FOREST HEALTH CRITERIA

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON FOREST AND FOREST HEALTH

OF THE

COMMITTEE ON RESOURCES
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIFTH CONGRESS

FIRST SESSION

ON

CRITERIA TO DETERMINE IF A FOREST IS HEALTHY OR UNHEALTHY, AND HOW TO IMPROVE OR MAINTAIN FOREST HEALTH

MARCH 18, 1997—WASHINGTON, DC

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MANAGEMENT OF OUR NATION'S FORESTS AND CRITERIA FOR DETERMINING HEALTHY FORESTS

TUESDAY, MARCH 18, 1997

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

The Subcommittee met, pursuant to call, at 2:05 p.m., in room 1324, Longworth House Office Building, Washington, D.C., Hon. Helen Chenoweth (Chair 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 what criteria should be used to determine if a forest is healthy or unhealthy, and what management tools would be considered the most appropriate to maintain or improve forest health.

Under Rule 4(g) of the committee rules, any oral opening Statee ments at 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 their schedules. Therefore, if other members have statements, they can be included in the hearing record under unanimous consent.

STATEMENT OF HON. HELEN CHENOWETH, A U.S. REPRESENTATIVE FROM IDAHO; AND CHAIRMAN, SUBCOMMITTEE ON FORESTS AND FORESTS HEALTH

Mrs. CHENOWETH. I am pleased to be conducting this hearing. The Subcommittee has invited a broad range of witnesses to testify on the criteria to determine if a forest is healthy or unhealthy, and how to improve or maintain forest health.

It is my desire to use this forum as an education tool for the Subcommittee to listen to a broad range of interests as well as to substantiate and to form a hearing record.

We are fortunate to have with us today the caliber of witnesses representing the Forest Service, academia, local government, industry, and the environmental community. The subject of forest health has become a matter of great concern to us all. Forest health has been defined in many different ways to express important values obtained from forests.

Many attitudes and policies during the past century have contributed to the forests' present condition. The forests that seem to be at most serious risk today are those developed under a historic

cycle of high-frequency, low-intensity wildfire. Nearly 100 years of fire exclusion following thousands of years of management of the same forests by the use of fire by Native Americans has led to many crowded and unhealthy forests. Rather than the high-frequency, low-intensity wildfires of those days, today's wildfires are larger, hotter, more lethal to vegetation, more damaging to topsoils, and exceptionally dangerous to human settlements and property.

Although the majority of forest health problems and the resulting large, damaging fires are found on the public lands of the west, introduced non-native forest pests such as the gypsy moth and Dutch elm disease in the east have also created serious threats to forest health across the United States, including all of these criteria.

It is my desire to obtain information from this hearing that will be helpful to the Subcommittee as we move forward with improving the health of our nation's forests. I would also like to point out that it was my desire to have as broad a range as possible of interests and expertise represented at today's hearing. Although as I pointed out, we have a highly qualified list of witnesses, I would like to note that I extended invitations to more members of the environmental community to testify, but because of reasons known to them only, only one representative could attend today, and we certainly welcome him.

I look forward to the testimony and will recognize the ranking minority member when he does get back from New York. Representative Hinchey is on his way in from New York, and will be joining us when he arrives.

At this time, I would like to recognize Mr. Kildee for any opening statement he may have.

Mr. KILDEE. Thank you, Madame Chairman, for recognizing me. I really have no opening statement, just look forward to learning what we can learn about the genuine health of our forests, part of our national patrimony, and thank you for having the hearing.

Mrs. CHENOWETH. Thank you, Mr. Kildee. I would like to introduce the new Chief of the Forest Service, Michael Dombeck, and his assistant, Director Ann Bartuska. As explained in our first hearing, it is the intention of the Chairman to place all outside witnesses under oath.

This is a formality of the committee that is meant to assure open and honest discussion and should not affect the testimony given by witnesses. I believe all of the witnesses were informed of this before appearing here today, and they have each been provided a copy of the committee rules.

