

**HEARING ON H.R. 2458, THE COMMUNITY PRO-
TECTION AND HAZARDOUS FUELS REDUCTION
ACT OF 1997**

HEARING

BEFORE THE

SUBCOMMITTEE ON FOREST AND FOREST HEALTH

OF THE

**COMMITTEE ON RESOURCES
HOUSE OF REPRESENTATIVES**

ONE HUNDRED FIFTH CONGRESS

FIRST SESSION

—————
SEPTEMBER 23, 1997, WASHINGTON, DC
—————

Serial No. 105-62

—————

Printed for the use of the Committee on Resources



U.S. GOVERNMENT PRINTING OFFICE

45-570 CC

WASHINGTON : 1998

COMMITTEE ON RESOURCES

DON YOUNG, Alaska, *Chairman*

W.J. (BILLY) TAUZIN, Louisiana	GEORGE MILLER, California
JAMES V. HANSEN, Utah	EDWARD J. MARKEY, Massachusetts
JIM SXTON, New Jersey	NICK J. RAHALL II, West Virginia
ELTON GALLEGLY, California	BRUCE F. VENTO, Minnesota
JOHN J. DUNCAN, Jr., Tennessee	DALE E. KILDEE, Michigan
JOEL HEFLEY, Colorado	PETER A. DeFAZIO, Oregon
JOHN T. DOOLITTLE, California	ENI F.H. FALEOMAVAEGA, American Samoa
WAYNE T. GILCHREST, Maryland	NEIL ABERCROMBIE, Hawaii
KEN CALVERT, California	SOLOMON P. ORTIZ, Texas
RICHARD W. POMBO, California	OWEN B. PICKETT, Virginia
BARBARA CUBIN, Wyoming	FRANK PALLONE, Jr., New Jersey
HELEN CHENOWETH, Idaho	CALVIN M. DOOLEY, California
LINDA SMITH, Washington	CARLOS A. ROMERO-BARCELO, Puerto Rico
GEORGE P. RADANOVICH, California	MAURICE D. HINCHEY, New York
WALTER B. JONES, Jr., North Carolina	ROBERT A. UNDERWOOD, Guam
WILLIAM M. (MAC) THORNBERRY, Texas	SAM FARR, California
JOHN SHADEGG, Arizona	PATRICK J. KENNEDY, Rhode Island
JOHN E. ENSIGN, Nevada	ADAM SMITH, Washington
ROBERT F. SMITH, Oregon	WILLIAM D. DELAHUNT, Massachusetts
CHRIS CANNON, Utah	CHRIS JOHN, Louisiana
KEVIN BRADY, Texas	DONNA CHRISTIAN-GREEN, Virgin Islands
JOHN PETERSON, Pennsylvania	RON KIND, Wisconsin
RICK HILL, Montana	LLOYD DOGGETT, Texas
BOB SCHAFFER, Colorado	
JIM GIBBONS, Nevada	
MICHAEL D. CRAPO, Idaho	

LLOYD A. JONES, *Chief of Staff*

ELIZABETH MEGGINSON, *Chief Counsel*

CHRISTINE KENNEDY, *Chief Clerk/Administrator*

JOHN LAWRENCE, *Democratic Staff Director*

SUBCOMMITTEE ON FOREST AND FOREST HEALTH

HELEN CHENOWETH, Idaho, *Chairman*

JAMES V. HANSEN, Utah	MAURICE D. HINCHEY, New York
JOHN T. DOOLITTLE, California	BRUCE F. VENTO, Minnesota
GEORGE P. RADANOVICH, California	DALE E. KILDEE, Michigan
JOHN PETERSON, Pennsylvania	ENI F.H. FALEOMAVAEGA, Am. Samoa
RICK HILL, Montana	_____
BOB SCHAFFER, Colorado	_____

BILL SIMMONS, *Staff Director*

ANNE HEISSEN BUTTEL, *Legislative Staff*

LIZ BIRNBAUM, *Democratic Counsel*

CONTENTS

	Page
Hearing held September 23, 1997	1
Statements of witnesses:	
Albrecht, Michael H., President, Sierra Resource Management, Inc.	12
Goicoechea, Pete, Chairman, Board of Eureka County Commissioners, Eureka, Nevada	16
Prepared statement of	66
Holmer, Steve, Campaign Coordinator, Western Ancient Forest Cam- paign	9
Prepared statement of	34
Hubbard, James, Director/State Forester, Colorado State Forest Service, Colorado State University	13
Prepared statement of	61
Joslin, Robert, Deputy Chief, National Forest Systems, United States Forest Service	3
Wiant, Jr., Harry V., President, Society of American Foresters	18
Prepared statement of	71
Additional material supplied:	
Society of American Foresters, prepared statement of	74
Belsky A. Joy, and Dana M. Blumenthal, Effects of Livestock Grazing and Stand Dynamics and Soils in Upland Forests of the Interior West ..	38
Quotes from scientists and others	51
Excerpts from the SNEP Final Report to Congress, etc.	52

HEARING ON H.R. 2458, THE COMMUNITY PROTECTION AND HAZARDOUS FUELS REDUCTION ACT OF 1997

TUESDAY, SEPTEMBER 23, 1997

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON FORESTS AND FOREST HEALTH, COMMITTEE ON RESOURCES, Washington, DC.

The Subcommittee met, pursuant to notice, at 2:05 p.m. in room 1334, Longworth House Office Building, Hon. Helen Chenoweth (chairman of the Subcommittee) presiding.

Mrs. CHENOWETH. The Subcommittee on Forests and Forest Health will come to order.

The Subcommittee is meeting today to hear testimony on H.R. 2458, the Community Protection and Hazardous Fuels Reduction Act of 1997.

Under rule 4(g) of the Committee rules, any oral opening statements in hearings are limited to the Chairman and the Ranking Minority Member. This will allow us to hear from our witnesses sooner and help members to keep to their schedules. Therefore, if other members have statements, they can be included in the hearing record under unanimous consent.

[The statements referred to follows:]

Mrs. CHENOWETH. I would like to welcome our witnesses and the members of this Committee today on H.R. 2458, the Community Protection and Hazardous Fuels Reduction Act of 1997.

Last year, wildfires burned over 6 million acres and cost nearly \$1 billion to fight. These intense fires are now frequently occurring in America's backyards. In the early part of this century, a clear delineation existed between the urban center and what was considered rural America, but this no longer exists.

Over time, cities have grown into suburbs and suburbs have blended into what was once considered rural, and this complex landscape has come to be known as the wildland/urban interface. Forests and grasslands are intermixed with housing, businesses, farms and other developments, posing new challenges for fire management and fire suppression.

The intensity of many of the wildfires witnessed in recent years are of a magnitude seldom seen before and they are the result of unnaturally high fuel loads, caused from years of aggressive suppression, forest disease, and grossly overstocked stands also contribute to this. This is an unhealthy, dangerous condition that must be properly dealt with and dealt with now.

Last spring, the Subcommittee traveled to several forests in the West. The Forest Service provided us with an excellent tour which

gave us an idea of what can happen if we do not take action. In the Boise National Forest alone, the Forest Service showed us an area larger than Los Angeles County that had been burned from catastrophic fires over the past 5 years.

During this trip and other trips that I have had a chance to take this year, the Forest Service employees working on the ground have asked for the authority contained in this bill to help deal with the fire danger and forest health problems that plague our national forests.

There is no doubt that something must be done. The question is not if our forests will burn from catastrophic fires, but when. These intense fires not only threaten the destruction of communities, putting human life and property at risk, they also damage water supplies, destroy fish and wildlife habitat and damage ambient air quality. The unnatural temperatures of these fires also damage soil to the degree that it substantially reduces the ability of the land to support future stands of trees and greatly increases the potential for massive soil erosion.

Regarding the importance of protecting our forests, President Teddy Roosevelt, one of the greatest conservationists of all time, said this, quote, "If there is any one duty which more than any other we owe to our children and our children's children to perform at once, it is to save the forests of this land, for they constitute the first and most important element in the conservation of the natural resources of this country."

Quoting from a Forest Service brochure on forest health, the agency states, and I must commend the Des Chutes National Forest for their very excellent brochure, and I am very pleased to quote from this. It is a very, very outstanding brochure.

"The Forest Service has identified the factors that are weakening the forests and there are a number of acres affected and it will take time, effort, resources and cooperation to restore the balance. The Forest Service has a vision, a vision of a healthy, balanced, self-sustained forest." And I agree with this vision, and for this purpose, I introduced the Community Protection and Hazardous Fuels Reduction Act of 1997.

This bill is the result of listening to the on-the-ground experts, those men and women who work every day in the Forest Service. It provides the Forest Service with a new tool that will allow it to help protect our forests, fish and wildlife habitat, protect our air quality and water quality, as well as human life and our property.

I look forward to working with the Forest Service and interested members as we move this bill forward; and in light of last year's severe fire season and the threat that remains in our forests, now is the time to properly deal with the unnaturally high fuel loads that lead to loss of human life and property, as well as most of the environmental damage and taxpayer expenditures that result.

Since the Ranking Minority Member is not here right now, I will recognize him when he does come in for his statement, but I would like to recognize my colleague from Montana, Mr. Rick Hill.

Mr. HILL. Thank you, Madam Chairman.

Madam Chairman, first of all, thank you for this hearing and thank you for this bill. This is an important issue for Montana. In western and central Montana we have many communities that

would certainly fall within the definition of communities where there is urban and forest interface.

Knowing full well that recent reports indicate that the fuel build-ups in western Montana are at excessive levels, and also in light of the fact Madam Chairman, that we are entering an El Nino season, which traditionally has created very dry and warm conditions in much of Montana, I think this is a very important issue facing Montanans.

The threat is very real, and this deserves action; and Madam Chairman, your bill would seek to reverse the trends of the ever-increasing fuel loads in these national forests while giving our agencies and local communities the tools to properly manage the forests not only for the benefit of wildlife, but also for the benefit of our citizens. I think, most importantly, it establishes that protection of our citizens and our communities are public interest priorities in resource management.

So I thank you very much, Madam Chairman.

Mrs. CHENOWETH. Thank you, Mr. Hill. And now I will introduce our first panel of one witness.

Mr. Robert Joslin, Deputy Chief, National Forest System, Washington, DC.

Mr. Joslin, I am very pleased to have you join us today. Please proceed.

STATEMENT OF ROBERT JOSLIN, DEPUTY CHIEF, NATIONAL FOREST SYSTEMS, UNITED STATES FOREST SERVICE

Mr. JOSLIN. Thank you, Madam Chairman and members of the Subcommittee. We thank you for the opportunity to appear before you today to discuss H.R. 2458, the Community Protection and Hazardous Fuel Reduction Act of 1997. I would like to enter the written statement into the record and provide summarized testimony.

As you mentioned, I'm Bob Joslin, the Deputy Chief of the National Forest System. I also have with me Tom Patten, our fuels management specialist here in the Washington office.

I would like to preface my remarks by saying, we have not had sufficient time to fully analyze this bill or to go over it with your staff to clarify our interpretation, and we would certainly like to do so. The Bureau of Land Management is in the same situation, and today's remarks should not be interpreted as a representation of their official position.

As we interpret it, H.R. 2458 would expand contracting authorities of the Secretaries of Interior and Agriculture to allow them to require treatment of hazardous fuel buildup or improvements to noncommodity resources as conditions in contracts for the sale of forest products within wildland/urban interface area. The bill would also establish authorities for forest management project credits to be used by the purchasers to offset against their payments.

While the administration certainly agrees with the stated purpose of H.R. 2458, to safeguard communities, lives and properties by reducing the threat of wildfires in the wildland/urban interface, we cannot support the bill as introduced, but would certainly be willing to work with you to address these issues.

While H.R. 2458 focuses on forest health in the wildland/urban interface, this problem requires a broader view and extends well beyond the urban interface area. We would like to see legislation that provides adequate authorities to deal with the urban interface and forest health issues.

Congress has certainly demonstrated their interest in improving the health and fire defensibility of the wildland/urban interface through a number of legislative proposals and restructuring of the Forest Service fire management budget to add fuel reduction work to the fire suppression program. There are several administrative efforts under way to identify the management needs and authorities that fully address the protection of wildland/urban interface lands.

We are currently collecting information necessary to assess risk and treatment needs as part of our efforts to develop balanced approaches at the landscape scale and developing a long-term management strategy based on the data collected. We are also currently working in close partnership with local communities around the country to assess and reduce the risk of wildfire losses. I will share one of these efforts with you today.

The Pike and San Isabel National Forest and Canon City District of the BLM in Colorado are working through the State forester, who is with us today, with a number of partners and communities along the front range of the Rocky Mountains to identify opportunities in response to wildland/urban interface issues. Their broad coalition of groups and governments called the Pikes Peak Wildfire Prevention Partners is working on a number of efforts together. They include revamping a suppression training facility to improve the efficiency of wildfire suppression and to serve as a demonstration area for fire-safe building materials; completion of fire protection assessments in the three-county area that identify priorities for treatment—the U.S. Air Force Academy provided the technical expertise and assistance to map the assessment area—establishment of a slash/mulch project where homeowners can bring woody debris from private property fuels treatment for disposal. The material is mulched onsite and then made available to the public for use in landscaping at no cost. The Forest Service is carrying out this effort and similar ones under authority of the Cooperative Forestry Assistance Act.

Both Secretaries have a number of authorities available to do restoration and forest health activities similar to those identified in the bill. We are currently examining administrative options for new ways of accomplishing the ecosystem management through the timber sale program, including the potential for stewardship contracting. This effort will provide valuable information about whether there is a need for additional legal authorities.

While the authorities proposed in H.R. 2458 would allow additional improvement activities outside sale area boundaries, using timber sale contracts, and increases the opportunities to treat fuels not generated by harvest activities, there are substantive and technical concerns related to H.R. 2458 that merit more analysis and discussion. The three significant most significant issues are:

Section 101(b) appears to exempt the identification of wildland/urban interface acres from interdisciplinary and environmental

analysis and documentation. The administration believes that this exemption from the normal application of NEPA is unnecessary.

Section 102(b) establishes a new system of forest management project credits and permits their transfer to purchase future timber sales. This provision could have potentially significant pay-as-you-go implications.

Section 201(a) authorizes and encourages the Secretaries to enter into contracts for grazing when the local county commission or other unit of local government certifies that there is a danger of fire in the wildland/urban interface area. Existing authorities in the use of a contract rather than a permit generates some concerns.

Definitions in section 3 that would be critical to the operation of the bill need to be clarified and refined. Wildland/urban interface and hazardous fuel buildup definitions need some work. The addition of a forest management project does not appear to include fuel reduction.

Finally, the timeframe for development of regulations implementing the bill in section 301 is too short and appears to conflict with section 102(g) of the bill.

The Forest Service has received about 50 project proposals for the treatment of fuels and in urban interface areas across the countries. These proposals may provide the best information to date to look at in order to identify the array of possible authorities we might want to explore.

Madam Chairman, while we agree that protection of communities, lives and property in wildland/urban interface areas is a national priority and agree we need to continue our efforts to reduce threats of high-intensity wildfires to both human life and property, we cannot support the bill as introduced. USDA funding proposals for fiscal 1998 would provide sufficient appropriation to address areas of immediate concern and to develop the necessary science and procedures to assess the long-term situation. Once information from that work is available, we can develop long-term strategies and implementation proposals on the priority areas. Once we have that information, we will know more about the need for additional authorities and would like to work with the Committee.

This concludes my statement. I would be happy to answer any questions you or other members of the Subcommittee may have.

[The prepared statement of Mr. Joslin may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Mr. Joslin.

The Chair recognizes Mr. Hill.

Mr. HILL. Thank you, Madam Chairman.

Mr. Joslin, do you believe it ought to be a priority in terms of forest management to reduce the threat to our communities from fire?

Mr. JOSLIN. Yes, I do.

Mr. HILL. Is it your opinion that this bill would give you more tools to accomplish that, or would it give you fewer tools to accomplish that?

Mr. JOSLIN. I think with some work on this bill that it would certainly help us and provide tools to help us.

Mr. HILL. Let me ask you a specific question for Montana.

Do you have any programs, pilot programs, efforts in Montana right now, to identify and reduce life-threatening fire hazards from fuel buildup in Montana, anything going on in Montana that is specific?

Mr. JOSLIN. Yes, sir, there are. We had gone out with a letter to all of our units across the national forest system and asked them to come up with some potential ideas for dealing with this particular effort. In regard to that, in a pilot sense, we received over 50 responses. Some of those are from Montana. Bitterroot National Forest, region one, has one; the Lolo; the Flathead; and another one from the Lolo. And these properties are all across the board.

What we are doing now that we have all of these in, we have a group together that are evaluating each one of these projects. Some of the projects that are proposed will certainly require help from Congress in dealing with some of the laws that we would need changed, et cetera, to make them feasible to carry out. But we believe that with a pilot program like this, which are done in partnerships that vary from tribal governments, State forest industry groups to local organizations, that we can get a good idea by trying these out of what works and what does not work.

Mr. HILL. Have you examined the cost of being proactive in terms of reducing fire hazard by reducing fuels as contrasted to what it costs to fight fires? Do you have any studies on that to indicate which is more cost-effective?

Mr. JOSLIN. We have looked at that, and I think certainly over the long term, pay-me-now is certainly better than pay-me-later. And I think if we can get after the fuel reduction and those kinds of things over the long term, that you will find that that will pay off.

Mr. HILL. The Chief, I think, has identified about 40 million acres of land that are in need of treatment to reduce fire fuels. What criteria do you use to measure the fuel loading and how do you determine if an area has too much fuel?

Mr. JOSLIN. I would probably want to refer that to the expert, but the Chief identified the fact that we consider that we have about 40 million acres of the national forest system at high risk, and those are based on a broad assessment of what the fuel loads are out there, the amount of fuel both on the ground and the density of stands, how much is standing, and all of those things in combination.

I think that as you go from that broad scale down into the local situations more information would be taken to determine what that fuel loading is, what you need to do, whether you need to combine mechanical with fire or whether you can go in and use fire, for example, by itself, or what the other actions might be that you might need to take to reduce that to an acceptable level.

Mr. HILL. This bill gives considerable flexibilities to the local foresters to make those kinds of decisions. Do you agree that is where those decisions ought to be made?

Mr. JOSLIN. Yes, I do.

Mr. HILL. And this bill provides for some exception from the NEPA process with regard to identifying those interface areas where there could be communities at risk. Do you take exception to that provision?

Mr. JOSLIN. What I think should be done there, as far as identifying areas, there is no need for legislation on changing the NEPA requirement there, because there would be none. But I think when you get down to those specific areas, that NEPA and that process should be used to consider all of the public's needs and everything else to come to a decision on exactly what you're going to do there.

Mr. HILL. So let me make sure I understand what you are saying. What you are saying is, for whatever the management solution would be, obviously you should follow the NEPA process—do an environmental assessment, do an environmental impact statement. But just for designating areas, saying this is a community where there is interface between urban and forest areas, it would be duplicative, would it not, to be required to go through the NEPA process just to obtain that designation?

Mr. JOSLIN. The process we use now, we designate areas like that without going through the NEPA process.

Mr. HILL. So there is nothing unusual about that specific aspect of this bill?

Mr. JOSLIN. No. The only concern there is, when you get down to talking about the actions that you might propose to take that, those need to go through the NEPA process in our opinion.

Mr. HILL. I would agree with that.

Thank you, Madam Chairman.

Mrs. CHENOWETH. Thank you, Mr. Hill.

Mr. Joslin, I am somewhat surprised at the administration's position on this bill, especially since the idea for the bill had come from Forest Service personnel not only working on the ground but in regional administration. And a similar bill was introduced by my predecessor, Mr. LaRocco, and came out of the administration, and he did not introduce it in Committee or it did not proceed very far. It was a very good concept and it probably should have.

I find it a bit disconcerting that the White House is now opposing the bill. But I listened very carefully to your testimony, and I would like to know, how would you define wildland/urban interface areas?

Mr. JOSLIN. Madam Chairman, there are a lot of different definitions for that. The one that currently is in use by us is the zone where structures and other human development meet or intermingle with undeveloped wildland.

Mrs. CHENOWETH. That is right. That is good.

Approximately how many acres does the Federal Government manage in what you would consider wildland/urban interface areas?

Mr. JOSLIN. I will have to get that figure for you, Madam Chairman.

[The information referred to may be found at end of hearing.]

Mrs. CHENOWETH. If you do not like this bill, then how does the Forest Service plan to systematically reduce fuel buildups on these lands within a 15- to 20-year cycle to protect private property and lives?

I ask this in view of the fact of your most recent letter to me with regard to the ice and standing limbs in the Panhandle National Forest. The Cooperative Forestry Assistance Act was not employed there by your agency. It has not helped us. And the danger

there continues to grow with every day that we are not able to get those damaged trees off the forest floor.

Mr. JOSLIN. Madam Chairman, I just want to reiterate that we support what you are after in your proposal here and that we would like to work with you on certain specific elements in the bill, because we think that taking these kinds of actions are what it is going to take out there to save property, lives and all those kinds of things—certainly agree with you on that.

Mrs. CHENOWETH. Thank you very much.

Tell me, Mr. Joslin, to help me, how would you define hazardous fuels buildup?

Mr. JOSLIN. Well, there is about 150 different ways, and I am not sure which is the correct one, but I think that we need to work with you and your staff on one that would be acceptable to all of these partners that—you will be talking to some more of them later on.

Mrs. CHENOWETH. Tell me how would you define forest management projects.

Mr. JOSLIN. Forest management projects, to me, are any of the projects that take place out either in a national forest, or in any other forest as far as that is concerned, any kind of activity that would be used to enhance the resource for the future.

Mrs. CHENOWETH. Well, what management prescriptions would you include as an appropriate forest management project?

Mr. JOSLIN. Well, in connection with this particular bill that we are discussing here today, and we talked earlier about the 40 million acres that we have identified as high risk, we have looked at that, and about 25 million acres of that would probably have to be treated with some kind of combination of mechanical and fire; the remainder, you could probably deal with that strictly with fire. And that—you have to remember, that is a pretty gross overall assessment.

Mrs. CHENOWETH. You state in your testimony that, quote, the administration has not had sufficient time to fully analyze this bill; and you stated further that the Forest Service has not had an opportunity to go over the bill.

Who has looked at the bill for the administration? It has been there for a couple of weeks.

Mr. JOSLIN. We have looked at this bill quite a bit, in depth in the last couple of days, in fact, right up to the time before coming over here; and we still have some of these questions that we would like to work with you and your staff on to clarify.

Mrs. CHENOWETH. Well, Mr. Joslin, I appreciate your being here, and I appreciate your obvious willingness to work with us on the bill. The bill certainly is not cast in stone and we remain very open and willing to work with the administration. I, however, am not particularly inclined right now to see the landscape concept of management employed all at once across the national forest. I would like to see it tried out in an area that has the most critical concern for the potential damage to private property and human life. So that, indeed, is why we confined this new concept to its workability based on the needs of the urban and rural interface.

Mr. JOSLIN. Madam Chairman, I would like to also indicate to you that the pilot program that I mentioned, there is one proposal

on the Clearwater National Forest in your home State of Idaho, and we really think that this is an opportunity to try a lot of different efforts and use this information to work with you and other Members of Congress on some things that we need to make these feasible and go ahead and work them.

Also, I would like to thank you for taking the time to take a look at the Boise National Forest and the moonscape that has occurred because of the wild, severe, intense fires that we have had out there since the mid-1980's.

Mrs. CHENOWETH. It is very impressive, what we see out there, and I have extended, and so has Senator Craig, invitations to the Secretary and to the Chief to come out; and we would also love to have you join them for the same type of tour that our leadership team took, and I think that when we all see the same thing, we are far better able to work in our separate capacities to, together, find solutions to the problems that we see.

So, Mr. Joslin, I really appreciate your being here, and I wonder, if time permits, if you would mind staying. We have another panel that I will be calling.

Mr. JOSLIN. Thank you, Madam Chairman.

Mrs. CHENOWETH. Right now the Chair will recognize the second panel and excuse Mr. Joslin.

We welcome Mr. Harry Wiant, President of the Society of American Foresters, and Pete Goicoechea, County Commissioner from Eureka, Nevada; Jim Hubbard, Director, Colorado State Foresters, Colorado State Forest Service, Colorado State University; Michael Albrecht, President, Sierra Resource Management, Sonora, California; and Steve Holmer, Western Ancient Forest Campaign.

Gentlemen, if you will all take your place at the table. I wonder if you might stand and take an oath, please.

[Witnesses sworn.]

Mrs. CHENOWETH. Mr. Bob Schaffer from Colorado will be here soon. He is still on an airplane, as we speak, but he should be in soon; and Mr. John Doolittle wanted also to be back; and Mr. Jim Gibbons from Nevada also wanted to come in. It is a very busy time as we are nearing the end of the year, and so I know where their concerns are; and they personally indicated those to me and they will try to join us.

To begin with, I would like to recognize Steve Holmer from the Western Ancient Forest Campaign. Steve.

**STATEMENT OF STEVE HOLMER, CAMPAIGN COORDINATOR,
WESTERN ANCIENT FOREST CAMPAIGN**

Mr. HOLMER. Thank you for this opportunity to testify.

Western Ancient Forest Campaign represents organizations and individuals nationwide who are dedicated to protecting forests and aquatic ecosystems on the national forests.

Our organization strongly opposes H.R. 2458 and urges the members of this Committee and the House of Representatives to oppose the bill and its objectionable elements in any form.

While the environmental community supports protecting lives and properties in the wildland/urban interface threatened by fire, there is no scientific evidence increasing logging will accomplish that goal and, in fact, significant evidence suggests the opposite.

This bill, if enacted, will allow for increased logging that will increase fire risk and threaten other important values such as public safety, clean water supplies, fish and wildlife habitat, recreational opportunity and fiscal responsibility.

There is no conclusive scientific data that indicates forests can be successfully fireproofed by thinning. The Sierra Nevada Ecosystem Project reported to Congress that logging increases fire hazard by increasing surface dead fuels and changing microclimate. Given the lack of confirming scientific data, limited pilot projects already under way by the Forest Service should be intensively monitored and researched to see if the strategy works and under what conditions before it is employed on a broader basis.

Our organization disagrees with some of the fundamental assumptions found in the bill's findings section. For example, the bill states the forests are experiencing significant disease epidemics and insect infestation. The U.S. Forest Service testified June 19 before the House Agriculture Committee that there is no forest health crisis on the national forests. Disease and insects, like wildfire, are natural parts of a functioning ecosystem.

The bill claims inconsistent management and natural effects for the buildup of fuels, but there is substantial scientific evidence that fire suppression, on which the government spends nearly a billion dollars a year, the selective logging of larger, more fire-tolerant trees and cattle grazing, which is also subsidized by taxpayers, are the primary causes of overly dense forest conditions. Nothing in this bill addresses these fundamental causes, and in fact, the bill's promotion of cattle grazing could make the overstocking and fuels problem worse in some regions.

The NEPA exclusion clause will prevent meaningful public participation in designating lands for management activities that may be very near communities. For example, landslides and flooding, which have killed people and destroyed properties, have been linked to road building and clear-cutting. Under this bill, there would be no protection or even the opportunity to comment for communities or property owners who could be put at risk by future logging and road building projects in the designated areas that have steep or unstable slopes. Similarly, recreation interests would not be allowed to comment on project designations that could adversely affect hunting, fishing or hiking near their communities.

WAFC strongly opposes the provision for "Forest Management Credits" found in section 101(b). The Clinton Administration has proposed an end to the purchaser credit system because it subsidizes logging road construction, and the House voted to cut this program in half. Forest Management Credits would create a new subsidy that could lead to even less money being returned to the Treasury from a timber program that is already losing hundreds of millions of dollars every year. It could also detract from the KV fund, which is supposed to pay for reforestation of areas that have already been logged.

The "Cost Considerations" provision of 101(f) would also allow the Forest Service to ignore economic considerations when conducting timber sales under this bill, and specifically states that "No sale shall be precluded because the costs of the sale may exceed the revenues derived from the sale." This section would also obfuscate

the extent of money-losing timber sales by allowing the Forest Service to exclude these sales from any calculations concerning the revenue of the timber sale program. In other words, the agency would be granted a blank check, and they would not even have to worry about how much money is actually being lost to the taxpayer.

A better approach for funding necessary projects is to appropriate the money in the annual Interior appropriations process. If the threat to public safety warrants, it is our belief Congress should provide adequate funding, not to promote the giveaway of the public assets as this bill does.

We also strongly oppose section 201 concerning removal of grasses and forbs because there is significant evidence that grazing is harmful to forests and streams, and it contributes to overstocking conditions in some forests. I would like to submit for the record a scientific report entitled "Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forests of the Interior West" by A. Joy Belsky and Dana Blumenthal.

Mrs. CHENOWETH. Without objection, so ordered.

Mr. HOLMER. It comes to the conclusion that grazing is, in fact, a major contributor to overstocking and changes in tree species composition in our forests. Similar studies conducted by the Forest Service have come to similar conclusions for Southwest forests.

In conclusion, the agency has adequate existing authority to carry out necessary activities in the interface zone to protect lives and property. This bill calls for uncontrolled logging that may increase fire risk and threaten other important values such as public safety, clean water supplies, fish and wildlife habitat and recreational opportunity.

Western Ancient Forest Campaign will actively oppose H.R. 2458 and urge the members of this Committee to vote against its passage.

Thank you for this opportunity to testify.

Mrs. CHENOWETH. Thank you, Mr. Holmer. I appreciate your testimony.

[The prepared statement of Mr. Holmer may be found at end of hearing.]

Mrs. CHENOWETH. For the next witness, I would like to call on Mr. Doolittle to introduce him.

Mr. Doolittle.

Mr. DOOLITTLE. Thank you, Madam Chairman. I appreciate your holding this hearing and apologize for arriving late.

I would like to introduce Michael Albrecht, President of Sierra Resource Management, a constituent of mine; and this is a firm that specializes in forest thinning in our heavily overgrown forest in the central Sierras.

