead fuel component, that with subsequent wildfire events could consume any small trees that become established within these areas.

So in summary, based on our experiences, it is clear that through active management and some forest types, we can accelerate by many decades the development of large tree structure, and we can much better protect the replacement forest that becomes established. In contrast, by letting nature take its course for these projects, we run the risk of delaying or not achieving these objectives.

With that, I would like to turn it back to Dr. Bartuska to summarize our testimony.

Dr. BARTUSKA. Just a few last points. I think the main message for me on this is that we are learning as we are going, and we are also, I think, taking advantage of projects, bringing the best available science to the managers so that they have the tools they need, but also with the managers being able to inform the next set of scientific questions, reducing uncertainty in the long run. Maybe the bottom line right now is that one size doesn't fit all, that we want to keep learning from these, but also putting new practices into place.

[The prepared statement of Dr. Bartuska follows:]

Statement of Dr. Ann Bartuska, Deputy Chief for Research and Development, Forest Service; and Steve Eubanks, Forest Supervisor, Tahoe National Forest, U.S. Department of Agriculture

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to discuss with you the important topic of restoring forests after catastrophic events.

Background

Catastrophic events such as wildfire, hurricanes, tornados and other wind events, ice storms, insect infections and disease, and invasive species impact millions of acres of forests annually across the United States and the rest of the world. When

these events occur on National Forest System lands, the need for restoration is determined by ecosystem characteristics, by economic, social, and ecological values at risk, and by land management objectives as described in the applicable Forest Plan. Forests, in the long term, are adapted to recover from such events, although recovery may take tens to hundreds of years and sometimes result in modifications to forest type. Therefore, management objectives, which address all these considerations and reflect research findings, are the critical factors in determining the amount, type, and location of restoration treatments. Many disturbed areas should be, and are, left to recover naturally, but there are times when restoration or other management activities including the commercial removal of dead and dying trees is the appropriate and responsible thing to do.

Because wildfire is a recurring and frequent force in North American forests, we will focus on restoration after fire. Wildfire is one of the most complex events that impact forests.

Ecological impacts of fire vary with forest type, stand density, fuel loading, fire intensity, slope and soil characteristics, and weather conditions. Shrubs, stimulated to sprout or germinate after fire, may prevent establishment or suppress growth of forest regeneration on some dry and mid-elevation sites. Changes in species composition and structure after fires may make these areas more susceptible to future fire and may not meet long-term objectives for an area for wildlife, recreation and other resources. Severe fires may increase the susceptibility to invasion by exotic grasses and other undesirable plant species. Steep slopes and sites with water-repellant soils may lose surface soils to erosion, causing streams and reservoirs to become silted. This accelerated erosion, combined with the increased runoff typical of burned sites can cause channel erosion, loss of fish habitat, and downstream flooding or debris flows. In these situations management to restore or speed recovery would likely be appropriate.

Emergency Stabilization, Rehabilitation, and Restoration

Restoring forested ecosystems following a large-scale disturbance typically involves three stages: emergency stabilization, usually completed in the year following the event to prevent threats to life, property, and further damage to watersheds; rehabilitation of key resources affected by the disturbance and unlikely to recover without human intervention; and longer-term forest restoration which includes reforestation and other treatments needed to restore functioning ecosystems; and that span many years. All of these stages are completed consistent with the direction contained in individual forest plans. Research and tools developed by scientists provide important methods of evaluating what needs to be done and the effectiveness of emergency stabilization, rehabilitation, and restoration.

After a catastrophic event, our first priority is public health and safety. Our goal as land managers is to take the steps needed to stabilize and restore the resource to meet the desired condition of the resource using treatments that are based upon sound ecosystem restoration science. Emergency stabilization treatments are conducted through the Burned Area Emergency Response (BAER) program. Treatments vary based on values at risk and the probability of protecting those values. The nature of the treatment is based on severity of the fire, the slope, soils, ecotype, and post fire weather conditions. Because we fund emergency stabilization with emergency wildland fire funding, we require that treatment measures provide essential and proven protection at minimum cost in order to qualify for funding.

Over the past three years, we have developed the capacity to use satellite imagery to assess burn severity on most large fires on National Forest System lands. Maps are derived and supplied to managers who must decide where to treat and how much area needs treatment. Forest Service and United States Geological Survey scientists have developed an integrated system called FIREMON for determining and implementing appropriate methods for quantifying and monitoring effects and severity of wildland fire.

For example, the bare soils of a severely burned forest may be susceptible to invasive, non-native species which compete with native species, limiting growth and productivity of desired vegetation. Treatments would be designed to prevent the establishment of invasive species based on severity of the burn, soil condition, and anticipated invasive species.

Our researchers are currently working with managers to improve a prototype computer tool that considers soils, vegetation, terrain, burn severity, and climate characteristics to estimate sedimentation that might be expected after fire, and how much erosion might be reduced by various treatments. Results are expressed in terms that allow managers to assess the uncertainty associated with future climatic events. This computer model summarizes a vast quantity of data into a form that managers can use to design effective treatment regimes.

Information developed by researchers helps manager determine appropriate treatments. For example, the 2003 Myrtle Creek Fire heavily burned the municipal watershed for the City of Bonner's Ferry, Idaho. The steep slopes, granitic soils and typically heavy rain falls made erosion likely. To prevent heavy sedimentation of the City's water supply, the watershed was seeded with non-persistent grasses. In comparison, the Southern California fires burned the area surrounding the Silverwood Lake, a major distribution point for the Southern California water supply. Because of the Santa Ana winds and the seasonal distribution of rains, seeding likely would not have been effective in preventing sedimentation in Silverwood Lake. Instead, mulch was placed to slow the run off and reduce erosion. The differing treatments were equally effective in preventing sedimentation.

Last year over 1.4 million acres of National Forest System land burned. Emergency stabilization treatments were carried out on 78,317 burned acres. There were also 1,474 miles of road and trail stabilization and stream rehabilitation. We also completed 2,170 projects that cannot be measured in acres or miles, such as culvert replacements, hazard warning signs and early warning systems to warn residents of impending floods.

Rehabilitation focuses on the lands unlikely to recover from fire through natural processes. The goal is to produce a more intact ecosystem that meets management objectives for fire and disease resistance, tree type, regeneration, and fish and wildlife habitat in a manner appropriate to the site and the impacts of each particular fire. These activities are carried out using the best available science to maximize benefits and minimize negative impacts of treatments.

Tools for Long-Term Restoration

On many acres, natural processes may foster recovery at a pace that is entirely sufficient to satisfy land management objectives without human intervention. We conduct vegetative treatments in those locations where this is not the case, and where we can help expedite the recovery process through carefully planned and conducted activities that may also recover value from these areas through various actions, including timber salvage operations.

Longer-term restoration goals are achieved through the application of prescriptions designed to achieve long-term objectives for the land. I will focus on two types of prescriptions today: the removal of trees affected by the disturbance event and those designed to facilitate reforestation.

Restoration Tree Removal

We remove trees following catastrophic disturbances for both ecological and economic reasons. Prescriptions are developed following catastrophic events to achieve specific land management objectives. For example, prescriptions to achieve wildlife habitat objectives have become increasingly commonplace on the national forests, particularly for late-seral dependent wildlife species. The retention of snags, coarse woody material, and other features are beneficial to these species and to the ecosystem as a whole. Other harvest prescriptions are designed to couple the objective of leaving large tree structures in place, while removing other dead and dying trees, to expedite the establishment of a new forest.

There will be other situations where removing dead and dying trees is primarily for economic and social benefits. If we can get some of these trees out of the woods in a timely manner they still have commercial value. Timber salvage operations can provide jobs in the woods and in the mills of nearby communities. If these trees are processed before they deteriorate too much, forest products for the American economy can be the end result. Purchaser deposits generated from salvage sales may also be used to complete the renewable resource work needed to restore these project areas through reforestation treatments.

The removal of dead trees must be done promptly if economic benefits are to be derived because deterioration begins immediately after death. Steve Eubanks will share his experiences connected to the cost of delayed implementation, shortly.

In Fiscal Year 2003, salvage treatments were conducted on 49,000 acres following fire, insect infestations, and disease or about 22 percent of the total area where commercial harvesting was done on the national forests (224,000 acres).

Reforestation

Immediately following a disturbance event, a preliminary diagnosis is made to determine the areas that will require reforestation treatment to restore forest cover. This diagnosis is generally made by a silviculturist. Within one year of the disturbance event, a detailed prescription with specific sequence of treatments is developed. These prescriptions provide direction to restore these lands to a forested condition consistent with the land management plan.

We annually tabulate these treatment needs by national forest and include them in the Reforestation Needs report submitted to Congress as required in the Forest and Rangeland Renewable Resources Planning Act of 1974. Our most recent report compiled as of the end of Fiscal Year 2003 identifies reforestation needs of approximately 899,000 acres service-wide. Approximately two-thirds of these needs have arisen from wildfires.

Reforestation treatments may or may not involve tree planting. Natural regeneration may be entirely sufficient to achieve resource objectives. For example, in Fiscal Year 2003, reforestation treatments were completed on about 160,000 acres. Of this total, the Forest Service planted about 76,000 acres and seeded about 5,000 acres. The remaining 79,000 acres regenerated naturally. Each of these practices is carried out in a manner that will restore native tree species to the treatment area.

The silvicultural prescription provides direction for how many young trees must be reestablished, the proper mix of vegetation, and the target structure and composition for the reforested area. The desired future condition may be a structurally complex conifer dominated forest to provide habitat for the Northern Spotted Owl on a national forest in the Pacific Northwest, the development of cover in key winter range for black-tailed deer or myriad other possible combinations representing the spectrum of resource benefits embodied by our national forests.

One of the most useful collaborative products emerging from Forest Service research and our National Forests Systems applications group has been the Forest Vegetation Simulator and the Fire and Fuels Extension to this tool. This model enables resource managers to visualize and project through time the development of reforested areas following wildfires and treatments.

Science and Restoration

In their paper titled "Environmental Effects of Post-Fire Logging: Literature Review and Annotated Bibliography", Forest Service research scientists, McIver and Starr reviewed the existing body of scientific literature on logging following wildfire. Twenty-one post-fire logging studies were reviewed and interpreted. McIver and Starr concluded that while the practice of salvage logging after fires is controversial the debate is carried on without the benefit of much scientific information. They also concluded that the immediate environmental effects of post fire logging is extremely variable and dependent on a wide variety of factors such as the severity of the burn, slope, soil texture and composition, the presence or building of roads, types of logging methods, and post-fire weather conditions.

We realize that there are gaps in what we know about post-fire restoration and we are working hard to fill those gaps. Forest Service researchers, in collaboration with other scientists, are working to increase our knowledge of how ecosystems respond to fires and how management actions can affect desired outcomes. For example, there are as many as ten different research studies within the Biscuit Fire Recovery Project.

Our research program is focused on improving our ability to understand and implement restoration and rehabilitation actions. For example, research has studied the interactions of undesired, invasive species and fire, use of native plant materials in rehabilitation and restoration, and watershed responses in terms of nutrients and sediment loading.

We have established comprehensive studies to examine the variability of watershed response and treatment effectiveness. For example, we have established a network in six western states to examine variability of post-fire erosion and effectiveness of emergency rehabilitation treatments such as contour felled logs, mulches and straw wattles. Included are watersheds in the 2002 Hayman Fire in Colorado and the 2004 Cedar Fire in southern California.

Several research publications related to rehabilitation and restoration are available to all and are in general use. A series of recent publications synthesizes the science related to fire effects on flora, fauna, and air. These documents are useful in understanding how fire affects ecosystems including important post-fire plant regeneration information. The computerized Fire Effects Information System, available online, contains species and vegetation community specific summaries of what is known regarding fire effects and interactions.

In April 2003, the General Accounting Office recommended that the Forest Service and the Department of the Interior specify methods to monitor the effectiveness of emergency stabilization and rehabilitation treatments after wildfires and develop a system to disseminate monitoring results. The Wildland Fire Leadership Council chartered the National Burned Area Emergency Response Coordinators Group and assigned the group to take action on the GAO recommendations. The group has identified the major treatments and is establishing teams to identify protocols for

monitoring these treatments. An additional team is being established to develop methods to disseminate the monitoring results for use in management decisions.

Tahoe Experience

During the fire season of 2001, several major fires occurred on the Tahoe National Forest including the Gap and Red Star Fires. I want to share with the committee my experience with some of the issues faced in planning and implementing restoration projects after these fires, particularly impacts of delaying the implementation of salvage and restoration activities.

First, let me provide some perspectives on what it is that we are trying to achieve as we restore forest resources to the areas impacted by the Gap and Red Star fires. In terms of our management direction, most of the fire area was in a Land Management Plan allocation (Sierra Nevada Forest Plan Amendment) that emphasizes perpetuation of mixed conifer forest conditions in support of late-seral dependent species. Our management actions would thus be directed at re-establishing these structural and compositional elements on the landscape at the soonest practicable time.

The focus of Gap and Red Star Fires'proposed restoration work was only on high intensity fire areas where mortality exceeded 75% (due to provisions of the Sierra Nevada Forest Plan Amendment). The area planned for treatment was 737 acres on the Gap Fire and 1038 acres on the Red Star Fire.

Post-fire restoration projects typically include extensive environmental analysis and documentation intended to respond to the anticipated challenges of administrative appeals and formal litigation. The Gap Fire Restoration Environmental Assessment for the areas on the Tahoe NF was completed and a decision signed by June 2002, ten months after the fire, and operations began in October 2002 after the administrative appeal process was completed. The Red Star Restoration Project's Record of Decision was approved in November 2002, more than one year after the fire. After appeals were completed, work began in the non-roadless portion of the project in June of 2003. Most of the areas burned on private land were treated without comparable environmental analysis or public participation, by the end of November 2001.

Normally, trees 10 inches in size and larger may have commercial value. By the time operations actually began in the Gap Fire and Red Star Fire restoration work, deterioration was significant within smaller trees, and their value was no longer high enough to pay for their removal. Deterioration was less significant only on larger trees. Therefore, the minimum size of trees removed had to be increased to approximately 18 inches. As a result, many fewer trees were removed when the project was conducted. This in turn meant there was less monetary return to the Treasury from the timber sales: reductions in the returns to the taxpayer were over $1.3 million for the Gap Fire area and nearly $4 million for the Red Star Fire area.

Beyond the economic costs I have outlined, there is an ecological cost that we must also weigh. The Red Star and Gap Fire areas occur within a fire regime that experiences a frequent fire return interval (30-35 years). By delaying treating in these areas, the trees that were killed by the fire may remain standing for a decade or perhaps two, but they will eventually fall to the ground and create a very significant dead fuel component that, with subsequent wildfire events, could consume the young stand that becomes established within these areas.

Through active management in some forest types, we can accelerate by many decades the development of large tree structure and we can better protect the replacement forest. By letting nature take its course for these projects, we run the risk of delaying or not achieving these objectives.

Summary

Mr. Chairman, post-catastrophic forest restoration is a complex process which begins almost immediately following a destructive event. Forest Service research works with managers to develop tools and information that these managers need to do their jobs better. Forest Service managers strive to use the best science available in their decision making. We realize there are questions still to be answered about the effects of our restoration activities, and we are working to find these answers. We also know that we would not be responsible stewards if we waited to satisfy all uncertainties before proceeding with our work.

We appreciate your willingness to listen to us today and look forward to your support for active forest management based on the best available science. This concludes our testimony. We will be glad to answer your questions.

Mr. WALDEN. Thank you very much. I appreciate your testimony.

I think what we will do is, rather than run out of time as you give your testimony, Mr. Shepard, we will go ahead and recess the Committee now. I think we have three votes, I believe, so probably be back in, I am going to guess, 30 minutes. We will try and reconvene then at 12:00 at the latest, and we will go from there. So meanwhile we will stand in recess.

[Recess.]

Mr. WALDEN. We will call the Subcommittee on Forests and Forest Health back to order. When we left off last we had heard from Dr. Ann Bartuska, Deputy Chief of Research and Development, and Mr. Steve Eubanks, and we were teed up to hear from Ed Shepard, the Assistant Director, Renewable Resources and Planning from the Bureau of Land Management, Department of Interior. Thanks for your patience as we went over and voted.

We welcome you, and please go forth.

STATEMENT OF ED SHEPARD, ASSISTANT DIRECTOR, RENEWABLE RESOURCES AND PLANNING, BUREAU OF LAND MANAGEMENT, U.S. DEPARTMENT OF THE INTERIOR

Mr. SHEPARD. Good morning, Mr. Chairman, and good morning, Congressmen.

The BLM manages 201 million acres of public lands, including 55 million acres of forest and woodlands. Approximately 2.4 million acres of these forest lands are in the O&C lands in Western Oregon, and intended to be managed primarily for timber production.

When events such as fire or blowdown occur, our goal as land managers is to stabilize and restore the resource. Restoration actions undertaken soon after the event are most likely to be successful, and conversely, delays in implementing treatments may jeopardize the successful restoration of the forest resources to its intended state.

Immediately after a fire, our focus is to stabilize the soil, reseed the area, and prevent non-native and noxious plants from becoming established. In some areas where severe burns have occurred and on some lands that have burned with moderate severity repeatedly, natural processes may satisfy Land Management objectives, but in other areas, we know that without management intervention forests will not return for many decades and resource objectives will not be met.

Potential restoration treatments are considered on a site-specific basis, and may include grass seeding to reduce erosion, reforestation to hasten forest establishment, stream enhancement to repair damages stream banks, and timber salvage to reduce future fuel loads, provide for public safety and recover the economic value of the resource.

Salvage is the process of preparing and offering a timber sale contract to remove dead or dying trees before the economic value is lost, optimally, within the first year after a fire. The Federal share of receipts from timber sold under this authority is paid into a permanent operating fund, and those receipts are used for further restoration work.

Since Fiscal Year 2000, over $21 million in receipts from the salvage of timber has gone into this fund and have funded other forest health treatments.

In considering alternative ways to address the restoration of a forest, the BLM follows environmental laws including NEPA. If, for example, a fire was relatively small or did not threaten a watershed and other resources, the BLM may do an environmental assessment. In such cases we are able to implement restoration within a few months after the event.

Up to a few years ago, preparing an EA was sufficient for most of our restoration work, and we were able to proceed rapidly. However, in other cases, restoration becomes more complex. It is not as simple as salvaging the timber and reforesting the damaged area. Management intervention may be needed for restoration of severely damaged watershed, wildlife habitats and other resources. So before implementing restoration actions that may have significant environmental effects, the BLM will do an environmental impact statement, and this can take a considerable amount of time, usually about 2 years, to complete an EIS.

However, we know that significant delays before undertaking restoration action can substantially reduce the success of restoration, increase our costs considerably, and reduce recoverable economic value by as much as 40 percent in larger diameter trees and 100 percent in small diameter trees. In fact, excessive delays can prevent us from taking any action at all.

A few examples of BLM's restoration actions are shown in the Oxbow Fire from 1966 and the Bland Mountain Fire more recently in 1987. The Oxbow Fire began on August 20th, 1966 and burned approximately 42,000 acres, including 27,000 acres in the Oregon BLM's Roseburg, Coos Bay and Eugene Districts. Immediately after the fire salvage of merchantable timber was started to protect against insects infestation, reburn possibilities and to recover the material. 510 million board feet of timber was recovered.

After 40 years of forest management treatments, the stands in the Oxbow Fire are now healthy and robust. Competition related mortality is occurring which is creating small diameter snags and down-woody material. These stands provide both ecosystem value and future timber production.

I have some slides of the area. This is right after the fire. You can still see smoke in the picture from 1966. From that photo point—go to the next slide—this was the salvage operation that was kind of the practice at that time. If this were to occur now, there would be more snags left. You can see snags on the ridge top. We would distribute them more throughout the area and we would leave more material down in the draws in the bottoms and the riparian.

Next slide. In 1983, from the same photo point, this is what the area looked like after several years of intensive forest management. The final slide, this was in 1985, this was that same area a little closer in. The area has been pretty commercially thinned, and they are fertilizing it right there with nitrogen fertilizer. It is anticipated that while this area is now ready, it is commercially available for commercial thinning, and we are looking at producing over 1-1/2 billion board feet of timber in the future, and it is also providing habitat for many of the species out there.

The Bland Mountain Fire began on July 15th, 1987 near Canyonville in Southwest Oregon, and that fire burned approximately

10,000 acres. Tragically, two local forest workers lost their lives in this fire, and there was significant property to residents, outbuildings and logging equipment.

Restoration in this area included planting trees, grass seeding on stream side areas, seeding and mulching of more than 27 miles of road and fire trails, and the salvage of 55 million board feet of timber.

Reforestation in that area overall has been very successful, and the stands reforested after the fire are currently 15 to 30 feet tall and are being thinned pre-commercially for future timber management opportunities and for wildlife habitat development.

In contrast within this fire area, there were small areas that were not restored, and those areas are now dominated by low shrubs rather than trees, and these areas are now being retreated at significantly higher costs.