Mr. Dombeck, if you will stand and raise your right hand, I will administer the oath.

Do you solemnly swear or affirm under the penalty of perjury that you will tell the truth, the whole truth, and nothing but the truth, so help you God?

Mr. DOMBECK. I will.

Mrs. CHENOWETH. Thank you. Let me remind the witnesses that under our committee rules they must limit their oral statements to five minutes, but that their entire statement will appear in the record. We will also allow the entire panel to testify before questioning the witnesses.

The Chairman now recognizes Mr. Dombeck, and, without regard to what the rules say, we are anxious to hear from you.

STATEMENT OF MICHAEL DOMBECK, CHIEF, FOREST SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY ANN BARTUSKA, DIRECTOR, FOREST HEALTH PROTECTION

Mr. DOMBECK. Thank you for that introduction, and I have to say I am pleased to appear before the Subcommittee for the first time as Chief of the Forest Service. I want you to know that Dr. Ann Bartuska here with me is here as an expert. She is our director of the forest health protection staff and knows all of the details.

I would like to begin my testimony by giving three brief examples just to demonstrate that we do have tools and we know many of the things we have to do. I would like to start out with an example from the south.

The southern pine, the longleaf pine, was considered probably the most valuable in terms of wood quality products, aesthetically pleasing, fire-resistant species, resistant to insect diseases and attacks.

In pre-settlement times, we had something in the neighborhood of 60,000,000 acres of longleaf pine stands. By the early 1900's, that was reduced to about 3,000,000 acres due to fire exclusion and conversion of forest lands to agriculture uses. Because of the management technologies today, the Forest Service is making progress in restoring the longleaf pine ecosystems and it is a priority in that part of the country. We are establishing new stands that provide a wide array of social and economic benefits as well as just the beauty of the forest.

The second example I would like to give has to do with white pine blister rust. From 1909 and 1910, white pine blister rust came to this country and contaminated nursery stocks. It first affected Idaho and was discovered around Coeur D'Alene in about 1923. Then it spread throughout the west, Washington, Oregon, Idaho, and Montana, and as you know, the white pine was often known as the tree that built America from the standpoint of its value.

In the 1950's, we began a successful effort, a breeding program to develop blister rust-resistant stocks because many of the original stands have been decimated as a result of this disease. Today, we are restoring white pine stands and white pine ecosystems in many ares of the west, so this is another example of genetics and the importance of disease and those kinds of studies that are going on.

The third example I would like to mention is an issue that you are so familiar with in your home State. Last week, I spent some time in the west looking firsthand at some of the forest health issues, and you have already described in your opening statement some of the problems associated with overstocked stands.

In the Boise National Forest in your State, they are moving ahead with a wide variety of tools to get on top of the issue, and I would like to say that it is important that we use all of the tools at our disposal to deal with the forest health issues from salvage logging to thinning to fuel reduction to prescribed burning.

I looked at examples of mowing when I was out in Deschutes National Forest, and one striking thing that I saw there that also ap-

plies to the entire west is the Skeleton Fire, on the outskirts of Bend where 19 homes burned in the wildland/fire interface.

We spent some $1,600 an acre suppressing that fire, whereas many of the management practices we could have used to avoid that type of situation as we move forward are much less costly than that.

For example, we can do prescribed burning in some cases for $20 to $50 an acre, so I just list those as examples to say that we do have the tools and we need to use all the tools and we need to work with communities in a positive way.

I guess the message I would like to leave the Subcommittee with is that we can accelerate the healing of our forests, and we can do so in a balanced and measured way. Because the consequences of inaction far outweigh the fiscal costs of the needs for restoration, catastrophic events, fires, floods, landslides seem to be occurring at increasing frequencies with ever more devastating consequences.

Noxious weeds are diminishing the productivity of hundreds of thousands of acres of public land. The devastating fires are increasingly encroaching on the urban/forest interface. Last year alone, over 6,000,000 acres of public land burned.