As you know, Madam Chairman, from the field hearing that was held recently in Sonora, we have had some excellent testimony from Mr. Albrecht and an excellent demonstration, where you and I became personally involved in his expensive equipment and survived; and he survived without, as far as I can tell, injury to the equipment.

Mrs. CHENOWETH. I think he was more at risk than we were.

Mr. DOOLITTLE. Oh, definitely, and the bystanders, if I might say. Anyway, I am pleased to welcome him today, back here in Washington, to testify.

STATEMENT OF MICHAEL H. ALBRECHT, PRESIDENT, SIERRA RESOURCE MANAGEMENT, INC.

Mr. ALBRECHT. Thank you, Madam Chairman and Committee members. Greetings from Sonora, California. It truly is a pleasure to be here today discussing such a positive piece of forest health legislation.

H.R. 2458, the Community Protection and Hazardous Fuels Reduction Act of 1997, is a welcome sign that Congress is ready to give professional foresters the tools we need to protect our forests, our firefighters and our homes.

Before I continue, let me give you a quick snapshot of who I am and what I represent. Who I am is Mike Albrecht, the registered professional forester in both California and North Carolina. I am co-owner of a small timber harvesting and timber management business. Our company, Sierra Resource Management, employs approximately 50 people dedicated to sound forest management. We specialize in forest thinning.

What I represent is the future, and the future of forestry in our great Nation is exciting. The potential we have to do trend-setting, positive and profitable work in our forests keeps me optimistic about the future.

As in all endeavors, our future has been shaped by our past. I am not here today to apologize for past forest management practices, because an apology is not appropriate, but I would strongly acknowledge that the forest practices 50 and 100 years ago were abusive. Foresters, environmental groups and the general public recognize this fact. The good news is that although often contentious, the forest resource dialog of the past 50 years has resulted in advanced forest management practices and environmental protection that today is second to none. It is my strongest professional opinion that regardless of political affiliation and regardless of who signs our paychecks, we should all be able to agree that American forestry is the world's standard.

Nevertheless, all is not well in the woods. Your field hearings held last week in Sonora produced plenty of frank discussion. We all heard prominent U.S. Forest Service managers and scientists being critical of the state of our forests. They were bewildered by the maze of regulations they confront. But the most disturbing and disheartening revelation, they confided, is that the sense of purpose of the national forest is gone.

Our local media summed the whole situation up with the headline, U.S. Forest Policy Broken. I found in private business that you can always fix machines, you can build bridges and buildings, but repairing a broken spirit and defeated attitude is very difficult. After hearing the Forest Service testimony, I know we have a difficult task ahead, but I also know we can do it.

Today, I bring you no new statistics about wood supply and demand, catastrophic fire, job loss or firefighters killed. You have heard all of them by now. Instead, let us take some action.

No. 1, pass H.R. 2458, give us this proactive mandate to thin the forests around our communities. I applaud the emphasis of this bill that assigns priority to reducing fire risk. The management credit idea is innovative. H.R. 2458 dovetails perfectly with the California Board of Forestry's recent emphasis on community fuel break areas. The timing of this bill could not be better.

No. 2, support Congressman Doolittle's effort to fund a watershed level demonstration project on the Stanislaus National Forest. This represents an equally innovative approach to protecting and enhancing our forest resources.

No. 3, continue to seek out and support local projects and initiatives like the Quincy Library Group's proposal to promote forest health, local economy and consensus building.

These are the efforts to support. The result of your support will be healthier forests and safer communities. The result of your support will be vibrant wildlife habitat. But most importantly your support will renew the optimism and spirit within the people whom we charge with managing our forests.

Madam Chairman, I believe that under your leadership we are beginning to turn the corner toward better forest policy. Keep up the good work, continue to give up your weekends to hold field hearings; it will be worth it.

Mrs. CHENOWETH. Thank you, Mr. Albrecht. It was very enjoyable to be out there in California.

Mr. ALBRECHT. Those seats are still open for both of you on that equipment.

Mrs. CHENOWETH. You are very brave. Thank you.

[The prepared statement of Mr. Albrecht may be found at end of hearing.]

Mrs. CHENOWETH. The Chair now recognizes Mr. Hubbard, Colorado State Forester.

STATEMENT OF JAMES HUBBARD, DIRECTOR/STATE FORESTER, COLORADO STATE FOREST SERVICE, COLORADO STATE UNIVERSITY

Mr. HUBBARD. Thank you, Madam Chairman, members of the Committee.

Wildland/urban interface and the fire threat that goes with it is the State Forester's No. 1 priority. It has to be. We are talking about public safety and firefighter safety. So it is not just a choice of management options, it has to be our priority. Nothing else carries that kind of burden with it.

I appreciate your efforts to authorize tools for us to address this issue. Private land needs our adjacent Federal owners to be responsive, to be good neighbors, if you will. Today I would like to address the wildland/urban interface hazard and the wildland/urban interface mitigation.

The hazard first, and I break that into two components, the forest conditions and homes in the woods, which, if you will, is my simple definition of interface.

National forests, in the West in particular, are at an age where they are ready to regenerate. They have more trees per acre than normally occurs. As the result of age and the number of trees competing for limited nutrients, they have lower fuel moistures, so

when they burn, they burn hotter; and we have more of them than ever. So we are facing that kind of a firefighting situation.

Fuel buildup: That makes it more difficult to suppress these kinds of fires, makes it more costly to suppress these kinds of fires, puts more at risk when they burn hotter. It does more permanent damage. And we are also experiencing a frequency of fire that is not what we have faced in the past. Nineteen ninety four to 1996 were well above the 10-year average by 30,000, 40,000 fires and by 2.4 million acres. That is a lot.

The homes in the woods are the result of development that usually comes from local decisionmaking, local decisionmaking that we are not likely to interrupt. So it gives us a protection situation that we have to deal with. Little choice. We cannot ignore it. And it makes it a priority because of the values and the people that are at risk.

Mitigation, I break into identifying and assessing the hazard and land management practices that deal with the situation.

Fire suppression policies and local planning assistance, in identification, I have included in a copy of my testimony the Colorado red zone map. That is a joint assessment of all of the land management agencies in development in the front range, and it identifies 3 million acres of front range that is susceptible to interface fire and loss. It helps to set priorities that identify where we have to work first, where the forest conditions and the disturbance regime and the housing density dictate we do something that we have not normally done.

In land management practices, the something that we do is reduce fuels; the fuel buildup that now allows for hotter fires to carry further and burn more and be more difficult and costly to suppress, that regime has to be altered. It has been altered by preventing—by the suppression activities that have prevented fire from running its normal course in those areas, and now we are dealing with how to adjust that situation because we have people in the way.

We are faced with small diameter trees and limited markets, small diameter material and limited markets and what to do with that. That says if we do not find an innovative way, we are not likely to find a commercial method of reducing this hazard. The contracting mechanism you proposed to reduce hazard offers opportunity.

The fire suppression has been aggressive in the past 50 years, 100 years, and that has produced some modifications we now have to deal with; but we have little choice but to take aggressive suppression action in the interface.

In land management planning, most States have State mitigation plans. Many counties have county mitigation plans. So they are starting to face this situation. It is driven a lot by suppression costs that they cannot afford, and ruled by public protection as well. But the development permitting process still is their decision. We can only advise as to what mitigation might help that situation.

States are paying major attention to interface. I mentioned it is our priority. The Federal lands, especially the intermingled lands, are key components to dealing with this problem.

In 1996 there was a fire west of Denver, Buffalo Creek fire. I will run through that quickly. It was 10,000 acres in one afternoon. It

destroyed homes, but also left significant natural resource damage after it was over, it left some permanent damage. The regeneration does not occur, because it burned too hot. The air and water quality suffered. There was flooding following that fire. It put water into a Denver water reservoir, and put more sediment into that reservoir than the previous 13 years of the operation of that reservoir, in one rain storm event; and the citizens were outraged that we have not done anything about that.

That kind of burning will continue. So it is a situation we have to address in some way. We have to do what we can. We have to do the best we can to redeem our land stewardship responsibilities. So I thank you for your efforts in proposing methods to do this.

We need Federal land managers full participation to achieve public safety and land stewardship in the interface, responsibilities of public ownership all become factors, and the State Foresters welcome the opportunity to work with you on the bill.

Mrs. CHENOWETH. Thank you, Mr. Hubbard.

[The prepared statement of Mr. Hubbard may be found at end of hearing.]

Mrs. CHENOWETH. The Chair now recognizes the gentleman from Nevada, Mr. Gibbons, to introduce our next witness.

Mr. GIBBONS. Thank you, Madam Chairman, and I do have the distinct pleasure to introduce somebody from the Second District of Nevada to testify on this issue. But before I do and with your approval, I would like to say it is an honor for me to be here today before your Subcommittee on Forest and Forest Health to talk about H.R. 2458, because that bill is of the utmost importance in protecting our Nation's forests, private property and human life.

Last year in Nevada we had the worst wildfire forest fire season that we have ever had in the history of our State. The passage of this legislation is needed in order to help Nevada communities reduce the accumulation of wildland fuels on public lands which lead to the wildfire destructions of these very communities.

Currently, the unnatural accumulation of dead and dying trees, large banks of sagebrush, prolonged drought in the West and the proximity of homes to wildland fuels have created a very dangerous situation in Nevada. This bill improves environmental health and water quality by allowing the use of revenue generated from the authorized sales of timber to be used for projects to achieve these needed objectives.

H.R. 2458 is important to the State of Nevada, and perhaps one of the most important and qualified persons to speak on it, and on Nevada's behalf, is here today, and it is Mr. Goicoechea. He is a local, self-employed rancher since 1970. He has been the Chairman of the Eureka County commissioners for the past 10 years, and since 1994 he has been the Chairman of the Humboldt River Basin Authority. He is also an active member of the Diamond Complex Working Group, which is a local consensus group developing resource management recommendations for wild horse and grazing issues. By developing working agreements between the BLM, the county and constituents, he has and currently does play a leading role in representing the people of Eureka County.

Further exemplifying his background and knowledge as it relates to this legislation, he is currently serving as Chair of the Nevada

World Health since 1988, as well as serving as Chair of the Central Nevada Development Authority. A current member of the Eureka Recreation Board and Community Development Block Grant Committee, this honorable gentleman from Nevada has long demonstrated his devotion and dedication to both the people of Eureka County and to the entire State as well. His insight on this issue will certainly be beneficial to this Committee.

Therefore, it is my distinct honor to introduce to you, Madam Chairman of this body, this gentleman from Eureka County, Nevada, Mr. Pete Goicoechea.

Mrs. CHENOWETH. Thank you, Mr. Gibbons.

The Chair recognizes Mr. Goicoechea

**STATEMENT OF PETE GOICOCHEA, CHAIRMAN, BOARD OF
EUREKA COUNTY COMMISSIONERS, EUREKA, NEVADA**

Mr. GOICOCHEA. Thank you, Madam Chairman and thanks, Jim. I feel a little bit like a sheep-man at a cattleman's convention, coming from a county that does not have any commercial timber, but I am here to testify in support of the concepts embodied in the Community Protection and Hazardous Fuels Reduction Act of 1997.

This bill does address the severe risk to human life, public and private properties, as well as our livestock and wildlife in Nevada. The costs associated with wildfire in Nevada in terms of taxpayer resources, property loss and resource degradation are staggering. In my testimony, there is a table that shows that presuppression costs alone, in Nevada, incurred by the Bureau of Land Management ranged between \$3 and \$5.5 million between 1990 and 1993.

The BLM was spending close to \$145 an acre in presuppression, and the suppression costs are believed to add another \$130 to \$145 an acre. Presuppression is a concern to us because we think it does not address the actual fuel reduction and the problems. When you put this with the additional \$8 million that was spent in wildland fire activities in suppression cost in Nevada alone, it is astronomical.

Despite incurring high costs of fire management, the rehabilitation in Nevada is surprisingly low. In 1985, we burned over a million acres of Nevada's grasslands and forests. We only rehabbed 55,000 acres. A large percentage of those nonrehabbed acres became infested with introduced annuals, cheatgrass predominantly. As the frequency of fire increases, the landscape will ultimately be dominated by cheatgrass and these other annuals, and that, in itself, will continue and we feel it will build a time bomb in central Nevada.

Recognizing the Federal fiscal constraints, we need to look at some realistic alternatives. Such alternatives might include additional enhanced roles for local and State governments. We need to look at forage banks. We would like to look at greenstripping. We have a lot of people living out there in the brush, and the only way, given our small infrastructure, limited fire departments, that we can really control those would be to seed these greenstrips into fire retardant—back to the native grasses and forbs, which burn slower, and we feel we have a better job of controlling.

Prior to the settlement of the West, fires in these sagebrush communities was an important factor. Dr. Burkhardt of the University

of Nevada said the Pinyon-Juniper stands in Nevada appeared to have burned in a 30-year cycle. Our modern fire suppression efforts, in conjunction with grazing and without rehabilitation, have turned that into a monoculture of cheatgrass in central Nevada, whereas the possible seeding programs should be the native grasses and forbs which are more resilient to fire. They will reduce that catastrophic fire of—which Congressman Gibbons talked about last year that we had. And we were very fortunate to get off without significant loss of life.

Within Eureka County we have extensive stands of pinyon-juniper. These noncommercial forests pose a significant wildfire hazard, and these fires are very costly to suppress, given their location. The dense stands of pinyon-juniper seldom support any type of understory and forage for wildlife and livestock and use a tremendous amount of water.

In western Oregon, of course, they are a little bigger juniper than we have in Nevada, but they use approximately 16 inches of water a year. When we start talking an acre-foot of water, it is a lot of water. Controlled burns might be an alternative, and in Nevada today the Bureau is talking about the light burn policy, but it seems like a tremendous waste of resource. Perhaps we should be exploiting methods to use this renewable resource, products that are going to require a new and realistic alternative.

We feel that the wood chip industry in rural Nevada, as we look at the pinyon-junipers, we have some estimates that they will yield between 12 and 15 ton of biomass per acre out of these pinyon-juniper stands. We see new products on the market. One of them we have in Eureka is called trex. It is made of wheat native beach straw. It is not structurally sound, but it can be used for siding and roofing and some subflooring. We think there is some real room for those.

We would promote the harvesting of areas in a mosaic pattern that fits with the contour and the topography of the land. We would also like to see these seeded down on the urban interface. We think we need to—as we do the EAs and EISs on these contours or green zones or greenstrips or free zones, we think they should include in the environmental assessment—we feel that we should have the capability of moving in there with machinery and bulldozers and graders that would in fact not require the wait-and-see, as we see in Nevada.

Usually the fire has gone by, the houses are burnt, the cows are burnt, and the rangelands are gone before anyone wants to make that call that, yes, it is time we moved equipment in. So if the greenstrips were, in fact, cleared to the point, and they should be treated as farmland if they could be harvested for the seed, then in the event of the threat of a fire in an urban interface area, we could move in with the mechanized equipment and establish the fire break.

We have witnessed a lot of change in Nevada. The fire policies—when I was growing up in Nevada in the 1950's and 1960's, fire suppression constituted a firebox that was given to different ranchers. One of these was designated the fire warden. There was not a lot of manpower in the Federal agencies then. In the event of a fire, the ranchers and miners came together, fought—I would not

say truly fought, they more herded and shaped the fire until it burned out. At that point, if it truly became out of control, miners entered into it and they did, in fact, put a fire break around that.

Today we see retardant bombers, helicopter attack teams, hundreds of professional firefighters coming on the scene, some of them arriving days after the fire is out.

We have also seen a significant change in Nevada as far as livestock numbers and the reduction of livestock. In Eureka County alone over the last 15 years we have seen a 70 percent reduction in the number of cattle in the county, from 41,000 to 13,000 in 1997.

We appreciate your efforts on this bill, Madam Chairman. We think that we can reduce the fuels through livestock grazing. I will not speak on commercial timber harvest because again, like I said, we do not have any. We believe with this bill you are helping to address the many issues and concerns I have expressed, and I also wish to thank you for giving me an opportunity to testify on this issue. It is very important to Nevada and my constituents in Eureka County.

Mrs. CHENOWETH. You are very welcome, Mr. Goicoechea, and I am very pleased you could come and join us today.

[The prepared statement of Mr. Goicoechea may be found at end of hearing.]

Mrs. CHENOWETH. The Chair recognizes with great anticipation Mr. Harry Wiant, President of the Society of American Foresters. Mr. Wiant.

**STATEMENT OF HARRY V. WIANT, JR., PRESIDENT, SOCIETY
OF AMERICAN FORESTERS**

Mr. WIANT. Madam Chairman, it is a real honor to be here representing the Society of American Foresters, which many people here know is the society that is the largest forestry organization in the world, 18,000 members. And also I would like to say that it is foresters that represent the most successful conservationists in history, and I say that rather modestly, of course.

We are a diverse organization. We cover all facets of forest management, and we have worked on the forest health issue long and hard. I would like to submit our report, "Forest Health and Productivity: A Perspective of the Forestry Profession," for the record.

When it comes to forest health, we believe your bill addresses in a very farsighted and innovative way most of the issues that we face. We truly support the intent of the bill. The bill identifies a significant problem, provides land managers the opportunity to address the problem, and allows for a mechanism to pay for the projects that would be necessary.

However, we think there are some areas of the bill that could be strengthened. We think that perhaps we need a more solid definition of the wildland/urban interface; several have mentioned that here today. And also on hazardous fuels, as to what is hazardous and what would that involve?

The bill requires the local Forest Service or BLM managers to determine the areas in need of fuel reduction. We support that because local managers know best what should be done. In fact, the more decisionmaking that can be done locally on the ground, the

better off our forests would be. However, it does not encourage, perhaps as much as it should, to get the views of the community members, other natural resource professionals, and State and local government officials, to identify areas in need of treatment.

The use of the credit system may cause problems. Some will try to relate it to road building and so forth, which of course is necessary also, but we know that will be attacked. And as you know one thing we do not need is more controversy on managing our forests in this country.

But a credit system is warranted. It is used in the private sector. But we think it also should be supplemented by appropriated funds in certain situations where there will not be the opportunity to have credit to do things that need to be done. For example, you could think of some of the forests in Southern California where they would not have enough timber to offset the cost of things that need to be done. There needs to be a specific credit allocation process developed.

For example, you need to have it so the counties get their 25 percent payments, thus there should be some limits drawn around how the credit system works; and of course, that could be developed.

The credit system might work against small operators. Small operators do not have the fiscal resources to perform the forest management work and then wait for their payments. There might be a problem there that perhaps could be addressed in some way. Some of these small operators that may not be interested in commercial production may actually specialize in fuel reduction and do a good job of it. They could be some of our best resources for that.

The management options presented in the grazing portion of the bill seem to be a bit too prescriptive. As it stands, the bill would not allow the managers to use prescribed burns, biological control or selective herbicides as management tools.

In conclusion, we support the intent of H.R. 2458. It certainly is a terrific problem that we have in this country. I was just last Friday on the Coconino National Forest, and they showed us the biggest fire they had had since the forest had been established, over 16,000 acres; and they said they only got it stopped where they had thinning done; they could finally stop it because it was not moving through the crown as rapidly. The opportunity to do that is obviously there and needs to be done.

I want to conclude by saying that the management of nature, such as we are talking about here, is not just an option, but it is a necessity for human survival. It is a fact that is easily forgotten in our urbanized and, unfortunately, propagandized population.

Thank you.

[The prepared statement of Mr. Wiant may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Mr. Wiant. I want to thank you very much for that very constructive testimony; and I want to thank all the members of this panel for their constructive testimony. It was very, very well received, and I look forward to working with each and every one of you as we try to move this bill to a better position and a stronger bill.

With that, the Chair recognizes Mr. Gibbons from Nevada for questioning.

Mr. GIBBONS. Madam Chairman, I have no questions of these witnesses at this time. Thank you.

Mrs. CHENOWETH. The Chair recognizes Mr. Vento. And Mr. Vento, if you have an opening statement or anything you would like to add to the record—

Mr. VENTO. I will submit an opening statement, Madam Chair. I have a lot of questions about this bill and regret that I was held up on the floor with another matter.

In any case, I missed the Forest Service witnesses. I am a little confused because I think that the suggestion that we are spending a billion dollars—and apparently, that is not being spent correctly. As far as I understand this legislation, it does not propose to change any of the policies on how the billion dollars is spent, at least not on the surface. It superimposes some new direction with regards to forestry practices vis-a-vis rural or urban forest interface and grazing types of policies.

In fact, as I listened to one of the witnesses, Mr. Gibbons' witness, speak about the problems with grazing, I thought that was pretty much the conventional wisdom, that overgrazing had given rise to pinyon-juniper types of stands, and that cheatgrass and sagebrush are a by-product of improper grazing policies.

Of course, if it is on land, that is the case, then you have to do something about it, because it does burn so hot that it will damage the surface soils. And the overgrazing actually causes the forbs to be cut so low that they do not regenerate or compete with these types of species, because the cows are the cheapest likely to graze in these areas.

So I am a little perplexed that by contracting, a unique idea, it is going to somehow solve the problem. I thought maybe resting the cows or taking the cows off it, or changing it and keeping the cows off might be part of the answer to that.

The other issue, I think there are questions that need to be answered, and I will turn it over to the panel in a minute to respond; but the other issue, of course, if it is an urban/forest interface, the first thing that should happen with local communities, counties and others is to try to reduce the number of those interfaces in terms of how we allocate and plan where human habitation takes place.

In fact, the Forest Service, as you know, itself was guilty of some of the problems with regards to promoting these types of leases or inholdings in years past. But by and large, I think it is a major concern. Of course, many persons that have these types of homes or ranches frequently want to have the forest very close to them. It is sort of an aesthetic question.

So I think we are talking about broader questions here. I understand that, but I think one of the first concerns you will run into in terms of trying to reduce that is folks that want to have trees around the house. I know I am proud of my three or four oak trees in my backyard. I think most folks want some trees close, except when they fall on the house, then we are not so happy about it.

I think they have raised a lot of questions. I think it is innovative, trying to build these credits and trading them and so forth;

but I am interested in why we cannot take the existing dollars that are in the program and use those to better manage. I think we are pretty much on the right track in terms of forest health, in terms of thinning and in terms of selective tree removal, in terms of replanting, in terms of watershed restoration and some of the other issues more broadly.

And I assume the Forest Service's testimony—from what I have read, I think they are doing some of this already. But there is a supposition or assumption here, I think, in this legislation that this is going to be much more aggressively pursued.

As an example, Mr. Wiant, are there any States that have actually tried these two policies, this issue of pursuing, for instance, on State lands this type of policy with regards to—that is envisioned in this legislation with regards to grazing?

Mr. Wiant. Well, for your information, I would route that question to Jim Hubbard, since he is a forester.

Mr. Vento. OK, let us go to him.

Mr. Hubbard.

Mr. Hubbard. I am not aware of anything in relation to grazing. But in relation to—

Mr. Vento. I think it is important. Because if we are to model this, and there is not a single State actually pursuing this type of policy, then I think that is an important problem.

Mr. Hubbard, with regard to the other, forest interface?

Mr. Hubbard. Yes. In regard to dealing with the forest situation, yes, there are other examples of the same type of approach that is proposed here in the contracting mechanism, and it is new.

The interface situation, though—

Mr. Vento. That is with the credits and everything, so that has a lot of different aspects. I did not think you were testifying to that.

But do you think the legislation ought to at least—you are dealing with an interface issue between housing and other habitation and forests—that you ought to deal with some sort of a land use plan or some agreement between the counties and other authorities to try to reduce this incident? Would that not be one of the highest priority issues?

Mr. Hubbard. I do not think we are in a position in Federal or State government to require it, but I think that should be a criterion for selecting our projects.

Mr. Vento. I think that is right, Madam Chairman. I know I am going over a little bit, but I have to leave, and I apologize, but the issue is a rather confounding problem. Because the truth is, with the type of urban sprawl or community sprawl that we have, everybody wants to spread out.

In fact, we spend a lot of our Forest Service firefighting and BLM firefighting money in these areas, trying to protect this, and I am not suggesting that is inappropriate, but we sure ought to try to reduce that. That should be clear in terms of if we are going to take over.

I have a lot of misgivings about us getting involved in terms of the science of this. I think a lot of it gets to be a lot more political science than forestry science, but I will leave it at that.

I will submit a statement, and thank you, Madam Chair, for giving me an extra minute.

[The information referred to may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Mr. Vento.

The Chair just cannot resist responding to you. We are trying to prevent the \$1 billion from having to be spent on fighting fire that would normally destroy private property, like we just recently saw.

And as far as grazing is concerned, because of the overgrazing in our Western States, there is a new kind of grass called cheatgrass that has begun to come in and it creates very, very hot fuel. You can graze that cheatgrass in the early spring, but if it is not grazed down in the early spring, well, then it becomes a real, real dangerous problem.

So, yes, you are right, this cheatgrass situation is caused from overgrazing, and that happened—

Mr. VENTO. Not very nutritious either.

Mrs. CHENOWETH. It sure is not in June or July, but in March, April and May it can be quite acceptable.

So we are trying, Mr. Vento, to initiate the new stewardship landscaping concept in Forest Service management on a smaller scale, and one that would impact private property very positively. So rather than biting off the whole kahuna all at once, that is what we are trying to do; and I appreciate your comments.

Mr. Albrecht, I understand that in California there is a pilot project going on with the State with this concept; is there not?

Mr. ALBRECHT. Yes, there is, Madam Chairman. I would like to address, if I could, Congressman Vento's comments, if I may do so.

Mrs. CHENOWETH. Please do.

Mr. ALBRECHT. In talking about the urban/wildland interface and how agencies and government work there, the urban component is regulated. You are correct in that counties and the State often have a lot of say over the urban component and what is done around homes. The wildland component is still governed by the U.S. Forest Service; they are the ones that really need the tool, and they are the ones that really have the complex fuel problem on a wide scale.

So this bill would give them and us as foresters a very important tool to manage that Forest Service landscape that would then work very well with what the county and State agencies are trying to do. They can only do what they are allowed to do, which is right around their homes or private property. So they work together very well.

Mr. HOLMER. If I may, I want to comment on that. On our staff we have a Ph.D. forest ecologist named Tim Ingalesbee, and he traveled to Quincy, California, and one of the things that he noted is that all around the community of Quincy it is private lands that are—the forest lands that are immediately about the community and the public lands are actually a fairly significant distance from the actual city itself.

And I think that is the case in many communities. And so to really look at this, you do have to look at the private lands, and I think you also have to look at the Forest Service's national wildlands policy, which I believe they promulgated several years ago, which said that the Federal Government does not have an obligation to protect every single property, particularly if it is indefensible, if it is an indefensible area, or if it is made out of inappropriate materials.

So, clearly, there does need to be some responsibility by private landowners and also by property owners that they are not putting an undue burden on the public.

Mr. VENTO. Madam Chair, if I can, I know I am trespassing on my colleague's time, but I appreciate your tolerance. I have no doubt there are instances in California and others where there are good examples of where it is needed. I think if we are going to set down a policy nationwide with regard to this, we need to have at least the expectation that we are not going to be counterproductive in terms of the areas that it does not do us much good to deal with it if there is simply no response.

I am aware and I support—I think most of us support State and local government doing the determination and zoning, but if we are going to come to the table, we at least want someone there so we can work with them; otherwise, this policy would not work. We would still be spending a billion dollars and would not accomplish what you are trying to do.

Thank you.

Mrs. CHENOWETH. Mr. Albrecht, did you have a response?

Mr. ALBRECHT. Thank you. In response to my colleague here, and again to Congressman Vento and some of his comments, where we need to prevent these fires is well before they get into the urban part of the interface. Once they are in the urban interface, we lose. Then we are losing homes. The wildland portion of this component is where we need to really put our effort. That is where the fires get hot and they move quickly.

I think, at least in the private sector and in working with the Forest Service in California, there is total agreement that this type of effort is going to do nothing but improve our situation. And the Chairman is right that it was a billion dollars spent in firefighting, and I think it was in 1994 actually that we spent a billion dollars fighting fire nationally. If we could take a fraction of that money and, in a proactive manner, prevent some fire—you talk about reinventing government; that is just exactly, I think, what everybody has in mind.

Mrs. CHENOWETH. Thank you, Mr. Albrecht.

Mr. Vento, I always appreciate your leadership.

Mr. VENTO. I would suggest, Madam Chairman, a lot of the money spent fighting fires is not really well spent in the sense that I think if you have a dry year, you end up spending a lot of money putting out fires you are not going to put out. That is another problem in terms of that.

So changing it to look at land-use patterns and some of the other issues, prescribed burns, probably would be a marked improvement. But we have to get over the idea that we can control, in some of these dry years, these fires in these areas, because we probably cannot. Cutting down the forest, of course, would eliminate the problem, but that is hardly the solution from my standpoint.

Mrs. CHENOWETH. And we do not propose that right now.

The Chair is very pleased to have Mr. Bob Schaffer from Colorado join us.

Mr. SCHAFFER. Thank you, Madam Chairman, and I particularly appreciate the attendance of Mr. Hubbard, who is from my home-

town, back in Fort Collins and, of course, familiar with their work back in the State.

I had a chance to read your statement and have a couple of questions for you as well. But before that, I want to point out that Mr. Hubbard mentioned Colorado's front range is kind of a good case study for this particular bill and an illustration of the need for it, and I could not agree more. From a political standpoint, it is the kind of place—if you are not familiar with Colorado, the front range is where the prairie ends and the mountains start and everybody wants to live there. It is just a strip from north to south which contains probably at least two-thirds of the State's population in that area.

Every time there is a forest fire of some sort that results in some house burning down or loss of life, as has been the case in Colorado, everybody wants to know how in the world that ever happened and how could we allow conditions to get to that stage. Then, when we talk about preventing that from occurring again, whether it is at the county or State or Federal level, well, then another element of our population decides that that is in fact a tragedy, so it is a constant battle that goes on.