Fire is not the only event that causes us problems. Wind and water also cause catastrophic damages, and in the winter of 95-96 a series of storms with heavy snows, followed by rain on snow events, and high winds occurred in BLM South River Resource Area in Southwestern Oregon. Many of the trees were blown down and broken off at 10 to 50 feet above the ground. Although this was an area where we had to do no immediate stabilization work, we did go in and do a lot of restoration work in there, including the salvage of 8 million board feet, treatment of slash from the downed material to prevent insects and fire danger, and planting new trees. Some of the areas we just went in there and thinned the area out and allowed the area to reforest itself because there wasn't that much damage.

Mr. Chairman, before I end my statement, I would like to thank you for your leadership in the Healthy Forests Restoration Act. This new law allows the BLM to use expedited administrative processes to get hazardous fuels reduction projects started, and we all know we would rather treat the forests earlier than wait until we have to come in after a fire.

Earlier this year, we issued guidance to our field offices on implementing the law, and we believe the additional tools this law provides will greatly help our efforts to reduce the risk of severe wildfire, and restore forests and rangeland health.

In conclusion, the BLM believes that all restoration tools, including salvage logging, should be available to us. To be successful, restoration tools must be used in a timely, cost effective and efficient manner. The BLM has been challenged over the past several years to find an approach to rapidly address restoration issues without being held up in lengthy litigation into other issues.

I thank you and I would be glad to answer any questions.

[The prepared statement of Mr. Shepard follows:]

Statement of Ed Shepard, Assistant Director, Renewable Resources and Planning, Bureau of Land Management, U.S. Department of the Interior

Thank you for the opportunity to participate in today's hearing on "Restoring Forests after Catastrophic Events." Although rangelands comprise much of the land administered by the Bureau of Land Management (BLM), we also manage substantial forest resources on the public lands. The BLM manages 55 million acres of forests and woodlands, 2.35 million of which are O&C lands in western Oregon. The O&C lands are managed primarily for timber production under the Revested Oregon

and California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands Act of 1937.

Over the years, some of these forests have suffered catastrophic events, usually fire, occasionally blowdown, often exacerbated by outbreaks of disease or insect infestation. In the aftermath of such events, our first priority is public health and safety. Our goal as land managers is to take the steps needed to stabilize and restore the resource. Those steps need to reflect the desired condition of the resource, as well as the science about ecosystem restoration. Our experience with post-fire resource rehabilitation indicates that in some cases an ecosystem that has experienced a catastrophic event will readily meet a desired condition of the resource when restoration actions are undertaken soon after the event. Conversely, delays in implementing treatments after a catastrophic event—whether due to litigation, weather, or other factors—may jeopardize successful restoration of the forest resource to its intended state.

Based on our experience with forest rehabilitation after several major wildfires, and drawing upon the best available science, the BLM has developed a multi-step approach to restoring the forest resource after a catastrophic event.

Immediately after a fire or catastrophic event, the BLM's focus is two-fold: 1) to stabilize the soil, re-seed the area, and prevent non-native and noxious plants from becoming established; and 2) to address short-term impacts to local communities, such as threats to public health and safety from fire-damaged hillsides and watersheds. Next, the BLM examines whether longer-term management interventions may be necessary to restore the forest and other resources (wildlife, for example). In some areas where severe burns have occurred, and on some lands that have burned with moderate severity repeatedly, natural processes may satisfy land management objectives without additional agency action. In other areas, we know that without management intervention, forests may not return for many decades. Indeed, some of these forests may remain as brush fields, and in some areas soils can be severely degraded.

When deciding which management interventions to consider, the BLM looks at several factors: the Resource Management Plan (RMP) objectives; the scope, intensity and severity of the event; the possibility of further on-site or off-site damage; the potential economic value of the resource; the timeframe desired to meet resource objectives; and the possibility of success and the cost of failure.

Restoration and potential treatments are considered on a site-specific basis. BLM considers several types of treatments, including: seedings to reduce erosion; reforestation to hasten forest establishment; timber salvage to reduce future fuel loads, recover the economic value of the resource, provide for the safety of forest workers, and prepare the site for future resource conditions to meet RMP objectives; stream enhancements to repair damaged streambanks; and erosion and runoff control structures. The tool or tools that are selected must be tailored to the site and to the intended objectives.

The removal of dead and dying trees, sometimes referred to as salvage, is among the various management tools the BLM may consider in restoring the forest resource after a catastrophic event. Salvage is the process of preparing and offering a timber sale contract to remove dead or dying trees before the economic value is lost, optimally within the first year after a fire. The Federal share of receipts from timber sold under this authority is paid into a permanent operating fund to be utilized for further restoration work. Since FY 2000, over $21 million in receipts from salvage timber sales and other forest health treatments have been deposited into this fund and used for additional restoration work and for the planning and preparation of additional salvage sales.

If salvage is an option, the agency must consider how much timber to remove and how much to leave for wildlife habitat, nutrient cycling, and other ecological functions. Again, this is a site-specific determination. If too much material is removed, site productivity can be affected. If too much material is left, there is a risk of insect and disease attack as well as potentially heavy fuel loading that may drive future wildfires.

Depending on the size of the fire and the complexity of issues involved, the BLM may prepare an environmental assessment (EA) or an environmental impact statement (EIS) to consider alternative ways to address the restoration of a forest. This process also gives the agency and the public a chance to evaluate the possibility for economic recovery of the trees killed in a fire or other catastrophic event.

Beyond the immediate stabilization of a fire area, the BLM is required to follow all environmental laws when preparing restoration projects, including the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA). In the past, BLM relied on documentation included as part of our land use planning process to cover the majority of our restoration actions, and we were able to include

these documents by reference with an EA. In such cases we were able to implement restoration within a few months after an event.

More recently, however, on the advice of agency counsel and in light of certain trends in court decisions, we are preparing EISs before implementing those restoration actions that may have significant environmental effects, which can take considerable time to prepare. Significant delays before undertaking restoration actions can substantially reduce the success of restoration, increase costs considerably, and reduce recoverable economic value by as much as 40 percent in larger trees to 100 percent in smaller diameter trees. Excessive delays can prevent us from taking any action at all.

The following are two examples of forest restoration actions following catastrophic events: the Oxbow fire (1966) and the Bland fire (1987).

Oxbow Fire: The Oxbow Fire began on August 20, 1966, and burned approximately 42,274 acres, including 24,359 acres managed by the BLM, 17,601 acres owned by the International Paper Company, and 915 acres of other private land.

Within a short time after the fire, salvage of all merchantable timber began to protect against insect and reburn possibilities. Salvage logging in the Coos Bay, Roseburg, and Eugene BLM Districts resulted in 82 timber sales contracts, representing 510 million board feet, purchased by 20 separate timber companies.

In the 40 years since the Oxbow fire, the vegetation pattern of the area has changed considerably. The current vegetation pattern reflects years of forest management treatments following the Oxbow Fire. At present the stands in the Oxbow Fire are healthy and robust. Most of the stands are classified as Pole-young: that is, pole—5 to 11 inches in diameter at breast height, and young—11 to 21 inches in diameter at breast height.

Within the stands, competition-related mortality (suppression) is occurring, creating small diameter snag and down-woody (suitable for nesting) material. Most of the stands are ready for commercial thinning, or will be ready for commercial thinning within the next ten years. These stands currently provide both ecosystem values and future timber production value. Estimated commercial volumes will be 1.5 billion board feet in thinning and regeneration harvest over a ten year period. Without years of forest management treatments these stand would be decades behind their present condition.

Bland Mountain Fire: Near Canyonville in southwest Oregon, the Bland Mountain Fire began on July 15, 1987. Approximately 10,000 acres burned, including 4,000 acres of BLM-administered land and 6,000 acres on private lands. Tragically, two individuals lost their lives in this fire. Property destruction included eleven residences, 18 vehicles, twenty outbuildings, the loss of two log yarders, one log loader, and one dozer.

Restoration activities on the BLM-managed lands included: tree planting on all burned BLM acreage; grass seeding on 790 acres of stream side areas; creation of 140 waterbars; creation of one 8,000 cubic yard capacity sediment pond; seeding and mulching of 27.3 miles of roads and fire trails; creation of 320 temporary sediment catch basins and check dams; and 55 million board feet of timber salvage.

Reforestation has been successful overall on both BLM and private lands. Trees planted post-fire are currently between 15 to 30 feet tall. Stands reforested after the fire are currently being thinned for future timber management opportunities and wildlife habitat development.

In contrast to areas with active restoration management, small areas which were not restored are in distinctly different condition. These are dominated by low shrubs, rather than trees. These small areas are actively being restored. However, the delay in active restoration has resulted in a delay of future timber harvest opportunities of approximately 20 years.

While fire is the most common cause of damage to forests on lands managed by the BLM, wind and water may also cause catastrophic damage requiring restoration measures. In the winter of 1995-1996, for example, a series of storms—heavy snows, followed by rain-on-snow events and high winds—occurred in the BLM's South River Resource Area in southwestern Oregon. Most of the trees on 500 acres of BLM-managed forests (at elevations of between 3,500 to 4,000 feet above sea level) were blown down or broken off at 10 to 50 feet above the ground. Unlike in a fire, no emergency stabilization measures were needed. In the spring of 1996, the BLM initiated an EA on management actions to salvage the broken and blown down trees, and undertook various restoration actions. Under the Standards and Guidelines of the Northwest Forest Plan, nearly 8 million board feet of timber were salvaged. On some sites, the BLM burned the remaining slash [debris] and planted new trees. At other locations, the BLM removed relatively few trees—similar to a thinning—and allowed the area to reforest itself.

The Healthy Forests Restoration Act (HFRA) [P.L. 108-148], signed into law on December 3, 2003, gives Federal agencies additional tools to reduce the risk of severe wildland fire and to restore forest and rangeland health. HFRA recognizes that delays in critical fuels treatment and forest and rangeland restoration projects place rural communities, as well as ecological values, at risk of damage or destruction by wildfire. The new law authorizes federal agencies to use expedited administrative processes on hazardous fuels reduction projects. We thank the Congress for passing this important legislation.

The BLM believes that all restoration tools, including salvage logging, should be available for use by our resource managers. To be successful, restoration tools must be employed to meet land and resource management objectives in a timely, cost-effective, and efficient manner. The BLM has been challenged over the past several years to find an approach to rapidly address restoration issues without being held up in lengthy litigation.

Thank you again for the opportunity to testify. I would be glad to answer any questions.

Mr. WALDEN. Thank you, and thanks to the other panelists for your testimony on this first panel, and I appreciate your comments on the Healthy Forest Restoration Act. It was, as you know, a bipartisan measure that achieved I think unanimous vote in the Senate and overwhelming vote in the House and is being, hopefully, implemented aggressively across the country so we will have healthier forests, safer communities and protect habitat and watersheds.

It is my hope that we could find out of the information we gather here from all sides and across the country in field hearings I hope to hold soon, the kind of data we need to figure out if there is a way we can expedite the process in a post-catastrophic event so that we can protect the environment—I don't want to do any degradation there—but so we don't lose the value of these trees while they still have value, and moreover, so we can get in and do the reforestation, prevent the invasive species and noxious weeds from taking over while we wait to act. It just strikes me if we are going to be true good stewards and true to the sort of philosophy that Theodore Roosevelt and others put forward in the beginning about protecting these forests, we need to put a better strategy for moving quicker while still fully involving the public, including rights of appeal.

I appreciate, Dr. Bartuska, your statement that in the presence of some uncertainty action is still often warranted. But I question that there's a huge gap of information and science in some forest types and regions. For example, I wondered if you have seen this book, "Reforestation Practices in Southwestern Oregon and Northern California?" If so, do you find that useful, and those in your agency?

Dr. BARTUSKA. I have not personally seen that particular reference, but my suspicion is that many of the authors are people we have been working with over time.

Mr. WALDEN. I want to go to Mr. Eubanks. What did the Forest Service learn about the forest restoration efforts after the 1960 Volcano Fire? I understand you may have some slides you can share with us.

Mr. EUBANKS. Yes, I have actually I think three photos, and maybe we could take a look at those. Basically the fire was a very large fire in 1960, had extensive—

Mr. WALDEN. Where was it?

Mr. EUBANKS. It was in the area around Forest Hill in California. It is the west slopes of the Sierra Nevadas, the lower west slopes, not too far out of the town of Auburn and about an hour out of Sacramento.

It had an extensive amount of high-intensity fire, and similar to the photos that the gentleman from the BLM showed, in those days we did fairly extensive salvage logging, and probably by today's standards not real gentle on the sites and on the forests in terms of our approaches. But we did extensive salvage logging and restoration on national forest lands.

This first photo shows the difference between national forest that was in fact treated; it was salvaged, planted and thinned over time, and—

Mr. WALDEN. What are those three—

Mr. EUBANKS. That is on the left-hand side.

Mr. WALDEN. Are those pine trees or—

Mr. EUBANKS. Those are primarily pine trees, yes, but it is somewhat mixed conifer. There are other species there as well. What was planted was primarily Ponderosa pine. On the right-hand side of the photo is unrestored private land, and I think you can see the contrast in that particular photo, and I would like to move on to the next one.

This basically is a ground level photo today of the brush that is growing on private land where no restoration activities occurred. Then I would move on to what the forest looks like today.

Again, this is a photo just recently, within the last few weeks, of the area that was restored, and I think the difference is that regardless of whether we would do that intensive a management today, the fact is that there is a reasonably healthy forest growing there today, and it provides the values of a forest, and over time that will move to an old forest situation. Our management focus would be getting back to a more open large forest situation that provides good wildlife habitat, protection for soils and water.

This particular area is now being actively thinned to provide better fuels treatment over time. The trees are large enough that they actually have economic value after about 44 years.

Mr. WALDEN. There doesn't seem to be too much doubt about the outcome when forests are not reforested quickly. I mean we have seen this on the Mt. St. Helens example. We see it in this example, in the Volcano Fire. I wonder, are those brush fields, I assume, pretty big fire hazards compared to the forest?

Mr. EUBANKS. Certainly the issue would be that if a fire went through those brush fields, it would be very difficult to maintain any kind of control. Those are the kinds of situations where if you have any kind of fire danger like this time of year, you kind of back off to some kind of a control area and hope that you can stop it.

Mr. WALDEN. One of the things I would like to get answered is, what does the science show where landowners, whether they be private or public, go in and move quickly after a catastrophic event versus where they don't, with regard to soil erosion, effect on streams and habitat. I think that is the underlying issue. None of us wants to do anything that is going to worsen the situation for fish or fowl or the land. Does moving rapidly, is there science that

shows by doing what you did here, it is worse than what was not done on private land and vice versa? Can anybody address that?

Dr. BARTUSKA. During my testimony I mentioned work that had been done by two of our scientists that tried to get a handle on—of the 21 studies that had been done to that point, what were we able to learn? I think what we are finding is in some cases success is apparent, and you certainly have an ability to respond to soil erosion, minimize soil erosion, minimize sediment loading, maintain the healthy water quality and quantity, and get a good recovery. But that one case study put on another piece of the landscape doesn't necessarily end on the same point. I think what we are trying to do is fill in those gaps so that we have a better understanding for different forest types, for different types of soils and different conditions, that we increase our likelihood of success.

Mr. WALDEN. Is it possible, once you complete those studies or if there are others out there, to create some sort of template that could be applied to similar sorts of areas around the country when there is a similar sort of catastrophic event? In other words, western forests of Southern Oregon and eastern forests of Eastern Oregon, can you look at a Ponderosa pine forest with certain types of hillsides and say, OK, here is what science shows happens in areas like this, so here is where we should be able to come up with a recovery plan?

Dr. BARTUSKA. To me the ideal thing is exactly what you are talking about, would be a decision support tool for managers that would lay out, given certain characteristics, here are the treatments that one could do, and here are the outcomes that one would expect to achieve over a certain period of time. I think we have done that successfully in other areas. So the more we have studies like this, after the Biscuit Fire, after Hayman, and others that fortunately have not burned and we are still able to study, putting that all together gives us a much better understanding of management, and it is the same—it is making sure that we have a good understanding of what sites and what forest types and what the soils are doing, and use all of that to figure into our decision process.

Mr. WALDEN. I have overrun my time, unfortunately. Did you want to make a comment, Mr. Shepard? No, OK.

Mr. Inslee?

Mr. INSLEE. I would yield as much as the Chairman wants to consume, keep going. If you would want to just keep going, I bet you Mr. Renzi would agree too.

Mr. WALDEN. I do have a couple other questions.

Mr. INSLEE. Mr. Renzi, should we defer to the Chair?

Mr. RENZI. Certainly.

Mr. WALDEN. I like this chairmanship thing. It is pretty good. I have a gavel and all the time I want.

[Laughter.]

Mr. WALDEN. Thank you.

I guess what I am trying to get to, it seems to me that in some of these private landowner situations they are able to move quicker. In some they don't, which is of course the case. What I want to know—and maybe you can't answer this—but what I want to know is what is the outcome in 2 months, 6 months, 6 years?

I mean is there a short-term degradation but a long-term benefit by moving quickly? How do we analyze that, and how much—it just strikes me as amazing that every other landowner type, whether it is State, city, county, private, seems to be able to move quicker than the Federal Government. The question is, by moving quickly, do they cause environmental degradation or are they able to move in a way that is beneficial to the environment, but it is just the sort of regulatory scheme you all have to work under in the Federal Government?

Mr. Shepard, do you want to touch that one?

Mr. SHEPARD. The regulatory scheme that we work in under the Federal Government does slow us down. The foresters from the private land, they know what to do and how to do it. The science is there to support them. Our resource specialists know what to do and how to do it, but we do have to go through that regulatory process. There are questions raised. There is differences in the science from both sides, and we have to try to rectify that the best we can, but the quicker we can move into action on the ground, the quicker that we can get the forests back to our desired conditions that are the objectives that we put out in our land use plans, where industry, the timber industry or another private landowner, their objectives may be timber. It is to their advantage to get that timber, the reforestation done as quickly as possible. And depending if our objectives are maybe an early stage for big game or something like that, we may not take rapid action. But if our objective is timber or trying to replace an old forest quickly, the quicker we can get in there, the better we will be.

Mr. WALDEN. It strikes me now in the Biscuit Fire, having lost 80,000 or 90,000 acres of spotted owl habitat in late successional reserve, that the goal has been to protect the old growth because that is the spotted owl's habitat. It would seem to me therefore our responsibility to try and recreate that habitat as rapidly as possible. And some of the studies—and I know, again, everybody's got a little different science on this, but some studies indicate moving quickly can regenerate that forest in 50 to 100 years faster than delaying by even a few years.

Do you find that? I mean is that what your science shows in general?

Mr. SHEPARD. I think you will hear from Dr. Sessions who synthesized a lot of the science there and that supports that book that you held up, was the product of Forestry Intensified Research Program, the FIR Program, in Southwest Oregon, and I think a lot of what that showed is whether—you know you're trying to restore an area after a fire or reforest it after timber harvest, the quicker you can get in there, the quicker you're going to get conifers established because the brush species, particularly in Southwest Oregon and areas like that are—have a competitive advantage early on right after disturbance. So if you can get in there before they get themselves established, you may have a much better chance of success reestablishing a mixed conifer forest and getting the trees up to where they're going to be able to compete with the brush.

Mr. WALDEN. The other issue I would like somebody to address is—I believe, Dr. Bartuska, in your testimony, you indicated that reforestation need is roughly 899,000 acres, and last year the

Forest Service completed treatment on 160,000 acres, 79,000 of which regenerated naturally. It sounds like we are falling way behind where we should be on reforestation. Why and what can we do about it?

Dr. BARTUSKA. We are trying to treat our highest priority areas, and so the 160,000 value for 2003 reflects that, and we are doing that within the appropriation. I think where there are additional needs on the national forest, they are identifying that within program and trying to address those also.

But you raise a very important point, and that is, it is not all about active treatment. Some natural regeneration will take place, and I think we need to, through our analysis, determine where do we have to actually do some planting or do some aggressive treatment to get that restoration, or where do we just let nature take its course, so that analytical part is really critical.

Mr. WALDEN. Now go to my Ranking Member on the Committee, Mr. Inslee.

Mr. INSLEE. Thank you. Before I forget, I want to put in the record a statement by Dr. Jerry Franklin, Professor at College Forest Services at UW, if I may.

Mr. WALDEN. Without objection, absolutely.

[The statement submitted for the record by Dr. Franklin follows:]

Statement submitted for the record by Dr. Jerry F. Franklin, Professor of Ecosystem Studies, College of Forest Resources, University of Washington, Seattle, Washington

Our scientific understanding regarding how forest ecosystems are affected by and recover from major disturbances—including intense wildfire and windstorm—has increased dramatically during the last 20 years. Much of this ecological knowledge is not yet fully assimilated into forestry philosophy and practices. My objective in this testimony is to identify for you some important aspects of ecological science that need to be considered when developing plans for restoration of forests following stand-replacement disturbances by fire, wind, insects, and other agents.