Healthy forests provide the resiliency to minimize the severe consequences of these events, and without decisive actions, these problems will only get worse. I want to say that restoration will not be quick, and in fact will be expensive, but we must look to these sorts of activities as investments in the land, investments that will immediately reduce the cost of catastrophic fire and, in the long run, greatly enhance forest productivity, health, and diversity.

It took many decades to get where we are today, and it will take years to get to where we need to go. With that, I would be happy to answer any questions you have.

[Statement of Michael Dombeck may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Chief Dombeck. I appreciate hearing from you. Dr. Bartuska, do you have any comments to make or are you here to assist in any questions that might need your expertise?

Ms. BARTUSKA. I am primarily here to assist in any questions. I will make one comment as to the criteria with regard to understanding what the health of the forests are.

We have programs in place to try to describe that so we know what the current condition is and where we are going in the future, and I think that is particularly critical in order to identify the areas of highest priority and highest risk, and part of our understanding on the national forests helps us do that, but also, we are trying to put that into national context using the Santiago Agreement which is a way internationally to define what the health of forests are and sustainability of communities.

So part of our criteria for understanding where these forests are going is to identify current conditions and trends.

Mrs. CHENOWETH. Can you tell me what the Santiago Agreement may list as far as criteria for healthy forests?

Ms. BARTUSKA. It involves a whole combination of biological criteria such as productivity of the forest lands, extent of forest lands, whether or not you have high fire risk.

It also speaks to the stability and sustainability of communities, so there are economic factors. The ability to sustain small communities and large communities, the contributions to the GNP would be included, so it is a whole array of criteria dealing with health of ecosystems but also health of communities.

Mrs. CHENOWETH. Dr. Bartuska, when we think of actual forest health, which I think we have tried to confine our thinking in this committee to include community stability as it so very important to us, but in terms of restoring forest health to the forests, can you give me a little more detail with regard to the Santiago Agreement, if that is the criteria that you will be looking at?

Ms. BARTUSKA. I don't have all the details of those criteria. We can send that to you.

I will say that of seven main biological criteria, there is one specifically dealing with forest health, and the measures of that include extent and condition of the forest lands, mortality balanced against growth, conditions of soil productivity, so it would be fairly traditional within our own monitoring programs, traditional measures, but there are also some dealing with other criteria, other characteristics of the system, and I don't have all those details with me.

Mrs. CHENOWETH. In terms of having our own chief be able to make the decisions about the forests, what would the Santiago Agreement do with regard to his ability to make decisions on our forests in America? Chief Dombeck.

Mr. DOMBECK. I look at Ann as the expert on the Santiago Agreement, but I look at it as more of the umbrella concepts, sort of the macro approach that then we would build those or other concepts that we would apply to different geographic areas based upon differences in species composition, differences in precipitation, differences in elevation, and all those other types of things then become nested in those overall, overarching concepts that apply broad-scale.

I see it as an umbrella that is as much a communication and education tool. We are, I believe, in the United States with the academic institutions, such as places like the University of Idaho—who I understand did the bulk of the research along with the Forest Service on the white pine blister rust issue that I used as an example, along with the Forest Service and industry and many others—we in this country are the experts on this issue, and many, many other countries look to us for technical expertise, for advice on these kinds of issues, and I have got to say one more thing about your home State where the national interagency fire is another example of, these are the experts from the standpoint of wildland fire fighting and incident command. We have this level of expertise in this country that is sought after by the international community, and it is something that we should be proud of.

Mrs. CHENOWETH. I think you can probably gather from the line of questioning that you are receiving that we want you to have authority and be unencumbered to make decisions about forest health in the future. I would be very interested in receiving more information with regard to the relationship there.