And I think it is a good illustration of how this bill can have particular relevance in allowing those who are capable and competent in employing scientific principles and a certain amount of history, where management is concerned, to prevent loss of life and properties and, at the same time, enhance the environmental attributes that our State has to offer.

Mr. Hubbard, if you would comment a little on the importance of forest roads in fighting fires, particularly on the front range.

Mr. HUBBARD. OK. If we do not have access on the ground, then our costs go up tremendously and our losses increase. Sometimes that is acceptable in the right situations, the acres burned, but in most cases, and in particular on the front range, that is not the case.

Where we have interface along the front range in Colorado, access is not that much of a problem. Sometimes the kind of access prevents some of the equipment from getting in, so we have to take alternative measures. Building new roads to treat interface in the front range of Colorado would not be necessary.

Mr. SCHAFFER. I want you to comment, if you would, just about the differences in fire prevention that you see in Colorado between the State Forest Service and the U.S. Forest Service.

Mr. HUBBARD. I see no differences, and I say that because all the agencies have worked together on that. So we are into an interagency mode, and while there is some difference in terms of initial attack, in Colorado we put that burden on the counties; and the counties, through fire protection districts and volunteer fire departments, provide for that initial attack, and that deals with 90 percent of our problem. When we get into larger fire situations, it is everybody working together on an interagency basis.

Mr. SCHAFFER. This urban/rural interface is the largest concern for most foresters who focus on that particular aspect of fire control and so on. Just in terms of the costs associated with fires in that particular setting and contrasted with wildfires that you may see throughout less populated areas of the country, could you comment

just about the cost differences and why a taxpayer ought to be concerned about fire suppression and fire prevention in the interface areas?

Mr. HUBBARD. A lot of people that move to the interface do not understand what they are getting into in terms of protection and that it is more limited than they might have experienced in an urban setting. But when the fire starts, they do not want to debate that matter; they want the fire put out.

Any interface fire costs much more than a wildland fire. You are bringing all your resources that you can bring to bear on suppressing that incident and that usually involves expensive air shows that deal with the interface. In the wildland, we have learned to modify our suppression tactics. All fire is not bad fire, so a modified suppression approach in some situations makes sense for the resource and certainly makes sense for the cost.

In the interface, that is not the case. You throw everything you have at it and it costs a lot of money.

Mr. SCHAFFER. In the time I have left to get a question off to you, you mentioned in your testimony, again, the use of small contractors for removal and thinning and so on; and the marketing and the economics of that are challenging at times, particularly in our area up in Larimer County and down in Las Animas County, as well, that I represent. What kind of incentives do we need to build in to make it a marketable proposition for small contractors to be involved in thinning?

Mr. HUBBARD. As you are well aware, our markets are very limited, and the acceptance of logging on the front range of Colorado is questionable at best, so we have to go about it carefully. We have to make sure we have local acceptance. What that causes for contractors is problems with a sure supply and how much investment they can afford to make.

So we are dealing with small contractors that are more than willing to modify their actions to address this issue. But they need some mechanism that does not exist now; and a modified contracting approach, as proposed in this bill, holds some promise.

Mr. SCHAFFER. Thank you, Madam Chairman.

Mrs. CHENOWETH. Mr. Schaffer, we will return for another round of questioning, if you have further questions.

The Chair now recognizes the gentleman from Michigan, Mr. Kildee.

Mr. KILDEE. I will yield to your side. I have no questions at this time, Madam Chair. Thank you very much.

Mrs. CHENOWETH. Thank you. Harry Wiant, I have a couple of questions for you. In your testimony, you expressed concern for a system that allows for the costs of forest management projects to be offset against stumpage payments.

At a time when appropriated funds are tight, what other means would you recommend to fund some of these forest health projects?

Mr. WIANT. I wonder sometimes if it might not be better if we charged the users what it really costs. We hear about below-cost timber sales, mostly propaganda, but certainly nobody can challenge the fact we have below-cost recreation, below-cost wildlife management, below-cost practically everything else on the forest. So if there would be some way we could let people pay what it is

costing to provide the service that they are enjoying, that would help.

Other than that, I don't know. I think you have come up with an innovative approach, and it would be hard to come up with another right now.

Mrs. CHENOWETH. In your testimony, you state forest health should be determined at the local level, and I agree, and that is the intention of this bill, to give local foresters more flexibility in managing local forests.

What else do you think we should do to move decisionmaking closer to the ground that maybe is not covered in this bill or existing law?

Mr. WIANT. I have traveled over the U.S. in the last couple of years in my office with the Society of American Foresters, and talked to an awful lot of foresters that work with the Forest Service; and there are many very capable, well-driven individuals frustrated with the fact that they just cannot do anything—they cannot manage the forest, they cannot do what needs to be done. Somehow we have to move from the hierarchical system down to the ground level and let people there make the decisions that need to be made.

I worked for the Forest Service years ago, and it operated that way; and we had our forests in much healthier and better condition under that system than what we have today.

Mrs. CHENOWETH. Mike Albrecht, I have a couple of questions here I have noted. When dealing with the timber sale contract, is it reasonable to require the purchaser to conduct forest management projects in the sale area to remove fuels, improve forest health and/or achieve other forest objectives?

Mr. ALBRECHT. Well, I would say absolutely yes, Madam Chairman. One thing about us private contractors is, once we are out there, we like to work, and the more work you give us, the more we will do.

There is some real economy to your proposal, in that if we have people and equipment out in the forest anyway, the more tasks that can be bundled in one contract, certainly we are eager to do the work and certainly it will save the taxpayers money. I guess I cannot strongly enough support that concept. And the talk and talk and talk over the last 10 or 15 years that I have been involved, about trying this versus actually doing it, it is very frustrating. I am hoping your bill will move us into action.

Mrs. CHENOWETH. In your opinion, are provisions that allow for the cost of forest management projects to be offset against stumpage payments a practical and reasonable contractual mechanism?

Mr. ALBRECHT. Yes. You can pay for work several ways. The idea of using goods, the timber, for the Service's management activities is an excellent idea in that, No. 1, what I like about it, it is credit-earned. You have to do the work first to earn a credit. That is a good concept. Private industry does that all the time. Do the work, then get the credit; do not give the credit up front and assume the work will get done. I like that part of it.

I do not know where the money is going to come from otherwise. We cannot seem to get enough proposed money for all sorts of activities, so let us use the dollars out there on the stump. Yes, that is great.

Mrs. CHENOWETH. In following up on one of the comments and questions made by my colleague from Colorado, I want to ask you a similar question. Can materials that are removed in thinning or other activities be utilized as commercial products? Are there examples of that around Sonora?

Mr. ALBRECHT. Absolutely, yes. There are commercial thinning products, which would be small logs, that go to our small log mill, and those are converted to lumber.

There is another important piece of this puzzle, and that would be the biomass industry, where we are taking nonmerchandise products and chipping them to make cogeneration power. As you are aware—and that is probably out of the purview of this bill—that whole industry could use some help. We need that market in place to make this whole thinning work, which would be the chipping, biomass industry.

But, in general, yes, there are markets out there for the small product. There is a pulp market for paper. We need to strengthen that biomass market if we can, and then we have a real good approach to this.

Mrs. CHENOWETH. Mr. Albrecht, I do not believe that that concept is out of the purview of this bill, not at all. As we have been working on this bill, we have thought about those industries that would benefit from products that are having to be chipped up and otherwise hauled out of the forest, the value added, multiple use staging of our wood products instead of just sheer stumpage that would be made into 2x4s or lumber.

Mr. ALBRECHT. Right.

Mrs. CHENOWETH. So I thank you for your comments, and the Chair recognizes once again Mr. Gibbons from Nevada.

Mr. GIBBONS. Thank you very much, Madam Chairman. I appreciate the opportunity to respond to my colleague, Mr. Vento. Unfortunately, he is not here at this point in time.

I do not believe it was the testimony of Mr. Goicoechea that it was overgrazing that caused much of the cheatgrass, and I was wondering, Pete, if you wanted to respond to the grazing issues that were raised, especially with relation to the pinyon forest in Nevada and the grazing issues there.

And if you would like to respond, I would sure appreciate your comments.

Mr. GOICOECHEA. Yes, I appreciate that, Congressman Gibbons. I wish Congressman Vento was here so I could respond in fact to him.

We agree that we do have some sins and some overgrazing in the past we have to atone for, but grazing is not what causes the encroachment of pinyon-juniper. Pinyon-juniper is predominantly on rocky hillsides with very little soil base under them.

What we see in central Nevada is that generally fire is what causes the spread of pinyon-juniper. And the point is, if we take the native grasses and the forbs and we get the grazing annuals in, they are genetically designed to survive fire. Cheatgrass is in place any time you have a fire and you do not replace it. We would like to see us get back to the native brushes and forbs and grasses. They tend to burn a lot cooler than the cheatgrass fires we have.

The cheatgrass fires, we are all well aware of, and I know the chairman is aware of the Kuna fire 2 years ago, these cheatgrass fires, they might not seem like a lot of fuel, but they burn fast and hot and they kill people.

No, grazing practices of 100 years ago, we have to live and pay for those, that is true, but let us focus on recovering and rehabbing those and not continue to build on them with wildfire. And the fact is, we are not rehabbing these. Let us stop the spread.

Mr. GIBBONS. Mr. Goicoechea, can you give us a direct example of how operations under this bill will directly help Nevada in its problems with wildland fires?

Mr. GOICOECHEA. Well, I think the fiscal issue, Congressman Gibbons, is going to be the real driver in it. Again, as Mike Albrecht testified, we need a lot of research, especially into the biomass industry. We feel that there are significant resources in Nevada and in all the intermountain West.

When we talk about pinyon-juniper stands, we would like to see an alternative to just controlled burning, and we would like to see both revenues generated from those pinyon-juniper stands. And also, on the grazing side, we have a lot of Forest Service allotments in Nevada and through the intermountain West that are inactive. They are standing grasslands; in some cases, they are just strictly, predominantly cheatgrass grasslands. They are waiting to explode.

I think there are revenues that can be generated both from contract grazing, like this bill addressed in the contract grazing portions; and I think you need to address the old preference statements. All of the intermountain West was adjudicated from grazing. Be sure, as you contract to graze these allotments in the intermountain West, that they address the property rights and the water rights of those adjacent base properties.

We are very concerned about the discretion of either Secretary doing contract grazing. We think that could jeopardize local economies if we see cattle transported out of the county and out of the State into an area. A year ago we had a permittee from White Pine County, approximately 200 miles away, move into a forest allotment on the Toiyabe's. It sounded like a good deal to him and to the Forest Service also, but when he got there, he did not have any water. He had to haul water into the allotment.

He was also denied access because of private property. He was denied some access to the forest. It did not work well for him and it was a problem.

I think grazing is a tool. It removes foliage. It does not go up in smoke. It goes through livestock for food production. We also feel that at any point that we can reduce that fire hazard, it reduces the loads on the local government.

We have to fight those fires, as Mr. Hubbard said. The first line of defense is the county and these small volunteer fire departments. We do not have the manpower and the equipment to truly wage an assault on the wildland fires, especially with the under-storage of fuel we are putting out there today.

Mr. GIBBONS. Mr. Wiant, quickly, in the time I have remaining, what would you suggest to this Committee as to your definition of the wildland/urban interface? What would be an adequate stance or defined definition you would suggest for us?

Mr. WIANT. We have a forest terminology committee hard at work which—we hope the publication will come out before long and it will address that.

Some of the things said here obviously make sense. You cannot call a cabin in the middle of 100 acres an interface. But where do you draw the line? I think that is going to take consideration by various interest groups to come up with a reasonable and a usable definition. I do not have one for you.

Mr. GIBBONS. Thank you, Madam Chairman.

Mrs. CHENOWETH. Thank you, Mr. Gibbons.

Mr. Goicoechea, I wanted to just ask you, indeed, is the range not in better condition now than it was even 30 years ago?

Mr. GOICOECHEA. In our area, yes. Madam Chairman, I think the range is improving, and it is dramatically improving. And, in fact, I think we are taking the reduction in the number of livestock in our county and most areas of Nevada; I think we are very rapidly approaching the point that we are, the forest and the understory there, we are in a dangerous condition. It is a threat. And I am generally concerned about the health and welfare of the residents of northern Eureka County and those vast grasslands. We do not have livestock to graze it.

Yes, the range is improving. I know today it is better than it was 10 years ago. I cannot speak if we go back 40 or 50 years ago, but I genuinely believe it is improving.

Mrs. CHENOWETH. Mr. Goicoechea, the cheatgrass is a replacement of the fire, but what is the native species usually in our high desert areas?

Mr. GOICOECHEA. It was predominantly bunchgrass. And, again, the nature of bunchgrass is, it grows tall and it always is a little green at the crown. When fire runs across it, it runs around a little cooler and it tends to have enough green there to hold it off.

And then, of course, when you get into the higher uplands, your bitter brush, and it burns very hot; and then, of course, the sage itself. But we prefer the sage to the rabbit brush and cheatgrass infestations we are seeing coming into these fires now.

Mrs. CHENOWETH. Very interesting. Thank you.

And the Chair recognizes Mr. Schaffer again.

Mr. SCHAFFER. Thank you, Madam Chairman. I have a number of questions.

Commissioner Goicoechea, the opponents claim this legislation would somehow impair the ability of local communities to participate in fire management plans and forestry issues. You, as a county commissioner representing local government, are here supporting the bill; and I would like you just to describe for the Committee your take on that issue of local involvement.

Mr. GOICOECHEA. I think just to the contrary. I think the only way the bill will work, once implemented, will be with the involvement of State and local governments. We have to be involved. It is the only way the bill can truly work.

Local government has to have some input, and I would hope that—and again I think we are seeing that with all the Federal agencies, a more cooperative approach to local government, with the Federal agencies working hand-in-hand, and especially in something that is as life-threatening as wildfire.

Mr. SCHAFFER. For the purpose of clarity, is it your position that this bill enhances or constrains local participation?

Mr. GOICOECHEA. I think it will enhance. It might not look like it from the outside looking in, but I think it is the only way it will truly work and become effective.

Mr. SCHAFFER. Thank you.

I would like to ask Mr. Holmer, in your testimony you mention your belief that the management credit program established in this bill will lead to further revenue losses from the timber sale program. I guess it is the further timber sale losses that I would like to inquire about.

When do you believe that the timber sale program has lost money?

Mr. HOLMER. According to the White House Council of Economic Advisers in 1995, the timber sale program lost \$234 million. The Government Accounting Office did an audit that showed from 1992 to 1994 \$995 million were lost. And we are anxiously awaiting the 1996 numbers to be released by the Forest Service.

We understand that it may for the first time show, according to their own numbers, there was a loss. It is my understanding only one national forest in the country actually makes money now, which is the Allegheny National Forest in Pennsylvania.

Mr. SCHAFFER. I will jump to Mr. Wiant quickly to comment on that particular aspect of the cost associated with the timber sale program from your perspective.

Mr. WIANT. Well, it is ironic to me that the same people that seem to object to the cost of timber sales, because of appeals and legal actions, keep increasing and increasing the cost, so it is very hard to ever harvest timber.

I mentioned that fire out in Arizona. Now they would like us to salvage some of the material but they cannot get through all the red tape to even do that. So the cost, a lot of artificial costs are tacked on.

But I do not believe that timber sales ever has had a loss, and if it has a loss now, it is pretty sad because it has had many, many years where the Forest Service returned—used to be they said they returned more to the Treasury than they spent. I think that was probably true in the 1950's; I do not know if that is true today, but I am sure they are not operating at a loss as far as the timber itself.

Mr. SCHAFFER. The purchaser credits that have been severely limited, or cut, during this Congress, it is the view of many that that will have a detrimental effect on our ability to manage forests, particularly in areas where the value of the timber may be getting so close to market value that having private contracts to manage those forests may not occur any more.

Secondly, in just remote areas that are difficult to reach, with the reduction in the purchaser road credit program, can you tell us a little bit about what you think the future holds for private contracts that are used in a way to assist the Forest Service in managing our forests?

Mr. WIANT. Testifying here on a previous occasion, I indicated I feel that a good road system is probably one of the most important tools we have for managing our forests and protecting the health

of our forests and of our citizens. So we have to have a good road system.

It is distressing to me to see, as I did in this forest I was in the other day, where they were saying the Forest Service was planning to retire 50 percent of their roads. Seems strange to me when we need good roads. The recreationers certainly use them a lot. The only people it will be available to are the backpackers that may get back in those areas—and I do that myself, and I like that, but that is a very small percentage of our population. We have to have them accessible to people that are on the trail for days.

Mr. HOLMER. If I may comment on that, I would like to read a quote from a recent scientific report which states, “Intensive timber management contributes to additional fire hazards due to greater road access and associated increases in human-caused fires, operation of logging equipment, slash buildup following logging, and the associated decrease in moisture content of forest understories.” This was from DellaSala, Olson and Crane, 1995 Ecosystem Management in Western Interior Forests.

And here is another quote. “It is after logging that the damage from fires is greatest, on account of the inflammable and unburned slash.” T. S. Woolsey, 1911, U.S. Forest Service.

In our view, intense management and road building actually exacerbate these problems and will not solve them.

Mr. SCHAFFER. Scientific reports. Which report is that you mentioned?

Mr. HOLMER. It is entitled Ecosystem Management in Western Interior Forests by DellaSala, Olson and Crane, and I will be happy to make that available to you.

Mr. SCHAFFER. I would request that report be submitted for the record. I am somewhat familiar with it and realize there are additional comments you will find in that report that actually expound on forest management.

Mrs. CHENOWETH. Without objection, so ordered.

Mr. SCHAFFER. I guess my time has expired. Thank you, Madam Chairman.

Mrs. CHENOWETH. Thank you, Mr. Schaffer.

Do you have any more questions that you would like to ask? Or do you, Mr. Gibbons?

Mr. GIBBONS. No.

Mr. SCHAFFER. Yes, I do.

Mrs. CHENOWETH. All right, Mr. Schaffer.

Mr. SCHAFFER. I wish to go back to the issue on BLM and the Forest Service with respect to reducing grasses around communities.

I would like to find out a little more from the Commissioner about the interactions that have taken place in your specific example, the communications and responses that your county has received with the Forest Service or BLM on grass management issues.

Mr. GOICOECHEA. In his introduction, Congressman Gibbons talked about the Diamond Working Group Complex, and this is a highly touted group; and the issue when we came together was wild horse management, which we could spend another afternoon on, no doubt, but with that there was a tour with approximately

11 permittees of 3 grazing districts and the Commission for the preservation of wild horses. Again, it was a horse-driven issue rather than a resource issue. But given the number of horses on the mountain, there was significant resource damage in that area.

We went on a tour, and it took about 11 months to put the program together. Permittees actually took a reduction in preference AUMs which—the active AUMs they would have on hand and in exchange for the horse groups agreeing to establishing an AML number. That AML was approximately 230 head. The census count on the mountain was over 1,500. So the permittees took a reduction.

The horses were reduced, and we are at, we hope, a happy medium. And now we will start working our way back up, both the horse numbers and the cattle numbers. There will probably be a period, I would assume, in some of those areas, of a couple of years' rest, because the resource damage was that bad.

No, we do, especially from the BLM perspective in Nevada, we are seeing more cooperation from the Federal agencies on the ground level. And I think that is the point I was trying to make in addressing Chairman Chenoweth's comments, too, that I think for any of this to work, it has to come from the bottom up. The people closest to it are the ones that truly understand.

I know the comment was made by Mr. Wiant here that one cabin out in the forest is not truly urban interface, but I guess it depends on who owns that cabin whether it becomes urban interface, if you are a politician. Speaking for myself, as well as you, we can get leaned on.

Mr. SCHAFFER. Mr. Hubbard, I wish to inquire about—with respect to catastrophic wildfires in Colorado, or anywhere else throughout the country for that matter, on Federal lands, how do you propose the Forest Service measure, assess and prioritize projects?

Mr. HUBBARD. I think that varies by location, but in Colorado, I propose we do what has already been put in place, and that is to use the different land management agencies. And it takes all of them getting together and deciding because of forest condition, because of housing density; and it is that group's definition of interface whether it is 20 homes per acre or 60 homes per acre. And it depends on the conditions, the access, the slope.

So they make those local decisions as to what they think are reasonable. They involve public participation in the process. They involve local government in the process. I think that is the only way that you come to a reasonable definition of what you consider to be your priorities that you want to then work on, and everybody is committed to that assessment.

Mr. SCHAFFER. Madam Chairman, thank you.

Mrs. CHENOWETH. Thank you, Mr. Schaffer. Again, I want to thank the witnesses for their very valuable testimony. I have certainly learned a lot.

My major concern is that we respond to what we have heard in testimony and in comments from our Forest Service people; that we respond to an outcry across America to protect private property, homes and humans. We talk about the \$1 billion cost to fight fire in just 1 year, but how do you put a price tag on a life?

And because we had an agency that did not feel they had the authority to plow a fire break around a little town called Kuna, Idaho, we nearly lost that town, and we lost lives in that fire; and because we did not have an agency that felt that they could graze down some of the Boise foothills and protect the homes that are adjacent and encroaching up into those foothills. The answer is not always just to stop humans from building, but rather, how are the public land managers going to protect human lives?

As we move through progress, another question I have as Chairman is, I have listened carefully to Forest Service managers across the country; and from the time that I came to Congress in 1994 until today, I have heard many of our members in the Forest Service open up. And I not only have listened to them, but I have sensed their feeling of despair in wanting to make this work and the sense of despair they feel, as we all do when we see headlines that the Forest Service is broken.

I do not think it is too late. I think if we do work together, we can reason with one another and we can build a better future for the wildland/urban interfaces, for the Forest Service and for the taxpayers in general. That is my vision. I am sure I share it with every one of you who testified.

Some of us have different thoughts on that, but as long as we keep talking and working in the process, I believe our thoughts will come together based on good solid facts. So I look forward to working with each and every one of you as we perfect this bill, and I very much value and appreciate every one of your comments.

I do want to let you know that the record will remain open for 3 weeks for any one of you who wishes to supplement your testimony; and with that, this hearing is adjourned.

[Whereupon, at 4 p.m., the Subcommittee was adjourned.]
[Additional material submitted for the record follows.]

**TESTIMONY OF STEVE HOLMER
CAMPAIGN COORDINATOR
WESTERN ANCIENT FOREST CAMPAIGN**

**On H.R. 2458, The Community Protection and Hazardous Fuels Reduction
Act of 1997**

Before the House Subcommittee on Forests and Forest Health

September 23, 1997

Chairman Chenoweth, thank you for this opportunity to testify. The Western Ancient Forest Campaign (WAFC) represents organizations and individuals nationwide who are dedicated to protecting forest and aquatic ecosystems on the National Forests.

WAFC strongly opposes H.R. 2458 and urges the Members of this Committee and the House of Representatives to oppose the bill and its objectionable elements in any form.

While the environmental community supports protecting lives and property in the wildlands urban interface threatened by fire, there is no scientific evidence that increasing logging will accomplish that goal. This bill, if enacted, would allow for uncontrolled logging that may actually increase fire-risk and threaten other important values such as public safety, clean water supplies, fish and wildlife habitat, recreational opportunity and fiscal responsibility.

This bill would eliminate the rights of local communities and concerned citizens to participate in management decisions and to be fully informed about management choices and their relative impacts. The creation of a new forest management credit program will only lead to further revenue losses for the timber sale program and would exacerbate the problem of the Forest Service literally giving away trees from our National Forests with no return to the taxpayer. Finally, the section concerning the use of grazing to remove excess grasses and to improve forest health contradicts substantial data that grazing causes significant harm to the environment and can increase fire risks.

There is no conclusive scientific data that indicates forests can be successfully fireproofed by thinning. While anecdotal reports about some fires support this contention, other fires have burned everything in their path, including recently thinned areas. The Sierra Nevada Ecosystem Project reported to Congress that logging "increases fire hazard by increasing surface dead fuels and changing microclimate." Given the lack of confirming scientific data, limited pilot projects already underway by the Forest Service should be intensively monitored and researched to see if this strategy works and under what conditions before it is employed on a broader basis.



**WESTERN
Ancient Forest
CAMPAIGN**

Jim Jantz,
Executive Director
Steve Holmer,
Campaign Coordinator
Sean Cosgrove,
National Organizer
Phone 202 / 879-3188
1025 Vermont Ave., NW
3rd Floor
Washington, DC 20005
Fax 202 / 879-3189

Board of Directors
Mitch Friedman
Bellingham, Washington
Tim Lilleho
Bend, Oregon
Mike McBerry
Boise, Idaho
Randi Sprink
Los Angeles, California
Connie Stewart
Arcata, California
Susan Swagert
Salt Lake City, Utah
Bethonie Walder
Missoula, Montana
Chuck Waller
Corvallis, Oregon

*Advisory Board**
Tom Coleman
Kettle Range
Conservation Group
Ed Grumbine, Ph.D.
Sierra Institute, UCSF
Ryan Hanson
California Wilderness Coalition
Paul Ketchum
Portland Audubon Society
Patti Laurson
Sierra Club - Ancient Forest
Task Force
Bill Lutzer
Lutzer Foundation
Tom McKay
Northcoast Environmental
Center
James Monteith
Save the West
Julie Norman
Headwaters
Arthur Partridge, Ph.D.
Forest Watch
Christopher Peters
Seventh Generation Fund
Glen Spain
Pacific Coast Federation
of Fishermen & Assns.
Kimery Wfishire
The Abbouette Fund

*Organizations listed for identification
purpose only



Testimony of Steve Holmer, Western Ancient Forest Campaign
September 23, 1997

Flawed Findings

WAFC disagrees with some of the fundamental assumptions found in the bill's findings section. For example, in Sec. 2 (2) the bill states the forests are experiencing significant disease epidemics and insect infestation. The U.S. Forest Service testified June 19 before the House Agriculture that there is no forest health crisis on the National Forests. Disease and insects, like wildfire are natural parts of a functioning ecosystem.

Sec. 2 (3) blames inconsistent management and natural effects for the buildup of fuels, but there is substantial evidence that fire suppression on which the government spends nearly \$1 billion per year, the selective logging of larger, more fire-tolerant trees and cattle grazing which is also subsidized by the taxpayer are the primary causes of overly dense forest conditions. Nothing in this bill addresses these fundamental causes and in fact the bill's promotion of cattle grazing could make the overstocking problem worse in some regions.

The definition for wildland/urban interface area is inadequate because it does not define "close proximity" or "other property" which would allow the Forest Service overly broad discretion to define the interface area. The bill also allows other kinds of management activities besides fuels treatments. Section 101 (a) (2) requires the agency to include areas with other forest management needs.

Suspension of Environmental Laws and Public Review

The NEPA exclusion clause in Sec. 101 (b) will prevent meaningful public participation in designating lands for management activities that may be very near communities. Also, by failing to conduct an environmental assessment or environmental impact statement, other important values found in our National Forests may be destroyed or impaired by management activities authorized and funded by this bill.

For example, landslides and flooding, which have killed people and destroyed property, have been linked to roadbuilding and clearcutting. Under this bill, there will be no protection (or even the opportunity to comment) for communities or property owners who could be put at risk by the logging and roadbuilding projects in areas with steep or unstable slopes. Similarly, recreational interests would not be allowed to comment on projects that could adversely affect hunting, fishing or hiking near their communities.

In general, the environmental community opposes legislation that undermines fundamental environmental laws like the National Environmental Policy Act. Under the Salvage Logging Rider, when the NEPA and other procedural laws were suspended, environmentally harmful timber sales were logged despite a massive public outcry.

Testimony of Steve Holmer, Western Ancient Forest Campaign
September 23, 1997

A New Subsidy for the Timber Industry

WAFC strongly opposes the provision for "Forest Management Credits" found in Section 101 (b). The Clinton Administration has proposed an end to the purchaser credit program because it subsidizes logging road construction and the House voted to cut the program in half. Forest Management Credits would create a new subsidy that could lead to even less money being returned to the Treasury from a timber program that is already losing hundreds of millions of dollars every year.

The "Cost Considerations" provision in Sect. 101 (f) would allow the Forest Service to ignore all economic considerations when conducting timber sales under this bill and specifically states that "no sale shall be precluded because the costs of the sale may exceed the revenues derived from the sale." This section would also obfuscate the extent of money losing timber sales by allowing the Forest Service to exclude these sales from any calculations concerning the revenue of the timber sale program. In other words, the Forest Service would be granted a blank check and the agency would not even have to worry about keeping track of how much taxpayer money is being lost.

A better approach for funding necessary projects is to appropriate the money in the annual Interior Appropriations process. If the threat to public safety warrants, it is our belief Congress should provide adequate funding, not promote the giveaway of the public's assets as this bill does.

Grazing Harms Forests and Streams

WAFC also strongly opposes Section 201 concerning removal of grasses and forbs because there is significant evidence grazing is harmful to forests and streams and that it contributes to overstocking conditions in some forests. Enclosed for the record is a scientific report entitled "Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forests of the Interior West," by A. Joy Belsky and Dana M. Blumenthal concluding that grazing has substantially contributed to overstocking and changes in tree species composition. Similar studies conducted by the Forest Service have come to the same conclusions for Southwest forests.

Allowing for new contract authority outside of the normal grazing allotment system will allow activities to take place without adequate environmental review. Further, this program would also be a costly subsidy to an already subsidized industry.

Testimony of Steve Holmer, Western Ancient Forest Campaign
September 23, 1997

Conclusion: Oppose H.R. 2458

In conclusion, the agency has adequate existing authority to carry out necessary activities in the interface zone to protect lives and property. This bill calls for uncontrolled logging that may increase fire-risk and threaten other important values such as public safety, clean water supplies, fish and wildlife habitat, recreational opportunity and fiscal responsibility. Western Ancient Forest Campaign will actively oppose H.R. 2458 and urge the Members of this Committee to vote against its passage. Thank you for this opportunity to testify.