A first principle regarding forest disturbances is understanding that intense forest disturbances invariably leave behind significant legacies of organisms and organic structures (e.g., snags and logs)—"biological legacies"—which are critically important to recovery of the forest ecosystem (Franklin et al. 2000). The concept of biological legacies emerged from research following the 1980 eruptions at Mount St. Helens where an incredible diversity of organisms and immense legacy of snags and logs survived the devastating disturbance and contributed to the rapid redevelopment of the ecosystems within the so-called devastated zone.

Legacies of snags, logs, and other woody debris are typically very large following an intense natural disturbance since such events kill trees but rarely consume or remove much of the dead wood. Even an intense wildfire typically consumes no more than 15% of the biomass and typically much less. A catastrophic windstorm blows down trees but consumes or removes essentially none of the organic matter!

Types and amounts of biological legacies persisting on impacted sites are probably the most important variable in assessing the actual ecological impacts of a disturbance because of their important roles in recovery. The most conspicuous and among the most important of the biological legacies are the surviving live trees, standing dead trees (snags), and logs and other woody debris on the forest floor and in the streams. The living trees, snags, and logs play critical roles in lifeboating many animal, plant, fungal, and microbial organisms, such as by providing essential habitat (e.g., places to live and hide) and keeping the microclimate of the disturbed site within acceptable levels. The trees, snags, and logs also greatly enrich the structure of the young forest as it develops, increasing diversity and rate at which species that have been displaced and which need structural complexity—such as Northern Spotted Owls—can return to the site.

So, how does this legacy of dead wood contribute to the recovery and ultimate functioning of the post-disturbance forest ecosystem? In earlier times we believed that once trees were dead they provided little value to the ecosystem or to recovery processes. In fact, they were often viewed as waste, potential fire hazard, and an

impediment to proper management. However, research during the last 30 years has shown the critical role that structures such as snags, logs and wood debris play in the functioning of forest and stream ecosystems including (Harmon et al. 1986; Maser et al. 1988):

- Provision of wildlife habitat;
- Long-term sources of energy and nutrients;
- Sites for nitrogen fixation;
- Seedbed for trees and shrubs; and
- Creation of fish habitat.

These and other functional roles of woody debris are well documented in the peer-reviewed reviews by Harmon et al. (1986) and Maser et al. (1988) and literally hundreds of articles that have been published since.

Snags, logs, and woody debris provide critical habitat for the majority of higher (vertebrate) animals (birds, mammals, reptiles, amphibians, and fish) and, probably, lower (invertebrate) animals (e.g., insects), as well. In many western coniferous forests the overwhelming majority of higher animals make some use of snags, logs, and woody debris and for many—including groups as diverse as woodpeckers and salamanders—woody structures are absolutely critical (see, e.g., Thomas 1979).

The larger and the most decay-resistant snags and logs are the most important ecologically. Larger snags and logs will serve a large array of organisms and functions than smaller snags and logs as well as persist longer. For example, large snags are necessary for large cavity excavators, such as the Pileated Woodpecker and large logs are critical elements in creating stable aquatic habitat. Large snags and logs of decay-resistant species—such as cedars and Douglas-fir—can also persist and fulfill habitat and other ecological functions for several centuries in terrestrial environments or even millennia, in the case of stream and river ecosystems.

The levels of biological legacies such as snags and logs that need to be retained following a major disturbance very much depends upon the natural resource objectives for the property and the natural disturbance regime of the site. Where recovery of natural ecological functions is a primary goal, removal of significant legacies of living trees, snags, and logs through timber salvage is not appropriate. This is particularly true in forest types and on forest sites where stand-replacement ("catastrophic") disturbance regimes are characteristic. It is sometimes argued that following a stand-replacement fire in an old-growth forest that snags and logs are present in "excess" of the needs of the site, in terms of ecosystem recovery. In fact, the large pulse of dead wood created by the disturbance is the only significant input of woody debris that the site is going to get for the next 50 to 150 years—the ecosystem has to "live" off of this woody debris until the forest matures to the point where it has again produced the large trees that can become the source for new snags and logs (Maser et al. 1988).

In conclusion, the scientific lessons regarding biological legacies and the importance of retaining snags, logs, and other woody debris are being applied in regular timber harvesting practices (i.e., structural retention) but have not yet been fully incorporated into restoration policy. Timber salvage may be carried out for economic reasons. However, timber salvage will rarely achieve any positive ecological benefit as has been pointed out in a recent article in Science (Lindenmayer et al. 2004). Timber salvage should be viewed as a "tax" or debit on the recovery process. Removal of large, decay-resistant snags and logs is particularly negative because of impacts on long-term recovery and stand development processes.

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Mr. INSLEE. Thank you. I want to talk about the, or ask you to distinguish something I think it is easy to lose the forest for the trees on this, and that is to distinguish replanting from harvest of

the dead and standing timber. I have seen pictures of some of these projects, or on the video, and on this picture and the like. Do they go hand in hand? For instance, can your replant successfully and remove none of the snags and stumps? Is there a relationship between those two? How do those two functions interrelate? That is for anyone who might tackle that.

Mr. EUBANKS. I can address that, particularly as it applies to the two fires that I spoke about, Gap and Red Star. We did in fact reforest the areas where we were able to remove almost no dead standing timber. It is not so much an issue of whether we can successfully plant the trees. We can certainly do that. I think the real issue is whether we can protect those trees in the long run, and whether or not they are going to be very susceptible to additional catastrophic wildfire. But we certainly can go in and plant them, as long as we do it soon enough that there is not a hazard from the dead trees to the planting crews. I mean if you waited too long there would be a hazard there just from falling material. But if we get in there soon enough we can certainly plant them.

Mr. INSLEE. So if your goal was solely kind of ecologically based, in other words, you wanted to build an old growth forest as rapidly as possible, economics was not an issue at all, is there a reason, would you want to clear-cut the dead timber for an ecological reason?

Mr. EUBANKS. I would say that we would not clear-cut on national forest in the traditional sense. In fact, our plans in these projects from the very beginning, called for leaving some of the largest dead trees for long-term habitat and for soil nutrient recycling, those kinds of values, but we would have removed a significant number of the large and smaller dead trees simply to provide protection in the long run from wildfire, the reoccurrence of wildfire, because as I mentioned in my testimony, these part fire areas are in true fire ecology systems. It is not a question of whether fires are going to come back, it is when they come back, and generally in these areas, we anticipate it would be less than 35 years recurrence of fire.

Mr. INSLEE. In the projects you made reference to, were those in stand replacement historic areas, where there had been stand replacement fires in the past?

Mr. EUBANKS. Yes. Although in the Sierra Nevadas, generally the magnitude of stand replacement fires was much smaller. It was one of those situations where there—you have certainly seen situations in the Pacific Northwest where you are that stand fires, even the stand replacement fires are very patchy. There are some areas of high intensity, some low intensity. That was normally the situation even in the Sierras. But what we are experiencing now are much larger areas of high-intensity fire than normally occurred because of the buildup of fuels over the last 100 years.

Mr. INSLEE. And because of the drought, do you think?

Mr. EUBANKS. Certainly that has an effect. That enhances the effect.

Mr. INSLEE. Again, taking the economics out of it, I was just referring to Dr. Franklin's statement here that I put in the record. He was describing recent research which has shown substantial ecological benefit of the deadened trees. Wildlife habitat, which you

mentioned, long-term sources of energy and nutrients, sites for nitrogen fixation, seed bed for trees and shrubs if they have other ecological values.

And he said something that is interesting to me. He said that only 15 percent of the biomass is typically actually consumed, even in a stand replacement fire, which is surprising to me.

But anyway, he suggests that there is, from a biological standpoint, value of the timber, dead timber, and you are saying there is also a benefit of reducing fuel hazard, of getting it out of there. How do you make a decision from an ecological standpoint? Where is the right balance there? Do you do it on a project-by-project basis, or is our science just too uncertain to really be able to figure out what the net balance is?

Dr. BARTUSKA. I just want to take a broad answer to that one, and Steve will follow up with his specific examples. I think the science does know enough that we can go in and look at certain of these ecosystems and determine where you would have on a landscape the value of leaving snags and down-woody debris where it adds to either the stream quality or to the structure of the forest. But it is also clear that if we want to take a part of that landscape and get it to the desired condition faster, which means bringing in the next generation of species and retaining them over time, then certain areas you will have to do some treatment.

I think part of our challenge, like the Biscuit Fire Recovery is—

Mr. INSLEE. Can I stop you just for a moment, because I think this is an important point.

Dr. BARTUSKA. Sure.

Mr. INSLEE. You said you have to do some treatment. Again, I am trying to distinguish the replanting from the removal of the snags, and you seem to lump them together. Maybe I misunderstood.

Dr. BARTUSKA. Those are all different kinds of treatments, so there are multiple things going on, and I think leaving—it is a deliberate decision, so it is a treatment, if you will, to leave dead and dying material as snags and as coarse woody debris. But similarly, if you wanted to take a piece of this landscape and move it to your future condition faster to ensure you have that late successional forest faster, then removing some of that material, harvesting some of that, and planting or possibly not—natural regeneration is still part of the picture—so you have all of these different pieces, and part of what we have been doing with I think the science is pulling those pieces together and then having the tools for managers to make some decisions.

The other thing I would like to just comment, in the big scheme of things we have been focusing on fire in the West, but this same scenario we dealt with it after Hugo in South Carolina, we dealt with it after Boundary Waters Canoe Area blowdown, where you had this huge tract, 10,000 acres of land, and if you had not done some treatment and recognized the role of downed material versus the regeneration, then we would have ended up with a very different forest. And certainly in South Carolina, we might have lost part of Charleston, South Carolina due to fire.

So I think those are all part of pieces that Jerry's very approximately pointing out you have got to look at.

Steve?

Mr. EUBANKS. Well, I would just mention Jerry Franklin is one of my mentors. I worked with him extensively in the Northwest, and so I respect what he is saying.

Your question was really along the lines, do we have sort of broad guidelines, or do we do some project specific assessment, and it really is project specific assessment. We try to take a look at the conditions that we are dealing with, and not use some broad brush guidelines.

I just mention that in the case of the Red Star Fire, the fire burned on the Tahoe Forest about 10,000 acres. Of those 10,000 acres we were proposing to come back in and actually do some salvage logging, replanting and restoration on about 1,000 acres, actually, 1,039 I think is the figure I used. And those were the areas that had at least 79 percent of the trees that were dead. So one of the things I would point out is that we had areas that had 74 percent of the trees that were dead that we were not treating, on down to that very low intensity fire. But we had lots and lots of acres out there that had extensive dead trees beyond what we were proposing to treat. We were trying to pick the strategic areas that we could best deal with that enabled us to restore old forests more quickly.

Mr. INSLEE. Just one more quick question if I can. In our decisions regarding harvest of standing timber now, what percentage decisions are made taking into consideration the economics of it, in other words, generating some stream of revenue for someone, and what percentage of these cases where that is really not an issue in the decision? In other words, are these decisions biologic, or are they economic, or both, and how do you distinguish those?

Mr. SHEPARD. It really depends on the objectives that you are trying to meet under the Land Use Plan which vary across different areas. If you take the Northwest, for example, under the Northwest Forest Plan, we have approximately 80 percent of the land that is in some type of reserve. Where we get large fires in there, we may do some salvage, but that is secondary to trying to reestablish there and move it toward an old growth condition because we are trying to manage for spotted owls and marbled merlet. Other areas with the matrix land, where we are managing predominantly for timber production off those lands. While we would not go in there and take off all of the dead material because there is value in standing dead and in down woody material, we would go in there and take out more trees in an area like that.

Mr. INSLEE. Thank you.

Mr. WALDEN. Thank you.

The Chair recognizes the gentlewoman from South Dakota.

Ms. HERSETH. Thank you, Mr. Chairman.

I want to thank each of you for your testimony today, and how this hearing and your testimony and that of others later on will help guide us as we go forward on the best way to be part of our future efforts to help forests recover from devastating fire.

I represent South Dakota, and we have had several major forest fires in the Black Hills National Forest in the past number of years, including the Jasper Fire, which affected 83,000 acres. It was the largest forest fire in the Black Hills in a century, and as

we have seen in South Dakota and some of what you have testified to today, the effect very large hot fires can have in inhibiting our efforts to fully recover the forest, and how they inhibit those recovery efforts. I certainly acknowledge how critical it is for the Forest Service to be in the best position possible and how we need to improve the manner in which you can go about undertaking the recovery efforts.

You had mentioned, Dr. Bartuska, at the outset, as it relates to the Healthy Forest Restoration Act, that most of the focus in on the fire safety issues prior to a devastating fire, and what we do in treatment management, thinning of the forests to reduce the fire hazard, whether it is because of disease, storm-fallen trees, other issues that we have had, just because of how quickly the Ponderosa pine in the Black Hills regenerates, that we have had in the Black Hills.

Recently, a couple weeks ago, when I was visiting with some of the folks with the Forest Service in the Black Hills, as well as individuals in the timber industry and others that live in the communities within the Black Hills, there has been what is called the Prairie Project, which has been a timber sale that included a lot of public input to try to find some consensus because of the public awareness in the Western part of South Dakota, especially in those communities near and within the forest about the fire hazards, the need for fire safety. One of the interesting things that came out of that discussion with the district supervisor is, because of some of the controversy in the past, what they did as it related to the consensus building efforts to get the public input to generate more levels of public trust, and to ask the first question, not how we are going to achieve the desired result for thinning or reducing the fuel hazard, but what do we want to see? What can we agree is going to be the best thing to see, you know, in this parcel of that sale?

When they sought the input and arrived at that consensus, the tools they then used became much less controversial, and it has been a really good example, in the Black Hills anyway, of how they can go about minimizing some of that controversy that has dogged these efforts in the past for thinning.

But now I want to move toward this recovery and restoration and rehabilitation, to ask you what your thoughts are, regardless of what legislation we have in place, regardless of the regulatory issues that come into play, directives, categorical exclusions. Those are going to be there. We can work toward what tools the Forest Service needs. But over and above that, your thoughts on how in this case we can find and try to develop that kind of consensus and that type of public input based on some of the science that you have testified about today to move forward, understanding the need to try to avoid some of the unnecessary delays and very lengthy delays that litigation can cause when we don't have that kind of consensus.

Dr. BARTUSKA. It sounds like you were involved in a very interesting process with the Prairie Project. I am not familiar with that one.

The only response I guess I would give to your remarks is that you hit a very important part of what researchers have been doing with managers, and that is the idea of developing data visualiza-

tion tools, so that whether it is in a public meeting or ourselves as managers, we can see what the condition is, what that forest is that we want to have, what it looks like, how it functions, but see it in front of us, and then manipulate it so that you could actually put different treatments on that landscape.

I mentioned the forest vegetation simulator. It is a really good tool to have a—it is computer generated, but it still looks like a forest. Then you change the condition of the forest based on different treatments, or you introduce a bark beetle outbreak or you introduce a fire. It allows a member of the public to see what each of those different forests will look like given this background. In some experiences we have had in the past that I am familiar with, on the Dixie National Forest some years back, and also in Colorado, those tools have been very important and effective to talk through the community about what they want from the forests, and I think that is a real good way of how science and management has come together.

Now, the challenge is, of course, backing up and saying, just as you indicated, "you have your desired condition. We agree that is what we want. How do we get there?" But I think seeing it and agreeing that this is what we want makes it a much better product at process.

Ms. HERSETH. I appreciate that, and it sounds in the sharing of information with people in the community and building that consensus, and you know, this really is, in addition to the testimony you have offered today about what we do to restore the health in a post-fire situation, but when we are looking at the political question here, and the local input involved in finding the consensus that I think is part of the key to moving forward in a way that even by some of the questions that have been posed and what science will tell us, from what I think you are saying there is the research projects that you are introducing, and even to a greater degree right in some of the other forests across the country as it relates to the restoration, the rehabilitation efforts, and then sharing the results of some of those projects as well as the efforts as they varied, understanding, as I think, Mr. Eubanks, you said that each, based on the unique ecosystems involved with our different forests, that a project-specific assessment is generally required in addition to what science may tell us more broadly. That is where I am just—if you have any other thoughts to share about how the Forest Service can go about improving the manner in which it seeks some of these—the local input, the public input, to find the consensus as it relates to the post-fire operation.

Dr. BARTUSKA. I think if I understand the question you have, clearly we have a commitment to working at the community level and being, because of the site-specific nature of some of our projects, even if we have these broad analyses ultimately you have to get it down to the local level, and I think over and over again we are trying to improve that particular community interaction. The example I gave was just to provide a tool to help improve that particular discussion and improve those kinds of communications.

Ms. HERSETH. Thank you, Mr. Chairman.

Mr. WALDEN. Thank you.

I believe Mr. Inslee has one more question, and then we will move to the second panel.

Mr. INSLEE. I wanted to ask you about the return on sales of harvesting of these salvage sales. My understanding, they go into the salvage sale account that is meant to be used for other salvage activities, restoration activities. Is that generally correct?

Mr. SHEPARD. Well, for BLM it is, and Steve would have to answer for the Forest Service, but I believe it is also the case with them.

Mr. EUBANKS. In the case of many of our projects, there is not just the Salvage Sale Fund, but it would also be Knutson-Vandenberg Fund, and Brush Disposal Funds. There are different kinds of cooperative funds that we use that would do further work on the project area. Knutson-Vandenberg can do fuels treatment work, but it can also do wildlife habitat improvement work, reforestation, further thinning later on down the line. Brush disposal work would deal with just fuels treatment of the materials that needed to be treated as a result of that project. Salvage sale would be one of the funds that we would also use certainly to use on future projects.

Mr. INSLEE. Let me ask you a hard question. You have a very difficult job balancing these multiple needs of the forests, partly in salvage sale situations, deciding what should be harvested, what should not. Those are really hard decisions that you have as professionals, to balance the community interest and all this, and some have suggested, myself included, that it is an unhealthy incentive to have the agency that is charged with that responsibility to have an incentive on one side of the ledger, in this case to make harvest decisions that would increase the revenues to allow you to fulfill your other obligation, that that is just a bad policy that creates an incentive for the Service to go this one direction rather than another. Then it would be asking you to engage in some sort of super human beneficence to sort of ignore that when you have to make these tough calls.

What would you say about that? In my view, this money ought to go to the General Fund so you are relieved of the decision or any economic incentive for your own agency on what you do. You ought to be driven by your policy decisions and the community input and not your own budget. What is your reaction to all that?

Mr. EUBANKS. If we had no guidelines under which we are operating to begin with, I think perhaps some of your fears might be realized. The bottom line is that we do have in fact a forest plan that guides what the desired future condition is. This really fits with what the Congresswoman from South Dakota was talking about in terms of looking at what we want in the future.

There has been a fairly broad consensus in terms of what we would like the forest to look like in the future, and that is what really guides our actions. It is not purely the economics. Certainly we are concerned about how do we get that work done and the economics that—if we decide ahead of time that we in fact want to have a salvage operation to provide long-term fire protection and protection of a new forest and get it established quickly. The quicker we do that, the more economic return there is. That is where the economic comes in. It is not in deciding what job we want to do ahead of time.

Mr. INSLEE. Thank you.

Mr. WALDEN. I want to thank the witnesses for your testimony today. The record will remain open for 10 days, and other members on the Committee who may have had other conflicts today may have questions they would like to submit. We would appreciate your response to those in writing.

Now I will ask our second panel of witnesses to prepare to come up to the table, and we appreciate your patience with us today. On Panel II we have Steve Thomas, who is the Assistant State Forester of the Oregon Department of Forestry; Mr. John Sessions, the Stewart Professor of Forest Engineering at Oregon State University; Chips Barry, the Director of the Denver Water Board; and Cate Hartzell, City Council Member, City of Ashland, Oregon.

We welcome all of you today. We appreciate your time, talent and input, and we look forward to hearing from you. Let me remind you that under our Committee Rules, you are supposed to limit your oral statements to 5 minutes. Your entire statement will appear in the record.

I would first like to recognize Mr. Thomas for his statement. Good morning, and we welcome you—or good afternoon. It is still morning in Oregon, but afternoon here. Welcome.

STATEMENT OF STEVEN R. THOMAS, ASSISTANT STATE FORESTER, OREGON DEPARTMENT OF FORESTRY

Mr. THOMAS. Good morning, Mr. Chair, and members of the Committee. It is a pleasure to be with you this morning. Oregon is very proud of the work that has gone on the Tillamook Burn, and I am pleased with the video you showed. Maybe I should just have you ask questions now. Dr. Moore did a pretty good job of trying to explain what has gone on there. Let me give you a few comments that may help your deliberations.

I want to talk to you briefly about the Tillamook State Forest. The Tillamook State Forest is on the Coast Range about 40 miles west of the City of Portland, with some of the most productive forest land in the world. The State has a forest there, Tillamook State Forest, 360,00 acres, of which about 250,000 acres were included in the Tillamook Burn, and the Tillamook Burn, as also mentioned by Dr. Moore, was one of North America's largest wildfires.

The Department has been engaged in the Tillamook for over 70 years, from the fire suppression efforts that started in the '30s up until the current day management. We are the managers of the Tillamook.

I will hit a couple highlights for you this afternoon, first talk a little bit about the fires, then about the rehabilitation reforestation efforts, and then finally close with where we are with the forest today. I also welcome the members of the Committee to come to Oregon if your work takes you there and have a tour of the Tillamook. Sometimes that is the best way to really see what is going on on the ground and what might be potentially available to you.

To start with, before the fires, the original forest covered the Coast Range with stands of large trees, and some of these were 3 to 7 feet in diameter. Very little logging had gone on on the Tillamook. By 1933, most of the logging had been on the periphery

of the forest and not on the interior, had been done with trains and steam donkeys.

But then there were the fires, four of them basically. We talk about the Tillamook Burn, and everybody thinks maybe it is one fire, but there were actually four fires that were at 6-year intervals, called the 6-year jinx, starting in 1933 and running through 1951. The fires devastated the landscape and the economies of the surrounding area. Coming on the heels of the Great Depression, it was a devastating blow for all of Oregon.

The 1933 fire was the largest fire. The first 10 days had burned 40,000 acres. Then in 20 hours it burned 200,000 acres, so 240,000 acres in basically an 11-, 12-day period, but most of that coming in 20 hours. In total, the four fires burned around 350,000 acres, of which 250,000 of that eventually came into State ownership.

So despite this devastation, there was lot of early visionaries that foresaw a new forest from the ashes, and what followed was the beginning of a remarkable transformation of the landscape. The transformation occurred generally in two specific periods, and I think what is interesting here is the longevity of this transformation. It did not happen over night.

The first period was from 1933, which was the date of the first fire, to 1948. Not much reforestation occurred in the Burn during that period of time because no one had undertaken a project of this magnitude, so there were many questions to be answered.

In addition, the salvage logging was underway, and these were fairly large logs, and so salvage logging went on for years, and some records indicate that 7 to 10 billion board feet of the 13 billion that were destroyed in the fire were eventually salvaged from the burn. Many questions about who should own the land. Many of the private landowners have gone tax delinquent. So should the counties own the land? Should the state own the land, or should the Forest Service own the land? Who was going to undertake the restoration of this forest? Who was going to finance it? How was it going to be financed? No one had undertaken a project of this magnitude. And how would public funds be acquired to do that? Eventually the funding was put up by the State of Oregon. There were no Federal funds involved in this project.

Planning. We have several research projects underway, and plans put together so that people have some idea, if this project was undertaken, how it would be accomplished.

In addition to that, remember, between 1933 and 1948 there were two additional fires in the Tillamook Burn, the 1939 fire and the 1945 fire. While these actually increased the size of the total burned area, they also reburned a significant amount of the burn. So there were a number of people who were hesitant about reforesting the burn until it could be fireproofed and they didn't want to invest the money until they felt it wasn't going to burn up again. I might add there was a fire in 1951, and it was mostly within the old burn.

So there was a big challenge for Oregonians, the size of the area, the logistics required, the organization of people, equipment and funds, the need for seed and seedlings. It wasn't until about 1948 that things really got underway in terms of reforesting the burn.

In 1948, Oregonians passed a constitutional amendment that allowed for funding of the reforestation's rebonding process.

That really started the second phase of this reforestation/rehabilitation effort, which went on from 1949 to 1973, 24 years. During that period approximately $12 million were spent, millions of trees planted, billions of seed dropped from helicopters, 220 miles of firebreaks belt to get the snags out of the way so that it wouldn't burn up again, and many Oregonians were involved, contractors, inmate crews, volunteers, school children. It was an effort by all Oregonians to reforest and rehabilitate the burn.

So what is the legacy of that fire, the salvage and the replanting? Well, the result is—and I would like to have quite as glowing a report as Dr. Moore made—but the fact is we have a very densely packed, even-age, single species forest, which today is probably what we do not necessarily want for the future forests. Nearly 65 percent of the Tillamook is in this type of forest structure, providing limited biodiversity.

Our view of biodiversity today would have a variety of tree species, ages, and forest structures across the landscape. These conditions are not prevalent on the Tillamook today, and that knowledge informs our activities and plans for the desired future condition of the forest, which would have about 50 percent of the forest being an older forest structure, and the remaining 50 percent being through regeneration through younger stands.

Some ask what would the Tillamook look like today if no rehabilitation and reforestation occurred. Remember, some of the recommendations were to turn this into grazing land, and some said put a super fire line around it and just let nature take its course. Neither of those particular alternatives were followed up on.

Certainly some regrowth would have occurred. The problem was that due to the multiple burns and the complete loss of seed sources within the area, I mean it would be difficult to imagine a landscape that would have a vigorous forest upon it. A much higher degree of alder and brush species would exist, and we would expect much lower levels of habitat recovery. Thanks, however, to our predecessors, the former Tillamook Burn is a productive forest which grows like a sea of green across this stretch of the coast range.

An interesting sidelight is that the sea of green is valued by all Oregonians, no matter what their view on forest management might be. During the last State legislative session two bills were proposed. One person called them bookend bills. One bill said we ought to manage to forests for timber production. One bill said we should set 50 percent of the forest aside for reserves and old growth, and grow old growth, and then manage the other 50 percent. Both of those groups, with quite different values on how forests could be managed, saw the value of the Tillamook in being able to achieve their goals in the future. So the foundation that we have out there allows many pathways for Oregonians to manage their forests into the future.

Today we manage the forests to provide a sustainable flow of social, economic and environmental values, and at the same time we manage today to leave options available to the future. The rebirth of the Tillamook Burn into a healthy and sustainable forest is one

of Oregon's most dramatic success stories, and it is a forest and a story that will continue to grow, and one that we will continue to tell.

Thanks in part to strong support from the Oregon Congressional Delegation, including Representative Walden, I am proud to say that next year we will open a forest education facility known as the Tillamook Forest Center to help share the incredible story of recovery and sustainable forest management with hundreds of thousands of visitors. The landscape of the Tillamook has witnesses dramatic change in the last century. The events that played out there have defined the times and shaped the options we have available today. The decisions we make today are thus linked to the past and will in turn shape the future.

Thank you very much for inviting me.

[The prepared statement of Mr. Thomas follows:]

Statement of Steven R. Thomas, Assistant State Forester, Oregon Department of Forestry

INTRODUCTION

Good Morning Mr. Chair and Members of the Committee. My name is Steve Thomas and I serve as the Assistant State Forester for the Oregon Department of Forestry—based in Salem, Oregon—responsible for the management of just under 800,000 acres of Oregon's state-owned forest land.

As Representative Walden has no doubt told you, and perhaps many of you have seen, Oregon has been blessed with rich and diverse forests that blanket nearly half of our state. There are 28 million acres of forestland in Oregon—our total statewide land mass is just over 64 million acres.

I am very pleased to be here this morning to address the past, present and future of one particularly renowned piece of that 28 million acre forest landbase: the 364,000-acre Tillamook State Forest, located in the far northwest corner of Oregon.

We offer to the committee our experience with the restoration and management of the Tillamook, for over 70 years, from fire suppression to the current day management of the forest.

FOCUS

I come before you as a person who knows the Tillamook as an Oregonian, a Forestry Department employee, and more recently as a person who has helped set policy for the future of the forest. This morning, I will highlight key chapters of the Tillamook State Forest Story:

- How the original forest was devastated by a series of wildfires in the 1930s and 1940s;
- How rehabilitation and reforestation brought communities together, while also beginning to restore the forest;
- How two generations of forest management created options for the future;
- How sustainable forest management today in the Tillamook seeks to address social, environmental and economic values.

I have submitted additional materials to staff, that will be entered into the record. In addition, we welcome members of the committee to a tour of the Tillamook State Forest should your work afford you an opportunity to visit Oregon.

OVERVIEW AND EARLY HISTORY

To begin, I felt it would be helpful to describe where this forest is: The Tillamook State Forest is located in the northern Oregon Coast Range Mountains, about 40 miles west of Portland. The forest covers about 364,000 acres, roughly 570 square miles.

Understanding the history of this forest is crucial to understanding the challenges and opportunities we face today and in the future. For the most part, the outline of today's Tillamook State Forest follows the footprint of areas burned during the 1930s and 1940s. Prior to the fires, the entire area was privately owned. The story of the Tillamook (and really of any forest) is defined by change. Here's one interesting facet of that: The nearly complete change of property ownership in the Tillamook, from private to state ownership as a result of the fires.

Before the fires, the original forest covered the coast range with large stands of old trees, openings created by wind, fire, disease, and many stands of vigorous

young trees. By 1933, when the first fire hit, there were few roads through the area, and much of the forest had not been logged. Steam donkeys and rail lines were beginning to operate around the edges of the forest, and communities at the forest's edge were depending on the jobs, raw material and revenue that came from these private forest lands.

But then there were the fires. Four of them, burning at six year intervals, devastating the landscape and the economies of the surrounding area. Coming on the heels of the Great Depression, this was a devastating blow for all of Oregon.

The 1933 fire, like those that followed, stemmed from a logging operation. At first, the loggers thought they could contain it, but it quickly outran them. CCC firefighters, conscripts, loggers and volunteers had all they could do to stay out of the way. Hard to imagine, but the 1933 fire burned 200,000 acres in 20 hours. That's an average of 10,000 acres—or 15 square miles—per hour.

In the hard years immediately after the fires, many landowners in the burned-over area stopped paying taxes and let their lands revert to the counties. The fires left behind a landscape virtually devoid of green trees. As far as you could see, only brown, gray and black.

RESTORATION AND TRANSFER TO THE STATE

Despite this, a spirit of cooperation, forged in part by the fires themselves and the hard economic times, began to arise about the Tillamook Burn. Early visionaries foresaw a new forest from the ashes.

What followed was the beginning of a remarkable transformation of the landscape. Remember that this is the depression. Remember that this entire landbase is privately owned. Salvage operations began, ultimately reclaiming about 10 billion board feet of timber from the 13 billion board feet burned by the fires. Companies—former rivals—banded together to create a consolidated company that salvaged and milled the burned timber.

Put in today's terms, the Tillamook Burn salvage era produced almost three times the amount of today's total annual timber harvest from all of Oregon's forests: state, private and federal combined.

In a series of agreements begun with the 1939 State Forest Acquisition Act signed by then-Governor Charles Sprague, these burned-over lands were transferred from the counties to the state. As new state forests, these lands would be managed to provide revenue for the counties and to provide a wide range of forest values for all Oregonians. This early vision shaped the forest we know today.

Then, there was the reforestation. It started modestly at first, as an experiment really. The challenge was formidable in every way. The size of the area, the logistics required, the organization of people and equipment and funds, the need for seeds and seedlings. It was a time of great innovation. Reforestation gained speed as Oregonians passed a constitutional amendment in 1948 to fund the reforestation process.

Hundreds of thousands of volunteers and contract tree planters helped restore the Tillamook Burn. In the period between 1949 and 1972, more than 72 million seedlings were planted by hand, creating a new forest from the ashes. More than a billion seeds were dropped from helicopters. Students from across northwest Oregon helped replant the burn. Though the territory they planted was less than 1 percent of the landscape, their memory of that collective act lives on today. One teacher, reflecting on the completion of reforestation, wrote: "We have completed our mission of planting trees and growing citizens."

THE LEGACY OF FIRE, SALVAGE AND REPLANTING

The wildfires of the 1930s and 1940s—and the salvage operations that followed—had huge impacts on this region. The volume of green timber killed by the fire has been estimated at 13 billion board feet. Natural reseeding processes were interrupted and in some areas seed sources were destroyed. Fish and wildlife habitat was devastated. The local economies and communities suffered lost wages, lost taxes, lost jobs. Land ownership patterns and practices were significantly changed.

At the time, common practice was to plant 1,000 trees per acre. That's different from what we plant today. Today, 400 trees per acre in the Coast Range is considered fully stocked, and that's with an eye toward early thinning. Of course, at the time, there was little science or empirical evidence to suggest how to accomplish this kind of project. The other element to note was that during the 23-year reforestation process, Douglas-fir was the only species of tree planted in The Burn. We know that Doug-fir was and is the predominant tree in this region, but there were plenty of other species, very few of which were planted at that time.

How does that legacy affect practices today and options for the future? Today we have a 570 square-mile forest of trees that are essentially all the same species and

all planted about the same time. This context poses plenty of challenges for today and the future. How do you create a forest management plan for such a vast even age single species forest? How do you work to restore biodiversity? The context of today's forest—shaped by the events of the past—means we have a lot of work to do. Getting the trees in the ground, as it turns out, may have been the easy part.

We have a very densely packed, even aged, single species forest. Nearly 65 percent of the Tillamook is in this type of "forest structure," providing only a narrow niche of habitat, and very limited diversity. Biodiversity comes through having a variety of tree species, ages, and forest structure or stand types. These conditions are not prevalent in the Tillamook today and that knowledge informs our activities and plans for the future.

What would the Tillamook look like today if there had been no rehabilitation and reforestation? Certainly, some regrowth would have occurred. But due to the multiple fires, and the complete loss of seed source in some areas, it is fair to imagine a landscape still struggling to support a vigorous forest; a much higher degree of alder and brush species; and lower levels of habitat recovery, particularly in riparian areas. Thanks, however, to our predecessors, the former Tillamook Burn is a productive new forest, which grows like a sea of green across this stretch of Coast Range.

Today, we manage the forest to provide a sustainable flow of social, economic and environmental values. And at the same time we manage today to leave options available to the future. The rebirth of the Tillamook Burn into a healthy and sustainable forest is one of Oregon's most dramatic success stories. And it's a forest and a story that will continue to grow, and one that we will continue to tell. Thanks in part to strong support from the Oregon Congressional Delegation, including Representative Walden, I am proud to say that next year we will open a forest education facility known as the Tillamook Forest Center to help share this incredible story of recovery and sustainable forest management with hundreds of thousands of visitors.

The landscape of the Tillamook has witnessed dramatic change in the last century. The events that played out there have defined their times and shaped the options we have available today. The decisions we make today are thus linked to the past. And will in turn shape the future.

Mr. WALDEN. Thank you. We appreciate your testimony too, and the State's work on the Tillamook.

I now would like to recognize Mr. John Sessions for his statement. Good afternoon and welcome.

STATEMENT OF JOHN SESSIONS, UNIVERSITY DISTINGUISHED PROFESSOR OF FORESTRY AND STEWART PROFESSOR OF FOREST ENGINEERING, COLLEGE OF FORESTRY, OREGON STATE UNIVERSITY

Mr. SESSIONS. Thank you, Mr. Chairman.

I am John Sessions, Professor of Forestry at Oregon State University. Last year I was lead author of a study to examine the cost of management delay on restoration following the 2002 Biscuit Fire, the largest fire in recorded Oregon history, burning more than 400,000 acres.

Most of the Biscuit is being managed for wilderness and to provide habitat for species that live in older conifer-dominated forests and for recreation and watershed production purposes. A small part is managed for multiple use, including timber production.

I want to make six points regarding opportunities to hasten forest regrowth and the costs of management delay after catastrophic fire in Southwestern Oregon.

Point 1: Natural recovery of large, intensively burned areas to mature conifer-dominated forest is typically slow and uncertain, and in this area, will take perhaps 200 years.

Point 2: Well-established silvicultural techniques can hasten conifer regrowth. We have learned through $25 million in research and more than 20 years' experience, that we can successfully plant and establish conifers in Southwest Oregon. With control of competing vegetation we can maintain rapid height growth, double the conifer diameter growth rate, and substantially reduce the time necessary to regrow a conifer-dominated forest. The science is very clear on this point.

Point 3: Conifer regeneration costs rise rapidly as a function of time since wildfire. Conifer forests, if planted immediately, can be reestablished at a fraction of the cost, than if delayed 5 years.

Point 4: Standing fire-killed trees, while having other values, contribute to future fire risk, including the potential of long-term soil damage.

Point 5: Salvage value of standing fire-killed trees declines rapidly. Delay results in lost opportunities to provide resources for society, employment, and to provide finds for restoration. Currently, by the time decisions are made and implemented on Federal forests, only the largest most commercially valuable species have remaining economic value. More rapid decisionmaking could provide a win-win situation where smaller dead trees could be salvaged while they have economic value, and larger dead trees left onsite for wildlife and other values. If agencies were allowed to move quickly to utilize the smaller dead trees that the industry is now geared for, the debate over salvage and over the large dead trees would be much reduced.

Point 6: Time is not neutral. The window of opportunity to rapidly restore conifer forests closes quickly. With regards to the Biscuit, the restoration decision have been made. The record of decision is now public. 4 percent of the burned area will be salvaged, 7 percent will be planted, and the majority will be left for nature to chart its course. On the actively managed lands, effectiveness of forest restoration and its cost now depends on whether wood products firms will take the risk of investing in fire-killed timber entering its third summer, and whether groups opposed to reforestation and utilization try to obstruct agency action.

My key message is there is substantial ecologic, economic and social costs to delays in post-fire restoration activities. They are large. They are important, and they are real.

Thank you very much.

[The prepared statement of Mr. Sessions follows:]

Statement of John Sessions, University Distinguished Professor of Forestry and Stewart Professor of Forest Engineering, College of Forestry, Oregon State University, Corvallis, Oregon

Introduction

Mr. Chair, I am John Sessions, University Distinguished Professor of Forestry and Stewart Professor of Forest Engineering at Oregon State University. I have advanced degrees in civil engineering, forest engineering and a PhD in forest management. I have been teaching and doing research in forest planning and transportation planning at Oregon State University for 20 years. I also provide strategic planning support to the Oregon Department of Forestry (ODF) on the Tillamook and Elliott state forests. I have prior experience in harvesting operations and management with the forest industry and 10 years experience with the USDA Forest Service at the district, forest, regional office, research station and Washington Office levels. I have provided planning advice and services to companies and agencies in 16 countries on five continents. Specific experience relevant to my testimony includes

hot shot crew fire operations experience, forest planning and fire modeling on the Congressionally mandated Sierra Nevada Ecosystem Project, the Applegate Project, and currently the Jackson County Wood Utilization and Fire Risk Reduction Project. In 2003 I was lead author of a study on management options on the Biscuit Fire that originated with a request by the Douglas County Commissioners, concerned about the large wildfires that occurred in southwest Oregon during 2002.

Wildfires that burn with uncharacteristic intensity can affect the natural recovery of conifer-dominated forests by elimination of conifer seed sources, creation of conditions for dominance by competing vegetation, and lock in cycles of fire and shrubs and hardwoods for long periods. There is a short window of time in which cost efficient management actions can be taken if rapid restoration of conifer-dominated forest is desired.

I am going to discuss the rapid restoration of conifer-dominated forests in fire-prone landscapes after uncharacteristically intense wildfire in order to describe the significant ecological and economic costs that can result from management delays in decision-making and implementation. I use the southwest Oregon Biscuit Fire of 2002 as a case study.

During the summer of 2002, the Biscuit Fire, the largest fire in recorded Oregon history, burned more than 400,000 acres over 54 days and cost more than $150 million in direct suppression costs. Most of this land was being managed for wilderness and old forest conditions to provide habitat for species that live in older conifer-dominated forests and for recreation and watershed protection purposes.

The seven points I will make are:

1) natural recovery of large, intensively burned areas of forest in southwest Oregon to mature conifer-dominated forest is typically slow and uncertain
2) under natural recovery, most or all the standing fire-killed trees will be on the ground many years before the new conifer forest can produce green trees and future snags to replace those now used by snag dependent wildlife
3) well-established silvicultural techniques can hasten conifer forest regrowth
4) conifer regeneration costs rise rapidly as a function of time since wildfire
5) standing fire-killed trees contribute to future fire risk
6) salvage value of standing fire-killed trees declines rapidly
7) the window of opportunity to rapidly restore conifer forests is closing

Natural Recovery

Historically, large areas of conifer forests that burned light to moderate in intensity reseeded naturally. Where seed is readily available and site conditions are conducive to Douglas-fir, the most common conifer in the Biscuit area, natural stands begin with seedfall of 100,000 or more seeds per acre yielding more than 1000 seedlings per acre. Over time, through inter-tree competition, the new forests self-thin themselves to often fewer than 100 trees per acre by age 160. Seed crops occur naturally at irregular intervals. Most conifer seeds are wind dispersed and the majority fall within one tree height; 90% within two tree heights with some seeds being found at distances of 800 feet or greater. Given that a seed falls, the chance of it developing into a successful seedling is less than one in a hundred.

On drier sites, with long distances to seed trees, naturally-seeded areas may develop slowly and restocking by conifers may require 100 years or more. Thus, natural recovery to the pre-fire conifer-dominated forest can be a slow process. Although Douglas-fir is the most common conifer in the Biscuit fire area, other conifers also occur. Three important conifers in the area, Port-Orford-Cedar, Sugar Pine and Western White Pine, are threatened by non-native diseases. Disease resistant strains have been developed. Nature, alone, will not guarantee the long-term survival of these species without planting disease resistant stock.