Review

Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forests of the Interior West

A. JOY BELSKY† AND DANA M. BLUMENTHAL*

Oregon Natural Resources Council, 5825 N. Greeley, Portland, OR 97217, U.S.A.

Abstract. Many ponderosa pine and mixed-conifer forests of the western, interior United States have undergone substantial structural and compositional changes since settlement of the West by Euro-Americans. Historically, these forests consisted of widely spaced, fire-tolerant trees underlain by dense grass savards. Over the last 100 years they have developed into dense stands consisting of more fire-sensitive and disease-susceptible species. These changes, sometimes referred to as a decline in "forest health," have been attributed primarily to two factors: active suppression of low-intensity fires (which formerly reduced tree recruitment, especially of fire-sensitive, shade-tolerant species), and selective logging of larger, more fire-tolerant trees. A third factor, livestock grazing, is seldom discussed, although it may be as important as the other two factors. Livestock alter forest dynamics by (1) reducing the biomass and density of understory grasses and sedges, which otherwise outcompete conifer seedlings and prevent dense tree recruitment, and (2) reducing the abundance of fine fuels, which formerly carried low-intensity fires through forests. Grazing by domestic livestock has contributed to increasingly dense western forests and to changes in tree species composition. In addition, enclosure studies have shown that livestock alter ecosystem processes by reducing the cover of herbaceous plants and litter, disturbing and compacting soils, reducing water infiltration rates, and increasing soil erosion.

Efectos del Pastoreo sobre la Dinámica de Árboles y Suelos en Bosques en el Altiplano del Occidente Interior

Resumen: Muchos bosques de pino ponderosa y de coníferas mixtas en el occidente interior de Estados Unidos han tenido cambios sustanciales en su estructura y composición desde la colonización del Oeste por euro-americanos. Históricamente, estos bosques consistían de árboles tolerantes al fuego ampliamente espaciados y de densos maticiones de pasto. En los últimos 100 años se han desarrollado en densos bosques que consisten de especies sensibles al fuego y susceptibles a enfermedades. Estos cambios, conocidos como una declinación en la "salud del bosque," han sido atribuidos a dos factores principales: la supresión activa de fuegos de baja intensidad que anteriormente reducían el reclutamiento de árboles, especialmente de especies sensibles al fuego y tolerantes a la sombra; y la tala selectiva de árboles más grandes y tolerantes al fuego. Un tercer factor, el pastoreo de ganado, es discutido raramente, aunque puede ser tan importante como los otros dos. El ganado altera la dinámica del bosque (1) reduciendo la biomasa y densidad de pastos del sotobosque, los cuales compiten con plántulas de coníferas y previenen el reclutamiento denso de árboles, (2) reduciendo la abundancia de combustibles pequeños, que anteriormente favorecían la expansión de fuegos de baja intensidad. Por lo tanto, el pastoreo de ganado doméstico ha contribuido a que los bosques occidentales sean cada vez más densos y a cambios en la composición de especies arbóreas. Además estudios de exclusión muestran que el ganado altera procesos de los ecosistemas al reducir la cobertura de plantas herbáceas y de hojarasca, al perturbar y compactar suelos, al reducir las tasas de infiltración de agua y al incrementar la erosión del suelo.

† Address correspondence to A. J. Belsky at her current address: Oregon Natural Desert Association, 732 SW 3rd Avenue, Suite 407, Portland, OR 97204, U.S.A., e-mail jbelsky@onda.org

* Current address: Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108, U.S.A.

Paper submitted September 7, 1995; revised manuscript accepted June 5, 1996.

Introduction

Management of forests throughout the mountainous interior of the western United States has recently received wide attention from both government agencies and the general public. Much of this attention has concentrated on what federal land-management agencies and the press call the "forest health emergency," which is generally described as the conversion of low-density, fire-tolerant ponderosa pine and mixed conifer forests into dense, fire-prone, diseased "thickets" that contribute to "catastrophic forest mortality" (Wickman 1992; Mutch et al. 1993). This widespread perception, which may not be supported by the evidence (Smith 1994; AFSEEE 1995), has been promoted by the timber industry, some western congressmen, and the U.S. Forest Service to justify widespread thinning and salvage logging of forests of the Interior West (DellaSala et al. 1995).

Recent publications and state and federal assessments (e.g., Gast et al. 1991; Mutch et al. 1993; O'Laughlin et al. 1993; Everett 1994) on structural and compositional changes in western forests have concentrated primarily on the effects of logging, silvicultural practices, fire suppression, disease, and road construction on forest stability and sustainable timber production. The effects of livestock grazing on these forested ecosystems have received little attention. However, an extensive scientific literature, beginning as early as the 1920s (e.g., Pearson 1923; Leopold 1924), suggests that livestock played a major role in altering these forests.

Domestic livestock currently graze approximately 115 million ha, or 91%, of all federal lands in the 11 contiguous western states (U.S. General Accounting Office 1988; Armour et al. 1991). The impacts of grazing on western ecosystems in terms of species losses, soil erosion, and degradation of wildlife habitat have been both widespread and severe (Flather et al. 1994; Fleischner 1994). Several excellent reviews have documented effects of grazing in a variety of ecosystems, primarily in western rangelands, arid woodlands, and riparian zones (Kauffman & Krueger 1984; Skovlin 1984; Thurow 1991; Archer 1994; Fleischner 1994). However, none is specific to the more arid low and mid-elevation forests of the western, interior United States, which include forests from Washington south to New Mexico and from the Rocky Mountains west to the eastern Cascade-Sierra Nevada Range. Specifically, we review the effects of livestock grazing on low- and mid-elevation forested ecosystems of the Interior West and discuss evidence suggesting that livestock have had a profound influence on the stand dynamics, species composition, soils, and stability of these forests.

Effects of Livestock Grazing on Forest Dynamics

Over the last 100 years, the structure, composition, and dynamics of semi-arid western, interior forests have

changed dramatically. These forests, dominated at low elevations by ponderosa pine (*Pinus ponderosa*) and at middle elevations by Douglas fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), and western larch (*Larix occidentalis*), were once commonly described as open woodlands of widely spaced, majestic trees, underlain by dense grass swards (Fig. 1a) (Cooper 1960; Peet 1988; Habeck 1990; Covington & Moore 1994). Over the last century, most of these forests have been clearcut, roaded, and fragmented so that only a small fraction of the original forests remains. In Oregon, for example, only 2-8% of the original late-seral ponderosa pine forests still exist, and in Montana's Kootenai National Forest only 10% of its original late-seral forests remain (Henjum et al. 1994; DellaSala et al. 1995). Of those forests not extensively logged, many have experienced great increases in tree density (Fig. 1b) and changes in species composition, often forming dense stands of fire- and disease-sensitive trees. These changes were initiated by land-use changes by early Euro-American settlers and exacerbated by more recent management decisions (Weaver 1943; Cooper 1960; Peet 1988; Morgan 1994).

Presettlement Ponderosa-Pine and Mixed-Conifer Forests

Open, park-like forests were once common throughout the interior forests of British Columbia (Tisdale 1950), Washington (Weaver 1947; Oliver et al. 1994), Montana (Habeck 1990), Oregon (Hall 1976), Idaho (Zimmerman & Neuenschwander 1984), California (Laudenslayer et al. 1989; Morgan 1994), Utah (Madany & West 1983), Colorado (Smith 1967), Arizona (Cooper 1960; Clary 1975; Covington & Moore 1994), and New Mexico (Savage & Swetnam 1990). Forest overstories were composed of widely spaced trees growing in even-aged (Weaver 1943; Cooper 1960) and uneven-aged (White 1985) patches, and understories were composed of grasses, forbs, and low shrubs. Densities of large-diameter trees were on the order of 12-70 trees/ha (Laudenslayer et al. 1989; Habeck 1990; Covington & Moore 1994).

In xeric sites, at low elevations, and on south-facing slopes forests were dominated by widely dispersed ponderosa pine, which formed one of the most extensive forest types of the western United States (Peet 1988; Olson 1992). In wetter sites, at mid elevations, and on north-facing slopes late-successional forests were dominated by Douglas fir, western larch, and true firs such as grand fir and white fir (*Abies concolor*). These more mesic mixed-conifer forests had closed canopies and sparse understories, but after intense fire they were replaced by early-successional ponderosa pine and western larch stands, which often persisted for long periods as frequent, low-intensity fires eliminated the more fire-sensitive true fir seedlings. The fires, therefore, opened up the early successional pine and later successional Douglas fir stands and maintained them at low densities. At high elevations closed forests were dominated by subal-

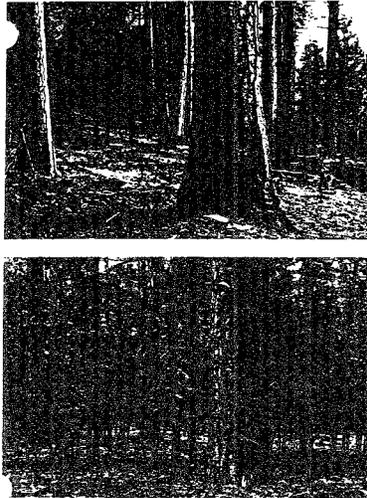


Figure 1. An open, park-like stand of ponderosa pine in eastern Oregon, which resembles low-elevation western, interior forests prior to settlement by Euro-Americans (A), and a ponderosa pine stand with a dense understory of pine saplings, which resulted from years of livestock grazing and fire suppression (B). Both stands are in the Deschutes National Forest in eastern Oregon. (Photos by Sandy Lonsdale.)

pine fir (*Abies lasiocarpa*) and mountain hemlock (*Tsuga heterophylla*).

Forest floors were dominated by grasses such as mountain muhly (*Muhlenbergia montana*) in the Southwest, blue grama (*Bouteloua gracilis*) and Arizona fescue (*Festuca arizonica*) in the central Rockies, and Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), pinegrass (*Calamagrostis rubescens*), and elk sedge (*Carex geyeri*) in the Northwest (Currie 1987; Laudenslayer et al. 1989; Archer & Smeins 1991). In some forests shrubs such as ninebark (*Physocarpus malvaceus*), snowbrush ceanothus (*Ceanothus velutinus*), and bitterbrush (*Purshia tridentata*) were important constituents (Franklin & Dyrness 1973; Zimmerman & Neuenschwander 1984).

Prior to extensive Euro-American settlement, circa 1820-1890, two natural phenomena maintained the trees at

low densities: (1) competitive exclusion of tree seedlings by dense understory grasses and (2) frequent thinning of understory trees by low-intensity surface fires. The vigorous graminoid understory was particularly important in maintaining low tree densities because established grasses with their extensive root systems are able to outcompete tree seedlings for soil moisture and nutrients (Rummell 1951; Larson & Schubert 1969; Miller 1988; Karl & Doescher 1993). Recruitment of tree seedlings into larger size-classes was, therefore, low. Nevertheless, healthy grass swards did not totally prevent tree regeneration. The occurrence of uneven-aged stands of ponderosa pine suggests that tree seedlings occasionally survived, most probably in sites disturbed by animals, tree falls, and locally severe fires (Franklin & Dyrness 1973; White 1985).

Low-intensity surface fire was the second factor reducing tree density in presettlement ponderosa pine and mixed-conifer forests (Weaver 1943, 1947, 1950; Cooper 1960). These fires, ignited by lightning and Native Americans (Cooper 1960; Arno 1980), were fueled by grasses, shrubs, and dry pine needles (Morgan 1994). Typically, they were cool and slow burning and were non-lethal to large-diameter fire-tolerant trees (Morgan 1994). Because ponderosa pine, western larch, and Douglas fir evolved with frequent fire, they possess numerous traits, including self-pruning and thick, heat-resistant bark, that increase their tolerance of fire (Franklin & Dyrness 1973; Saveland & Bunting 1988). Douglas fir is less fire-tolerant than the other two species because it develops a thickened bark layer at a later stage (Habeck 1990). Nevertheless, saplings of ponderosa pine (stem diameter <5 cm) (Hall 1976) and saplings and trees of other species suffer heavy mortality during low-intensity surface fires (Weaver 1950; Cooper 1960; Peet 1988).

Fire-scar studies have shown that low-intensity fires occurred frequently in ponderosa pine forests of presettlement times, with an average return interval of 5-12 years throughout the West (Peet 1988). The mean fire interval was 4-5 years in some parts of the Southwest (Dieterich 1980; Savage & Swetnam 1990), 10 years in southern California (McBride & Laven 1976), and 5-38 years in the Northwest (Weaver 1947; Hall 1976; Habeck 1990; Agee 1994). Arno (1980) reported that in the northern Rockies the average fire-free interval was 5-20 years in ponderosa pine stands and 15-30 years in mixed-conifer stands.

Intense, stand-replacing fires were less frequent (Morgan 1994). In such fires most, but not all, large-diameter trees and understory grasses were killed, resulting in reduced competition, exposed mineral soils, and improved conditions for seed germination and seedling growth (White 1985). Several authors (e.g., Weaver 1947; Cooper 1960; White 1985; Savage & Swetnam 1990) have speculated that the conditions necessary for ponderosa pine regeneration are (1) an adequate seed crop, (2) re-

duced herbaceous competition, (3) high rainfall in the spring and early summer following germination, and (4) avoidance of mortality from fire, predation, and frost heaving. Following seedling establishment, periodic surface fires reduce the densities of the regenerating stands (Weaver 1943).

Recent Changes in Forest Dynamics

Forest composition, structure, and dynamics began to change as Euro-Americans settled the West and altered natural ecosystem processes. Sharp increases in tree density have led to less productive and aesthetically pleasing forests and to reduced nutrient cycling (Morgan 1994; Covington & Moore 1994). More importantly, they have led to widespread insect infestations, greater tree mortality, increased fuel buildup, and increased fire intensity (Mutch et al. 1993; Filip 1994; Hessburg et al. 1994). These changes have recently been attributed almost entirely to fire exclusion, which prevents the natural thinning of young trees, and to high-grading, a form of selective logging that targets commercially valuable, but also fire- and disease-resistant, species such as ponderosa pine and western larch (Arno 1970; Filip 1994; Agee 1994; Oliver et al. 1994). Changes in climatic conditions (Cooper 1960; White 1985; Neilson 1986; Savage & Swetnam 1990), reduction of genetic diversity by the planting of "improved" tree stocks, and use of herbicides and fertilizers (L. Hardesty, personal communication) have also been suggested as factors increasing the vulnerability of western, interior forests to disease and fire.

Livestock grazing is occasionally mentioned as contributing to "forest health" problems (e.g., Laudenslayer et al. 1989; Irwin et al. 1994; Oliver et al. 1994), but it is simply noted as one of many factors reducing the frequency of surface fire. Most of the recent publications on forest health issues, including U.S. Forest Service brochures (e.g., U.S. Department of Agriculture 1992, 1993), popular articles in U.S. Forest Service publications (Hall 1994; Finneran 1994), and scientific publications (Mutch et al. 1993; Filip 1994), have completely ignored livestock grazing.

Nevertheless, a large number of authors have suggested that fire began to decline in frequency and forests began to increase in density soon after livestock were first introduced into the Interior West (Leopold 1924; Weaver 1950; Cooper 1960; Madany & West 1983; Peet 1988). Livestock were brought to the Southwest in the 1700s (Savage & Swetnam 1990) and the Northwest in the mid-1800s (Harris 1991). By the early 1800s in the Southwest and the late 1800s in the Northwest, virtually all plant communities that supported grass and sedge production, including ponderosa pine and mixed-conifer forests, were heavily stocked with cattle and sheep (Savage & Swetnam 1990; Oliver et al. 1994). After clearcutting and seeding with grasses, even previously dense forests provided "transitory" range for livestock.

As the number of livestock increased the biomass and vigor of the grasses and sedges they grazed declined (Painter & Belsky 1993), thus reducing the competitive dominance of the herbaceous layer. Consequently, more tree seedlings became established (Rummell 1951; Larson & Schubert 1969; Miller 1988; Karl & Doescher 1993), and dense stands of saplings and pole-sized trees developed (Fig. 2). Livestock also reduced the frequency of surface fire by consuming the herbaceous vegetation, which otherwise would have dried into the fine fuels necessary to carry the fire (Weaver 1943; Cooper 1960; Covington & Moore 1994). Until recently this fire prevention was valued by forest managers, reflecting their strong desire to prevent forest fire.

The trend toward denser forests with smaller trees was accelerated during the early part of the twentieth century as federal agencies began implementing policies of fire prevention (i.e., Smokey Bear), containment using a network of roads and firebreaks, and active fire suppression. Densities of ponderosa pine in central Arizona, for example, increased from approximately 50 trees/ha in presettlement forests to 2000 trees/ha today (Covington & Moore 1994), and ponderosa pine stands in western Montana increased from pre-1900 levels of 93 and 172 trees/ha (on south and north slopes, respectively) to about 2300 and 1900 trees/ha today (Habeck 1990).

As forests grew denser they became shadier (Zimmerman & Neuenschwander 1984; Wickman 1992), encouraging establishment of more shade-tolerant, but also fire-sensitive, species such as Douglas fir, grand fir, and white fir. Consequently, seral forest stands shifted from dominance by fire-resistant ponderosa pine and western larch to dominance by fire-sensitive species (Habeck 1990; Morgan 1994).

Increased densities of saplings and pole-sized trees set in motion the next phase in the alteration of low and mid-elevation forests. The densely spaced young trees, as well as larger-diameter trees, become water-stressed during dry seasons and drought, causing reductions in tree vigor and productivity (Skovlin 1991; Agee 1994; Hall 1994) (Fig. 2). As growth is suppressed some tree species become increasingly vulnerable to attack by insects such as Douglas fir tussock moth (*Orgyia pseudotsugata*) and bark beetles (*Dendroctonus* spp.) (Weaver 1950; Wickman 1992; Hessburg et al. 1994; Morgan 1994). Trees also become more susceptible to pathogens such as annosum root disease (*Heterobasidion annosum*), armillaria root disease (*Armillaria ostoyae*), and Indian paint fungus (*Echinodontium tinctorium*). Because the increasingly dominant grand fir and Douglas fir are also favored hosts of Douglas fir tussock moth and western spruce budworm (*Choristoneura occidentalis*), increasing numbers of trees become infested. High tree densities in western forests have therefore led to more frequent and widespread disease outbreaks (Wickman 1992; Hessburg et al. 1994).

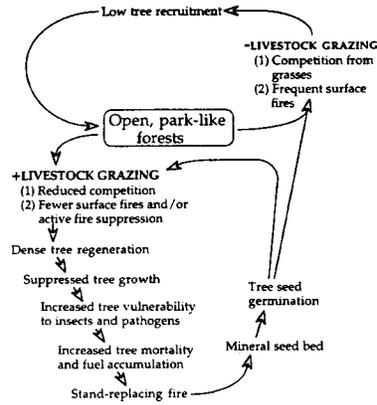


Figure 2. Effects of livestock grazing on stand dynamics of western, interior forests of the United States.

As shade, drought, water stress, and pests kill small and large trees alike, fuel loads increase. Examples are forests of the Blue Mountains of Oregon, where fuel loads have increased by a factor of 10 over the last 25 years (Hall 1994), and central Arizona, where fuel loads have increased by a factor of 9 over the last 100 years (Covington & Moore 1994). These woody fuels cause what otherwise might be low-intensity surface fires to develop into intense conflagrations, resulting in high tree mortality. Not only is there currently more woody fuel on forest floors than in presettlement times, but standing dead and dying sapling- and pole-sized trees are more likely to transport fire to forest canopies (Agee 1994), causing destructive crown fires (Morgan 1994).

Case Studies of the Effects of Livestock Grazing

Although there seems to be little debate about the mechanisms by which livestock grazing has contributed to the dense and fire-prone conditions occurring in many forests of the interior West, few have been tested experimentally. They have, however, been examined through comparisons of grazed and nearby ungrazed forest stands and through correlations of vegetational changes with historical occurrences. Although not all of the individual studies have true replication, their results are similar throughout the West, suggesting that the authors' conclusions are relatively robust. We present a few of these comparisons to illustrate the effects of grazing on a range of forested ecosystems in the Interior West.

CASE STUDY 1

Rummell (1951) compared Meeks Table, an isolated plateau in central Washington, which had never been grazed by livestock, to nearby Devils Table, which had been grazed continuously for 40 years prior to the study. The two plateaus were similar in elevation, geologic origin, climate, forest type, and fire history. Neither table had been logged.

At the time of the study forests on the ungrazed Meeks Table were covered with open, park-like ponderosa pine and mixed-conifer stands, and "luxuriantly thick" grasses, and had low tree regeneration. Conversely, forests on the grazed Devils Table had only a sparse herbaceous layer but had approximately 8000 ponderosa pine, Douglas fir, and western larch seedlings and saplings per hectare.

Rummell (1951:606) wrote that "the large number of small trees on Devils Table appeared to have been fostered by heavy livestock grazing rather than [lack of] fire" because neither table had burned in 125 years. Many of the young trees on Devils Table became established between 1903 and 1909, following heavy livestock grazing, good seed years (1903 and 1909), and above-average precipitation (1903, 1904, and 1909). He went on to conclude that "continued heavy grazing held the range vegetation [i.e., grasses and sedges] at lowered densities and permitted the seedling trees to grow without severe grass competition."

CASE STUDY 2

Zimmerman and Neuenschwander (1984) compared grazed and ungrazed ponderosa pine and Douglas fir forests in forested foothills of the Bitterroot Mountains in Idaho. The forests were selectively logged in 1925 and heavily grazed from the turn of the century through the 1960s. In 1941 a large enclosure (approximately 600 ha) was constructed in a heavily grazed stand to exclude cattle, but not deer and elk (Neuenschwander, personal communication).

Zimmerman and Neuenschwander (1984) found that grazed ponderosa pine stands outside the enclosure had twice as many trees in the smaller size classes (<5 cm diameter at breast height) as ungrazed stands inside the enclosure. The ages of these small trees indicated they had been established after the enclosure had been erected. Grazed Douglas fir stands also had a greater density of young trees than ungrazed stands; however, the differences were not as great. The authors concluded that "livestock grazing was probably the principal factor in creating and maintaining conditions that favored increased tree regeneration" (p. 106).

The study also discussed the cascade of effects initiated by livestock. As the grazed stands grew denser, they became shadier, benefiting the more shade-tolerant Douglas

fir. Species composition began to shift from fire-tolerant ponderosa pine to the more fire-sensitive and disease-prone Douglas fir. The denser stands also produced more litter from shaded branches and dying trees, accumulated more woody fuel, and became more vulnerable to intense fire. The authors predicted that, if the grazed stands in the study didn't burn soon, they might "stagnate, causing reductions in growth rates and increased susceptibility to damage from insects and disease" (p. 109).

The stands that were protected from livestock later recovered much of their herbaceous cover. Conifer regeneration began to decline and low-intensity fires once again reduced fuel levels on the forest floor without damaging the larger trees. The protected stands currently have a mean fire frequency of approximately 25 years, similar to that of a century earlier (Neuenschwander, personal communication).

CASE STUDY 3

Madany and West (1983) compared ponderosa pine forests on Horse Pasture Plateau (HPP), Utah, which had been grazed by livestock since the late 1880s, to compositionally similar forests on Church and Greatheart Mesas, which had been protected from grazing livestock and fire by steep cliffs. Because neither the mesas nor HPP had burned between 1892 and 1964, livestock grazing was the only environmental variable distinguishing the sites.

Madany and West (1983) found that during the 100 years prior to their study, tree recruitment on the grazed HPP had increased by a factor of 10 or more, whereas recruitment on the nearly ungrazed mesas was unchanged. The mature-to-young tree ratio at HPP was 1:598, whereas on the two ungrazed mesas, the ratio was 1:0.8. Most tree establishment at HPP occurred between 1890 and 1940 (Fig. 3), years of high livestock densities (primarily sheep), and began to decline after a reduction in animal numbers in 1940. When livestock were permanently removed in 1960, tree establishment rates returned to the low rates of the previous century (Fig. 3).

Because Church Mesa had not burned, its low tree density cannot be attributed to recurrent fire (tree density on Greatheart Mesa was not determined). Madany and West (1983) concluded that the vigorous understory vegetation inhibited tree recruitment on the ungrazed mesas, whereas grazing and the concomitant reduction in fire frequency had favored establishment of dense stands on HPP. Active fire suppression was not a factor in tree recruitment because the decline in fire frequency on HPP occurred "45 years before the National Park Service began any sort of fire suppression" (p. 665).

CASE STUDY 4

Savage and Swetnam (1990) reconstructed the fire history of a ponderosa pine forest on the Arizona-New

Mexico border by establishing fire dates from scars on tree stumps. The mean fire interval was 4.2 years between 1700 and 1830, the period when sheep herds were first building in the area; after 1830, when sheep numbers were high, only two fires were recorded. These differences in fire interval suggest that livestock were instrumental in reducing fire frequency after 1830 because the precipitous decline in fire frequency occurred 100 years before effective fire suppression was instituted. The authors concluded that "grazing may have been the most important factor in the ending of episodic fire regimes in ponderosa pine forests" (p. 2377).

Livestock grazing in the late 1800s did not immediately stimulate abundant pine regeneration. Many of the dense pine stands now found throughout the Southwest appear to have been established in the early 1900s, coinciding with a period of relatively high rainfall (e.g., Neilson 1986). Savage and Swetnam (1990) suggest that the higher ponderosa pine densities from that period resulted from a combination of livestock grazing, reduced fire frequency, abundant seed crops, and warm, wet conditions.

Effects of Livestock Grazing on Herbaceous Understory

By grazing and trampling herbaceous species livestock affect understory species composition directly; this dif

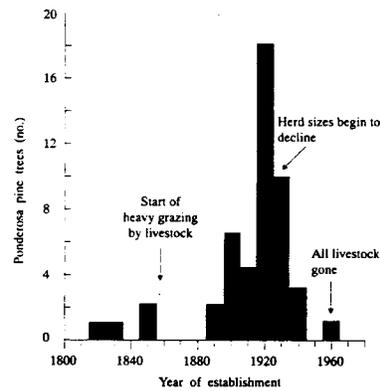


Figure 3. Effects of livestock grazing on tree recruitment in a ponderosa pine forest in Utah (after Madany & West 1983 and Archer & Smeins 1991). Dates of establishment determined by coring fire-scarred trees.

fers from the more indirect effects they have on over-story trees. Impacts vary with animal density and distribution: the more evenly grazers are distributed, the lower their impact on any given area (Gillen et al. 1984). Unfortunately, cattle show strong preferences for certain environments, leading to high use in some areas and little or no use in others. This is particularly true in western, interior forests, where steep slopes and increasingly dense forests make much of the landscape unattractive (Clary 1975; Roath & Krueger 1982).

The most thoroughly studied irregularity in livestock distribution is the heavy use by cattle of riparian areas (e.g., Bryant 1982, Roath & Krueger 1982; Gillen et al. 1984). Gillen et al. (1984), for example, found that forage utilization by livestock was 7.5 times higher in riparian meadows than in adjacent uplands, and Roath and Krueger (1982) found that a riparian zone in a forested watershed in Oregon comprised 1.9% of the allotment but produced 21% of available forage and 81% of forage consumed. Cattle distribution is also distinctly irregular on uplands, where animals tend to concentrate in open forests, clearcuts, and open meadows (Smith 1967; Bryant 1982; Roath & Krueger 1982).

Understory Cover and Composition

Enclosure studies in forested ecosystems of the Interior West have consistently found that livestock substantially reduce vegetative cover (Table 1), especially that of perennial bunchgrasses (Arnold 1950; Rummel 1951; Smith 1967). In the Bitterroot Mountains, for example, grazing has been found to reduce the productivity, frequency, and cover of Idaho fescue, bluebunch wheatgrass, and Colombia brome (*Bromus vulgaris*) by 50–100% (Zimmerman & Neuenschwander 1984). Annual grasses and perennial weeds often expand following the decline of bunchgrasses; however, this increase is typically not enough to make up for the reductions in perennial grass cover (Arnold 1950; Smith 1967). In uplands grazing has fewer effects on shrubs than on grasses (Skovlin et al. 1976; Zimmerman & Neuenschwander 1984); in riparian areas, however, grazing dramatically reduces the number and total biomass of shrubs and trees (Marcuson 1977; Schulz & Leininger 1990), which are critical for shading streams, stabilizing stream banks, and providing wildlife habitat (Kauffman & Krueger 1984).

Livestock also alter understory plant composition as animals select more palatable species, leaving the less palatable ones to increase in dominance (Smith 1967; Hall 1976; Skovlin et al. 1976). The effects of livestock grazing on understory composition and biomass are sometimes difficult to distinguish from the effects of tree canopy closure (Smith 1967), which creates shadier, cooler, and moister conditions. However, when Arnold (1950) separated the effects of livestock grazing from those of tree canopy closure, he found that grazing

alone was sufficient to reduce the cover of most native bunchgrass species.

Domestic livestock, as well as agriculture, logging, road construction, and other practices that disturb soils, have been instrumental in the establishment of alien weedy species in western forests (Franklin & Dyrness 1973; Johnson et al. 1994). Livestock act as vectors for seeds, disturb the soil, and reduce the competitive and reproductive capacities of native species. Exotic weeds have been able to displace native species, in part, because native grasses of the Intermountain West and Great Basin are not adapted to frequent and close grazing (Stebbins 1981; Mack & Thompson 1982). Consequently, populations of native species have been severely depleted by livestock, allowing more grazing-tolerant weedy species to invade. It is possible that in some areas aggressive alien weeds such as cheatgrass (*Bromus tectorum*) and Kentucky bluegrass (*Poa pratensis*) have permanently replaced native herbaceous species (Smith 1967; Lauen-slayer et al. 1989).