Snag Dependent Wildlife

Green conifers are now absent from large areas burned by the Biscuit Fire and snags are abundant for those wildlife species that utilize snags. On these areas, most or all of the fire-killed trees will be on the ground many years before green conifers return under natural recovery. Planting conifers followed by vegetation control could reduce the large conifer tree recovery time by half, thus hastening the return of green trees and replacement snags before the current snags have fallen.

There are tradeoffs between leaving many large fire-killed trees for wildlife and the impact that might have on conifer regrowth and future fire risk. There is no question the large dead trees are the most significant for snag-dependent wildlife and no question that they pose future risk from lightening strikes. The tradeoff entails how many to leave standing, where and how decisions for snag retention will both serve wildlife and reduce future fire and insect risks. More than half of the

intensely burned area is in Wilderness and will be left with high snag densities and natural recovery regardless of management decisions in the other burned areas.

Hastening Conifer Forest Regrowth

By far, the most significant problem facing young conifer regeneration in the southwest Oregon region is competing vegetation. Following wildfire, shrubs and hardwoods reoccupy sites rapidly from seed stored in the soil and scarified by the fire and from sprouting. At lower elevations, grass can aggressively reoccupy sites. All three are vigorous competitors to conifers. Grasses and shrubs also provide habitat for birds and seed-eating rodents. Much of the conifer-dominated forest that burned in the Biscuit fire was established during the waning years of the Little Ice Age. Current and likely future climates are more favorable to root-sprouting shrubs and hardwoods than when the burned forests originated. With limited amounts of soil moisture, competition from woody and herbaceous vegetation greatly reduces the survival and growth of conifers.

At the request of community leaders in the late 1970's, a major cooperative research and technology transfer effort called the Forestry Intensified Research Program (FIR) was initiated by Oregon State University and USDA Forest Pacific Northwest Research Station, with strong support from Senator Mark Hatfield and Congressman Les AuCoin. The ensuing basic and applied research greatly expanded our knowledge of forest ecosystems in the region and identified silvicultural practices for successful reforestation after wildfire or timber harvests. Some experimental treatments have now been continuously monitored for 23 years. It has been demonstrated that rapid planting of conifers after wildfire can have more than a 90% success rate, and with control of competing vegetation, it is possible to double conifer diameter growth rates and to increase height growth. This can substantially reduce the time necessary to regrow a conifer-dominated forest with large tree characteristics, which is precisely the forest conditions called for in the Northwest Forest Plan for much of the burned area. A tree's resistance to death by fire is related strongly to its diameter and height to the live crown. The more rapid the height growth, and the larger its diameter, the greater its chance of survival.

In the absence of human assistance, we estimate that the larger conifer trees (>18 inches diameter) that provide much of the character of mature conifer forest and most of the habitat for old-growth-dependent wildlife will take much longer to grow. On many sites, it will take 50 years or more to supplement the surviving larger trees, even with prompt regeneration, and up to 100 years to approach pre-fire conditions for 18-inch or larger trees. Without planting and subsequent shrub control, it could take more than 100 years to even re-establish conifer forests that will be anything like the pre-fire forests.

Conifer Regeneration Costs

As an outgrowth of the FIR Program and related regeneration studies in the Northwest, OSU researchers have estimated (1) the initial cost of a variety of regeneration options, (2) the declining probability of success related to time, and (3) the differences of success on north- versus south-facing slopes. Immediately following intense fires, conifer forests can be re-established at one-quarter to one-eighth the cost that will be required if planting is delayed five years. Three important conclusions can be drawn from examining regeneration costs: (1) the most cost-efficient method of establishing conifers is immediate regeneration; (2) planting delays beyond the first three years (or less with aggressive sprouting) can substantially increase costs through poor survival and high restocking costs if competition from weeds and shrubs is not adequately addressed; (3) when delays are unavoidable, herbicides for site preparation and release will dramatically reduce costs of establishment over other reforestation options. The use of herbicides could substantially reduce the out-year establishment costs and increase forest restoration success.

Future Fire Risk

The adage "lightning never strikes twice in the same place" is not true. Lightning frequency tends to be higher in certain areas, such as southwestern Oregon. Although we do not know when fires will start, we do know what conditions create fire hazards. These conditions include (1) availability of snags that are easily ignited; (2) forest litter (fine fuels) and shrubs that provide opportunities for rapid fire spread; (3) down wood derived from decaying dead trees that contributes to high-intensity fires; (4) tree canopies that extend to the ground, providing fuel ladders to the tree crowns; (5) dense forest canopies that provide conditions for spread of crown fire; (6) lack of access that can delay or prevent suppression, and (7) falling snags that create danger for firefighters. All of these contribute greatly to the difficulty in developing control strategies for new fires.

We estimate there is an average of more than 160 fire-killed trees per acre in the Biscuit fire area. These trees will fall over time and create small and large logs that, while providing habitat for many different species and slowly returning organic matter to soils, also will fuel the intensity of future fires. We estimate that high numbers of snags will persist for several decades and that down wood accumulations on the forest floor will grow as snags fall and/or deteriorate, reaching maximum levels in 40 years and remaining at those levels for several decades. The numbers of snags and amount of down wood will be higher in more severely burned areas and lower in less severely burned areas, but are indicative of the trend. Significant concentrations of dead and dying trees in the Biscuit area will leave the landscape prone to large, intense wildfires for at least 60 years into the future, further jeopardizing any potential for the forest to return to mature conifer dominated forest.

Salvage Value

If decisions are made to assist nature in forest recovery and reduce future fire and insect risks, actions could involve the removal of some fire-killed and fire-stressed trees. This is often referred to as salvage logging. We estimate that timber containing several billion board feet was killed in the Biscuit Fire. Much of the timber in this condition that is located outside of designated Wilderness is accessible and could provide funds to offset restoration costs. Past experience indicates that the recovery value of fire-killed timber will decrease as trees deteriorate from checking, fungal decay, and woodborer activity. Based on studies throughout the West, we estimate that approximately 22% of the fire-killed volume that existed immediately after the fire will be lost during the first year and by the fifth year, only volume in the lower logs of the larger trees will have economic value. By the summer of 2004, we estimate that the economic loss due to timber deterioration will already be in the tens of millions of dollars. Delay results in lost opportunities to provide materials for society, employment, and to provide funds for restoration. Often by the time decisions are made and implemented, only the largest trees of the most commercially valuable species have remaining economic value. More rapid decision making and implementation could provide a win-win situation where smaller trees could be salvaged while they have economic value while larger trees are left on site for other values. Consideration might be given to a national policy on post-fire restoration so that agencies can move ahead quickly and have the opportunity to utilize the smaller trees that the industry is now geared for and reduce the debate over the large trees.

In areas of limited access such as the Biscuit fire area, helicopter logging provides an opportunity to quickly remove fire-killed timber with little soil disturbance, and it can be done without the construction of any new roads, thus keeping roadless areas, roadless. Oregon is home to the majority of helicopter logging capacity in North America and the capacity exists to remove more than 2 million board feet per day. Helicopters were used to salvage significant volumes in the 1987 Silver Fire (within the Biscuit fire area) and the Rodeo-Chediski fire (White Mountain Apache Reservation, Arizona, 2002). Logs from fire-killed trees at the Slater Creek Salvage Sale (Boise National Forest, Idaho, 1993) were flown as far as 4 miles. Eight years of monitoring after the Silver Fire salvage showed no adverse effects on water quality.

Time is Not Neutral

Typical NEPA and sale preparation procedures now take up to 2 years. For green timber sales, this time investment may be reasonable given the costs and benefits of the proposed actions. After wildfire, however, the costs of delay are extreme. Green timber may increase 2%-6% in volume and value over the 2-year plan preparation and decision- making period. But, after a wildfire, fire-killed trees will lose more than 40% of their value during the same period, and delays in subsequent forest regeneration will further increase costs (Figure 1).

The Record of Decision for the Biscuit is now out, almost exactly two years after the first trees burned. The federal agencies propose to reforest 31,000 acres (about 7% of the burned area) and salvage 372 million board feet from 19,000 acres (about 4% of the burned area), primarily by helicopter. The effectiveness of these efforts now depends upon the speed of agency implementation, whether wood products firms will take the risk of investing in fire-killed timber entering its third summer, and whether groups opposed to reforestation and utilization of a small portion of the trees killed by the fire try to obstruct agency action.

There is evidence that agencies have begun to react to the urgency for restoration after wildfire. On June 28, 2003 the 21,000 Davis Fire started on the Deschutes National Forest in eastern Oregon. The Draft EIS was issued in May, 2004, less than one year after the first trees burned. The agency rationale for the aggressive

timeline—(1) rapid restoration of late successional reserves and (2) more timely salvage to finance restoration and to reduce future fire risk.

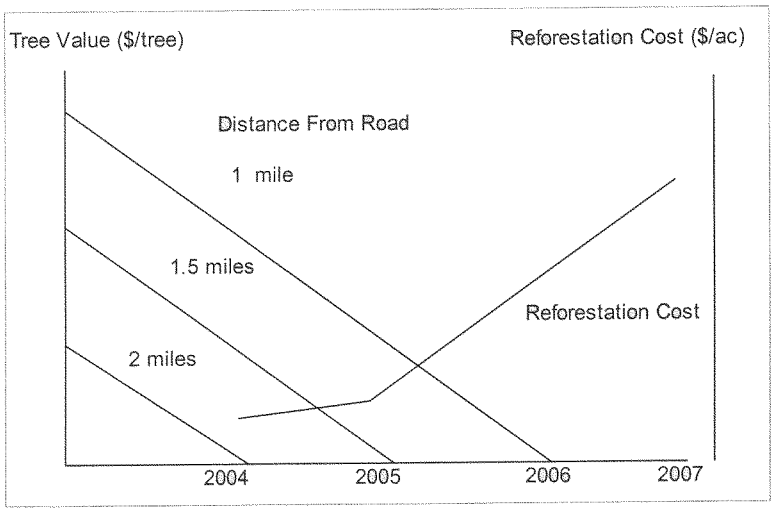


Figure1. Average salvage value of fire-killed trees as a function of distance from road and year, using helicopter logging, and cost of reforestation.

Mr. WALDEN. Thank you, Mr. Sessions. we appreciate your work and your testimony today.

Now I would like to welcome Mr. Chips Barry from the Denver Water Board. We appreciate having you back before our Committee.

STATEMENT OF HAMLET J. BARRY, III, MANAGER, DENVER WATER BOARD

Mr. BARRY. Mr. Chairman, thank you very much. I am pleased to be here again. I am Chips Barry. I am the manager of the Denver Water Department.

It has been many years since Teddy Roosevelt was here to testify, but I am going to be Teddy Roosevelt for exactly 30 seconds, and give you some enlightenment from Teddy, which is in fact relevant to these proceedings. Teddy said, "When wood and water are endangered, the political differences between men of power are dissolved." Point one.

Point two: "The water supply itself depends upon the forest. In the arid region it is water, not land, which measures production." Both of those things come from my message to Congress in 1902, and I thought you should here about them now before I revert to my later self.

I do think Teddy Roosevelt is extremely relevant to these discussions and this debate about what we do about forests, so I just had to do my little piece there for you.

Now let me talk a little bit about Denver Water and what we have done. Ryan has got some slides that he is going to run through, but the purpose is for me to explain a little bit about what happened to the watershed that serves Denver Water. We have had

two big fires, one in 1996 called the Buffalo Creek Fire. It burned 12,000 acres. We thought it was a big deal at the time. What happened to us after that was within a period of about 8 weeks. We got two inches of rain on top of the burned area. Two inches of rain then produced 400,000 cubic yards of sediment into one of our major reservoirs. 400,000 cubic yards was more sediment then we had received naturally in the preceding 12 years.

The picture at the top right, which you cannot see, but you may have copies of, shows you that after the Buffalo Creek Fire the surface of our reservoir was covered with porta-potties, driftwood, propane tanks, campaign yard signs, all kinds of stuff. It was an enormous problem, and the sediment beneath that debris was even a bigger problem. That was 1996. We did not have any time to do any rehabilitation, but we certainly learned a lesson. What we learned was when you have a big fire, you had better get in and move as quickly as you can.

In 2002, we had the Hayman Fire. Reference has been made in front of this Committee today, and I think I testified to your Committee in California about the Hayman Fire. The Hayman Fire burned 134,000 acres of land. There is the Hayman Fire. You can see in the middle of that slide is a black square, and in the middle of that square is Cheesman Reservoir. The intensely burned area was right around our reservoir. That is 8,000 acres of our land and 134,000 acres of the Forest Service land.

Having learned our lesson from the Buffalo Creek Fire, immediately after the Hayman Fire I had 50 people working in the forest for 5 days a week for more than 40 weeks, and we did everything that it is possible to do to rehabilitate a burned area because we feared again we might have a rainstorm of 2 or 3 inches, which could bring us as much as 2 million, 2 million cubic yards of sediment into that reservoir.

Now, fortunately, that fire was a year and a half ago or almost 2 years ago now, and we have not had a rainstorm of that magnitude. We can therefore say we have had reasonably good reclamation so far.

This illustrates an area around that reservoir where the area marked in yellow is where we had treated the area before the fire to do the kind of forest management that you need to do. We cleared the brush. We thinned the trees, no clear-cutting. Where that occurred, we did not have fire damage. We did not lose our structures around the reservoir, and where we had done forest treatment, we in fact avoided the major damage. Where we had not gotten to that yet, we had major damage.

We can go to the next slide. Here is what the area that burned looks like today. I cannot say it is completely reclaimed, but you can see we have reasonably good growth of grass. The areas has been somewhat stabilized. I want to now simply take you through basically what Denver Water did.

We put up 2,000 straw bale dams, 50 log sediment dams at a cost of $600,000. We did tree contouring and directional filling to the tune of $20,000. We did hydro seeding and hydro mulching to the tune of $200,000. We put on an aerial application of polyacrylamides. We hydro-axed—and a hydro-axe is a thing that looks like—it is the functional equivalent of a pencil sharpener that

you put at the top of a standing burned tree and grind into mulch in about 30 seconds. It is a remarkable machine. It really does look like putting a tree in a pencil sharpener. We spent $900,000 doing that, and we hydro-axed 400,000 trees in a space of about 2 months. It turns a tree to mulch and it is extremely helpful in getting revegetation started. We did salvage timbering on 1,700 acres. We salvaged 10 million board feet of lumber. We did that at no cost. We didn't make any money, but it didn't cost us anything to have it done. The people who came in and did it said they would do it for the value of the salvaged timber. We were not caught up in any of the forest service procedural delays, so we could do that almost immediately. We aerial-seeded 7,000 acres and we are now planting 25,000 pine seedlings a year for the next 10 years.

That is sort of the sum total of what we have done. We spent about 4-1/2 million dollars to rehabilitate our 8,000 acres. On the whole we have probably out spent the Forest Service 10 to 1 on an acre-for-acre basis. We are kind of the poster child for what you do after a fire, but I do have to tell you, until we get a 3-inch rain on top of the land we have rehabilitated, I cannot tell you that everything we did worked. I can say that we have worked very hard to make this as successful as we can.

That is a list of what we did. We built these sediment trash racks. We did 60 of those to catch the sediment. Then we got to go in and clean them out.

Another one, that just shows the straw bale applications. That is contour filling where we cut the trees and laid them horizontally across the slope. That is a completed series of treatments, where you see seeding, hydro-axe and mulching and contour filling all together on the ground.

One more. One last thing we did, we have built two enormous sediment traps, $850,000 apiece. They are in essence a leaky dam. It is interesting to go to a water utility that I run and ask your engineers to build a leaky dam. They had a little problem with the concept at first, but the concept is to let the water through and catch the sediment. We have built two of those on the major small tributaries coming into Cheesman Reservoir. They are successful. We are catching an enormous amount of sediment in those even from the small rainstorms.

That is sort of my sum total of what we have done. We did not rely on the Forest Service for help. We would get some advice from them from time to time, but frankly, their problem was much bigger than ours, and their budget was comparatively much smaller. So if I bring a message, it is the locals know what to do. If the Feds could help, that is terrific. We got in there and did everything we could do. We have been reasonably successful so far.

With that, I can see my light is on and I have exceeded by time either as me or as Teddy.

[The prepared statement of Mr. Barry follows:]

Statement of Hamlet J. Barry Iii,
Manager of Denver Water, Denver, Colorado

Mr. Chairman and Members of the Committee:

Thank you for allowing me to appear before you to address the important issues of forest health and the attendant protection of municipal water supply. The Denver Water Board is a municipal corporation that supplies water to almost 1.2 million

people: that is one of every four people who live in Colorado. Denver Water's supply is almost entirely dependent on water generated within the boundaries of watersheds located on Forest Service and other public lands. Denver's water system gathers diffuse surface flows originating on public watersheds and moves the water to treatment plants and drinking water systems located as much as 80 miles away from the water's origin. [See Exhibit "A"]

Denver Water has extensive experience in responding to and trying to prevent wildland fires in our watershed, while continuing service to our broad customer base. Since 1996 Denver Water has been the victim of six fires in its Upper South Platte watershed, a major water supply and delivery system for Denver Water. [See Exhibit "B"] The effects of these fires on Denver's system have varied, but the overall result is one of vitiated water quality and diminished reservoir capacity due to large amounts of fire-related debris and sediment filling our reservoirs. For example, approximately twenty miles of the South Platte River is subject to fire erosion that has resulted in severely reduced water quality, high stream turbidity, and diminished reservoir capacity due to foreign debris caused by the fire. To date, the costs of responding to the fire damage has been almost $8,000,000 and continues to grow. [See Exhibit "C"]

As a result of dealing with forest fire issues, Denver Water provides the following information that may be useful in your decisions regarding the appropriate level of federal response, including appropriations, to assist in recovering fire-degraded watersheds as well as establishing an effective fire prevention program:

1. Fuel reduction can control or limit forest fires. Select cutting and fuel reduction limited damage to Denver Water's property during the 2002 Hayman Fire. The fire began during times of drought, and was fueled by an overgrown, undermanaged forest. The fire burned for six weeks and consumed 138,000 acres in Denver's South Platte watershed. [See Exhibit "D"] The Hayman fire completely consumed trees on acreage surrounding Denver Water's Cheesman Reservoir. Denver Water was in the process of thinning our trees on its own 8,000 acres prior to the Hayman Fire.

In the areas where fire-prevention treatment was completed, the fire dropped from the tops of the trees to the ground, and fire intensity was diminished. Four caretaker houses, an office and maintenance facilities survived the fire. Of the 8,000 acres owned by Denver Water at the Cheesman site, everything burned to extinction except for the treated areas. [See Exhibit "E"]

2. Ongoing water quality and reservoir clean-up issues continue long after a fire is contained. Forest fires themselves are only the initial onslaught on the integrity of Denver Water's system. Denver Water's facilities and its water quality have suffered from the Upper South Platte Fires. For example, the Buffalo Creek Fire of 1996, dumped 400,000 cubic yards of sediment in Denver's terminal Strontia Spring Reservoir. This debris meant that after the fire and related flooding, Strontia Springs Reservoir received as much fire debris and sediment as had accumulated in the prior eleven years. [See Exhibit "F"] For this relatively small fire the water quality and clean-up costs were nearly a million dollars, with an estimated future cost of 15 to 20 million dollars to dredge this reservoir. It is estimated the after effects of erosion will negatively affect water quality at a cost of $250,000 annually for the next ten years.

Six years later, the Hayman fire dealt another blow to the Denver Water delivery system. As a result of the Hayman fire alone, it is estimated that more than 2,000,000 cubic yards of debris and sediment could erode into Denver's Cheesman and Strontia Springs Reservoir.

3. Restoring a watershed destroyed by fire is an expensive, continuous, and long-term process. Since July of last year, the following restorative efforts have occurred on the Cheesman Reservoir property:

- To stabilize soils and reduce erosion Denver Water crews and aerial contractors have applied more than 210,000 pounds of grass seed over 7,000 acres. [See Exhibit "G"]
- 2,000 temporary sediment dams have been created by placing nearly 30,000 straw bales in gullies to slow the flow of debris carried in rain runoff. Sediment dams are also created by contour felling of dead trees which is the process of cutting and aligning trees perpendicular to the slopes to prevent erosion.
- Mulching of standing dead trees helps break up hydrophobic soils and returns organic materials to the soil, replacing those destroyed in the fire. This was done in areas that were already seeded, providing mulch over the seed as well as removing unsightly burned trees.
- Salvage logging was very effective combined with the aerial seeding. Under private contract, 1,700 acres of burned land were logged by timber salvage companies. About 10 million board feet of lumber were salvaged. [See Exhibit "H"]

- To reforest the burned area on its property, Denver Water planted 25,000 ponderosa pine seedlings for each of the past two years and plans to plant the same amount annually for the next eight years.
- Aerial applied PAM (polyacrylamide) treatment was used to temporarily bind the soil and thereby reduce erosion. Use of PAM continues to be evaluated.
- Denver water spent $1,500,000 on two sediment dams in order to prevent filling Cheesman Reservoir with the large amount of debris and sediment from burned areas on federal lands. [See Exhibit "I"] The Goose Creek sediment dam contains about 14,000 tons of rock. The Turkey Creek sediment dam will be 140 feel long with a 40 foot high span. Both sediment dams are designed to be water permeable.