Effects of Livestock Grazing on Forest Soils

Plant Litter

By consuming aboveground plant biomass, domestic livestock also reduce the amount of biomass available to be converted into litter and, therefore, increase the proportion of bare ground (Table 1). Schulz and Leininger (1990) found, for example, that grazed areas of a riparian meadow had 50% lower litter cover and 400% more bare ground than ungrazed areas. Johnson (1956) reported that litter biomass in a ponderosa pine/bunchgrass ecosystem was reduced 40% and 60% by moderate and heavy livestock grazing, respectively. Such reductions in litter may have severe consequences on forested ecosystems because litter is critical for slowing overland flow, promoting water infiltration, serving as a source of soil nutrients and organic matter, and protecting the soil from freezing and the erosive force of raindrops (Thurow 1991; Facelli & Pickett 1991).

Compaction and Infiltration

The rate at which water penetrates the soil surface governs the amount of water entering the ground and the amount running off. Livestock alter these rates by reducing vegetative and litter cover and by compacting the soil (Lull 1959) (Table 2). As a result livestock grazing is usually associated with decreased water storage and increased runoff. Lower soil moisture contents in turn reduce plant productivity and vegetative cover, creating negative feedback loops that further degrade both the plant community and soil structure (Fig. 4). These changes in soil structure may also lead to increased water stress

Table 1. Effects of livestock grazing on herbaceous vegetation and litter in western interior forests of the United States.

Ecogystem type	Location	Elevation (m)	Type of study	Livestock exclusion (years)	Duration of grazing prior to exclusion (years)	Grazing intensity	Results	Reference
Herbaceous cover								
Alpine shrub/grassland	Marit National Forest, Idaho	3000	exclosure	5	>15		grazing reduced cover by 66%	Forsling 1931
Ponderosa pine/bunchgrass	Cochise Plateau, Arizona	2000-2500	exclosure	29			grazing reduced total cover, perennial bunchgrasses	Arnold 1980
Ponderosa pine/bunchgrass	Meeks and Devils Tables, Washington	1100	comparison of grazed and ungrazed areas		40		grazing reduced density of understory vegetation by 45-61%	Rummel 1991
Ponderosa pine/bunchgrass	Marion Experimental Forest, Colorado		exclosure	10		variable: 10-20%, 30-40%, and 50-60% utilization	grazing reduced herbage yield by 50%, reduced vigor of perennial bunchgrasses	Johnson 1996
Ponderosa pine/bunchgrass	Marion Experimental Forest, Colorado		exclosure	18	29	variable: 10-20%, 30-40%, and >50% utilization	proportional to grazing intensity	Smith 1967
Ponderosa pine/bunchgrass	Blue Mountains, Oregon	1200-1500	exclosure	11	>40	variable: 40, 30, or 20 acres/cow-calf unit/A months	total cover increased with increasing grazing intensity for 3 years, then declined for 8 years	Skovlin et al. 1976
Riparian/floodplain Douglas fir/mitchcank	Rock Creek, Montana		exclosure	10	>28	85% utilization	grazing reduced shrub cover by 92%	Marcuson 1977
	Bitterroot Mountains, Idaho	900-1000	exclosure	37	>75		grazing reduced shrub cover	Zimmerman & Schatz 1984
Riparian meadow	Roosevelt National Forest, Colorado	2500	exclosure	30	>90		grazing reduced herb, shrub, and total cover	Schulz & Leininger 1990
Litter								
Ponderosa pine/bunchgrass	Marion Experimental Forest, Colorado		exclosure	10		Variable: 10-20%, 30-40%, and >50% utilization	grazing reduced litter cover; reduction was proportional to grazing intensity	Johnson 1996
Ponderosa pine/bunchgrass	Blue Mountains, Oregon	1200-1500	exclosure	11	>40	variable: 40, 30, or 20 acres/cow-calf unit/A months	grazing reduced litter cover and increased bare ground	Skovlin et al. 1976
Riparian meadow	Rock Creek, Montana		exclosure	10	>28		grazing reduced litter cover and increased bare ground	Marcuson 1977
Riparian meadow	Roosevelt National Forest, Colorado	2500	exclosure	30	>90		grazing reduced litter cover by 50% and increased bare ground by 40%	Schulz & Leininger 1990

Table 2. Effects of livestock grazing on forest soils in western interior forests of the United States.

Ecosystem type	Location	Herbivore (no)	Type of study	Duration of grazing exclusion (years)	Duration of grazing exclusion (years)	Grazing intensity*	Results	Reference
Soil composition								
Ponderosa pine/bunchgrass	Cocconino Mtns., Arizona	2000-2500	exclusion	29			grazing compacted the soil and reduced soil organic matter	Arnold 1980
Riparian meadow	Black Hills, South Dakota		exclusion	5-17			grazing reduced large pore space and increased bulk density	Orr 1960
Riparian meadow	Black Hills, South Dakota		exclusion	0-4			grazing reduced large pore space and increased soil infiltration rates	Orr 1975
Riparian meadow	Blue Mountains, Oregon	1100-1100	exclusion	5		3.2 ha/ATM	grazing had no effect	Bohn & Buckhouse 1985
Soil infiltration rate								
Ponderosa pine/bunchgrass	Manitou Experimental Forest, Colorado		exclusion	10		variable: 10-20%, 30-40%, and >50% utilization	grazing reduced soil moisture by 30%, reduction in soil moisture independent of grazing intensity	Johnson 1956
Ponderosa pine/bunchgrass	Manitou Experimental Forest, Colorado		exclusion	18	29	variable: 10-20%, 30-40%, and >50% utilization	grazing reduced infiltration rates; reduction in infiltration rates was independent of grazing intensity	Smith 1967
Riparian meadow	Black Hills, South Dakota		exclusion	0-4			grazing reduced infiltration rates, which were correlated with macropore volume	Orr 1975
Artificial bunchgrass and subgrass plots	North Logan, Utah	1100	simulated trampling				trampling had negative effect on soil infiltration and increased erosion	Dunkley & Gilford 1981
Riparian meadow	Blue Mountains, Oregon	1100-1100	exclusion	5		3.2 ha/ATM	grazing reduced infiltration rates	Bohn & Buckhouse 1985
Varied	Blue Mountains, Oregon		compared different ecosystems				infiltration declined with decreasing range condition and productivity	Gaiber & Buckhouse 1983
Runoff and erosion								
Alpine shrub/grassland	Manitou National Forest, Utah	9000	exclusion	5	>35		grazing doubled runoff and erosion	Forsting 1931
Ponderosa pine/bunchgrass	Manitou National Forest, Colorado	2300	artificial clipping and litter removal			variable: 1-1.6 ha/ATM	clipping and removal of litter increased runoff and erosion	Dunford 1954
Ponderosa pine/bunchgrass	Manitou Experimental Forest, Colorado		exclusion	18	29	variable: 10-20%, 30-40%, and >50% utilization	grazing increased sediment production by factors of 3 to 10	Smith 1967
Riparian meadow	Black Hills, South Dakota		exclusion	0-4			grazing increased summer storm runoff which increased erosion and soil surface erosion	Orr 1975
Ponderosa pine/bunchgrass	Manitou National Forest, Colorado	2300	exclusion	35			grazing increased sediment production	Currie & Cary 1978
Riparian meadow	Blue Mountains, Oregon	1100-1100	exclusion	1 and 5		3.2 ha/ATM	grazing increased sediment production	Bohn & Buckhouse 1985
Varied	Blue Mountains, Oregon	1200-1300	exclusion	0-6	100	'low to moderate'	grazing had no effect on runoff	Tiedeman & Higgins 1969

*ATM = annual total months potential forage intake by one cow and its calf for the equivalent 12 one months.

and sustainability of interior western forest ecosystems rely on scientists and managers recognizing this fact.

Acknowledgments

We thank W. Clary, T. Dudley, G. Filip, T. Fleischner, D. Hall, L. Hardesty, B. Painter, J. Skovlin, and A. Tiedemann for reviewing drafts of this paper and the Columbia River Bioregion Campaign, the Kendall Foundation, and the Global Environment Project Institute for financial support.

Literature Cited

- AFSEE. 1995. The AFSEE-sponsored ecosystem management alternative for the Interior Columbia River Basin. Association of Forest Service Employees for Environmental Ethics, Eugene, Oregon.
- Agee, J. K. 1994. Fire and weather disturbances in terrestrial ecosystems of the eastern Cascades. General technical report PNW-320. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. Pages 13-68 in M. Vavra, W. A. Laycock, and R. D. Pieper, editors. Ecological implications of livestock herbivory in the west. Society for Range Management, Denver, Colorado.
- Archer, S., and F. E. Smeins. 1991. Ecosystem-level processes. Pages 109-139 in R. K. Heitschmidt and J. W. Stuth, editors. Grazing management: an ecological perspective. Timberlake Press, Portland, Oregon.
- Armour, C. L., D. A. Duff, and W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. *Fisheries* 16:7-11.
- Arno, S. F. 1980. Forest fire history in the northern Rockies. *Journal of Forestry* 78:460-464.
- Arnold, J. F. 1950. Changes in ponderosa pine bunchgrass ranges in northern Arizona resulting from pine regeneration and grazing. *Journal of Forestry* 48:118-126.
- Bohn, C. C., and J. C. Buckhouse. 1985. Some responses of riparian soils to grazing management in northeastern Oregon. *Journal of Range Management* 38:378-381.
- Bruant, L. D. 1982. Response of livestock to riparian zone exclusion. *Journal of Range Management* 35:781-785.
- Clary, W. P. 1975. Range management and its ecological basis in the ponderosa pine type of Arizona: the status of our knowledge. Research paper RM-158. U.S. Forest Service, Rocky Mountain Forest and Range Experimental Station, Fort Collins, Colorado.
- Cooper, C. F. 1960. Changes in vegetation structure, and growth of southwestern pine forests since white settlement. *Ecological Monographs* 30:129-164.
- Covington, W. W., and Moore, M. M. 1994. Southwestern ponderosa forest structure. *Journal of Forestry* 92:39-47.
- Currie, P. O. 1987. Grazing in ponderosa pine forests. Pages 194-200 in D. Baumgartner and J. E. Lotan, editors. Proceedings of a symposium: ponderosa pine—the species and its management. Washington State University Cooperative Extension, Pullman, Washington.
- Currie, P. O., and H. L. Gary. 1978. Grazing and logging effects on soil surface changes in central Colorado's ponderosa pine type. *Journal of Soil and Water Conservation* 4:176-178.
- Dadkhah, M., and G. F. Gifford. 1981. Influence of vegetation, rock cover, and trampling on infiltration rates and sediment production. *Water Resources Bulletin* 16:979-985.
- Dellabala, D. A., D. M. Olson, S. E. Barth, S. L. Crane, and S. A. Primm. 1995. Forest health: moving beyond rhetoric to restore healthy landscapes in the inland Northwest. *Wildlife Society Bulletin* 23:346-356.
- Dieterich, J. H. 1980. Chimney spring forest fire history. General technical report RM-220. U.S. Forest Service, Rocky Mountain Forest and Range Experimental Station, Fort Collins, Colorado.
- Dunford, E. G. 1954. Surface runoff and erosion from pine grasslands of the Colorado Front Range. *Journal of Forestry* 52:923-927.
- Everett, R. 1994. Eastside forest ecosystem health assessment. Volumes I-V. General technical reports PNW-317-331. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Facelli, J. M., and S. T. A. Pickett. 1991. Plant litter: its dynamics and effects on plant community structure. *The Botanical Review* 57:1-32.
- Filip, G. M. 1994. Forest health decline in central Oregon: a 13-year case study. *Northwest Science* 68:233-240.
- Finneran, B. 1994. Can you see the forest for the smoke? A plan for addressing prescribed burning and wildlife in the Blue Mountains of N.E. Oregon. *Blue Mountains Natural Resource News*, March:10-11.
- Flather, C. H., L. A. Joyce, and C. A. Bloomgardner. 1994. Species endangerment patterns in the United States. General technical report RM-241. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Fleischner, T. L. 1994. Ecological costs of livestock grazing in western North America. *Conservation Biology* 8:629-644.
- Forsling, C. L. 1951. A study of the influence of herbaceous plant cover on surface run-off and soil erosion in relation to grazing on the Wasatch Plateau in Utah. Technical bulletin 220. U.S. Department of Agriculture, Washington, D.C.
- Franklin, J. F., and C. T. Dyrness. 1973. Natural vegetation of Oregon and Washington. General technical report PNW-8. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Gaither, R. E., and J. C. Buckhouse. 1983. Infiltration rates of various vegetative communities within the Blue Mountains of Oregon. *Journal of Range Management* 36:58-60.
- Gast, W. R., Jr., et al. 1991. Blue Mountains forest health report: "New perspectives in forest health". U.S. Forest Service, Pacific Northwest Region, Malheur, Umatilla, and the Wallowa-Whitman National Forests, John Day, Oregon.
- Gillen, R. L., W. C. Krueger, and R. F. Miller. 1984. Cattle distribution on mountain rangeland in northeastern Oregon. *Journal of Range Management* 37:549-553.
- Habeck, J. R. 1990. Old-growth ponderosa pine-western larch forests in western Montana: ecology and management. *Northwest Environmental Journal* 6:271-292.
- Hall, F. C. 1976. Fire and vegetation in the Blue Mountains—implications for land managers. Proceedings of Tall Timber Fire Ecology Conference 14:155-170.
- Hall, F. C. 1994. Historical and present conditions of the Blue Mountain forests. *Blue Mountain Natural Resource News*, March:1-2.
- Harris, G. A. 1991. Grazing lands of Washington State. *Rangelands* 13:222-227.
- Henjum, M. G., et al. 1994. Interim protection for late-successional forests, fisheries, and watersheds, national forests east of the Cascade crest, Oregon and Washington. The Wildlife Society, Bethesda, Maryland.
- Hessburg, P. F., R. G. Mitchell, and G. M. Filip. 1994. Historical and current roles of insects and pathogens in eastern Oregon and Washington forested landscapes. General technical report PNW-327. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Irwin, L. L., J. G. Cook, R. A. Riggs, and J. M. Skovlin. 1994. Effects of long term grazing by big game and livestock in the Blue Mountains forest ecosystems. General technical report PNW-325. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Johnson, C. G., Jr., R. R. Clausnitzer, P. J. Mehring, and C. D. Oliver. 1994. Biotic and abiotic processes of eastside ecosystems. General

- technical report PNW-GTR-322. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Johnson, W. M. 1956. The effect of grazing intensity on plant composition, vigor, and growth of pine-bunchgrass ranges in central Colorado. *Ecology* 37:790-798.
- Karl, M. G., and P. S. Doeschner. 1993. Regulating competition on conifer plantations with prescribed cattle grazing. *Forest Science* 39: 405-418.
- Kauffman, J. B., and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications. . . a review. *Journal of Range Management* 37:430-438.
- Larson, M. M., and G. H. Schubert. 1969. Root competition between ponderosa pine seedlings and grass. General technical report RM-54. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Laudenslayer, W. F., H. H. Darr, and S. Smith. 1989. Historical effects of forest management practices in eastside pine communities in northeastern California. Pages 26-34 in A. Teale, W. W. Covington, and R. H. Hamre, technical coordinators. General technical report RM-85. U.S. Forest Service Forest and Range Experiment Station, Fort Collins, Colorado.
- Leopold, A. 1924. Grass, brush, timber and fire in southern Arizona. *Journal of Forestry* 22:1-10.
- Lull, H. W. 1959. Soil compaction on forest and range lands. Miscellaneous publication 769. U.S. Department of Agriculture, Washington, D.C.
- Mack, R. N., and J. N. Thompson. 1982. Evolution in steppe with few large, hooved mammals. *American Naturalist* 119:757-772.
- Madsen, M. H., and N. E. West. 1983. Livestock grazing-fire regime in interactions within montane forests of Zion National Park, Utah. *Ecology* 64:661-667.
- Marcuson, P. E. 1977. Overgrazed streambanks depress fishery production in Rock Creek, Montana. Special project report F-20-R-21-11a. Montana Department of Fish and Game, Helena, Montana.
- McBride, J. R., and R. D. Laven. 1976. Scars as an indicator of fire frequency in the San Bernardino Mountains, California. *Journal of Forestry* 74:439-442.
- Miller, D. L. 1988. The influence of competing vegetation in ponderosa pine forests. Pages 115-120 in D. M. Baumgartner and J. E. Lotan, editors. *Ponderosa pine: the species and its management*. Washington State University Cooperative Extension, Pullman, Washington.
- Morgan, P. 1994. Dynamics of ponderosa and Jeffrey pine forests. Pages 47-71 in G. D. Hayward and J. Verner, editors. *Flammulated, boreal, and great gray owls in the United States*. General technical report RM-254. U.S. Forest Service Forest and Range Experiment Station, Fort Collins, Colorado.
- Mutch, R. W., S. F. Arno, J. K. Brown, C. E. Carlson, R. D. Ottmar, and J. L. Peterson. 1994. Forest health in the Blue Mountains: a management strategy for fire-adapted ecosystems. General technical report PNW-GTR-310. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Neelson, R. P. 1996. High-resolution climate analysis and Southwest biogeography. *Science* 252:27-34.
- O'Laughlin, J., et al. 1993. Forest health conditions in Idaho. Report 11. Idaho Forest, Wildlife and Range Policy Analysis Group, College of Forestry, University of Idaho, Moscow.
- Olson, R. K. 1992. Physiography and forest types. Pages 7-40 in R. K. Olson, D. Binkley, and M. Bohm, editors. *The response of western forests to air pollution*. Springer-Verlag, New York.
- Oliver, C. D., L. L. Irwin, and W. H. Knapp. 1994. Eastside forest management practices: historical overview, extent of their applications, and their effects on sustainability of ecosystems. General technical report PNW-324. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Orr, H. K. 1960. Soil porosity and bulk density on grazed and protected Kentucky bluegrass range in the Black Hills. *Journal of Range Management* 13:80-86.
- Orr, H. K. 1975. Recovery from soil compaction on bluegrass range in the Black Hills. *Transactions of the ASAE* 18:1076-1081.
- Painter, E. L. and A. J. Belsky. 1993. Application of herbivore optimization theory to rangelands of the western United States. *Ecological Applications* 3:2-9.
- Pearson, G. A. 1923. Natural reproduction of western yellow pine in the Southwest. Department bulletin number 1105. U.S. Department of Agriculture, Washington, D.C.
- Pect, R. K. 1988. Forests of the Rocky Mountains. Pages 64-101 in M. G. Barbour and W. D. Billings, editors. *North American terrestrial vegetation*. Cambridge University Press, New York, New York.
- Roath, L., and W. C. Krueger. 1982. Cattle grazing and behavior on a forested range. *Journal of Range Management* 35:332-338.
- Rummell, R. S. 1951. Some effects of livestock grazing on ponderosa pine forest and range in central Washington. *Ecology* 32:594-607.
- Savage, M., and T. W. Swetnam. 1990. Early 19th century fire decline following sheep pasturing in a Navajo ponderosa pine forest. *Ecology* 71:2374-2378.
- Saveland, J. M., and S. C. Bunting. 1988. Fire effects in ponderosa pine forests. Pages 125-131 in D. M. Baumgartner and J. E. Lotan, editors. *Ponderosa pine: the species and its management*. Washington State University Cooperative Extension, Pullman, Washington.
- Schulz, T. T., and W. C. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and enclosures. *Journal of Range Management* 43:295-299.
- Skovlin, J. M. 1984. Impacts of grazing on wetlands and riparian habitat: a review of our knowledge. Pages 1001-1104 in *Developing strategies for rangeland management: a report by the committee on developing strategies for rangeland management*. Westview Press, Boulder, Colorado.
- Skovlin, J. M. 1991. Fifty years of research progress: a historical document on the Starkey Experimental Forest and Range. General technical report PNW-266. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Skovlin, J. M., R. W. Harns, G. S. Strickler, and G. A. Garrison. 1976. Effects of cattle grazing methods on ponderosa pine-bunchgrass range in Pacific Northwest. Technical Bulletin 1531. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Smith, D. W. 1967. Effects of cattle grazing on a ponderosa pine-bunchgrass range in Colorado. Technical bulletin 1371. U.S. Department of Agriculture, Washington, D.C.
- Smith, W. B. 1994. Timberland and growing stock summary data tables for the United States and by region. U.S. Forest Service, Washington, DC.
- Stebbins, G. L. 1981. Coevolution of grasses and herbivores. *Annals of the Missouri Botanical Garden* 68:75-86.
- Thurrow, T. L. 1991. Hydrology and Erosion. Pages 141-159 in R. K. Heitschmidt and J. W. Smith, editors. *Grazing management—an ecological perspective*. Timber Press, Portland, Oregon.
- Tiedemann, A. R., and D. A. Higgins. 1989. Effects of management strategies on water resources. Pages 57-91 in T. M. Quigley, H. R. Sanderson and A. R. Tiedemann, editors. *Managing interior northwest rangelands: the Oregon range evaluation project*. General technical report PNW-238. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Tisdale, E. W. 1950. Grazing of forest lands in interior British Columbia. *Journal of Forestry* 48:856-860.
- U.S. General Accounting Office. 1988. Rangeland management: more emphasis needed on declining and overstocked grazing allotments. GAO/RCED-88-80. U.S. General Accounting Office, Washington, D.C.
- U.S. Department of Agriculture. 1992. Restoring the forest ecosystem: forest health in Eastern Oregon. RG-UMA-039-02. U.S. Forest Service, Malheur, Ochoco, Umatilla, Wallowa-Whitman National Forests, John Day, Oregon.
- U.S. Department of Agriculture. 1993. Fire in the Blues: a natural force, a powerful tool. RG-UMA-PR-016-93. U.S. Forest Service, Malheur.

- Cochoco, Umatilla, Wallowa-Whitman National Forests, John Day, Oregon.
- Weaver, H. 1943. Fire as an ecological and silvicultural factor in the ponderosa pine region of the Pacific Slope. *Journal of Forestry* 41: 7-14.
- Weaver, H. 1947. Fire--nature's thinning agent in ponderosa pine stands. *Journal of Forestry* 45:437-444.
- Weaver, H. 1950. Shoals and reefs in ponderosa pine silviculture. *Journal of Forestry* 48:21-22.
- White, A. W. 1985. Presentment regeneration patterns in a southwestern ponderosa pine stand. *Ecology* 66:589-594.
- Wickman, B. E. 1992. Forest health in the Blue Mountains: the influence of insects and disease. General technical report PNW-GTR-295. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Zimmerman, G. T., and L. F. Neuenschwander. 1984. Livestock grazing influences on community structure, fire intensity, and fire frequency within the Douglas-fir/sitka spruce habitat type. *Journal of Range Management* 37:104-110.



**QUOTES FROM SCIENTISTS AND OTHERS ABOUT THE EFFECTS OF CONVENTIONAL
FOREST MANAGEMENT ON WILDFIRE HAZARD**

"Because salvage logging removes natural fire breaks, it homogenizes the landscape and increases susceptibility to catastrophic fires and insect outbreaks."

– **Dr. James Karr, University of Washington, and others, 1996 Open letter to President Clinton.**

"As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems...Even though these hazards [with logging slash] diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon."

– **M.H. Huff and others, 1995 Historical and current forest landscapes in eastern Oregon and Washington. U.S. Forest Service.**

"We need to accept that in many areas throughout the region, past forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years."

– **R.L. Beschta and others, 1995 Wildfire and salvage logging.**

"Intensive timber management contributes to additional fire hazards due to greater road access and associated increases in human-caused fires, operation of logging equipment, slash build-up following logging, and the associated decrease in moisture content of forest understories."

– **DellaSala, Olson and Crane, 1995 Ecosystem Management in Western Interior Forests.**

"The original old-growth ponderosa pine were quite resistant to crown fires, because the frequent ground fires kept fuel levels from building too high. Excluding ground fires, coupled with forestry practices such as clearcutting that convert old-growth to younger stands, has increased the probability of a ground fire moving into crowns and gaining intensity as it spreads. There is no doubt that big, thick-barked trees are most resistant to fire, and foresters have noted since the early decades of the century that plantations were particularly vulnerable to fire. Susceptibility was reduced with the advent of slash disposal. However, even with slash disposal, densely stocked plantations are more vulnerable to fires than healthy old-growth."

– **Dr. David Perry, Oregon State University 1995**

"Clearcutting can change fire climate so that fires start more easily, spread faster, and burn hotter. The effect of these changes on the fire control problem is extremely important. For each man required to control a surface fire in a mature stand burning under average conditions, 20 men will be required if the area is clearcut."

– **C.M. Countryman, 1956 Division of Fire Research, U.S. Forest Service**

"It is after logging that the damage from fires is greatest, on account of the inflammable and unburned slash."

– **T.S. Woolsey, 1911 U.S. Forest Service**

"Where the cut has been heavy and the resulting debris correspondingly large, all the difficulties of fire fighting are proportionally increased. All kinds of waste material left in the woods supply food for the flames, but the leaving of large unlopped softwood tops on the ground adds enormously to the fury of a brush fire and greatly prolongs the length of time that slash remains a menace to its own and surrounding areas...Fires on cutover lands usually kill all standing timber left on the area burned, as well as all the young growth"

A.K. Chittenden, 1905 USDA Bureau of Forestry

EXCERPTS FROM THE SNEP FINAL REPORT TO CONGRESS

Introduction

The following are key findings quoted from the Sierra Nevada Ecosystem Project (SNEP), Final Report to Congress, vol. I, Assessment Summaries and Management Strategies (Davis: University of California, Centers for Water and Wildland Resources, 1996). The report summarizes the SNEP completed by the Science Team. Volume I encapsulates a list of critical findings and a summary of the assessments, case studies, and alternative management strategies. Congress requested this project in the 1993 Interior Appropriations Act. The study called for a scientific review of remaining old growth in national forests in the Sierra Nevada by an independent panel of scientists. Over 100 additional scientists contributed to this report as well.

SNEP Key Findings:**Fire and Fuels**

The commonly expected consequence of decades of fire suppression - that large, infrequent fires are becoming larger and small, frequent fires smaller - is generally not confirmed by records for 20th century Sierran forests. The Plumas National Forest has had no change in the observed size and frequency of fires during this century (p. 4).

Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity. Logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate, if not accompanied by adequate reduction of fuels. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest (p. 4).

Although silvicultural treatments can mimic the effects of fire on the structural patterns of woody vegetation, virtually no data exist on the ability to mimic ecological functions of natural fire (pp. 4-5).

Naturally occurring fire in the Sierra Nevada has influenced Sierran ecosystems for millennia, influenced biodiversity, plant reproduction, vegetation development, insect outbreaks and disease cycles, wildlife habitat relationships, soil functions and nutrient cycling, gene flow, selection, and ... sustainability (p. 4).

Late Successional & Old Growth Forests

The successional old growth forests of middle elevations (west-side mixed conifer, red fir, white fir, east-side pine types) at present constitute 7-30% of the forest cover depending on forest type. On average, national forests have about 25% the amount of the national parks, which is an approximate benchmark for pre-contact forest conditions. East-side pine forests have been especially altered (p. 6).

Human activities, particularly timber harvest, indiscriminate burning in the 19th century, and fire suppression in the 20th century, have drastically reduced the extent of late successional forests through the removal of large trees and woody debris and dense ingrowth of shade-tolerant tree species, leading to greater stand uniformity over large areas and loss of landscape diversity (p. 6).

Over the past decade, as they have many times in the past, Sierra Nevada conifer forests have experienced widespread, locally severe mortality caused principally by bark beetles infesting trees stressed by drought, over-dense stands, and pathogens. Along the western slopes, air pollution stress may well have contributed to this extensive mortality. Although fire suppression and forestry practices leading to unhealthy tree densities are implicated in the current die-off, Forest Service records dating back to the beginning of the century reveal that periodic insect outbreaks, often associated with droughts, have killed trees (often just a specific species) over

extensive areas of the Sierra Nevada Tree mortality, even widespread or locally severe mortality, is an inherent component of Sierran forest ecology and an important generator of plant and animal habitats (p. 7).

...existing high-quality late successional forests must be retained and expanded to support the full range of organisms and functions into the future, that distribution of late successional conditions across the landscape involves a combination of focus areas and management of matrix land and that fire is reintroduced into the forest (p. 17).

Excessive sediment yield into streams remains a widespread water-quality problem in the Sierra Nevada. The main sources of sediments are roads of poor design, location, construction, and maintenance and riparian areas that have been devegetated by logging, fire, mining, grazing and construction (p. 8).

Anadromous fish (chinook salmon, steelhead), once native to most major Sierran rivers north of the Kings River, are now nearly extinct from Sierra rivers. Dams and impoundments, which block fish access to streams, together with degraded conditions above dams, have led to loss of about 90% of the historic habitat in the Sierra (p.8).

Sixty-nine species of terrestrial vertebrates (17% of the Sierra fauna) are considered at risk by state or federal agencies, which list them as endangered, threatened, of "special concern," or "sensitive" (p. 5).

The most important identified cause of the decline of Sierran vertebrates has been loss of habitat, especially foothill riparian habitats and late successional forests (p. 5).

Jobs and the Environment

The number of jobs has more than doubled in the Sierra Nevada since 1970, but the relative proportion of commodity-producing and service-producing jobs stayed constant. Recreation, timber, and

agriculture are the three largest employment sectors directly dependent on the ecosystem. In 1990, recreation accounted for 8% of all jobs, timber 4%, and agriculture 3%. Diversification has occurred within each sector (p. 2).

Water is the most valuable commodity, followed by timber, livestock and other agricultural products, based on gross revenues. The Sierra Nevada ecosystem produces about \$2.2 billion worth of commodities and services annually, based on estimates of direct resource values (not the total revenue produced by resource-dependent activities.) Water accounts for more than 60% of that total value, followed by other commodities totaling 20%, and services also totaling 20% (p. 3).

Communities in the Sierra Nevada are dependent on the ecosystem for a combination of direct and indirect natural resource benefits, including noneconomic benefits associated with aesthetic and sense-of-place values. Few economies are dependent exclusively on resource-extractive activities (timber, mining, grazing) (p. 3).

Timber industry employment may decline from present levels due to trends of increasing labor productivity within the region and a shift in remanufacturing facilities out of the region. Timber harvests from federal land will have only a modest impact on trends in local employment. Woods work (fuels management, environmental restoration, etc.) in the Sierra Nevada can make only a modest contribution to alleviating the effect of the decline on local workers (p. 3).