4. Costs of remediation to protect fire ravaged watersheds are high, but the aforementioned techniques are proven to control erosion and return the landscape to a native forested condition over a long period of time. The costs of the Denver Water response to the Hayman fire at Cheesman have totaled nearly $6,500,000. Federal help from the National Resources Conservation Service and the EPA has taken the form of technical advice and reimbursement of $2,490,000. Of course, future dredging costs have not been estimated, but fire debris and sediment have filled reservoirs, diminished storage capacity, and shortened their estimated useful life. As mentioned before, the costs of the Buffalo Creek fire are over $1,000,000 with anticipated reservoir and dredging costs of $15,000,000 to $20,000,000. Again the need for reservoir dredging has been accelerated by the fire-caused erosion filling the reservoir.

It is important for the federal government to stabilize their own land, not only to reduce the erosion that is fouling the water for Denver and other municipal suppliers, but also to assure a restoration of the forest environment. While expenditures are always of concern to a government, the damage caused on federal land has created a dangerous condition and endangered the public water supply that is an integral part of forest management.

5. Fire conditions on federal lands have not been sufficiently remediated, so that adverse impacts on municipal watersheds will continue and wildfire danger will remain high. In my opinion, Denver Water's experiences with the forest fires in the Upper South Platte can serve as a baseline for how to respond to large-scale wild fire watershed damage involving federal and private lands.

First, potential damage from forest fire can be significantly reduced by careful, deliberate forest management. Passage of the Healthy Forest legislation last year demonstrates Congress is aware of the activities that need to occur to protect watersheds from irreparable harm. It is useless, and perhaps unconscionable, to legislate a well-defined forest protection policy and fail to fund it adequately. There is too much fuel load in our forests, and these forests need to be treated and thinned regularly and scientifically.

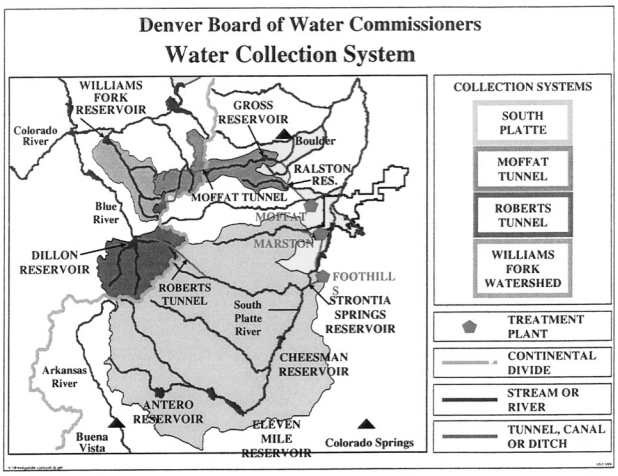
Second, sediment control measures, most of them small in scale, have helped to control fire caused erosion, but have not been severely tested by a large rain event. I am hopeful, but not particularly optimistic that we will succeed in preventing two million cubic yards of decomposed granite from moving downhill into our waterways.

Third, the federal government agencies, namely the Natural Resources Conservation Service, the United States Forest Service, and the Bureau of Land Management are occasionally helpful and usually sympathetic. However, their budgets are limited and the acreage they deal with is vast compared with our own. Following the Hayman fire, we out-spent these agencies nearly ten to one on an acre-for-acre basis comparing our land to theirs. The point is that to date municipal systems injured by a forest policy that failed to protect municipal watersheds cannot depend on the Federal Government to do a great deal for you no matter how big your problem is and no matter how much their actions contributed to it.

Fourth, Denver Water remains concerned about over-grown forests both publicly and privately owned. The "red zone" is the urban/wild land interface west of Denver over the entire Front Range. We have not discovered the right mixture of carrot and stick that will motivate private or federal landowners to treat and thin the forest on their property to avoid catastrophic wildfire.

The above observations lead clearly to the conclusion that the local government agencies know as much or more than anyone about the issues of watershed/wildfire and what will help alleviate future water quality, sediment and erosion problems. Based on our experience, any combination of these measures will work, but we need help from the federal agencies to solve problems on their own lands and to protect the watersheds that serve the forest as well as the people of Colorado. Congress has a blueprint in the Healthy Forest Act, now it needs to provide the money so restoration and wise forest management can occur on all federal land. I urge your support of the requests for funds to carry out the Healthy Forest mandates.

Exhibit A

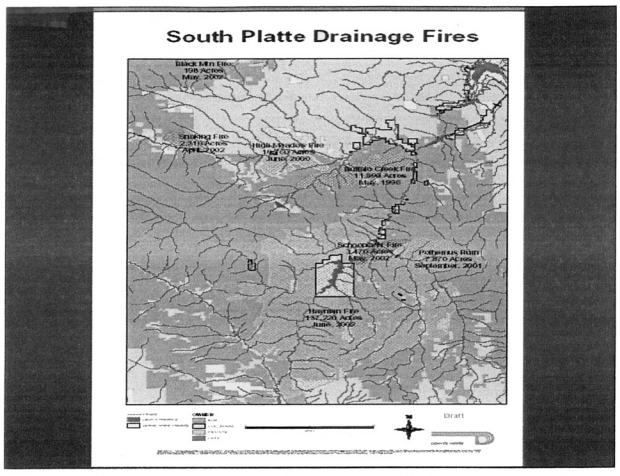


4 – major diversion collection systems – very diverse collection system both east and west slope of the continental divide

8 major reservoirs – 676,000 AF

Serve 1.1 million customers water

Exhibit B



6 fires since 1996 that have impacted our water supply watershed:

1996 Buffalo Creek

1998 Big Turkey

2000 High Meadow and Schoonover

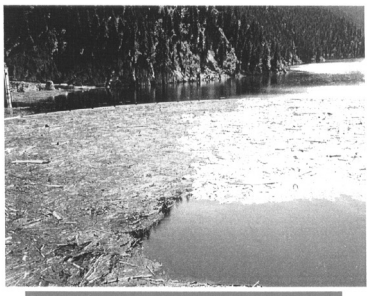
2001 Hayman and Black Mountain

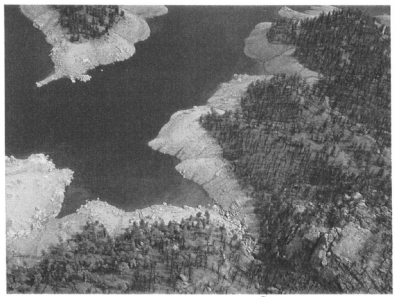
Exhibit C

Buffalo Creek Fire
Denver Water Costs

- Water Quality & Cleanup Costs
  = $903,743
- Estimated Future WQ (Dredging) Costs
  = $15,000,000 to $20,000,000
- Estimated Annual WQ Cost
  = $250,000

(10 Year Period)



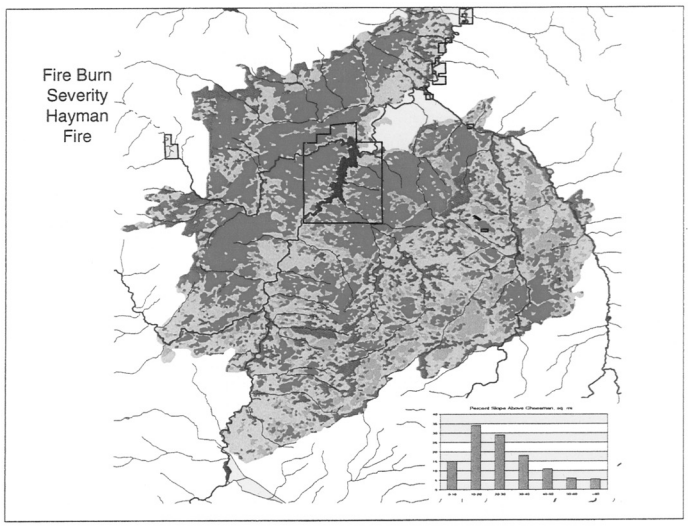


Hayman Fire

• To Date =	$4,600,000
• NRCS =	$2,400,000
Denver Water match =	$ 800,000
• EPA 319 Grant =	$ 500,000
Denver Water match=	$ 333,000
• Sediment Trap no funding	$ 1,500,000
• Prior Expenses DW=	$1,000,000
• Total =	$6,533,000

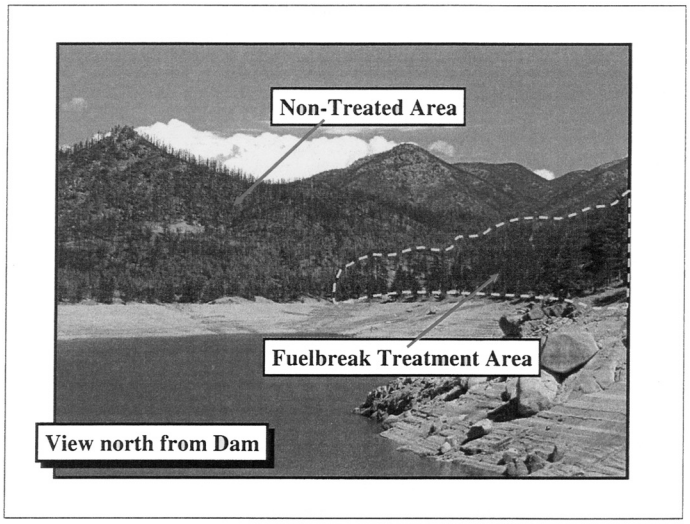
+ Timber Salvage of ±1700 Acres (Break-even)

Exhibit D



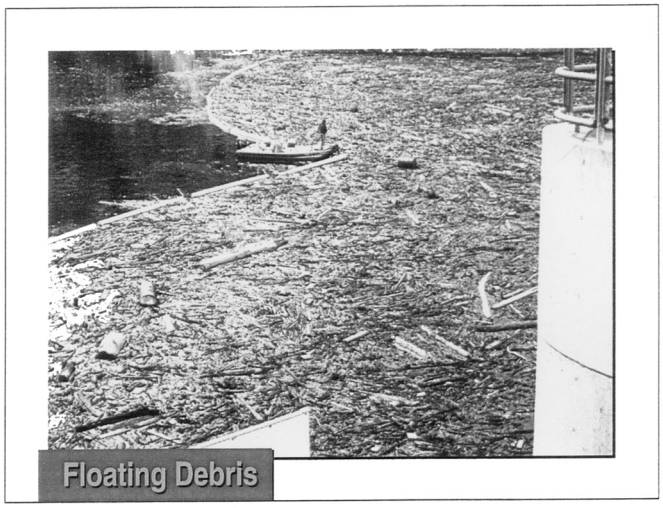
Hayman Fire burn 138,000 acres over 2,000,000 cubic yards of sediment is estimated to be eroding into Cheesman and Strontia Springs Reservoirs.

Exhibit E



Denver Water was in the process of thinning our trees prior to the Hayman Fire. In the areas that were completed the fire dropped down from the tops of the trees to the ground and provided defensible space for our facilities.

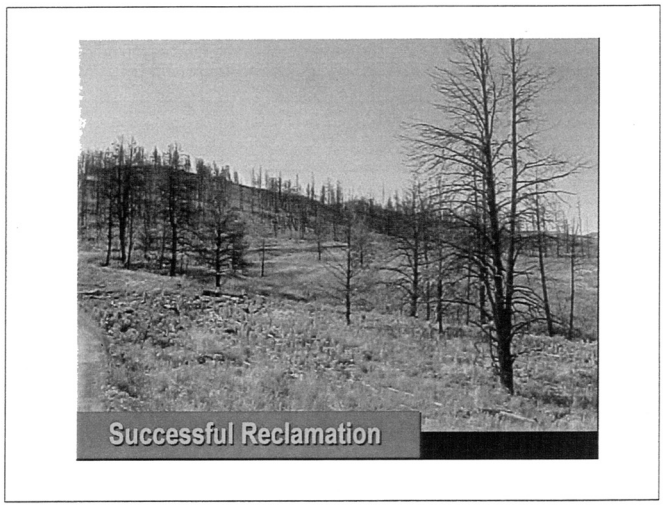
Exhibit F



Over 15 surface acres of debris just from the Buffalo Creek Fire.

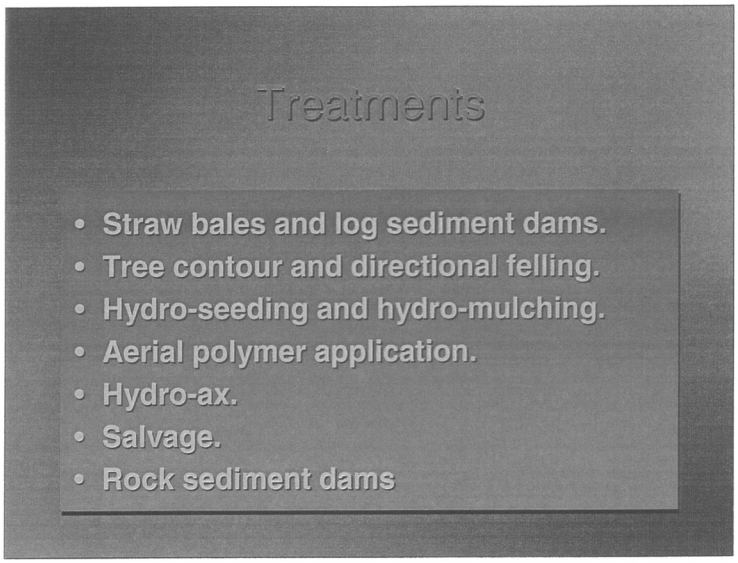
(slide sent to congressional staff)

Exhibit G



In the areas that had the hydro-ax, aerial seeding and contour felling treatment on Denver Water lands recover very well even under drought conditions. Other lands that were not reclaimed with this type of treatment are still experiencing extensive erosion.

Exhibit H



The best treatment for reclamation was the combination of aerial seeding, contour felling followed by Hydro-ax.

In addition, the salvage logging was very effective combined with the aerial seeding. This treatment as well as the Hydro-axing treatment provided roughness to the soil surface and integrated the seeds into the soil. Also these treatments broke up the hydrophobic soil.

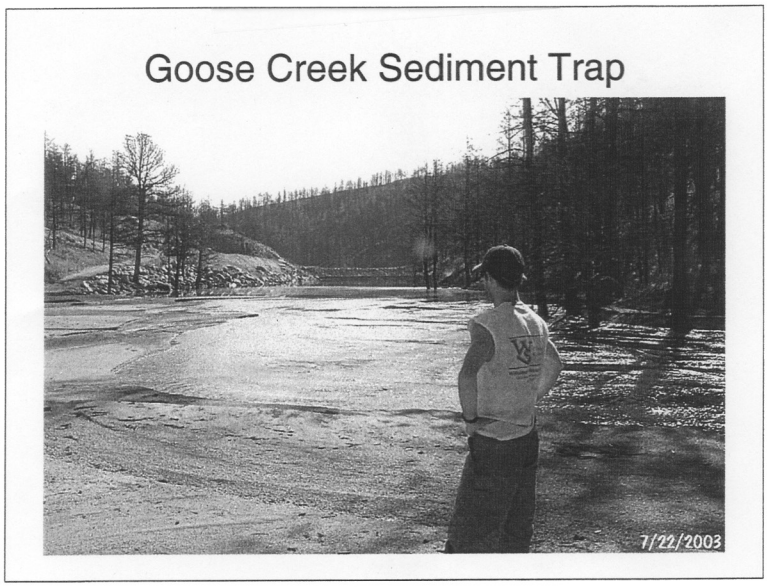
Log dam barriers (trash racks) work well as long as they are located in areas that are accessible for removing accumulated sediments.

Tree contour, directional felling, and straw bale dams are effective in slowing down water runoff and erosion.

The purpose of the Aerial applied PAM (polyacrylamide) treatment was temporarily to bind the soil to reduce erosion. We are in a drought and this application was not tested. It is still being evaluated.

Hydro-mulching and Hydro-seeding is not effective since the seeds are not integrated into the soil and do not establish.

Exhibit I



Denver Water has spent 1.5 million dollars on two sediment dams to prevent the sediment from federal lands from filling Cheesman Reservoir.

Cost for the Hayman Fire Land Reclamation Treatments on Denver Water Land

Treatment and Materials	Cost/Acre	Cost/Structure	Acreage of Treatment	No. of Structures	Total Cost
1)					
PAM	$197				
Seed @ 32.6 lbs of PLS/AC	$57				
Aerial Seed Applicaton	$38				
Total Treatment Cost	**$292**		889		$259,588
2)					
Hydro-ax including Contour Felling	$365				
Seed @ 32.6 lbs of PLS/AC	$57				
Aerial Seed Application	$38				
Total Treatment Cost	**$460**		2100		$966,000
3)					
Hydromulching and Hydroseeding	$982				
Seed @ 32.6 lbs of PLS/AC	$57				
Total Treatment Cost	**$1,039**		200		$207,800
4)					
Seed @ 32.6 lbs of PLS/AC	$57				
Aerial Seed Application	$38				
Total Treatment Cost	**$95**		1361		$129,295
Directional Felling	$300		11 miles / 65		$19,500
Straw Bale Dam		$233		2,000	$466,000
Log Sediment Dam		$3,500		60	$210,000
Salvage	Break Even		1,700		
Goose Creek Rock Sediment Dam	$871,000			1	$871,000
Turkey Creek Rock Sediment Dam	$830,000			1	$830,000
Nonspecific materials and services					$590,506
				Total	**$4,549,689**

Treatment 1,2,3 and 4 are mutually exclusive.

Restoration Labor & Overheads

Increase in normal O&M (Culvert Re-construction, Road Redesign, Maintenance of Sediment Traps)	166,128
Other Restoration Labor	504,490
Planting Trees	50,533
Design & Contract Admin for Construction of Trap on Turkey Creek & Goose Creek	230,473
Subtotal In-House Labor	951,624
In-house labor Related Overheads for Benefits, Leaves , General Admin Costs	1,415,937
Total	2,367,561
Page 1 Total	4,544,689
Grand Total	**6,912,250**

Mr. WALDEN. We will forgive both. Thank you for your testimony.

Now, I would like to welcome Councilor Hartzell from Ashland, Oregon. We look forward to your testimony. Thanks for being here.

STATEMENT OF CATE HARTZELL, ASHLAND CITY COUNCILOR, CITY OF ASHLAND, OREGON, AND PROGRAM COORDINATOR, COLLABORATIVE LEARNING CIRCLE

Ms. HARTZELL. Thank you, Representative Walden. I appreciate the time that you have given both this morning to me personally and to this hearing, as well as your staff and what they have done to contribute to it.

I am the City Councilor in Ashland, Southern Oregon, just over the State of California. I am also Program Director of Collaborative Learning Center. It is a regional network in Northern California and Southern Oregon of community based groups working on watershed restoration, small diameter hardwood utilization. I have done that for over a decade, both in my local community as well as regionally and nationally.

Today I want to touch upon briefly the challenges and progress we have made in that regard, the current situation, as some people in the communities that I live view this topic, and also some suggestions that we have learned from you for moving forward in the midst of the decade that we have lived through that has had social and economic change in it.

What many of us in the community have done is to look for the common ground and try as best we can to find areas where we can work there that would produce some experience that was successful. We have also advocated for decisions that integrate the different issues and perspectives so that, again, we can find more common ground. We have begun to work in the areas of agreement.

One of those areas that I want to highlight today is something that you as Congress members have been integral in providing for us, and that is the National Fire Plan. It has been extremely successful in my part. Having watched what we have done for 10 years and come to ask for when we come to Washington, D.C., this is a significant part of the answer.

The elements of success in that National Fire Plan, from my perspective, are severalfold. One, that it is far less expensive than to do the kind of treatments that we are highlighting in today's

hearing. To get in before the fire comes is far less damaging on the landscape and far less expensive in tax dollars.

We are also finding that it produces local and consistent jobs; produces a steady flow of small and medium-size timber which we have begun to do utilization and biomass on; and it forms really critical partnerships in being able to treat both the private and the public land, both of which are essential in protecting the forests and community infrastructure.

Today's topic. I am here to bring, or to perhaps highlight some of the comments that have been made earlier about the controversial nature both of post-fire restoration as well as post-fire salvage logging. Socially, from my perspective or from the perspective of many of the people who live in the area where I am from, is that it is reminiscent of the more traditional industrial or agricultural model of forestry, and that raised concerns that we dealt with in the '90s and are trying to grow through. Also the concern about the protections, both in public participation as well as ecological protections that we are seeing at least in our area of the Northwest.