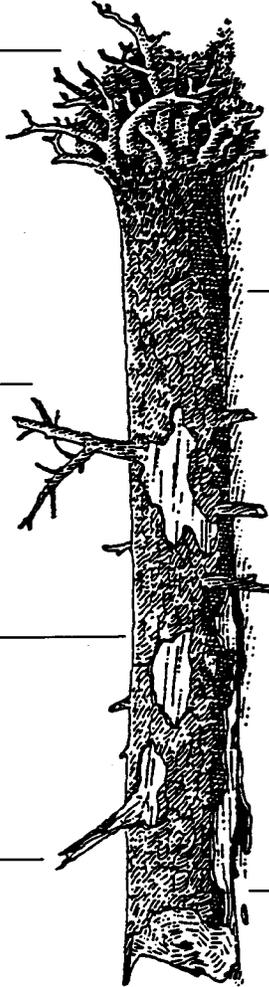
To obtain a copy of the summary of the Sierra Nevada Ecosystem Project: Final Report to Congress, please contact: Sierra Nevada Ecosystem Project, 916/752-8070, Room 2140, Hart Hall, University of California, Davis, CA 95616 or check <http://www.ceres.ca.gov/snep>

HOW SALVAGE SYSTEMATICALLY DEPLETES THE FOREST ECOSYSTEM

The trunk provides a food source for woodpeckers, particularly pileated woodpeckers.

Limbs are used as perches, and if hollow, as nest cavities.

Elevated areas are used as lookouts and feeding sites.



The spaces between loose bark and wood are used as hiding places and thermal cover by invertebrates and small vertebrates, such as Pacific treefrog.

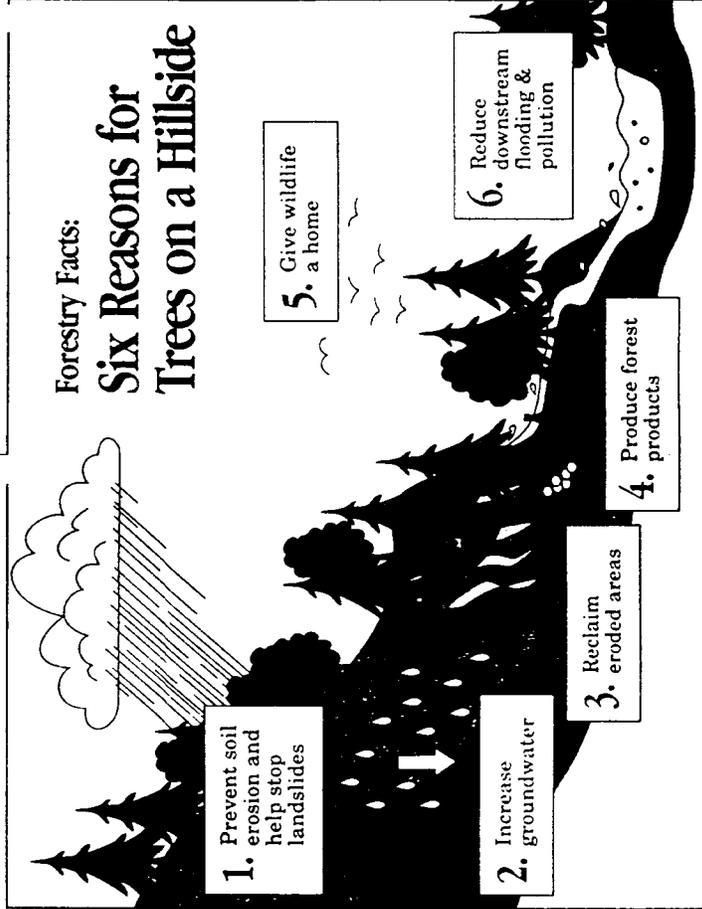
Protected areas under the log are used as nesting cover by grouse and as hiding and thermal cover by snowshoe hare.

(after Thomas, 1979.)

One of the most unique attributes of the ancient forest ecosystems of the Pacific Northwest is their ability to store carbon in the form of snags and downed logs on the forest floor. Also called coarse woody debris (CWD) or large woody debris (LWD) by scientists, this material can build up over time, providing habitat for many species and ultimately building forest soils. In tropical and semitropical environments CWD would quickly rot and disappear. In the Pacific Northwest CWD persists due to cool winter temperatures and dry summer conditions. In some cases, CWD will persist in the forest environment for centuries. CWD also plays a critical role in the riparian or streamside zone where it becomes habitat for aquatic invertebrates, and the salmon and trout that feed upon them. Clear cutting and salvage logging systematically eliminate CWD, a critical element of structure and energy in the forest ecosystem.

precious wetland

ches in to ship plan. who visits California, 'acher, maintain ences. n, is chief onent of tyard ws its Oaks specialty ent sted for s soil. ight, deer dship on ne beyond y on



Myths Perpetuated by the Timber Industry and its Allies

- Myth:** *Thinning will stop trees from burning.*
- Fact:** Thinning will not stop trees from burning. Although thinning may reduce the volume of wood that catches fire, there is no guarantee the trees remaining won't burn. In addition,
- thinning destroys ground cover plants, removes shade trees, and leaves behind brush on the forest floor which may cause forests to be more prone to fire.
 - thinning requires environmentally harmful road building, which increases risks that new fires will be ignited by sparks from logging machinery and individual carelessness and damages watersheds.
- Myth:** *Intensive use of thinning and post-fire salvage will help keep forests "healthy."*
- Fact:** There is no consensus of scientific opinion as to whether thinning will improve forest health.
- Myth:** *Clearcutting and other logging activities are substitutes for natural disturbances, such as fire, etc.*
- Fact:** These are not substitutes. Clearcutting does not maintain biodiversity in the forest.
- Myth:** *Epizootic species, i.e. mountain pinebeetle, spruce budworm, will quickly destroy the forests if not intensively controlled.*
- Fact:** Insects and disease naturally thin out specific tree species, allowing the understory to develop. Old growth forests can withstand insect population swings better than young forests. Furthermore, insects and fungi found in dead or dying trees are the food and habitat for many wildlife species, such as the pileated woodpecker who creates nesting cavities in old, large snags.



WESTERN Ancient Forest CAMPAIGN

Jim Junft,
Executive Director
Steve Holmer,
Campaign Coordinator
Sean Cosgrove,
National Organizer
Phone 202 / 879-3188
1025 Vermont Ave., NW
3rd Floor
Washington, DC 20005
Fax 202 / 879-3189

Board of Directors
Mikih Friedman
Bellingham, Washington
Tim Lillabo
Bend, Oregon
Mike McSherry
Bose, Idaho
Randy Spizak
Los Angeles, California
Connie Stewart
Arcata, California
Susan Swiggett
Salt Lake City, Utah
Bethonie Walder
Missoula, Montana
Chuck Willer
Corvallis, Oregon

*Advisory Board**
Tim Gleason
Kettle Range
Conservation Group
Ed Grumbine, Ph.D.
Sierra Institute, UCSC
Ryan Hanson
California Wilderness Coalition
Paul Ketchum
Portland Audubon Society
Patti Loursen
Sierra Club - Ancient Forest
Task Force
Bill Lazor
Lazor Foundation
Tim McKee
Northcoast Environmental
Center
James Montath
Save the West
Julie Norman
Headwaters
Arthur Partridge, Ph.D.
Forest Watch
Christopher Peters
Seventh Generation Fund
Glen Spain
Pacific Coast Federation
of Fishermen's Assns.
Kimery Wainshire
The Hillouette Fund

*Institutions listed for identification
purpose only



Myth: *Ecological effects of commercial cattle and sheep grazing mimic the effects of herbivory by native herbivores.*

Fact: Untrue. Cattle and sheep grazing is much more destructive to the forest ecosystem than native herbivores. Cattle and sheep cause more damage to riparian areas thereby impacting sensitive fish and aquatic species.

Myth: *There is a national "forest health crisis" and salvage and thinning are the solutions.*

Fact: There is not a "forest health crisis" according to the U.S. Forest Service. Many of the problems facing the forests have developed over a century. It will take time, not a quick cure, to react appropriately and conservatively with the best available scientific information.

FUELBREAKS: MYTHS vs. FACTS

by Timothy Ingalsbee, Ph.D.
Director of the Western Fire Ecology Center

MYTH: LARGE-SCALE FIRES ARE DESTRUCTIVE, "CATASTROPHIC" EVENTS

FACT: Forest fires are natural disturbance processes vital for maintaining ecosystem health and biodiversity. Native forests in the Sierra Nevadas evolved with frequent large-scale fires. Though fires do kill some trees, they normally burn in a mosaic pattern that leaves a diversity of mortality/vitality effects across a landscape. When natural recovery processes are allowed to unfold, short-term tree mortality is followed by long-term forest vitality. When fires and natural recovery processes are aborted through firefighting or salvage logging, ecological imbalances result, leading to "forest health" problems.

MYTH: IT IS NATURAL FOR HUMAN BEINGS TO FIGHT FIRES

FACT: Both native forest ecosystems and human civilizations evolved with fire. Indigenous peoples all over the world--and especially Native Americans inhabiting California--used fire to enhance food, water, shelter, and cultural resources. Contrary to this evolutionary and cultural legacy, institutionalized fire suppression is less than a century old. The Forest Service now admits that current excess fuel accumulations and "forest health" problems are the result of aggressive fire suppression coupled with road-building, logging, and grazing programs.

MYTH: FUELBREAKS WILL PREVENT LARGE-SCALE FIRES

FACT: Fuelbreaks are used in an "indirect" suppression strategy in which firelines are constructed far away from the flame front. On the Plumas National Forest, "large-scale" fires are defined as fires greater than 1,000 acres. The Cal. Owl RDEIS reveals that each parcel of land contained within the QLG fuelbreaks will be from 8-12,000 acres in size [RDEIS, p. J-23] while QLG documents state that each landscape block will contain 10-14,000 acres. Moreover, fuelbreaks will have no influence on fire size or behavior in the landscape between fuelbreaks. Essentially, the QLG fuelbreaks will become the fire perimeters of future fires that unavoidably will yield large-scale, possible severe fires of several thousand acres.



**WESTERN
Ancient Forest
CAMPAIGN**

Jim Jantz,
Executive Director
Steve Halmer,
Campaign Coordinator
Sean Cosgrove,
National Organizer
Phone 202 / 879-3188
1225 Vermont Ave., NW
3rd Floor
Washington, DC 20005
Fax 202 / 879-3189

Board of Directors
Mitch Friedman
Bellingham, Washington
Tim Lillito
Bend, Oregon
Mike McElberry
Boise, Idaho
Randi Spivek
Los Angeles, California
Cannie Stewart
Arcata, California
Susan Switzer
Salt Lake City, Utah
Barbaine Walker
Missoula, Montana
Chuck Wilber
Corvallis, Oregon

Advisory Board
Tom Coleman
Kettle Range
Conservation Group
Ed Grumbine, Ph.D.
Sierra Institute, UCSC
Rynn Hanson
California Wilderness Coalition
Paul Keitham
Portland Audubon Society
Patti Larsen
Sierra Club - Ancient Forest
Task Force
Bill Letzer
Lazar Foundation
Tom McKay
Northcoast Environmental
Center
James Montalsh
Save the West
Julie Hoeman
Headwaters
Arthur Partridge, Ph.D.
Forest Watch
Christopher Peters
Seventh Generation Fund
Glen Spies
Pacific Coast Federation
of Fishermen's Assns.
Kinney Withers
The Blount Fund

*Signatures listed for identification
purpose only.



MYTH: FUELBREAKS WILL AVOID THE HIGH COSTS OF WILDFIRE SUPPRESSION

FACT: Fuelbreaks will not avoid or prevent the high cost of firefighting. Fuelbreaks alone are unable to prevent or halt the spread of wildfires without aggressive fire suppression efforts to construct firebreaks within them. Indeed, the sole use for fuelbreaks is to facilitate the work of firefighting hand crews and aircraft. Fuelbreaks are most effective on small, low-intensity fires, but these are the kind that the Forest Service needs to allow to burn. Fuelbreaks are of questionable value on large, high-intensity fires which require massive inputs of personnel and resources. Moreover, the high costs of "presuppression" maintenance to reduce logging slash and brush must also be factored into total fire prevention costs.

MYTH: FUELBREAKS WILL MAKE FIREFIGHTING SAFER

FACT: The fuelbreaks located alongside valley bottoms or mid-slope roads will be very risky, for radiant heat effects and rapid fire spread will likely cause spotting within and beyond fuelbreaks. The effects will make the DFPZs risky as safety zones or escape routes. Ridgetop fuelbreaks are also risky where uncontrolled fire is below firefighters and is burning rapidly upslope. This is one of the most dangerous tactics that is rarely used in firefighting. Indeed, it is listed as one of the 13 "Watch Out" situations for firefighters to avoid. If the Forest Service fails to regularly maintain fuelbreaks, they will be more dangerous for firefighters; indeed, the vast majority of firefighter fatalities have occurred in brushfields, not closed-canopy forested areas.

MYTH: FUELBREAKS ARE EFFECTIVE IN FIRE SUPPRESSION

FACT: Fuelbreaks have been built in California since 1914, yet most have failed because of the high costs and lack of interest in regularly maintaining them. The Forest Service and Calif. Dept. of Forestry constructed nearly 2,000 miles of fuelbreaks in southern California and the northern Sierras from 1955 to 1972 as part of a strategy of "conflagration control" in case of thermonuclear war. The agencies failed to maintain these fuelbreaks, and they have had no effect on wildfires since the 1970s [Pyne, 1982]. Further research has documented several cases where even maintained fuelbreaks failed to stop fast-moving fires. [Omi, 1977; Salazar & Gonzalez-Caban, 1987]. Most recently, fuelbreaks failed to stop spotfires from crossing over them on California's Fountain Fire, and on the Tahoe Fire, flames raced along the ground surface of fuelbreaks and then climbed into the crowns of trees on the other side. [USFS Fire Effects Information System]

MYTH: FUELBREAKS WILL ENABLE THE REINTRODUCTION OF FIRE

FACT: The promise of prescribed burning often accompanies so-called fire recovery projects (i.e. fire salvage timber sales) and other forest management projects that promote

fuel reduction for fire protection. Nevertheless, these promises are rarely if ever kept. At present, forest managers lack the funding, resources, and willpower to implement prescribed burning, particularly the kind of burning that benefits ecosystems and restores fire ecology. Moreover, the several hundred group selection cutting zones in the QLG proposal will overwhelm agency efforts to track and treat these areas for slash and brush abatement.

MYTH: LOGGING IS THE MOST COST-EFFECTIVE MEANS TO MAKE FUELBREAKS

FACT: The small revenues generated by commercial timber sales mask the high costs that are "externalized" to the environment and future generations. The QLG bill mandates that the USFS should use "the most cost-effective means available...to implement resource management activities." If the objective is to build fuelbreaks that effectively retard fire spread and reduce fire intensity, then the most cost-effective means would be to use prescribed burning without commercial logging. SNEP studies report that prescribed burning is the most effective means of reducing fire hazard, and prescribed burning avoids the environmental impacts associated with logging and road-building, such as soil erosion and compaction, habitat fragmentation, water quality degradation. Additionally, prescribed burning can be done at a fraction of the estimated taxpayer costs (estimated by the GAO to be \$83 million) to administer commercial timber sales.



NATIONAL ASSOCIATION OF STATE FORESTERS

444 North Capitol Street, NW Suite 540 Washington, D.C. 20001 202/624-5415

Testimony

Presented to the U.S. House of Representatives
Committee on Resources, Subcommittee on Forests and Forest Health
Representative Helen Chenoweth, Chairman

James Hubbard
State Forester of Colorado
September 23, 1997

Good afternoon, Madame Chairman. My name is Jim Hubbard and I am the State Forester of Colorado. I am also a member of the National Association of State Foresters (NASF), a nonprofit organization which represents the State Forestry Directors of all 50 states, seven U.S. territories, and the District of Columbia. In our professional capacities, NASF members provide technical and educational assistance to the nation's 10 million nonindustrial private forest landowners. We also help to protect over 70 percent of U.S. forests from insects, disease, and, particularly, wildfire.

I would like to begin by commending you for recognizing the risks to both public safety and environmental quality posed by current conditions in the wildland urban interface. I am further encouraged by your acknowledgement that resource managers need a flexible and varied set of tools with which to address this multifaceted problem.

As the nation's population steadily increases, the "interface issue" is rapidly becoming the greatest fire-related concern among local, State and federal agencies. Project-based or "stewardship" contracts can provide Federal resource managers with an innovative way to work with their neighboring communities to reduce the risk of catastrophic wildfire while improving air quality, water supplies, recreational opportunities and other noncommodity benefits that the public demands and enjoys.

Finding ways to address interface issues is a land management responsibility we must all redeem.

Fire in the Forests -- A Brief Review

During most of the twentieth century, societal values demanded that a strict regime of fire exclusion and prevention be enforced across the federal landscape. Highly trained fire fighting teams effectively eliminated fire from the nation's forests and, as a result, disrupted the traditional cycle of frequent, low-intensity burns to which many forested ecosystems had become adapted.

In the absence of fire, these ecosystems experienced unprecedented changes including crowded stand densities; greater susceptibility to insect and disease infestations; loss of historic species and habitat; and dangerous levels of fuel loading. In other words, our forests have become more flammable and more at risk from catastrophic wildfire than ever before. Fed by thick ladders of vegetative fuel, wildfires now burn hotter, higher, and longer, causing long-term damage to soil, water, air and other essential natural resources.

As evidence of this growing risk, large-scale wildland fires have burned an average of 4 million acres per year over the past 10 years. In 1996, alone, nearly 95 thousand fires consumed 6 million acres on lands of all ownership. These wildfires cost local, State, and federal agencies

Testimony of James Hubbard
State Forester of Colorado
September 23, 1997 -
Page 2

more than \$1 billion to suppress and threatened a broad array of both public and private values -- including the lives of the men and women who fought to suppress the blazes.

The nation's current wildfire situation is further complicated by the expansion of human development into the interface between urban centers and forested wildlands. The interagency National Wildfire Coordinating Group defines the wildland urban interface as "the geographic area or zone where structures and other human developments meet and intermingle with wildland or vegetative fuels." But to many crowded city dwellers, this zone represents fresh air, scenic views, recreational opportunities, and even solitude.

State forestry agencies, along with municipal and volunteer fire crews, bear much of the fire protection burden when wildfires occur in interface areas. These dangerous areas are often characterized by fire-prone landscapes and building materials, distant water supplies, and safety hazards. The wildland urban interface is the number one wildfire concern for most State Forestry agencies and is an appropriate focus for this innovative legislation.

Because many of the nation's high-risk forests are in federal ownership, agencies such as the Forest Service and Bureau of Land Management have a particular responsibility to address dangerous conditions, such as the buildup of hazardous fuels, which could threaten their neighbor's lives and property. The causes and impact of wildland fire are not limited to federal lands, however, and these agencies must also work with local communities, state and regional land managers, and local fire fighting agencies to determine the wildland areas in greatest need of treatment and to identify the most effective tools for meeting that need.

Existing Fire Management Tools -- An Exploration

Vegetative management can alter wildland fire behavior by partially or totally removing particularly hazardous grasses, shrubs, trees and other types of forest "fuels." A number of silvicultural tools currently exist for addressing conditions such as fuel loading which leave forests highly susceptible to wildfire. Prescribed burning and the thinning or harvest of dense stands of small diameter trees are among the most effective of these tools.

Prescribed Burning: When carefully planned and implemented under appropriate weather and fuel moisture conditions, prescribed fire can successfully reduce the accumulation of combustible materials on the forest floor; recycle forest nutrients; minimize insect populations and spread of disease; encourage and maintain growth of native trees and plants; and improve access and conditions for wildlife. Prescribed fire is also a valuable tool in the long-term maintenance of hazard reduction projects. It is a tool which should not be excluded from qualifying "forest management projects" as defined by Section 3 (2) of H.R. 2458.

Prescribed fire must be used with particular care, however, when dealing with areas adjacent to human development. In both interface and predominantly wild areas, prescribed fire often requires thinning or other mechanical removal of forest material prior to burning.

Thinning: Thinning of forested stands for the purpose of reducing fire risk usually involves removal of small diameter wood on a scale often appropriate for small contractors. Unfortunately, such products are of limited marketability and it is not currently cost-effective for many small operators to take on harvesting projects geared toward fire risk reduction.

Despite the financial risks, some operators have indicated a willingness to take a chance on these

Testimony of James Hubbard
 State Forester of Colorado
 September 23, 1997
 Page 3

projects if an appropriate enabling mechanism were in place to assist them. Federal harvesting contracts which include the completion of fire-related forest management activities offer a promising way for federal agencies to achieve their management goals while encouraging the successful participation of small contractors.

Colorado's Front Range -- An Illustration

Colorado's Front Range is an area of intense urban development, with more than 3 million acres of homes in the woods. As the risk from catastrophic fire becomes increasingly threatening, the residents of the Front Range are demanding that something be done to protect their lives, homes, and property.

In response to this public demand, Colorado's land management agencies jointly assessed the interface situation along the Front Range zone. The agencies then prioritized areas-at-risk according to the urgency with which they needed treatment.

Federal, State and local interests submitted project proposals which are now being evaluated for local applicability and acceptance. Those projects which have local agreement and the ability to match contractors with markets will be moved toward expedited implementation.

Without the participation of all parties this endeavor will not succeed. Federal land managers need the tools provided by H.R. 2458 to fully meet their obligations with regard to reducing the risk of wildland fire -- along the Front Range and throughout the nation.

Implementing Forest Management Contracts -- Some Issues for Consideration

Stewardship or project-based contracts will not provide a final answer to the nation's forest health problems or even to the dilemmas of the wildland urban interface. But they can provide a useful tool for helping federal agencies work with their State and local partners to address these problems in some regions of country. In anticipation of this success, I offer the following suggestions with regard to the implementation of forest management projects as outlined in H.R. 2458.

***Existing Policies and Legislation:** The use of forest management contracts does not need to set aside any existing national policies or processes. Contract specifications can and should be developed in accordance with applicable forest or land management plans and implementation should be carried out in compliance with all applicable laws.

***Collaborative Identification and Monitoring of Treatment Areas:** Because conditions in the interface impact both land managers and the general public at many levels, federal agencies should work collaboratively with local communities, as well as appropriate state and local resource managers, to identify areas in need of fire-related vegetative treatment. The monitoring of contract implementation and completion should also involve applicable local and regional interests. State Foresters are directly involved in similar forest management projects and can assist in providing relevant performance standards and evaluation criteria for these assessments. NASF recommends you incorporate this collaborative action into Sections 101 and 103 of H.R. 2458 where applicable.

***Prioritization of Treatment Projects:** The Forest Service has indicated that there are at least 39 million acres of forest land in need of treatment for fire risk reduction. This tremendous need for action necessitates the prioritization of areas proposed for treatment under this legislation. This

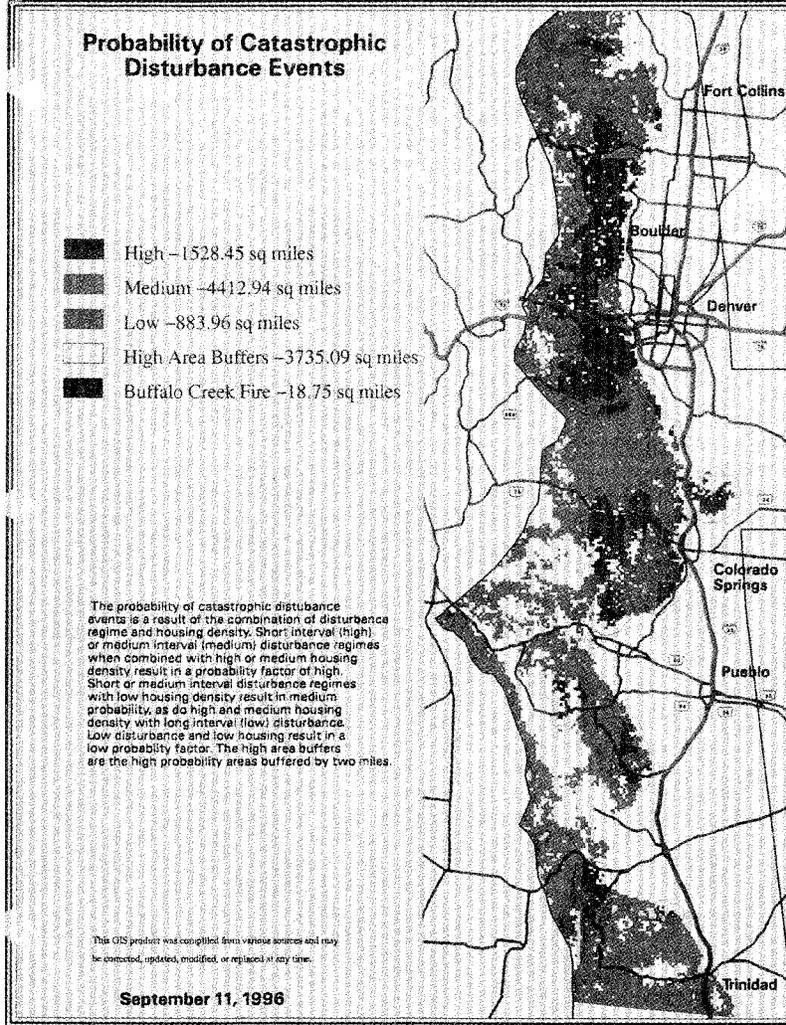
Testimony of James Hubbard
State Forester of Colorado
September 23, 1997
Page 4

prioritization should be done by federal land managers in concert with local officials according to criteria such as housing density; forest condition and probability of catastrophic disturbance events; local support for vegetative treatment; and the presence of a local land-use planning process that deals with hazard mitigation on a continuing basis.

Conclusion

The "Community Protection and Hazardous Fuels Reduction Act" provides authorizing legislation for the Forest Service and Bureau of Land Management to incorporate forest management project needs into traditional timber sale / harvesting contracts. This legislation essentially outlines a nationwide demonstration program focused on exploring the effectiveness of project-based contracts in combating fire-prone forest conditions in the wildland urban interface.

The State Foresters support contracting as one tool to reduce the risk of catastrophic wildfire and urge the federal government to pursue the authorities needed to make use of this tool. State level actions are already underway to address the interface problem and adjacent federal land managers must become an active participant in this process.



**STATEMENT OF PETE GOICOECHEA
CHAIRMAN
BOARD OF EUREKA COUNTY COMMISSIONERS
EUREKA, NEVADA**

**Committee on Resources
Subcommittee on Forests and Forest Health
Hearing on HR 2458
September 23, 1997**

Madam Chairman, and members of the Subcommittee:

My name is Pete Goicoechea and I am here to support the concepts embodied within the Community Protection and Hazardous Fuels Reduction Act of 1997. This Bill addresses a severe risk to human life as well as public and private property, including livestock and wildlife. The approaches to reducing the risk of wildfire and its severity put forth within the bill recognize the important role that domestic livestock can play in reducing dangerous fuel levels by harvesting combustible fuels. When wildfire ravages the land in our county we see energy and resources redirected away from the production of food, the management of wildlife and the maintenance of productive landscapes. Hopefully the concepts addressed within HR 2458 will help redirect energy and resources to the maintenance of functioning landscapes.

Wildfires in Nevada threaten the life and safety of our residents, our watershed resources, and the forage resources which support our wildlife, livestock, and outdoor recreation opportunities. The costs associated with wildfires in Nevada in terms of taxpayer resources, property loss, and resource degradation are staggering. As shown in Table 1, pre-suppression costs alone (which do not include the costs of putting out fires) incurred by the Bureau of Land Management in Nevada ranged between \$3 million and nearly \$5.5 million between 1990 and 1993. During this time, the BLM was spending up to \$145 per acre on fire pre-suppression costs in Nevada alone. BLM fire suppression costs are believed to add another \$130 to \$145 per acre. As a consequence, the BLM is estimated to spend on the order of six to eight million dollars each year in wildland fire activities in Nevada alone.

Table 2 reveals that Western states also incur significant costs for wildland fire management, although markedly less per acre than the BLM. Comparison of the costs per acre shown in Tables 1 and 2 does lead one to wonder why BLM is seemingly less efficient in managing its wildfire program costs. Please note that the acres per fire is very comparable between BLM and the States.

Table 1
Frequency, Acreage Burned, and Pre-Suppression Costs of Fires On,
Or Threatening, Lands Administered By BLM Within Nevada
Fiscal Years 1990 - 1993

Fires Suppressed ^{1/}		Acres Burned ^{1/}								
1990	323	118	441	15,322	8,398	23,720	54	\$ 3,114,385	\$7,062	\$ 131.90
1991	364	110	474	18,119	8,459	26,578	56	\$ 3,868,222	\$8,161	\$ 145.54
1992	395	88	483	25,295	22,768	48,063	100	\$ 4,872,594	\$10,088	\$ 101.37
1993	278	75	353	46,716	5,813	52,529	149	\$ 5,495,153	\$15,567	\$ 104.61

^{1/} Includes fires suppressed through force account and contract protection.

Sources: Fire Frequency and acreage data: USDI, Bureau of Land Management, Public Land Statistics, 1990-1993 editions; NSO Fire Suppression Costs: Bureau of Land Management Nevada State Office (NSO), Labor Cost and Operations Plans, 1990-1993.

Table 2
Four-State Average Wildland Fire Suppression Costs^{1/}

1991	418	17,632	\$ 639,867	\$36.29	42	\$1,531
1992	515	44,245	1,224,811	27.68	85	2,378
1993	912	79,589	1,549,145	19.46	87	1,699
1994	764	116,208	2,893,842	24.90	152	3,788

^{1/} Arizona, Nevada, New Mexico, Utah

Source: "Alternatives for Management of an Expanded State Land Base in Nevada", Prepared for Board of Esmeralda County Commissioners by Interlock Services Corporation and Resources Concepts, Inc., Carson City, Nevada, February 1994.

Despite incurring high costs for fire management, the total acreage of rehabilitated land in Nevada by BLM is surprisingly low. The Nevada Association of Counties in a 1988 report found that although nearly 1,000,000 acres burned in 1985, only 55,000 acres were reseeded in 1985.¹ A large percentage of those areas not reseeded in Nevada became infested with cheatgrass, an introduced annual that is genetically predisposed to survive repeated fire. As the frequency of fire increases, the landscape will be ultimately dominated by cheatgrass and other annuals. Recognizing Federal fiscal constraints to increasing the acreage of Federal lands which are rehabilitated following fire, realistic alternatives must be instituted. Such alternatives might include enhanced roles for local governments; establishment of forage banks; greenstripping; and fuel management through livestock grazing. In particular, local governments may be willing to invest in fire suppression, prevention and rehabilitation if such investments lend stability to local economies. HR 2458 establishes the framework for the use of such alternatives.

Many of the valley floors and fans in Northern Nevada have become vast monocultures of sagebrush with limited understory plants. There are many reasons this occurred and are probably mostly due to historical grazing practices and modern fire suppression activities. Prior to settlement of the West, fire in the sagebrush/grass communities was an important factor and occurred on a 30 year cycle. Our modern fire suppression efforts, in concert with continued grazing, eliminated the understory on vast tracts of land. As annual weeds invade these areas, future fires result in a monoculture of cheatgrass.

With regard to establishment of forage banks, Eureka County would recommend that HR 2458 facilitate such opportunities. The concept of a forage bank would enable local land users to enhance forage production by seeding the vast expanses of unproductive areas I just described. The additional forage produced could be made available to area permittees who have lost forage due to wildfire or the need to rest riparian or other areas of critical environmental concern. Where possible, the seeding program should include native grasses and forbs which are more resilient to wildfire, thereby reducing the hazard of catastrophic fire. While ranchers would benefit from such a program, so would many others. Our wildlife and watersheds would undoubtedly benefit by improving the condition of our landscapes.

Within Eureka County, extensive stands of Pinyon-Juniper (PJ) woodlands exist. These non-commercial forests pose a significant wildfire hazard and fires in these areas are costly to suppress. Furthermore, modern fire suppression has interrupted the historical fire cycle and has facilitated the invasion of PJ on more productive rangelands. Dense stands of PJ seldom support an understory and forage for wildlife and livestock is dramatically reduced by PJ encroachment. Dense stands of PJ also use tremendous amounts of water and I have personally witnessed previously dry springs begin to flow after fires removed PJ. While controlled burns may be an alternative, it seems to be a waste of a resource. Perhaps we

¹ Resource Concepts, Inc., Wildfire Management, prepared for the Nevada Association of Counties, August 1988.

should be exploring methods to use this renewable resource and products such as trex are a realistic alternative. If a demand could be established, we would promote that harvested areas be reclaimed to the original sagebrush/grass communities. We would also promote harvesting areas in mosaic patterns that conforms to topography and landscape. Reclaiming these areas would provide watershed, wildlife and economic benefits as well as reduce fire hazard and possibly develop a new rural industry (wood chips). HR 2458 should be structured to enable such creative and cooperative approaches to wildland fuel management.

Provisions of HR 2458 which authorize short-term grazing contracts are a beneficial tool for managing fuel but must recognize the rights of existing permittees, especially water rights. Since most of the Great Basin was previously adjudicated for livestock grazing, preference must be given to current or adjacent permittees who control appurtenant water rights. Last year we witnessed a forest permit in our county issued to a rancher who lives nearly 200 miles from the allotment. No consideration was given to the owner of the base property attached to this allotment or the fact that someone else owned the water rights. As a result, the new permittee had to haul stock water and much of his access was limited. By not addressing those rights, grazing permits for fuel management may prove difficult and in some cases may not be economically feasible. We suggest that such contracts be with permittees holding current grazing permits.

The Northern portion of our county supports ever expanding annual grasslands that are a direct result of fire. We expect these grasslands, which now surround this Nation's two largest gold producing mines, to burn every three to five years. With every fire we see an increase in the size of these annual grasslands as well as an increase in the potential for a catastrophic fire. Eureka County has hundreds of subdivided ranchette type properties that are in or adjacent to these annual grasslands. Considering these properties are very remote and infrastructure and support are limited, I have grave public safety concerns for these areas.

The checker board pattern of private/Federal land ownership in Northern Eureka County, current agency policies and increased development have made fire hazard management difficult and it is time to try something new. I believe local government should and must be involved. We were recently contacted by BLM to participate in a green striping program (planting strips of fire resistant grasses). Because of land ownership patterns, BLM policy and conflicting personalities the plan was eventually abandoned. We must do everything possible to contain the spread of these annual grasslands and green striping is a viable alternative. Perhaps the Federal government should expand the use of cooperative agreements with local governments to facilitate such programs. I also believe that environmental compliance requirements must be evaluated and possibly lessened as they pertain to fire. The cost of NEPA compliance is a significant factor and we often hear the excuse that time, money and manpower is limiting to the agencies. We need to make sure NEPA compliance is not limiting prevention and rehabilitation efforts. Also, we need to make sure environmental compliance includes planning for the future. For example, green striping should include future disturbances such as establishing a fire break at the first threat of a fire. Green strips, especially at the critical urban interface, should be treated like farm ground and harvested for seed or forage.

I am a third generation rancher in central Nevada and I have been in the livestock business a lot longer than my three terms as County Commissioner. I have seen a marked transition in central Nevada over the last 40 years. Fire suppression in the 1950's and 60's consisted of a fire box supplied to area ranchers. Those ranchers were the first line defense reinforced by what ever agency people were available and volunteers from the community. I might note that at that time there were far fewer agency people than today. On serious fires, dozers, graders and discs were supplied by the ranchers and miners who were threatened by the fire. Most of those fires were shaped and herded until they burned out. Now a plume of smoke brings retardant bombers, helicopter attack teams and hundreds of professional fire fighters. The cost of fire suppression has skyrocketed and in many cases is not warranted.

I have also witnessed how our fire policies have changed our landscapes and our communities. The harvest of forage through livestock is a significant and stable component of Eureka County's economy. Over the last 15 years, cattle numbers in our County have fallen over 70% from 41,000 head in 1982 to 13,000 head in 1997. With the reduction in livestock, I have seen more fires and suppression cost becoming a burden to local, state and federal governments.

I appreciate your efforts with this Bill and I believe it will help address many of the issues and concerns I have expressed. I wish to also thank you for giving me this opportunity to testify on an issue that is very important to Nevada and my constituents in Eureka County.

RESPECTFULLY SUBMITTED this 23rd day of September, 1997

By:
Pete Goicoechea
Chair, Eureka County Board of Commissioners

COMMENTS ON H.R. 2458 THE COMMUNITY PROTECTION
AND HAZARDOUS FUELS REDUCTION ACT OF 1997

Testimony by Harry V. Wiant, Jr.
President, Society of American Foresters
before the

COMMITTEE ON RESOURCES
Subcommittee on Forests and Forest Health
U.S. House of Representatives
September 23, 1997

Madam Chairman, my name is Harry V. Wiant, Jr., President of the Society of American Foresters (SAF). The more than 18,000 members of the Society constitute the scientific and educational association representing the profession of forestry in the United States. SAF's primary objective is to advance the science, technology, education, and practice of professional forestry for the benefit of society. We are ethically bound to advocate and practice land management consistent with ecologically sound principles. I am especially pleased to be here today and I thank the Subcommittee for its continued support of professional forestry. I thank the Chair for the opportunity.

The public policy activities of SAF are grounded in scientific knowledge and professional judgment. From this perspective we review proposed forestry and related natural resource programs to determine their adequacy to meet stated objectives and public needs.

SAF has been involved in maintaining the health and productivity of American forests since Gifford Pinchot, first chief of the Forest Service, founded the organization in 1900. As a diverse organization encompassing all facets of forest management, the concept of forest health and how to achieve it is one we have struggled with in recent years. Our recent report entitled *Forest Health and Productivity: A perspective of the Forestry Profession* comes to these conclusions:

- Professional foresters believe there are serious forest health and productivity questions in many parts of the country.
- Forest health is an informal and technically inexact term.
- Assessment of forest health and forest productivity requires an understanding of both the condition of the forest and the objectives for the management of that forest; recognizing that objectives are set by landowners be they private, public, tribal or trust, and also by society through policy and regulation.



Using the Scientific Knowledge and Technical Skills of the Forestry Profession to Benefit Society

- Forest health is determined at the local level; therefore, a single national prescription to achieve healthy forests is inappropriate.

We believe your bill addresses the bulk of these issues, and we truly support its intent. The bill identifies a significant problem that exists on some federal forests, provides land managers the opportunity to address this problem, and allows for a mechanism to pay for associated projects.

However, there are some areas of the bill that could be strengthened. SAF believes the definition of the wildland urban interface needs to be better defined. We suggest the focus should be on communities in the urban wildland interface. The definition of hazardous fuels also needs to be more applicable. Any accumulation of any amount of material has the potential to ignite. With limited funding, we need to make sure this initiative is focused on the biggest problems we face.

SAF believes the bill should focus on fuel buildup only. Under Sec 101 paragraph a2., the bill also mentions treating other forest management needs. If the bill mentions "other forest management needs" we believe some interest groups will misinterpret the intent of the bill, which we interpret as an effort to resolve the fuel buildup problem.

The bill requires the local Forest Service or BLM manager to determine areas in need of fuels reduction treatment. We support this because the local manager most often knows the ground best. However, it does not explicitly encourage land managers to seek out the views of community members, other natural resource professionals, and state and local government officials when identifying areas in need of treatment. In particular, the state forestry organizations and local community groups have special expertise in fire management and should be consulted. We believe this addition will strengthen the bill significantly.

As we read the bill, we believe the NEPA exemption applies only to the process of identifying areas in need of fuels treatment. Once an area is identified, we interpret the language in the bill to indicate that the NEPA process will be triggered for implementing specific projects. If this is the case, we strongly support this concept.

We are concerned that the use of a credit system will embroil this bill in controversy, and as the Chairman knows, the one thing our federal forests don't need is more controversy. These forests, particularly in the inland west, need management by natural resource management professionals who, with the help of community leaders and state and local government, can identify areas of need and prescribe management solutions to address them. Although a credit systems is warranted and used extensively in the private sector, in addition, we believe Congress should appropriate significant funds to address the wildfire problems we face. A credit system, although effective, is not always the most efficient means of performing such operations. Many national forests that have forest health problems do not have adequate timber resources to offset the costs of fuels reduction, especially those in southern California and other areas in the arid southwest. The material causing some of these forest health problems has little, if any, commercial value. In some cases, operators have to be paid to take this material away. We believe Congress and the administration should make substantial investments in our national forests. While life and property are at stake, so are many other resource values. Investment is needed to safeguard them as well.

We need to stress that the forest health problems we are facing cannot be solved by the green timber sale program alone. A CRS study estimated the cost of reducing these fuel loads at \$3.5 billion.

The bill should establish a specific credit allocation process. We recommend the Secretary determine the amount of forest management credits for each sale as your bill instructs. However, as it is currently written, there are no limits on the amount of credits he can apply to a specific project. The bill should direct the Secretary to determine those credits based on the estimated cost of the project. In addition, the bill provides no guidance for the amount of credits the Secretary can apply against the green sale program. Theoretically the Forest Service could use all the money achieved from green sales as forest management credits for forest health, and there would be no funds to maintain the 25% payments to counties. The bill should address this issue.

The credit system may work against the small operator. Small operators do not have the fiscal resources to perform forest management work waiting for the return on a future sale. These operators would benefit from direct payments for services. As you know Madam Chairman, timber sales can be tied up for years. Small operators can go out of business waiting to cash in their credits. There may also be small operators who specialize in fuels reduction who have no interest in harvesting timber. These operators may have more skill, more desire to perform the work, and they may be able to do it cheaper; however, if they can't take advantage of the credit system, they may not want to get involved in the project.

We have some serious reservations about the grazing provisions of the bill. While the bill addresses grasses and forbs control by livestock grazing, another serious need in forested areas and some rangelands, from a fire-fuels management perspective, is brush and noxious weed control. Cattle grazing won't deal effectively with this problem. Even if grazing cattle and sheep could address the fuel problems, it would require intensive, very expensive, management. The accumulation of brush and the invasion of noxious weeds is a major fuel build up problem in rangelands and adjacent forests. The bill should recognize and address this situation.

We believe county commissioners should be involved in the process of identifying fuel hazards. However, they, along with communities and other state and local officials, should be consulted by professional land managers rather than being responsible for determining the problem.

The management options presented in the grazing portion of the bill are too prescriptive. The manager on the ground should determine the best course of action to follow. As it stands, this bill would not allow managers to use prescribed burns, biological control, or selective herbicides as management tools.

In conclusion, we support the intent of H.R. 2458. Reducing the fuel loads in the federal forests and ranges should be one of our highest priorities, especially where lives and property are threatened. The SAF strongly encourages Congress to appropriate significant funds to address these forest management issues. We believe the suggestions we've offered today will make for a stronger bill that will address some of these very serious issues we face.

**Forest Health and
Productivity**

A Perspective of the Forestry Profession



Society of American Foresters
5400 Grosvenor Lane • Bethesda, MD 20814-2198

Forest Health and Productivity

A Perspective of the Forestry

A Report of the
Society of American Foresters

Prepared by the
National Committee on
Forest Health & Productivity

1997 Society of American Foresters
SAF 97-05
ISBN 0-939970-71-6

Forest Health and Productivity

A Perspective of the Forestry Profession

Table of Contents

Executive Summary.....	ii
Preface.....	iii
Introduction.....	1
Findings.....	3
Conclusions.....	8
Recommendations.....	11
Appendices.....	14
I. Charge to the Committee, Summary of Charter	14
Committee Membership.....	15
II. Process Used in Developing the Committee Report.....	16
III. Society of American Foresters Mission, Code of Ethics, and <i>Forest Policies</i>	17
IV. Federal Laws Established 1960–1976.....	18
V. Suggested Approach for Discussing and Resolving Forest Health Issues.....	18
Literature Cited.....	19

Forest Health and Productivity

A Perspective of the Forestry Profession

Executive Summary

Background

The health and productivity of forests in the United States is a subject of continuing interest. Many people, including professional foresters, believe there are serious forest health problems in many parts of the country.

Several years of study and discussion within the Society of American Foresters culminated in this report by the SAF national committee on forest health and productivity. The report was subsequently endorsed by the SAF Council. Its findings and conclusions are summarized below. Taken together as a set of principles and guidelines, they should foster understanding of the issue's complexity, and serve as a focal point for discussions which may lead to better analysis and resolution of forest health and productivity issues.

Findings and Conclusions

- Forest health and forest productivity mean different things to different people.
- Assessment of forest health and forest productivity requires an understanding of both the condition of the forest and the forest management objectives for that forest. Objectives are set by landowners (private, public, tribal, trust) and by society through policy and regulation.
- Forests, forestry, and forest management objectives change over time.
- Issues of forest health share common themes, but regional and local differences (cultural, political, economic, and ecological) make each forest health issue unique.
- Forest health is an informal and technically inexact term.
- Forest health issues can be generally organized into four broad categories: forestland base, sustainable forestry, biodiversity, and human and natural influences.
- A single national prescription for forest health restoration is not appropriate because economic climate, cultural traditions, political dynamics, and ecological systems vary widely throughout the country.
- Foresters and their colleagues in other natural resource professions need to work closely together to clarify forest health objectives before some forest health issues can be resolved.
- To help promote understanding and assist in resolving these issues at local and regional levels, the report recommends approaches professional foresters may use in working with others in their communities to:
 - Develop and articulate expectations of what our forests can provide;
 - Identify forest health and forest productivity issues;
 - Promote professional and public understanding of the issues; and
 - Work continuously to enhance the health and productivity of the nation's forests.

Council
Society of American Foresters
May 9, 1997

PREFACE

The Society of American Foresters (SAF) National Committee on Forest Health and Productivity was established in the wake of study, dialogue, and debate about the findings and recommendations of the 1993(a) SAF Task Force on Sustaining Long-term Forest Health and Productivity. SAF leadership recognized that it would be impossible for the membership to reach consensus on the task force's report and decided that another approach was needed (Siegel 1994). The leadership formed the National Committee and directed it to prepare a report that incorporated grassroots involvement of the SAF membership. Recounting highlights of the first and last meeting of this committee demonstrates how well this approach has worked.

At the first committee working session in November 1994, emotions about the findings and recommendations of the 1993 report were still running high. Committee members held widely varying opinions about the task force's report. Accordingly, they expressed wide-ranging ideas about how SAF should lead in supporting the principle of sustaining long-term forest health and productivity.

Nevertheless, before the first meeting was over, the committee made three important decisions that affected the work to come. First was agreement that the 1993 task force report provided credible and up-to-date scientific information about the sustainability of long-term forest health and productivity. The committee decided that it would not revisit or rework the task force's findings. Agreement on this point was reached only after the committee acknowledged a conviction shared by some committee members that ecosystem management, as recommended by the task force, is an overly prescriptive tool not readily adaptable for solving complex regional and local issues, the wide variety of forest conditions and landowner objectives in this country.

The second decision was that the committee would provide a social context for understanding forest health and productivity. The task force report included a review of the social history of forest health and productivity issues, but its portrayal of current societal views did not anticipate the brewing debate about the obligation of private landowners to achieve objectives that cross ownership boundaries. The committee would seek to diffuse the emotional tenor of discussion about forest health and forest productivity by providing a social context for understanding why the Society's membership held such divergent views about the task force report. Guided by a Charter provided by Council, the committee's goal was to foster communication within SAF membership and to reposition the organization to assume a leadership role in forest health and forest productivity issues.

Third, the committee agreed that its report would be brief and would include concise principles to guide understanding. The committee hoped to produce an accessible and straightforward report, despite the complexity of forest health and forest productivity.

Eighteen months of work and several meetings later, the committee started its final meeting with a discussion about the utility of the concept of health as applied to forests. For months, the

Forest Health and Productivity A Perspective of the Forestry Profession

committee had struggled to reconcile the political nature of current forest health debates with the belief that a professional view of forest health would clarify the issue. By the time of the last meeting, the committee was in agreement that it is nearly impossible to articulate a single or "correct" view of forest health in the absence of a clear vision of what is expected of America's forests.

The conclusions in this report are supported by all of the committee members. This is both a strength and a weakness, because the scope of the conclusions is limited to points of consensus. Some readers may be disappointed that this report does not go far enough, while others may feel the report stretches the limits of what they can accept.

The committee submits this report to the SAF membership, and to society-at-large, as a small step toward a societal goal of sustaining the long-term health and productivity of forests. It should be viewed as part of a series of ongoing incremental advances in professional forestry. The purpose of our report is to move forest health debates beyond rhetoric and polarization. Now it is up to SAF members, working with other professionals and in collaboration with interested citizens, to take the next steps forward.

National Committee on Forest Health and Productivity

INTRODUCTION

The health of America's forests occupies a pivotal position in natural resource debates of the 1990s. Articles in major newspapers ask, "Are our forests healthy?" Federal legislation proposes to cure forest ailments. Silviculturists prescribe treatments for forests with insect outbreaks. Endangered species are viewed as a symptom of poor forest health. The language used to describe the condition and management of forests is full of health-related terms (Haskell et al. 1992); prescription, treatment, and symptom are just a few. People draw parallels between human health and the condition of our environment, and they assume that forest health is clearly defined through science.

Forty years ago foresters had a clear idea of what constituted a healthy forest. Like physicians, foresters applied "first-aid" to prevent and control insects and diseases from injuring trees (Forbes and Meyer 1955). A forest with a concentration of insects or a level of disease that impaired tree growth or wood quality was diagnosed as unhealthy (Baxter 1952). Like physicians, foresters wrote prescriptions for treatment of forest stands.

Today the answer is more complicated. When people describe healthy forests, many are thinking about more than forests where insects and disease are controlled. But, they do not agree about what healthy forests should provide or about the obligation of private landowners to meet societal objectives (Gordon 1993). As a result, we are embroiled in controversy over how to manage America's forest resources—a controversy portrayed as a debate about forest health. Within the forestry profession, people are searching for a new "professional" definition of forest health that will make a positive contribution to the political debate.

In 1991, the Society of American Foresters responded to the national debate about how public and private forests should be managed by appointing a task force to evaluate ways to ensure long-term forest health and productivity. The task force examined the scientific, social, and economic forces that have rendered the traditional definition of forest health insufficient (SAF 1993a). Citing compelling evidence for a broader view of healthy forests, they offered ecosystem management as a strategy for the future. Members of the Society of American Foresters at large, however, could not reach consensus on this approach to sustaining long-term forest health and productivity.

The Society of American Foresters continued to pursue a responsible answer to the question about how to sustain the nation's forests. A National Committee on Forest Health and Productivity was appointed in 1994 and asked to craft a "professional view" of how to sustain the long-term health and productivity of the nation's forests as described in Appendix 1 (Siegel 1994). Members were selected to represent diversity within the professional organization, with a balance of geographic location, employment, experience, gender, and age. Representation of membership constituencies, not scientific expertise, was the chief criterion for committee membership.

A primary responsibility of the committee was to coordinate a grassroots effort to involve members of the Society of American Foresters in a dialogue about forest health. The committee used the information developed by the task force as background, focusing on understanding different perceptions of forest health held by members of the organization. Through interactions with members around the country, described in Appendix 2, the committee developed a common sense approach for addressing forest health and forest productivity.

FINDINGS

Forest health and forest productivity mean different things to different people (Rapport 1992). Early in the committee's discussions about forest health, a series of simple examples led to this seemingly obvious but important observation. Consider a forestland owner who defines his or her objectives as harvesting timber and regenerating trees over several generations. As long as timber is harvested and trees are regenerating, the landowner views the forest as healthy (Sampson 1994). Anything that impedes the landowner's objectives, such as an epidemic of insects attacking maturing timber, creates a situation that the landowner perceives as unhealthy.

Next, consider what happens if the insect outbreak occurs on a public forest that is managed for multiple objectives including timber and biodiversity. Forest products users view the dead trees as a loss of raw material and a fire hazard. They advocate salvage of the wood. People whose primary interest is biodiversity conservation view the insect outbreak as a natural process. They see the dead trees as a stage in forest succession and as a contributor to overall landscape diversity and biological productivity.

In this example there are two perceptions of the same forest condition: one viewpoint perceives the forest as *unhealthy* because it has insects, the other perceives it as *healthy* because it has insects. Both views are legitimate given the stated objective. People who hold different values will logically seek to sustain forests that meet different objectives (Lele and Norgaard 1996). Forest productivity, expressed as an amount of change over time, is perceived differently because of different choices about which components of the forest to measure.

Assessment of forest health and forest productivity requires an understanding of both the condition of the forest and forest management objectives. Assessing forest health by objectives alone is problematic when objectives differ, because it leads to multiple opinions about what is healthy (Kolb et al. 1994). Scientists can measure forest condition objectively, but assessments of forest health have an element of subjectivity because the forest condition is measured against an objective, or vision, of what the forest should be, which in turn is influenced by individual values (O'Laughlin et al. 1993). Forest health is therefore both a value judgment based on objectives and a measurable condition of the forest itself. Taken together they provide a basis for determining management objectives that are realistic given the ecological conditions of each forest site (Monnig and Byler 1992).

Forest management objectives are set by landowners (private, public, tribal, trust) and by society through policy or regulation. Under the US Constitution, owners of private forestland have the right to set objectives and forest management practices for their land, subject to duly established regulations and policies (MacDonnell and Bates 1993). Societal objectives for forest management on public land are expressed through policy and regulation.

Early in the history of American forestry, landowner objectives and societal objectives tended to be one and the same (Romm 1994). For example, before 1930 it was common for wildfire to burn

20 to 50 million acres of forest each year (MacCleery et al. 1995). Landowners and society at large agreed that wildfire control was needed. Fire prevention reduced wildfire to an average of 3 to 5 million acres annually. Today, landowner and societal objectives have changed. It is clear that wildfire suppression no longer achieves everyone's objectives (Clark and Sampson 1995). Fire prevention still protects property and landowners' investment in standing timber, but it has unintended consequences such as increased fuel loading, greater risk of catastrophic fire, and alterations in fire-dependent ecosystems. A single fire suppression prescription is not adequate to meet the wide variety of objectives that exist today.

Forests, forestry, and forest management objectives change over time. This is evident in the history of American forests, changes in the forestry profession, and the evolution of forest management objectives over the last century.

Forest cover in the United States declined significantly between 1860 and 1910, leading to the conservation movement of the latter 19th century and improved forest conditions. The decline corresponded to a tripling of American population, extensive use of wood for energy and building needs, and clearing of forests for farming (MacCleery 1993). Eighty million acres were cut, burned, and left unstocked. Populations of some wildlife declined precipitously as a result of unregulated hunting and massive habitat conversion from forest to farm.

Forest conditions have since changed significantly. In the 1920s the rate of forestland conversion to farms stabilized. With more efficient agricultural production, marginal farms were abandoned and reverted to forest (SAF 1991). Beginning in the 1950s, the quantity and annual growth of forests started increasing for the nation as a whole. This increase is attributed to both natural regeneration and forest management efforts. Professional wildlife management, including harvest regulation, restoration of locally or regionally extirpated species, and habitat protection, improved conditions for some wildlife.

The future promises further changes. Increasing world population and rising living standards around the globe will create more demand for timber and other forest uses and cause more concern about environmental protection (Haynes et al. 1995; FAO 1995). In the next twenty years, world population is expected to grow by one third. The impacts of people on forests and forested environments will undoubtedly grow as human population continues to increase and per capita land area shrinks.

Forestry contributed significantly to reversing the declining condition of American forests late in the 19th century. In 1900, European-trained forester Gifford Pinchot and six other pioneering foresters established the Society of American Foresters to advance the science, technology, education, and practice of professional forestry in the United States. Healthy forests were defined as stands where damage by insects and diseases to trees and their products was checked, controlled, or regulated (Baxter 1952). These early foresters, who had a clear sense of what the nation wanted from its forests, focused on efficient management guided by scientific knowledge (Gottlieb 1993; Nelson 1995).

Today, the Society of American Foresters' mission statement, code of ethics, and *Forest Policies* provide a foundation for addressing contemporary forest health issues. Relevant excerpts from these documents are included in Appendix 3. The mission of SAF includes using "the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society." In the past, when landowner objectives and societal objectives coincided and forest resources seemed vast, fulfilling this mission required technical skills. For example, differences in objectives for public lands were resolved with a technical solution, allocating land to different uses (Gottlieb 1993; Nelson 1995). Today, forestland is viewed as a finite resource, and decisions to allocate land for different objectives are controversial (MacDonnell and Bates 1993). Disagreement about what public forests should provide and whether private lands are expected to meet societal objectives makes this mission harder to fulfill.

The Society of American Foresters recently adopted Canon 1 of the code of ethics: "a member will advocate and practice land management consistent with ecologically sound principles" (SAF 1995a). This canon addresses the technical side of foresters' work to reflect growing knowledge in ecological sciences (Balster 1996). Participating in national policy dialogues, the Society of American Foresters has at least a dozen position statements on forest health issues. Titles range from "The Role of Salvage Harvesting in the Restoration and Maintenance of Healthy Forests" to "Developing Strategies to Control the Effects of Air Pollution on Forest Ecosystems." In Canon 1 and the position statements, the Society of American Foresters is articulating *how* forestry will contribute to the continued health of forests. But the nation's forest health debates continue. Without clear and consistent objectives, or a vision of what America's forests should be, the best technical solutions do not always address the problem of competing, and sometimes conflicting, objectives.

Societal objectives for forest management shifted significantly in the last century. From European settlement to the end of the 19th century, forests were viewed as a limitless source of timber needed to build a growing nation (MacCleery 1993). The conservation movement of the early 1900s, in a shift in societal objectives, advocated wise use of forests without waste (SAF 1993a). After World War II, a construction boom led to soaring timber prices, and societal objectives shifted toward production efficiency. By 1960, management of forests for multiple uses became the dominant societal objective for public lands, with emphasis on outdoor recreation, range, timber, water, wildlife, and fish in the national forests (Dana and Fairfax 1980).

From 1960 through the 1970s, nearly a dozen new federal laws expanded the management objectives for public forests (Dana and Fairfax 1980, SAF 1993a). Several other laws were passed during the same period, designed to ensure that clean water, clean air, and endangered species habitat would be provided on private forestlands. These laws, listed in Appendix 4, did not articulate a single, coherent vision for America's forests. Instead, they illustrated a growing plurality of objectives (Gordon 1993; Clark and Sampson 1995).

Then, in the early 1990s, both the USDA Forest Service and the Bureau of Land Management adopted ecosystem management as a policy for managing federal lands (Czech 1995). Ecosystem management is sometimes described as a new spin on forest practices that have been in effect for a long time (SAF 1993b). Ecosystem management concepts do reflect a change in philosophy and policy for federal lands, but they have yet to spawn the paradigm shift, complete with changes in values, theories, methodologies, and tools (SAF 1993a; Cortner 1995).

Assessment of forest health on federal lands has become increasingly controversial. The new federal laws clearly established the right of every citizen to be involved in determining objectives for public land (Dana and Fairfax 1980). Reaching agreement on desired forest conditions and objectives is extremely difficult, and is often portrayed as debate about forest health.

Objectives of private landowners have changed as a reflection of broader changes in society. For example, private landowners increasingly cite nonfinancial factors, such as wildlife and scenery, among the reasons they own forestland (Lankford 1994). When financial investment is a primary landowner objective, instability in the economic, regulatory, and investment climate has necessitated changes in management. For example, the 1986 Tax Reform Act reduced advantages for treating timber as a capital asset (NFLC 1994; Craig 1994). This altered the economic incentive for long-term management and resulted in changes in management, even though landowners' objectives stayed the same.