Scientifically there is uncertainty, not only uncertainty, but disagreement. Disagreement involves definition of what our end goal is. What are the goals that we are trying to achieve and what are the characteristics of the forests that we are trying to restore and rehabilitate? Also disagreement about the characterization of the impact of the fire. There is disagreement and certainly uncertainty about the appropriateness and the success of the traditional intervention strategies. There is disagreement about the impact or the theory of reburn, and again I think, as I mentioned in my testimony, we are touching an elephant here, and I would not invalidate the experience of people who would come from any part of the country and talk about their experience. There are distinct differences because they are distinct ecosystems, but there is differences there. And also the unintended consequences of the traditional strategies, the leaving of slash, the use of fertilizers and herbicides, weeds is certainly an issue that we are all paying attention to.

So with those levels of uncertainty and social disagreement around where to go, I wanted to bring forward some of my experiences of myself and my colleagues, and I want to talk briefly about them in the context of what we have done locally.

Ashland owns land in our municipal watershed. We have, through official commissions that the city has established and supported, just completed Phase 1 of a forest health project up in our watershed. What we did there was very important, and I want to share a couple of those lessons. One was that we phased it. We had areas lower down in our watershed where it was very important that we get up because of drought and overstocking, and thin out. We started doing below 7-inch thinning back in '95 with the use of our water funds. So we are familiar with some of the work that has been done up there already, but we wanted to go in and do a commercial sale. We also had an area a little bit higher up with old growth in it. The Commission decided that because of the diverse range of perspective in our community, we were going to start where we knew we would be successful. We did that. We just finished it. We were at cost. We wound up paying $500, but that

is not bad considering the number of acres that we treated, and we did helicopter log.

We collaborated. The fire chief is very frequently reminding me to slow down, because he has realized how carefully he has to work in the community and not to get ahead of himself. We are very interested in and invested in multi-party monitoring, bringing multiple stakeholders to the table, asking the questions and going out collectively to answer some of those questions. We do not have the constraints of NEPA, and yet we pay very careful attention to the involvement of the public and even more so investment in the analysis up in the watershed. We have a forester who may as well be on retainer, knows a great deal about our watershed, about the private and the public, and this commission charged him with going up and getting the information very site specifically.

The choice of where to work, I mentioned before we stress the—instead of the old growth. The goal was, in our project, forest health, and in order to move this forward in our community we needed to stay on point guard with that, and I believe that we did. The emphasis also was on working with our local workforce and our local businesses. That was very important to us. One of the things that does not come directly out of this, but that I mention in my testimony that I think is also important, is that as we talk about where do we spend that precious one dollar of the taxpayer and up from there, we have to make sure that we are spending it in the most cost-effective way that we can, and I think it is important that we analyze all the costs, not only what we are getting in revenue, but what we are spending to do that.

These principles, I think, are very important for us and perhaps for you in guidance. We have HFRA status as a watershed. We are still learning what that means. The rest of the time in D.C. I am going to try to go out and hunt down not only what it means but where the money might come from because we have identified cooperatively in our community where the next round of Federal work will be. We are developing a community wildfire protection plan alternative. We have it already. We are refining it right now. The importance of that is that we are bringing the principles that we learned working with our municipal land into the Federal land, and we believe it is possible and very important to do so.

What I would stress to you is that we built social capacity and we are doing what you asked us to do in allocating the money for the National Fire Plan. It is very important to us that you make very careful decisions about how to move forward in the post-fire area because of Biscuit. Biscuit, I brought newspapers. I will not bore you with them, but they are starting to show the headlines of protests and conflict and trying to mediate that conflict. The risk of moving in a direction that takes us backwards instead of forward, while we are really making progress on the early treatment for at least the area, the Rogue Valley, that I come from, is very, very critical, and I appreciate the interest that you are showing in doing it carefully, and we are available.

I would also offer that we are also open for tours and to become a good example of how it can be done with less conflict and product on the ground.

Thank you very much for allowing me this time to speak.

[The prepared statement of Ms. Hartzell follows:]

Statement of Cate Hartzell, Ashland City Councilor, City of Ashland, Oregon, and Program Coordinator, Collaborative Learning Circle

Thank you for this opportunity to offer my perspective.

I am a City Councilor in Ashland, Oregon, a town of 20,000 in southwestern Oregon. Our residents are actively involved in caring for our municipal watershed. We began thinning small trees on City land in our municipal watershed in 1995. We developed an Interface Management Plan for private lands and we partner with the U.S. Forest Service in the stewardship of federal lands. We are a Healthy Forest Restoration Act project and are currently updating a Community Wildfire Protection Plan. We have had fires "just over the ridge" the past two summers.

I also coordinate the Collaborative Learning Circle, a ten-year old regional network of community-based organizations in southern Oregon, northern California. Our member organizations responded to declining conditions in their communities and forests by creating training programs and jobs doing watershed restoration, hardwood and small diameter utilization, monitoring, and non-timber forest products.

My testimony addresses issues related to fire, as opposed to other catastrophic events; it is the disturbance I am most familiar with.

In the last ten years, our region has experienced a major social, economic and political transition. The demographics and industries have changed; the recreational value of the land is causing people to look differently at wild places. Much less of our economy is dedicated to extraction. Most mills closed or retooled for smaller trees.

Congress both stimulated and invested in this transition. Through the Northwest Forest Plan and the 1.2 billion dollars associated with the Northwest Economic Adjustment Initiative, a long-term commitment to fund the National Fire Plan, and the initial efforts to support the Healthy Forests Restoration Act, Congress has demonstrated its interest in a framework built on broad policy goals and common ground. These programs responded to the need to transcend the "boom to bust" cycles that communities faced and create continuity in management that's based on trust and good science.

Over the last ten years, our region adjusted to new policies, weathered controversies, cooperated with former adversaries on projects, lobbied for and implemented cost-share programs to leverage the public investment on private lands, and created businesses and training to implement new forestry practices. We painstakingly built delicate social agreements to move from conflict to collaboration.

Of course, there are issues that will not be resolved, despite the best intentions. Hopefully we will find compromises that move us forward, but the differences in the core values behind the debate change slowly, if at all. Part of our challenge as decision makers is to cleave out new decision space that involves integrative decision making. We have an opportunity for innovation that moves beyond supporting one interest group over another, instead exploring genuine work towards multi-stakeholder-supported and integrative decision making.

I believe that the questions you are exploring today relative to restoration practices on damaged forests fall into this "irresolvable" category. In my region, and I suspect the country, there is not agreement on whether there's an ecological imperative for post-fire restoration, or what "restoration" means or looks like on the landscape There is broad public support for post-fire restoration. In fact, the National Fire Plan and the 10-Year Implementation Plan for the Western Governors Association's Comprehensive Strategy identify "restoring fire-adapted ecosystems" as one of four major goals. Questions about post-fire restoration revolve around what it should look like and how it should be done, but there is broad support for goals such as ensuring soils stability, minimizing impacts on watersheds, minimizing the impacts of invasive species. These goals focus on restoring the health of the land, or the functioning of these forest ecosystems.

After a wildfire, managers and legislators are pressured to act fast for a number of reasons. Using the trees to fill industry's resource need and spending the revenue to offset the cost of restoration has some logic.

Salvage logging is not the same as restoration, although logging might be part of some restoration strategies. Salvage logging, however, focuses on capturing the economic value of trees damaged in a wildfire, generally for social and economic purposes, such as providing jobs and timber supply for local mills, and possibly providing revenues to the federal agencies. As a tool for post-fire restoration, salvage logging is controversial for a variety of reasons. People in various fields of science disagree over the range of impacts of post-fire logging, including possible adverse

environmental impacts due to the logging activity and increased fuel loads from post-logging slash. There are fundamental differences in how we define the value of a stand of burned trees, and about the appropriate function of a roadless area. Those differences directly affect what we think should happen after a fire and how fast it should happen.

In the mid-90s, when representatives from rural communities were committed to working in the forest in the face of scientific uncertainty and social distrust, they heeded the advice to "start small, go slow" and to ensure learning and corrective action. You are looking today at examples of wildfires and how people responded to them, but, of course there are other examples that proceeded quite differently; we are touching the proverbial elephant.

In our search for identifying best practices and building common ground, I offer the following suggestions:

Start at a scale that most stakeholders find acceptable or on the edge of comfort, and build experiences of success.

The increased frequency of fires and the convergence of multiple fires into large acreages, as happened in the Biscuit creates opportunities for potentially large revenue streams and projects. Unfortunately, in my region, people question the agencies' ability to complete non-commercial post-fire restoration as effectively as they complete salvage logging. One way for land managers to rebuild the necessary support for restoration after disturbance events is through projects that are at a scale that people feel comfortable with, can monitor and consider successful.

A good example from my region is the Forest Service's first "Proposed Action" for the Biscuit Fire area that came within ten months of the fire. It suggested logging 55,518 mbf from 4,029 acres without entering Inventoried Roadless Area or Late Successional Reserves (Table ES-1; FEIS). That modest post-fire salvage sale, had it complied with the environmental laws would have provoked far less legal and social conflict and could have been done with a more appropriate allocation of agency resources. The timber sales conducted under Categorical Exclusions on the Biscuit Fire this year removed Hazard Trees and fire line trees; they were monitored by environmentalists, but not challenged, despite alleged violations.

Had county and timber industry representatives not intervened with Dr. Sessions' study and the Administration redirected the project, it would have served as an important opportunity to realize revenue quickly, conduct limited rehabilitation, and allow the area to restore itself.

Maintain existing NEPA requirements for public participation and analysis of post-fire projects.

Projects developed under existing regulations and properly administered are cheaper and more effective than those proposed under regulations designed to truncate scientific analysis. Often delays and increased costs are blamed on "excessive" regulations and "analysis paralysis." In fact, delays and increased costs often result from agency project proposals that are not scientifically defensible. If projects are defensible based on their science, they are also likely to be more easily arbitrated on their values.

Ignoring or out-maneuvering opponents doesn't eliminate the issues; it fuels social conflict. In the case of the Biscuit Fire project, local newspaper headlines are already reinforcing this conflict. The kind of conflict that can be sustained in a big city like Washington DC, tears at the fabric in communities like Ashland and Cave Junction.

The Administration has made recent, significant changes to rules affecting the public's right to participate in management activities. We need time to try the additional categorical exclusions, emergency exemptions, and modified access to the courts without having those changes coupled with overly large projects that stimulate concerns about forest and watershed degradation. Fire brings its own set of changes and stresses; it is vital that your decisions and that of the Administration empower citizens to work out problems on the ground together.

Develop restoration goals through plans developed at the local level.

The best way to develop broadly supported restoration goals is through collaborative processes at the local level where there is opportunity for all stakeholders to be involved. Authorities for "community wildfire protection plans" in the Healthy Forests Restoration Act establish a local planning process through which communities have a strong voice in prioritizing where on the forest landscape fuel-reduction projects should be done and the methods of treatment. Generally, I believe, these authorities were intended for pre-wildfire treatments, to reduce fuel loads and protect communities and watersheds from wildfire risk. However, questions regarding post-fire restoration goals should also be dealt with through an open,

community-based planning process, such as that envisioned for community wildfire protection plans.

Direct agencies to maintain a firm check and balance on ecological protection where economic- and time-driven post-fire salvage logging is implemented.

Prescriptions for active restoration should be clearly related to the factors that limit ecosystem recovery and integrity. Under the NW Forest Plan, not all land is managed for its commercial value; the agricultural model of salvage logging immediately after fire, suppressing competitive vegetation with herbicides, and replanting is not appropriate on all Federal forest areas.

Create mechanisms that ensure that the non-commercial restoration work is completed at the same level of performance and timeframe as commercial restoration work.

While there may be few practices that can be applied to all post-fire forest restoration, the scientific literature appears to be consistent on the point that slash from logging or post-fire logging intensifies the impacts of fire in those areas and must be promptly removed from the system. A December 8, 2003 Los Angeles Times article "Dead Trees Fail to Bring Life to Forest," highlights problems that federal agencies face in our region obtaining sufficient bids on post-fire salvage sales and in producing revenues that ensure that slash left from logging is treated, and that other non-commercial restoration goals are met.

The Congress and Federal land managers promised pre-commercial thinning that was not delivered after high-grade logging in the 1970-1980s. The agencies must earn back the public's trust that it will complete non-commercial work after the big trees are removed.

Create incentives for post-fire restoration work that is accessible to people in nearby towns, while avoiding the creation of a new, fire-dependent industry

Community-based and non-profit organizations engaged in forestry and restoration work try to create or package natural resource-based jobs for rural people that are year-round and closer to home. Projects that support long-term capital investment, provide family wage jobs, and produce resource flows for value-added markets allow residents in rural towns to remain there. David Schott, the new Executive Director of Southern Oregon Timber Industries Association, stated that industry will not hire new workers to harvest the Biscuit volume, but will redirect existing employees from other volume while Biscuit is being cut.

In December of 2003, the LA Times reported that in 2002, salvage harvests made up nearly half the timber volume cut in California's 18 national forests. It is logical to examine the potential for salvage logging to pay for post-fire restoration in certain situations, however attempts to realign the agencies' administrative and legal systems to rely on and expedite fire-dependent timber production off national forests falls short of the goals that community groups hold in the following ways:

- It fails to produce a predictable resource flow, reflecting more the boom-bust industry model, especially for smaller, less mobile companies;
- It can create unintended ecological consequences;
- It will fuel social conflict because the ecological stakes are perceived to be higher when the forest is in a recovery mode.

Fund and support multi-party monitoring of post-fire restoration

Multi-party monitoring processes that include multiple stakeholders in the design, implementation and analysis of feedback provide venues for the questions and disagreements to be articulated and addressed. It assures that diverse perspectives are brought into potentially contentious processes, and in so doing can reduce conflict by reducing appeals and increasing trust building. Multi-party monitoring is a key tool for shared learning among stakeholders and with the agencies. However, it remains under-funded and under-prioritized.

Ensure that post-fire salvage logging is assessed on the basis of both the cost and return to the government and that its purposes are clear—as part of a restoration strategy.

The economics of post-fire salvage logging can be complex and tenuous. Economic returns are most often referenced to whether or not the timber purchaser can cover its costs and realize a profit margin; the cost and return to the government should be considered, as well. Economic motivations are heavily favored in salvage logging, so the public expects that they will be considered across the board. The availability of thorough economic information that internalizes typically externalized costs helps

to address concerns about insufficient revenue for non-commercial work and allows people to track investments in restoration.

Act carefully relative to post-fire restoration so as not to disrupt the social and financial momentum behind fire hazard reduction and prevention efforts.

When community organizers started working over a decade ago on value-added strategies for the by-products of watershed restoration, few expected to do more than reduce the cost of treatment with the small trees, hardwoods, etc. We knew that the job required the kind of reinvestment we're most familiar with in urban renewal projects and that the National Fire Plan is making. We did not expect that post-fire restoration would be paid for by salvage logging and feared that if too much emphasis were placed on this strategy, the restoration goals might be compromised by unanticipated or "perverse" economic incentives.

It is problematic, therefore, that the Forest Service's Rehabilitation and Restoration program, the primary program through which the agency pursues the National Fire Plan's major goal of post-fire restoration, has been funded at such a low level over the past three years. Congress provided $142 million for this program in FY 2001, the first year of strong funding for the National Fire Plan. Since then, funding has dropped dramatically. The Administration proposed to eliminate funding for this program in FY 2004 and has requested only $3 million in FY 2005. Our question is if the Administration is not requesting funds from Congress for this key program, how does it expect to pay for post-fire restoration. We do not think its primary strategy should be to pay for restoration with revenues from salvage sales.

Similar questions were asked by stakeholder groups about the initiatives to reduce hazardous fuels. The compromises made in the process of adopting the President's Healthy Forest Restoration Act offer a clear indication of public sentiment towards work on public lands; they mark some common ground.

- Focus strong emphasis on doing projects around communities;
- Focus on treatments that involved "thinning from below" i.e., attention to smaller trees;
- Protect old growth forests;
- Participate in local collaboration to ensure public involvement and build public trust; and
- Ensure sufficient federal investment to do the projects without relying on revenue from timber sales.

Certainly, the highest level of agreement that we have is around reducing the risk of wildfire. Investments in the Forest Service's State and Private Economic Action Programs contributed critical support for raising communities' capacity to plan, fund, and coordinate fuels reduction. The implementation of the National Fire Plan primed the pump for on-the-ground results and vital interagency partnerships, leveraged investments by private landowners, and created jobs. Since early treatment of fire risk is the most cost effective approach to our situation, people are counting on the longevity of the National Fire Plan. The Healthy Forest Restoration Act holds the potential to build on this work if the resources authorized are allocated.

Summary

Restoration of intensely burned forests involves far more ecologically and operationally sensitive components than implementing management strategies that focus on decreasing the likelihood of fire. Our restoration tools and options for intensely burned forestlands pale almost into insignificance compared with those available to us with intact forest ecosystems.

There is an impressive level of activity in watersheds across the West. It's happening on the slopes, in streams, and in meeting rooms. It's making a difference on the landscape and in our communities. The social capital that it takes to do this is an expense that doesn't appear in budget line items, but it nonetheless requires investment on your part. We are partners in this endeavor.

Mr. WALDEN. Absolutely. Thank you for coming all the way back. I appreciate it. For all of our panelists, especially those from the West Coast, which three of the four are, and the fourth one is pretty close.

Mr. Sessions, I want to start with you on some questions. Is it true that the Oregon industry just wants big trees? I mean is that what you hear, and what can be done in a post-fire environment

to provide wood fiber for industry and yet continue to provide the snags that are necessary for wildlife and proper management?

Mr. SESSIONS. Mr. Chairman, that is a big question, but I think certainly the Oregon forest industry has restructured over the last 15 years, such that the average size log going through an Oregon Mill now is less than 10 inches in diameter on the small end, probably much less, probably closer to 8 inches. There are very few mills left in Oregon that will process the large logs, and in fact, on our own college forest, we have to haul an extra 50 to 100 miles to get our larger logs processed.

What I have tried to comment on is that with the protracted Federal process, by the time a sale is implemented, only the larger trees have value, and that is why we seem to get caught in this no-win situation where the only trees that have value then are the larger trees. What I have suggested is if we could move more quickly, those smaller diameter trees, those trees 24 inches and less, really make up the bread and butter of the forest industry.

Mr. WALDEN. Is it the larger trees that hold the greatest value for habitat because they stand longer and therefore provide the snag habitat you seek?

Mr. SESSIONS. That is correct, that the wildlife biologists that I have talked to, they are primarily interested in the larger trees, and in fact the rationale is that you want to leave the largest trees because those will stand the longest. And what you would like to do is bridge the gap until the new forest can produce trees of equal size to the trees that are there before, and that brings us to restoration. In the Biscuit area, those trees of large size will take 200 or more years to come back under natural regeneration. If we come in and plant, and I am fully cognizant of what my colleague, Steve Thomas, said about planting dense plantations, but if we come in and plant at reduced densities, but with a sufficient number of conifers to reach the goals, that we can reestablish these forests 50 to 100 years earlier than would otherwise take place.

Mr. WALDEN. What effect would that have on the very species, the marbled merlet, the spotted owl that we are entrusted with trying to safeguard their habitat or restore it?

Mr. SESSIONS. Those two species utilize older conifer forests, although the owl does depend on its prey, does depend on wood rats which do live in some younger forests, but I would say that restoring the green trees as quickly as possible will provide for their long-term habitat for the owl and the merlet.

There are other species though, for example, the woodpeckers, they depend on dead trees. The question is, what is the appropriate amount of dead trees to leave? What are the appropriate restoration activities to get the large green trees back so they can produce the future dead trees? What materials should be utilized for social and economic needs?

Mr. WALDEN. That is the question. Who has the answer to that? Because that seems to me, given Mr. Inslee's questions of the last panel, some I certainly share, of what do we leave behind? What do we do we take out? What does the most good to the environment, and in my opinion, restores the forest to its healthiest state the fastest? Where do we get those answers if not from people like

you who are certified smart, and on books and in universities and spend your life doing this research?

Mr. BARRY. I will venture an answer from the point of view of a water utility, which is less concerned with the state of the forest than with the state of potential erosion out of the forest into the reservoir. So from our point of view, we did not spend a lot of time or difficulty deciding what we were going to salvage and what we were going to hydro-axe. We did as much of both as we could reasonably do under the circumstance, because both those measures were important to restore some stability to the forest floor and to reduce the erosion as quickly as possible.

There are not any major endangered species—there is a Pawnee montane skipper butterfly in the Hayman Fire area, but we were reasonably sure that nothing we were doing or failing to do was going to have any effect on the butterflies. So we simply did everything we could do to reduce erosion as quickly as possible.

I know that does not answer your question. It simply gives you a different perspective on how one manager of only 8,000 acres took care of that problem.

Mr. WALDEN. On the Biscuit, Dr. Sessions, you talked about 4 percent being salvaged, 7 percent being planted. What do you think happens to that other piece, that 89 percent that nobody touches, versus that which is actively being proposed for some sort of management?