Disagreement about the extent to which private lands are obligated to meet societal objectives is adding to the debate about which objectives should take precedence (SAF 1994a). Private owners have the right to set objectives on their own land, subject to duly established regulation and policy; society, through regulation and policy, has the right to set objectives for public lands. These rights remain distinct until objectives that cannot be achieved on a single ownership are considered.

Clean water and wildlife habitat are examples of societal objectives that cross ownership boundaries (MacDonnell and Bates 1993; SAF 1991). The Clean Water Act and the Endangered Species Act define limits to private rights and set objectives for public lands. But since water and endangered species cross ownership boundaries freely, the ability of one landowner to meet these societal objectives is influenced by the activities of adjacent landowners. The obligation of private lands to meet societal objectives that cross property lines is hotly debated (SAF 1991, Grumbine 1992). The issue is often portrayed as a forest health concern. Congress and the US courts are deeply involved, testing the boundaries of private property rights and societal objectives expressed through laws and policy.

The Seventh American Forest Congress, convened in February 1996 and sponsored by a number of organizations including the Society of American Foresters, aspired to move beyond controversy by developing a consensus vision of what is expected from our nation's forests (Banzhaf 1996). Convening 1,500 people from diverse constituencies for four days of discussion,

the Seventh American Forest Congress provided a forum to talk about differences in objectives. The Congress started a process to build consensus about what is expected of our nation's forests.

Issues of forest health share common themes, but regional and local differences make each forest health issue unique. Descriptions of forest health issues by Society of American Foresters members in different regions were provided to the committee, as outlined in Appendix 2. The descriptions demonstrated that perceptions about forest conditions and management objectives are shaped by cultural, political, economic, and ecological differences. Forest health issues currently being debated can be loosely organized in four broad categories.

Forestland base. Every region faces at least one forest health issue related to the forestland base, tied to population growth and increasing demand for forest products. These include forest fragmentation, changing patterns of ownership, forests in the rural/urban interface, and conversion of forests to other uses.

Sustainable forestry. Managing forests to sustain timber production and other forest resource objectives is at the heart of most forest health issues. Efforts to develop scientific definitions of sustainability have faced the difficulty of objectively determining what is to be sustained, at what scale, and over what time period. Current issues include harvesting methods, forest regeneration, balancing commodity and noncommodity uses, and responding to economic uncertainty and changes in laws and regulations.

Biodiversity. Maintaining biological diversity is a forest health issue with varying emphasis in every region. Topics include defining and measuring biological diversity, providing habitat for imperiled species, and maintaining old-growth and seral stages.

Human and natural influences. The effects of natural disturbances on forests have long been the subject of prescriptions to restore, maintain, or enhance forest health. Increasingly, human influences are also considered. Issues include periodic natural disturbances, introduced species, the consequences of forest management practices, and the impact of human activities beyond the direct control of the forestry profession.

Within each of these themes is a number of forest health issues that operate at different spatial and temporal scales. For example, in the above category of human and natural influences, tornadoes, bark beetle outbreaks, and acid rain each occur at different scales (SAF 1991). In addition, the scale at which a landowner or society sets forest management objectives is not likely to correspond to the scale at which the issue is perceived (Lee 1993). Forest management objectives, whether for public or private lands, tend to be determined at local, regional, or national scales. These range from a site to a management unit to a group of management units, or to an entire ownership.

Much of the complexity of forest health debates results from the many interacting scales that must be considered. Dictionary definitions of health emphasize the condition of a single organism, such

as a tree (Kolb et al. 1994). The application of health to complex forest systems is based on an assumption that ecosystems and organisms share similar qualities that can be assessed the same way. But the concept of health becomes more indefinite and inexact as it is applied to increasingly complex systems (Kolb et al. 1994). When health is applied to a forest stand or ecosystem, many more dimensions must be considered.

Temporal scales introduce further complexity to forest health issues. An insect epidemic that lasts five years may result in the perception, during the outbreak, that the forest is unhealthy. But, examined over a 100-year period, the five-year epidemic may be inconsequential to the health of the forest. Such environmental fluctuations are a normal part of forest dynamics (Botkin 1990). The idea that forest health is a static condition is challenged by the knowledge that change over time is a natural dynamic of forests (Botkin in Sampson et al. 1994).

The appropriate response to a forest health issue depends on a different combination of ecological, economic, cultural, and political factors, operating at different spatial and temporal scales. Even with similar forest health themes arising across regions of the country, the issues manifest themselves differently in each place they occur (MacDonnell and Bates 1993). With so much variation in ecological systems, as well as regional differences in culture, politics, and economic climate, no two issues are likely to play out the same way (Lee 1993).

Society of American Foresters members have different ideas about how to sustain healthy forests. Members' views about landowners' rights to set forest management objectives influence their perspective about the role of the Society of American Foresters in forest health debates (SAF 1993b, 1993c). Some members believe the organization should play a strong role in policy and legislative debates to resolve forest health issues (SAF 1995b). Some would like this role to be advocacy for certain forest management objectives. Others would like the role to be contributions of scientific expertise. Some members are critical of the organization for not anticipating national issues or developing timely responses, while other members feel that local and regional units of the organization, not the national unit, should be addressing forest health issues (SAF 1993c). But, almost without exception, foresters want a "professional" view of forest health to be articulated.

CONCLUSIONS

After two years of intense discussion, consideration of the views of Society of American Foresters members, and careful reflection about what comprises a healthy forest, the committee drew three conclusions: forest health is an informal and technically inexact term; a single national prescription for forest health is not appropriate; and, foresters and their colleagues in other natural resource professions may need to work closely to clarify objectives before some forest health issues can be resolved.

Forest health is an informal and technically inexact term. The concept of forest health is based on an analogy drawing parallels between human and environmental health (Ehrenfeld 1992).

Physicians use health to describe a patient's general condition, including the person's attitude and ability to live with symptoms. If we are to continue the analogy, foresters must acknowledge that forest health does not carry clear scientific meaning.

In coming to this conclusion, the committee reviewed a number of published definitions of forest health (O'Laughlin et al. 1993; SAF 1991, 1994b; Spurr and Barnes 1980; USDA Forest Service 1995). The definitions use imprecise terms such as "balance" and "sustainable" to define healthy forests (Kolb et al. 1994). Neil Sampson, senior fellow at American Forests, Forest Policy Center, provided a definition of forest health that recognizes the degree to which forest health can only be assessed in terms of values:

Forest health is a way for people to express and understand ideas about the condition of a particular forest place composed of definable elements; what changes are likely to affect it; how they feel about those possibilities; and what, if anything, they want to do to affect that condition or those changes. While it can be greatly assisted by good science and improved technical understanding, facts, and data, people's ultimate appraisal of the health of the forest is based on the values they hold (Sampson 1996).

People's objectives for a forest are derived from their personal values (Cronon 1995; Regier 1993; Sampson 1996). If people with different values can reach agreement about the desired condition of a forest, the forest management objectives will be apparent (O'Laughlin et al. 1993).

Definitions of forest productivity commonly express productivity as an amount of change within a given period or unit of time (rate), reflecting the capacity of a forest to produce certain biological and physical outputs (SAF 1991). Measurement of forest productivity can be objectively determined by scientists. However, choices about what to measure, at what scale, and over what time period are influenced by individual values (Lele and Norgaard 1996).

Since forests "produce" more than measurable outputs, and people value these forest outputs, the term "productivity" is being used in a broader way (SAF 1991). Some forest outputs, such as soil microorganisms and spiritual renewal, are difficult to quantify; contributing factors include the state of technology, the scale and cost of measurements, and the dynamic nature of the outputs themselves.

A single national prescription for healthy forests is not appropriate. Forest health issues take on a different character wherever they occur. Economic climate, cultural traditions, political dynamics, and ecological systems vary widely. Since many issues of forest health are based on lack of agreement about objectives, agreement is only possible when there is a common understanding of what is expected. In a country as large and diverse as the United States, it is unreasonable to expect that one set of expectations and objectives will work everywhere (Nelson 1995). A single prescription for managing healthy forests will not provide a cure for all situations.

Expectations of what our forests should provide are better determined at regional and local levels. Objectives need to be specific to the forest condition and land ownership and based on the unique cultural, political, economic, and ecological attributes of each place.

Foresters and their colleagues in other natural resource professions may need to work closely to clarify objectives before some forest health issues can be resolved. Many debates about forest health are disagreements about the objectives or desired condition of the forest in question (Kolb et al. 1994). To resolve a forest health issue, the people involved in making it an issue need to understand how their objectives differ. The process of resolving objectives will not be the same on public and private lands, where the rights of citizens to be involved are different.

Foresters play an important role by helping people think about forest health issues and involving them in a meaningful dialogue about objectives (Lee 1993; SAF 1991; Slover 1996). Productive discussion about forest health issues, as described in Appendix 5, begins by developing a clear understanding of the specific forest in question. This requires an awareness of the ownership pattern, scale, and relevant timeframe. The next step is to describe the current condition of the forest in question. Without judging whether the forest condition is good or bad, a description can be developed that provides a "snapshot" of the forest in question.

The most difficult part of resolving forest health issues where people have different objectives is to identify what the forest *can* provide, and to understand each other's expectations of what the forest *should* provide. Understanding how perspectives vary on public and private lands will help clarify management objectives. On private lands the objectives are set by landowners, subject to laws and regulations. On public lands the objectives are determined by society. Making value judgments about forest condition is an inevitable part of clarifying objectives (Balster 1996; Regier 1993). Foresters play a valuable role by assessing the condition of the forest, explaining what can be expected from it, and identifying where differences in forest management objectives arise from differences in values.

Once people have a common understanding of the condition of the forest and what can be expected from it, management prescriptions may be developed to achieve objectives (Angermierer and Karr 1994). Progress toward the objectives needs to be assessed at periodic intervals; the results of this assessment may indicate a need to change management practices or objectives. Through this logical progression of steps, foresters provide information about forest conditions, help clarify objectives, and contribute to the resolution of forest health issues.

RECOMMENDATIONS

The findings and conclusions of the committee do not lead directly to a set of actions that will neatly resolve forest health and forest productivity issues. Every debate about forest health and forest productivity requires consideration of biological and physical forest conditions at multiple spatial and temporal scales. Further complexities arise from societal values and landowners' objectives, which change over time.

Concerns about forest health and forest productivity have defined the very essence of the American forestry profession over the past 100 years. SAF's mission, code of ethics, policies, and positions provide a broad national framework for addressing forest health and forest productivity. If SAF and the forestry profession are to play a leadership role, then state, regional, and local SAF units will need to take action to fill in the details of this framework.

The challenge for SAF and the profession is to measure and assess forest health and forest productivity locally, in the context of specific forest conditions, land ownership patterns and objectives, laws, regulations, and policies. SAF's national framework provides broad goals and professional standards, and its regionalized membership structure provides local professional expertise to guide such assessments.

The committee recommends that state, regional, and local SAF units:

- Develop and articulate expectations of what our forests can provide;
- Identify forest health and forest productivity issues;
- Promote professional and public understanding of the issues; and
- Work continuously to enhance the health and productivity of the nation's forests.

Most professional foresters are involved regularly in these types of activities as part of their employment. However, to help promote understanding of the issues; and consider choices for resolving forest health and forest productivity concerns, SAF must link the knowledge and experience of its membership with that of other sources.

SAF members and local SAF units should select levels of activities that are appropriate for the forest resources and social dynamics of issues in their locale. The following approaches are recommended to guide SAF participation and response to forest health and forest productivity issues at all levels, from individual members to the national SAF:

Participate. SAF members should participate and involve others in meaningful dialogue about forest health issues at the local and regional level. Clarification of issues may be facilitated by following a logical progression of steps to assess forest conditions, determine what forests can provide, and identify differences in management objectives (see Appendix 5).

Respond. Local SAF units bear the primary responsibility for analyzing local and regional issues and involving forestry professionals. Responses to issues should draw on the best available scientific information and professional experience to acknowledge possible causes, assess the adequacy of data, identify gaps in knowledge, and recommend management response options.

Link science and policy. Within each SAF unit, better integration of scientific information about forest conditions and policy to resolve forest health issues is needed. SAF Council should take the lead, considering linkages among SAF units, between SAF and other professional organizations, and among SAF, landowners, and participants in public policy processes.

Measure and assess. SAF working groups and units should participate in developing and using state-of-the-art methodologies to measure and assess forest conditions and trends.

Think broadly. SAF members assessing forest conditions and determining what forests can provide should

- consider both landowner and societal objectives across the landscape and over time;
- base forest management activities on site-specific consideration of forest conditions and probable outcomes;
- consider possibilities for cross-ownership cooperation to maintain and improve productivity at larger scales; and
- develop close working relationships with other natural resource professionals and stakeholders.

Educate. SAF members, individually and through SAF activities, should actively participate in continuing education forums and promote natural resource curricula that ensure students have a strong foundation in physical, biological, and social sciences.

Enhance productivity. SAF members should promote professional forest management to maintain and enhance the productive capacity of forests and to produce the goods, services, and quality of life that, given the conditions of each forest, can be provided to meet people's needs and desires.

Communicate. SAF members, individually and through SAF activities, should communicate the forest health and forest productivity consequences of laws, regulations, policies, and management activities. Many local and regional actions to resolve forest health issues will have further reaching impacts and implications. Information about local and regional issues needs to be coordinated with other units of SAF and shared widely beyond the organization.

The next steps are up to state, regional, and local units of SAF. Actions by individuals and SAF units can move the national debate beyond the current rhetoric by acknowledging that forest health can be both a value judgment based on objectives and a measurable condition of the forest itself. Leadership at the state, regional, and local level can play a significant role in helping society and landowners identify common expectations of our nation's forests, and in determining

seemingly small steps will contribute to incremental advances in professional forestry by considering the importance of local conditions, variations in scale, and environmental change over time. Local attention will, in turn, contribute to long-term regional, national, and global sustainability.

ABOUT THE SOCIETY

The Society of American Foresters, with about 18,000 members, is the national organization that represents all segments of the forestry profession in the United States. It includes public and private practitioners, researchers, administrators, educators, and forestry students. The Society was established in 1900 by Gifford Pinchot and six other pioneer foresters.

The mission of the Society of American Foresters is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish professional excellence; and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society.

The Society is the accreditation authority for professional forestry education in the United States. The Society publishes the *Journal of Forestry*, the quarterlies, *Forest Science*, *Southern Journal of Applied Forestry*, *Northern Journal of Applied Forestry*, and *Western Journal of Applied Forestry*; *The Forestry Source* and the annual *Proceedings of the Society of American Foresters national convention*.

APPENDICES

Appendix I. Charge to the Committee, Summary of Charter

The Society of American Foresters National Committee on Forest Health and Productivity was chartered to follow up on prior work by the task force on Sustaining Long-Term Forest Health and Productivity. The task force submitted its report, *Sustaining Long-term Forest Health and Productivity*, to the Society of American Foresters Council in December 1992. Council accepted the report but did not adopt the draft position statement. In the following months, differences of opinion and concern among members about the report and its findings made it impossible for the organization to reach a consensus position.

Following considerable study and deliberation (Siegel 1994), the Council on July 7, 1994, chartered a National Committee on Forest Health and Productivity to accomplish the following objectives:

1. Coordinate Society of American Foresters member involvement in considering the issue of sustaining long-term forest health and productivity;
2. Help the Society of American Foresters provide the public with the professional view on how to sustain the long-term health and productivity of the nation's forest resources; and
3. Develop a position and relevant interim products as appropriate for review and approval of the Society of American Foresters Council that reflect regional resource and ownership differences, represent the best science currently available, and clearly establish the profession of forestry as vitally concerned and involved with an issue of national and global importance.

Membership of the committee was selected to represent the diversity of Society of American Foresters' membership. Geographic location, employment, experience, gender, and age were primary considerations. Scientific expertise in forest health issues was not a consideration, although some committee members are scientists. The objective in appointing the committee was to ensure the dialogue would reflect regional ownership, resource, and management differences.

Recognizing the role envisioned for them, the committee interpreted the Council's charge as a challenge to (1) clarify the professional view of forest health and forest productivity issues; (2) clarify the role of the forestry profession and Society of American Foresters in responding to forest health and productivity issues; and (3) provide a basis for presenting professional views on forest health and productivity issues to the general public.

National Committee on Forest Health & Productivity

Kenneth E. Addy, Jr.
Forest Management Coordinator
Louisiana-Pacific Corporation
New Waverly, Texas

John H. Beuter, Co-chair
Principal, Duck Creek Associates
Natural Resources Consultants
Corvallis, Oregon

Laura Falk McCarthy, Co-chair
Forest Planner
White Mountain National Forest
USDA Forest Service
Laconia, New Hampshire

Nancy Graybeal
Deputy Regional Forester
State & Private Forestry
USDA Forest Service
Portland, Oregon

Stephen B. Jones
Associate Professor
Forest Resources
Pennsylvania State University
University Park, Pennsylvania

John Kotar
Senior Scientist
Department of Forestry
University of Wisconsin
Madison, Wisconsin

Laurens K. Larson
President & Treasurer
Larson and McGowin, Inc.
Mobile, Alabama

Gary M. Nakamura
Area Forestry Specialist - Redding
Department of Environment,
Science, Policy, & Management
University of California
Berkeley, California

Thomas W. Osterman
State Forester
Colorado State Forest Service
Ft. Collins, Colorado

Patricia A. Straka
Local Market Manager
Monsanto Chemical Corp.
Ridgeville, South Carolina

Thomas A. Terry
Manager of Western Forest Resources
Weyerhaeuser Company
Centralia, Washington

Staff Liaison: **Lawrence W. Hill**
Director, Forest Policy

Appendix II. Process Used in Developing the Committee Report

The committee held its organizing meeting in September 1994 at the Society of American Foresters National Convention in Anchorage, Alaska. In November 1994, it met to review the task force report, the transcript from the Critical Issues Forum on the task force report held at the 1993 National Convention in Indianapolis, Indiana, and other written comments. The committee decided not to critique the task force report, but to use it as information to help meet the charge set out in the charter.

The committee drafted a set of premises and 22 questions for addressing forest health and forest productivity issues. This draft questionnaire was sent to state and multistate units in January 1995 for review and comment. In March 1995, the committee met to consider the unit's responses and to revise the premises and questions.

A final questionnaire consisting of seven premises and only two questions was sent back to the units in April. The questions were (1) describe long-term forest health and forest productivity issues in your region, and (2) what is the Society of American Foresters' role in addressing these issues at the national, state, local, and individual member level? The instructions were to respond by August 31 with comments about the premises and answers to the questions. About two-thirds of the units responded, with varying degree of detail in their answers.

The responses from the Society of American Foresters units were reviewed and considered by the committee in September 1995. The responses reflected many interpretations of forest health and forest productivity issues. They were of significant value to the committee in refining the context for developing a professional viewpoint. They helped identify common issues and regional differences and aided the committee in developing recommendations regarding forest health issues.

The committee continued to deliberate its findings and conclusions at the 1995 National Convention in Portland, Maine. They presented a progress report to the House of Society Delegates, and they held an informal forum to update Society of American Foresters members and solicit comments and opinions about their preliminary findings, conclusions, and recommendations. A first draft of the committee's report was prepared and subsequently circulated for review and comment to the chairs of the Executive Committee, Committee on Forest Policy, Forest Science and Technology Board, and Council Subcommittee on Forest Policy.

A draft report with recommendations was sent to Society of American Foresters units for review and comment in late December 1995. The committee did not include a summary of unit responses to the questionnaire in the draft report because of the wide variation in content of the responses. Units had been asked to describe long-term forest health and forest productivity issues in their region to inform the committee's discussions, and the responses did not lend themselves to

synthesis in a description of regional issues. The committee described broad categories of forest health issues shared among regions and made copies of the responses available to members.

The committee asked for feedback on four aspects of the draft report: (1) were the terms of the charter met; (2) does the report contain any "red flags"; (3) what other specific suggestions should the committee consider; and (4) should the final report be the basis for a national position statement on forest health and productivity. Comments were received from 34 units or individuals. They ranged widely in content, with recommendations to discard the report, and to publish it without changes. An equally wide range of views was expressed about whether to use the report to develop a national position statement. However, the majority of comments supported minor revisions to the report and the development of a national position statement for member referendum.

In April 1996 the committee met to consider comments on the draft report and prepare its final report and proposed national position statement. The Society of American Foresters Forest Policy Committee and Forest Science and Technology Board reviewed the final report and position statement prior to its distribution to the Council for consideration in June 1996.

Council provided feedback to the committee on the final report and position statement at the June 1996 meeting. The Forest Policy Committee and the Forest Science and Technology Board also provided comments. Council asked the committee to modify the final report based on the comments and discussion, and they decided to send the final report to SAF leadership for consideration before to issuing a national position statement.

Appendix III. Society of American Foresters Mission, Code of Ethics, and *Forest Policies*

The following excerpts from the Society of American Foresters mission statement, code of ethics, and *Forest Policies* affirm the broadly based commitment of the forestry profession to protecting and managing for healthy, productive forests:

The mission of the Society of American Foresters is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish professional excellence; and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society (mission statement).

A member will advocate and practice land management consistent with ecologically sound principles (Canon 1, Code of Ethics).

Members will develop, use, and communicate their knowledge to protect, sustain and enhance forest resources for diverse benefits in perpetuity (*Forest Policies*).

Appendix IV. Federal Laws, Established 1960–1976

- Multiple-Use-Sustained-Yield Act of 1960
- Wilderness Act of 1964
- Wild and Scenic Rivers Act of 1968
- National Environmental Policy Act of 1970
- Clean Air Act of 1970 (as amended)
- Clean Water Act of 1972 (as amended)
- Federal Advisory Committee Act of 1972
- Endangered Species Act of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act of 1974
- National Forest Management Act of 1976
- Federal Land Management and Policy Act of 1976

Appendix V. Suggested Approach for Discussing and Resolving Forest Health Issues

A six-step process, proposed by Neil Sampson, senior fellow at American Forests, Forest Policy Center (March 1996), is suggested as a way to think about forest health issues and involve people in a meaningful dialogue. This process, modified slightly by the committee, is:

1. Describe the specific forest in question, making sure to address scale, timeframe, and ownership patterns.
2. Describe the current condition of the forest in question.
3. Identify a vision for the forest that describes what is, and is not, desired. This will clarify management objectives. When conflicting objectives are apparent, differences in values need to be understood.
4. Develop and implement strategies, including management, to achieve the vision of what is desired.
5. Assess progress toward the vision and objectives.
6. In light of results, make changes in management or the objectives.

This process is not a cookbook approach that yields the same answer every time. It is a checklist for a logical progression of steps to help foresters provide information about forest conditions, clarify objectives, and facilitate resolution of forest health issues.

LITERATURE CITED

- Angermeier, P.L., and J.R. Karr. 1994. Biological integrity versus biological diversity as policy directives: Protecting biotic resources. *Bioscience* 44(10):690-97.
- Balster, N. 1996. Science and ethics: A distinction for leadership. *Journal of Forestry* 94(5):44.
- Banzhaf, W.H. 1996. The Seventh American Forest Congress: Shared vision on a grand scale. *Journal of Forestry* 94(5):14-17.
- Baxter, D.V. 1952. *Pathology in forest practice*. New York: John Wiley & Sons, Inc.
- Botkin, D.B. 1990. *Discordant harmonies: A new ecology for the twenty-first century*. New York: Oxford University Press.
- Clark, L.R., and R.N. Sampson. 1995. *Forest ecosystem health in the inland west: A science and policy reader*. Washington, DC: American Forests, Forest Policy Center.
- Cortner, H.J. 1995. Conservation: A magical word? *Journal of Forestry* 93(12):20.
- Craig, G.A. 1994. Meeting owners' needs and wants: Forest health on nonindustrial private lands. *Journal of Forestry* 92(7):27-28.
- Cronon, W. 1995. *Uncommon ground: Toward reinventing nature*. New York: W.W. Norton & Company.
- Czech, B. 1995. Ecosystem management is no paradigm shift: Let's try conservation. *Journal of Forestry* 93(12):17-23.
- Dana, S.T., and S.K. Fairfax. 1980. *Forest and range policy: Its development in the United States*. New York: McGraw-Hill, Inc.
- Ehrenfeld, D. 1992. Ecosystem health and ecological theories. In *Ecosystem health: New goals for ecological management*, eds., R. Costanza, B.G. Norton, B.D. Haskell. Covelo, CA: Island Press.
- Food and Agriculture Organization (FAO) 1995. *Pacific rim wood market report*. Washington, DC.
- Forbes, R.D., and A.B. Meyer. 1955. *Forestry handbook*. New York: The Ronald Press Company.
- Gordon, J.C. 1993. *The new face of forestry: Exploring discontinuity and the need for a new vision*. Pinchot Lecture Series. Milford, PA: Grey Towers Press.
- Gottlieb, R. 1993. *Forcing the spring: The transformation of the American environmental movement*. Covelo, CA: Island Press.
- Grumbine, R.E. 1992. *Ghost bears: Exploring the biodiversity crisis*. Covelo, CA: Island Press.

- Haskell, B.D., B.G. Norton, and R. Costanza. 1992. What is ecosystem health and why should we worry about it? In *Ecosystem health: New goals for ecological management*, eds. R. Costanza, B.G. Norton, B.D. Haskell. Covelo, CA: Island Press.
- Haynes, R.W., D.M. Adams, and J.R. Mills. 1995. *The 1993 RPA timber assessment update*. Gen. Tech. Report RM-259. Washington, DC: USDA Forest Service.
- Kolb, T.E., M.R. Wagner, and W.W. Covington. 1994. Concepts of forest health: Utilitarian and ecosystem perspectives. *Journal of Forestry* 92(7):10–15.
- Lankford, L. 1994. Ecosystem forestry from the ground up: Forest health on nonindustrial private lands. *Journal of Forestry* 92(7):26, 28–29.
- Lee, K.N. 1993. *Compass and gyroscope: Integrating science and politics for the environment*. Washington, DC: Island Press.
- Lele, S., and R.B. Norgaard. 1996. Sustainability and the scientist's burden. *Conservation Biology* 10(2):354–65.
- MacCleery, D.W. 1993. *American forests: A history of resiliency and recovery*. Durham, NC: Forest History Society.
- MacCleery, D.W., G.T.M. Schildwachter, and H. Salwasser. 1995. *State of the forest*. New Haven, CT: Seventh American Forest Congress.
- MacDonnell, L.J., and S.F. Bates. 1993. Rethinking resources: Reflections on a new generation of natural resources law and policy. In *Natural resources policy and law: Trends and directions*, eds. L.J. MacDonnell and S.F. Bates. Covelo, CA: Island Press.
- Manion, P.D. 1981. *Tree disease concepts*. Englewood Cliffs, NJ: Prentice-Hall.
- Monnig, E., and J. Byler. 1992. *Forest health and ecological integrity in the northern Rockies*. FPM Report 92-7. Washington, DC: USDA Forest Service.
- Nelson, R.H. 1995. *Public lands and private rights: The failure of scientific management*. Lanham, MD: Rowman & Littlefield Publishers, Inc.
- Northern Forest Lands Council (NFLC). 1994. *Finding common ground: Conserving the northern forest*. Augusta, ME: Maine Department of Conservation.
- O'Laughlin, J., J.G. MacCracken, D.L. Adams, S.C. Buntin, K.A. Blanter, and C.E. Keegan III. 1993. *Forest health conditions in Idaho: Executive summary*, Report No.11. Moscow, ID: University of Idaho, Forest, Wildlife and Range Policy Group.
- Rapport, D.J. 1992. What is clinical ecology? In *Ecosystem health: New goals for ecological management*, eds. R. Costanza, B.G. Norton, B.D. Haskell. Covelo, CA: Island Press.

Forest Health and Productivity *A Perspective of the Forestry Profession*

- Regier, H.A. 1993. The notion of natural and cultural integrity. In *Ecological integrity and the management of ecosystems*, eds. S. Woodley, J. Kay, G. Francis. Waterloo, Canada: St. Lucie Press.
- Romm, J. 1994. Sustainable forests and sustainable forestry. *Journal of Forestry* 92(7):35–39.
- Sampson, R.N. 1996. *Forest health issues in the United States*. Washington, DC: American Forests.
- Sampson, R.N., D.L. Adams, and M.J. Enzer. 1994. *Assessing forest ecosystem health in the Inland West*. New York: Haworth Press.
- Siegel, W.C. 1994. A report from SAF Council: Studying long-term forest health and productivity. *Journal of Forestry* 92(7):6–8.
- Slover, B.L. 1996. A music of opinions: Collaborative planning for the Charles C. Deam Wilderness. *Journal of Forestry* 94(5):18–23.
- Society of American Foresters (SAF). 1989. *Forest Policies*. Bethesda, MD.
- _____. 1991. *Task force report on biological diversity in forest ecosystems*. Bethesda, MD.
- _____. 1993a. *Task force report on sustaining long-term forest health and productivity*. Bethesda, MD.
- _____. 1993b. Transcript of the Critical Issues Forum. Society of American Foresters National Convention, Indianapolis, Indiana. Bethesda, MD.
- _____. 1993c. Summary of SAF member commentary on the task force report on sustaining long-term forest health and productivity. Draft 12/2/93. Bethesda, MD.
- _____. 1994a. *Background report on private property rights: A report to the SAF membership*. Bethesda, MD.
- _____. 1994b. *Silviculture terminology with draft appendix of ecosystem management terms*. Silviculture Working Group. Bethesda, MD.
- _____. 1995a. Code of Ethics. *Journal of Forestry* 93(9):13.
- _____. 1995b. *SAF member opinion survey: Final report, May 1995*. Bethesda, MD.
- Spurr, S.H., and B.V. Barnes. 1980. *Forest ecology*. New York: John E. Wiley & Sons, Inc.
- USDA Forest Service. 1995. *Forest health highlights the northeastern states*. Radnor, PA. Northeastern Area, State & Private Forestry.