Mr. SESSIONS. Well, certainly for people not familiar with the Biscuit, about half of that area was in wild and scenic rivers and in wilderness.

Mr. WALDEN. Right.

Mr. SESSIONS. That area, under law, will recover naturally, although I think we need to be careful what "naturally" means. Naturally in the climate that we have means a return to shrubs and hardwoods with a slow return to conifers.

Mr. WALDEN. Slow being what period?

Mr. SESSIONS. Slow meaning this 150, 200, perhaps longer years, perhaps more years than that to restore the forests that were there now. Now, people ask me, well, why doesn't nature just do what it did before? But what we need to understand is that the physical factors do not remain constant. The weather has changed. If you look at a lot of the stands on the Biscuit, they were formed in the 1800 to 1900 period when the climate was much different than it is now. The current climate favors shrubs and hardwoods over the conifers. That does not mean that conifers cannot be reestablished or will not be reestablished, but it means that if we want conifers back and if we want them back quickly, then we will have to take some action.

So if you ask what is going to happen on the other area? Recovery, if you call it recovery, is going to be slow, meaning the return of conifer forests. The return of ground cover though is going to be relatively quick, that there are going to be shrubs and hardwoods.

Mr. WALDEN. But if you want a conifer forest you are going to have to wait for it. So if this were the Tillamook, if this strategy had been applied to the Tillamook—I realize they are at different ends of the State—would we be looking at a hardwood shrub forest on the Tillamook today as opposed to a, I assume, Doug fir forest?

Mr. SESSIONS. We would be looking at more of a hardwood forest than was there. The forests are a little different. It is true that in the Tillamook that a lot of the seed sources were burned out, and it may have come back to a shrub land and hardwoods for a while, but moisture is not the limiting ingredient in the Tillamook, and those conifers would come back. It is in the moisture limited areas such as Southwestern Oregon, that the ecological succession is very different.

Mr. WALDEN. All right. I will stop, having overrun my time by a full measure, and turn it over to the Ranking Member, Mr. Inslee of Washington.

Mr. INSLEE. I would really like to ask President Roosevelt if he would have been a Democrat if he would run today, but I don't want to interject any issues, so I will defer that question. He was one more step to the donkeys. But in any event, Dr. Sessions, could you elaborate on your statement about the climate favors non-conifers right now. Is that just in their young period, or what do you mean?

Mr. SESSIONS. What I mean by that is that the conifers were established at really what we would call the latter years of the little ice age, which ended somewhere 1850s, 1870s. It is just under that particular regime it was easier for conifers to get started again. That does not mean that they will not come back, but the history is that you need a couple of things. You need good seed years. You need spring moisture, and you need to have the competition that is not too aggressive, and that doesn't happen too often. It could happen that we have a couple of good years down on the Biscuit, but last year, if it gives any indication, we are not going to.

Usually after a fire, and if there are some seed sources available, most seed will fall within about one tree length, and some seed will go out 700 or 800 feet. On a study of the Biscuit last summer, where they looked for new seedlings, new conifer seedlings, they put in 64 plots. When I say "they" this is the Northwest Forest and Research Experiment Station in OSU, put in 64 plots, totaling a total of 12 acres. You would expect that several thousand new seedlings, that might survive, but you would expect to find them. They found 39, 39 seedlings. So the experience is that if we want those conifer forests back in a reasonable time to provide the habitat for those species that live in older conifer forests, that we are going to have to give them a little help, and the longer we wait, the more it is going to cost, and the less resources that we are going to have to pay for it.

Mr. INSLEE. If these climate changes continue, are we sort of, if not fighting a losing battle, trying to establish a flora regime that is just inconsistent with the climate?

Mr. SESSIONS. I think that is a very good question, because we are going to have—and the Southwest Station, Ann Bartuska, if she is still here, could comment on it, because they believe that climate change is really, in some sense, much more responsible for our current dilemmas in the Federal forest than fire suppression, although others beg to differ with them. But 6 of the 7 climate models predict that most of the Great Basin is going to become wetter over the next 40 to 50 years, that tree cover is going to increase, as well as this biomass to fuel future fires, and that U.S.,

which has been depending upon the wood basket in the Southeastern United States, is not going to have it because within 100 years the pine forests of the Southeast will return to savanna land.

Mr. INSLEE. Who is making this prediction?

Mr. SESSIONS. I am saying of these 7 major climate models that are proposed among the meteorologists, that 6 out of 7 of those agree that the West is going to become wetter, the Southeast is going to become much drier, and that is certainly going to influence the distribution of vegetation.

Now, Congressman, I am not here as a meteorologist. I am not here as a climatologist, but I am just saying that you asked an interesting question about climate, and there seem to be some trends and some agreement about where climate is going. Although, I will caution by saying this. I remember when Paul Ehrlich came to OSU in the 1970s—and I think we all know Paul Ehrlich—Paul Ehrlich said, "What I am most concerned about is that agriculture is going to fail because we are moving into the next ice age." That is what Paul Ehrlich said in the 1970s. Now, of course, he speaks a very different tune. So I do not how good these climate forecasts are myself.

Mr. INSLEE. You made reference to a group that thought that changes in fire is more responsible because of climate rather than forest practices. Who is that group?

Mr. SESSIONS. If you were to talk with Dr. Connie Millar at the Pacific Southwest Research Station—that is Forest Service—that she has done a lot of research into this area, and she thinks that climate and climate change has been more important than suppression in many areas, than what it is given credit for.

Mr. INSLEE. I would like to say for the record, she may be right, even though I agree with her.

[Laughter.]

Mr. INSLEE. Thank you.

Mr. WALDEN. Seldom does a hearing go by but my colleague makes the case that you have made now about climate change being responsible for the forest fires. So that will be interesting research to see.

I do not know that I have any other questions at this time, but I do appreciate your testimony. This is an issue that I hope the Subcommittee can continue to focus, see if we can't find some common ground. I am intrigued by the notion that we are better to leave the old growths, snags behind, and by moving faster you could actually achieve what many people think they can achieve best by moving slower. And that if you appeal to save old growth, in fact today yo may be moving the pointer to only old growth because it is the only stuff with value left at the end, and maybe moving faster you protect the old growth snags which is better for habitat, and meanwhile get out the salvageable timber that is better for the industry. So maybe we can find some common ground there. I don't know. We are going to continue to work on it.

Any final comments from the panelists before we adjourn? Yes, Councilor?

Ms. HARTZELL. I was just going to state, the question about trying to find solutions that will hasten it is sort of a Catch-22 with the analysis because we know that there may be some transferable

scientific direction and practices, but much of it does need to be site specific and situation specific, and at the same time, you can't do that and move fast. I mean hopefully we can improve on what we do, but there is the necessity of making sure that our analysis is based well as we move forward. I just had wanted to point that out.

Mr. WALDEN. There is no disagreement there.

Yes?

Mr. BARRY. Just one quick comment about climate change, I probably lose more sleep about the prospect for climate change than anything else, because as a water utility your life rises and falls on what the snowpack is for us. While I certainly believe that climate change is a fact, what isn't a fact and what people cannot predict, even the 5 models that Mr. Sessions referred to give different results, they don't tell you what is going to happen to precipitation.

What we think we know is that precipitation may be more variable, but we cannot tell you where it is going to be, where it is going to fall and where it isn't, and therefore, I continue to persist in the belief that the only assumption I can make is that the future will be pretty much like the past. I have decreasing faith in that assumption, but I don't have anything to replace it with. So I continue to predict reservoir content, snowpack, runoff, et cetera, on the basis that it will be pretty much like the past. Even as I do so, I know that I could be wrong, but I don't have anything to substitute for the assumption.

Mr. INSLEE. Can I make one comment?

Mr. WALDEN. Sure.

Mr. INSLEE. I just want to vigorously disagree. We do know where precipitation is going to occur. It is going to occur at any outdoor political event that we schedule before August 12th.

[Laughter.]

Mr. WALDEN. So just let us know where you need water.

Dr. Sessions?

Mr. SESSIONS. Yes. I would like to—there was a question earlier about separating salvage and planting.

Mr. WALDEN. Yes.

Mr. SESSIONS. And I did want to comment on that. As the supervisor from the Tahoe said, it is a question of risk, that you can undoubtedly plant new conifers. They will have to compete with the brush. You need to ask yourself how is it that you are going to ensure that they survive? We only have two ways of doing that. We either come in manually to release, to give more growing space to the conifers, or we use herbicides.

Now, if you are going to send men in or women to clean these areas to hold back the brush, it is very, very dangerous among the standing dead material. Second, these areas have return intervals of, say, 30 to 40 years on fire. If fire returns to these areas, no crew boss is going to send in people to build fire line among the standing snags. And third, all of the standing deal material is coming down sometime, and when it does come down, it creates more fuel, so that if a fire comes by it is going to burn more intensely, and when we have these fires burning through large dead material, they don't burn through any faster, but they take longer, and when they take

longer, the soil, which is a good insulator for a while, finally lets the heat down and you can burn down through the litter, down through the duff, and even change the chemistry of the soil particles themselves, sterilizing the soil for long periods of time.

So there are a number of reasons about if you want to restore forest, that you need to consider dealing with the standing dead material. That doesn't mean remove it all, but it means managing it so that the risks are acceptable. Thank you.

Mr. WALDEN. Is there a scientific template for different stands for what you should leave behind and what you should take out in a post-fire environment?

Mr. SESSIONS. In listening to the wildlife biologists, there are. That given, depending on what wildlife is in the area, if we are talking about wildlife, there are guidelines, but it is generally leaving those snags that are largest and of a species that will persist the longest until the new forest can recover.

That leaves some leeway because you could also, by choosing appropriate management action, move in and bring the new forest back much more quickly. I went through this with Jerry Franklin when Jerry came out to talk at our university, and I asked Jerry, "Jerry, isn't it true we could bring back those trees much more quickly?" And Jerry said, "We can, but I don't want to." And I asked Jerry why is that? And he says he believes that what we are shortest of on the West Coast is early seral stage, naturally occurring early seral stage, so we have to decide what it is we want.

Mr. WALDEN. Can you for us novice U of O grads, can you explain early seral stage? What are we talking about? Is that brush? Is that the alder?

Mr. SESSIONS. We are saying—yes, it is having a lot of large woody debris, a number of snags, letting brush, hardwoods, whatever wants to come back. When I talked to Jerry about Mr. St. Helens, he believes that eruption is one of the best things that has happened here on the West Coast. Others differ, but he look at that naturally occurring early seral stage after Mt. St. Helens and it is true that certain bird populations have improved, but there have been a number of other species that have not, and there needs to be an appropriate mix of restoration actions taken.

Mr. WALDEN. We will go to Mr. Thomas, and then one final comment from anybody, and we will wrap up.

Mr. THOMAS. Just two follow-ups. One, I agree with Dr. Sessions. I think there is some information out there in terms of the amount of down wood, the amount of snags, number of large trees that we are using. They are built into our forest management plan for State-owned forests, and so I think that information is there. Perfect answers, probably not, but we certainly have some good guidelines.

Second, just for instance on our plan, we are looking at a landscape level. We have 550,000 acres. We are estimating the 10 to 15 percent would be in regeneration or early seral stage, so as you work across the landscape, there is some desire to have a certain portion of your forest in that condition because that is what you would have expected through blowdown, through disease, through fire and a variety of other events that would have occurred if we weren't here. So there a number of ways to manage that process.

And can one landowner, say on the Tillamook, if we could afford 150,000 acres in early seral stage, well, probably not. That wouldn't meet our goals and objectives, so you have to look at it kind of on a landscape basis. Thank you.

Mr. BARRY. I just want to give a very quick nonscientific way to approach the question you asked. I agree with Professor Sessions, we did not choose to have a lot of standing dead timber left on the 8,000 acres we owned. We didn't want to leave the standing dead timber, but we couldn't cut it all. We cut or salvaged or hydro-axed as much as we could, and what we couldn't do was because of the geography, the steepness of the slope, the rock outcrops, et cetera. That is what got left. We didn't apply any scientific formula, but we know that probably 30 or more percent of the standing dead timber that was once there is still there because we can't get to it. And under the spur of the moment, that was as good a way to decide what got left and what didn't, was what can you get to?

Mr. WALDEN. All right. We want to again thank you for your time and energy into this hearing, your testimony, your comments. We appreciate it. It helps in our efforts.

The record will stay open for 10 days for anyone who wants to submit additional comments for our record. As I say, we will be conducting some field hearings, and hopefully members of the Committee will be able to attend some of those as well, and maybe we can find some way to move forward on this issue.

With that, the Committee stands adjourned. Thank you.

[Whereupon, at 1:45 p.m., the Subcommittee was adjourned.]

The following information was submitted for the record:

[A statement submitted for the record by Laura McCarthy on behalf of The Forest Guild follows:]

Statement of Laura McCarthy for The Forest Guild

Mr. Chairman and members of the Committee, thank you for the opportunity to provide this written statement on restoration of forests after catastrophic fire. I am the Policy Program Director for the Forest Guild, an organization of foresters and natural resource professionals based in Santa Fe, New Mexico. The Guild has a membership of about 500 foresters and natural resource professionals who manage over 41.4 million acres in the United States and Canada. The Guild's mission is to promote ecologically responsible forestry with active management to sustain the entire forest across the landscape.

This statement about the restoration of forests after catastrophic fire is derived from the experience of our member foresters, who spend most of their workdays planning and implementing timber sales. We are pleased to provide this statement because the issue of how to manage forests after catastrophic fire illustrates perfectly how the Guild's principles are put into practice.

The Oregonian recently published an editorial that echoes the principles of Guild members. Jack Williams, who was formerly the Forest Supervisor of the Siskiyou National Forest and is now a professor at Southern Oregon University, wrote the editorial. Mr. Williams suggested that a goal of a post-fire operation should be to determine the level of salvage that will produce net economic values in a timely manner without risking long-term harm to the land and water. The decisions about where and how much to salvage are key to achieving this goal. For members of the Guild, the optimal salvage level is determined by using ecological information as screens to filter out lands where salvage would impair ecosystem recovery. The screens usually remove from consideration lands with high erosion potential, steep slopes, and stream habitat, as well as roadless areas. Operational constraints are also factored in, such as road access and endangered species habitat.

The use of science in forest management is claimed by many, but demonstrated in practice by the forestry of Guild members. For example, the February 2004 issue of Science has an article by seven renowned ecologists on salvage harvesting after

natural disturbance. The ecologists make three main points backed up by national and international data. First, salvage harvesting activities undermine many of the ecosystem benefits of major disturbances such as wildfire. Second, removal of large quantities of timber can have negative impacts on many plant and animal species. Third, salvage logging can impair ecosystem recovery. The scientists conclude that large-scale salvage harvesting needs to happen quickly after a wildfire and, since managers are making rapid decisions with long-lasting ecological consequences, salvage harvesting policies should be formulated before major disturbances occur. Guild foresters use this kind of scientific information to plan and implement timber salvage.

For example, the 2002 Borrego Fire in New Mexico illustrates how a Guild member put the information into practice. The Borrego Fire burned out of the Santa Fe National Forest onto private land. A Guild member managed the private land, and had recently completed a fire management plan for the landowner. The plan included an assessment of the extent and location of hazardous fuels, a plan to remove fuels with mechanical thinning and prescribed fire, and other information that was critical for planning a salvage sale. The plan made it possible for the forester to determine where salvage logging would be appropriate, and where it needed to be prohibited to protect the recovery of the forest. Within a few months of the fire, burned trees, cut in areas that did not harm the prospects for ecological recovery, were delivered to the mill.

The Guild believes that the management of forests after large-scale fire events needs to be considered in the context of the entire landscape. Dr. Tom Swetnam at the University of Arizona's Laboratory of Tree Ring Research has discussed the idea of using the large catastrophic wildfires, such as Rodeo-Chediski and Biscuit, as templates for restoration of forests at a landscape scale. For example, severely burned areas, which usually account for about 25% of the area within the fire perimeter, are already acting as a fire break for the remaining green forest and for communities in the vicinity. If these areas are maintained as fuel breaks, then salvage logging on stable soils and gentle slopes and where roadless areas and endangered species habitat are not involved, could be recommended. The moderately burned areas will probably need fuel inventories and follow-up treatments that, depending on the fuel load, could include some timber salvage. Finally, the stage will be set to restore the low severity and unburned areas, in both structure and process, with the fuel breaks serving both to protect communities and to establish a landscape pattern for recovery of the forest.

In conclusion, the Forest Guild is not categorically opposed to salvage logging because its members have demonstrated that ecological constraints can be successfully applied to timber salvage operations after wildfire. The key considerations are how much is harvested, where trees are cut, applying the necessary environmental, social and economic constraints, and timing the operation. When making these decisions, the Forest Guild always considers the well-being of the forest first. The Forest Guild offers the following guidelines for salvaging burned timber:

1. Salvage timber at the level that will produce net economic values in a timely manner without risking long-term harm to the forest ecosystem.
2. Only salvage the trees that can be removed in the short-term without harming the prospects for long-term ecological recovery.
3. Do not salvage burned timber in roadless areas, on steep slopes, on highly erosive soils, or in stream corridors and use existing road systems for access. Avoid salvaging timber where the sale will compromise the protection of endangered species.
4. Develop timber salvage plans in the context of a larger wildfire restoration plan. For example, salvage trees in burned areas that will be managed in the future as fuel breaks that provide community protection.
5. Add planning for salvage logging to community wildfire protection plans that, under the Healthy Forests Restoration Act, consider broad forest landscapes, enabling land managers to salvage timber appropriately if wildfire occurs.

[A letter submitted for the record by Anton R. Jaegel, Supervisor elect, Trinity County, California, follows:]

July 9, 2004

Congressman Greg Walden
Chairman, Subcommittee on Forests and Forests Health
Committee on Resources
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Walden:

I would like to offer the following for your hearing on Salvage scheduled for July 15th, 2004.

I am County Supervisor elect in Trinity County, California. The Shasta-Trinity National Forest comprises 75% of our 2.1 million acres. Our forests are among the most fire dependent in the state and are in serious overstocked condition. Many large fires have burned here in the last 20 years. In 1987 a dry lighting event started fires that burned over 100,000 acres. Most of that acreage we were allowed to salvage and used the KV and BD funds created by that salvage for reforestation.

Some areas we were not allowed to salvage and replant due to objections from the environmental community and a court injunction in the 9th Circuit. The case was never heard but was withdrawn because the judge tabled the hearing for two years and made the project moot.

However, it did leave a fuel load of over 150 tons per acre in the untreated areas. One of those areas, Grouse Prairie, re-burned in 2003. Even though it was late in the fire season and the humidity levels were high, this fire was uncontrollable. Imagine large standing dead trees, some dead fallen trees and twenty years growth of deer brush and manzanita.

The trees would burst into flame just from the heat generated from other snags 40 ft. away. We could not put men or equipment into fight the fire because of the extreme danger from snags and this leap-frog effect. When they tried to used bomber and retardant they found the snags were not affected because there were no branches left to catch the slurry. So they dropped back to an area with a plantation on it from a successfully implemented salvage sale from the 1987 fire, put a line around the fire, and stopped it. The ground looked like a moon scape. Very high intensity fire had burned to mineral soil. Recovery will take eons. Suppression costs exceeded $2 million.

If the area had been salvaged, the fuels treated, and reforested the fire could have been controlled with one engine and its crew.

In 1998, the Big Bar complex burned another 100,000 acres and since then we have had six major fires in our county, four of which burned to the edge (and sometimes through the edges destroying homes) of our communities. None of these fires have been cleaned up.

As a volunteer fire fighter and member of the Board of Directors of our local fire department and now Supervisor elect for our county, I am gravely concerned about this explosive fuel load sitting next to our towns. Who will take the responsibility when these fuel loads (violating the forest plan standards) lead to destruction of our homes and livelihoods? I know who will be put at risk trying to save our communities. Forest Service fire fighters and local volunteers deserve better consideration.

We need to stop the endless rhetoric and political agendas and work together to solve this problem. Threats of appeals have stopped the agencies from even proposing to clean up after these fires. It is not only an economic waste in terms of salvage value, but it is also creating a terrible fire risk to our natural resources and our communities.

Please examine the relationship between salvage and restoration. Insure that any salvage that is implemented results in fuel loads below the forest standards, and insist the areas in the wildland urban interface are treated immediately after the fire. We believe post fire recovery plans must include salvage, fuels reduction and reforestation.

I am including pictures of the Grouse Prairie fire and photos of some of the conditions that exist today near our towns. I have an abundance of specific information on this situation and would gladly share it with you.

We are asking the House, the Senate, and the Administration to work together to make sure the tools, the resources, and the leadership are available to restore our forests, reduce the fuel load created by stand replacing fires, and protect our forest.

Thank you for the opportunity to comment.

Respectfully,

Anton R. Jaegel
Supervisor elect
Trinity County, California

[NOTE: The pictures included with Mr. Jaegel's letter have been retained in the Committee's official files.]