We have a situation in northern Idaho right now that I might use as an example to see if it is something that could be moved

ahead, and that is that on November 29, we had a very interesting phenomenon that occurred with regard to the weather. We had a very, very cold air inversion that settled in the northern part of Idaho and northeastern Washington, and then we had warm rain above, and the rain came through and rained ice for eight hours. We had ice buildup in the trees.

By the time the ice buildup reached up to two and a half tons in the crowns of these trees, sometimes trees 175 to 200 years old, so they were native species, the trees would break right below the last green limb, and it also occurred in the trees averaging 30 to 50 years old. They all broke about 30 feet off the ground, and that presents an emergency situation with regard to forest health, because we don't just have the normal fuel load on the forest floor. We have 25 to 30 percent of the forest on the floor now from that ice damage spanning Mr. Nethercutt's district as well as mine and some moving into Montana.

Are we in a situation where a decision can be made at your level or the level of Missoula, Montana, and Portland, Oregon, where we can get in and clean that up so we won't have a lot of fire damage and insect and disease moving in which would happen in this circumstance?

Mr. DOMBECK. Let me say that actually, I saw some of that, not the damage in the area that you speak of, but damage similar to that when I was in eastern Oregon, and it is not unlike the hurricanes that hit the southeast that will take a swath through the forest.

My hope is that our policies are such that our experts are on the land, that we have the ability and the flexibility, the processes to make these kind of decisions by the resource managers on the land working with the local people in that situation.

Now, I assume that that would be in Regional Forester Salwasser's area and I will check with him, but I assume that he and the forest supervisors and rangers are taking a look at that situation as we speak.

Mrs. CHENOWETH. Thank you very much, and welcome to your new job. I have appreciated working with you and your staff very much.

Mr. DOMBECK. Thank you.

Mrs. CHENOWETH. I would like to call on the gentleman from Colorado now. Mr. Schaffer.

Mr. SCHAFFER. Thank you, Madame Chairman. I have a couple questions and I would like to start out just on the whole topic of controlled burns, a big issue out in my State of Colorado, as you may well imagine.

We have great concern over air quality, and there are many communities in the range of the State that are in any given year just one or two days away from being considered nonattainment areas, and when Secretary Babbitt had mentioned, for example, the increased effort on forest burns and a considerable portion of our State includes federally managed lands, and that affects that range.

I would just like to find out first, your thoughts about that particular management practice in the first place, but secondly, what I need to hear is just some assurances that the air quality stand-

ards in our State are being considered, that there is a plan to accommodate those standards and help us maintain our attainment of those standards, and that there is a commitment to work with our State hand in hand just as these projects may be carried out.

Mr. DOMBECK. Let me say that air quality has been a significant issue associated with prescribed fire, that has been broadly discussed, and the one reality is that in using a prescribed fire, we do have control over fires, oftentimes. They are planned with the particular wind direction in mind and to work within windows of opportunity based on whatever the local conditions are, whereas, if we deal with the disaster of the uncontrolled fire that we just have Mother Nature take its course, that leads us then into a situation where we have no control, no ability to manage the situation.

What we have been doing is working with the Environmental Protection Agency. Our local folks are working with the State agencies to work with the windows of opportunity, to identify the windows of opportunity that they have so we make sure all of the situations, the air quality, the safety precautions, all of those kinds of things are taken into consideration. It is very important that we do that.

Mr. SCHAFFER. Colorado is in the process right now of passing State legislation that would give the State authority that was granted to States under the Clean Air Act to require Federal facilities to reduce emissions coming from Federal lands.

Are you familiar with that legislation or that effort among affected States and do you see any reason that there would be any kind of controversy or conflict at all?

Mr. DOMBECK. I am not familiar with Colorado's specific legislation and much of the clean air issues, of course, fall under the jurisdiction of the EPA, but what I will say is that the direction that we are going in, and I believe fairly aggressively, and the State of Colorado has been in the lead in this issue, is the Federal agencies are working with the States and the counties from the standpoint of planning, of having fire management plans of knowing how they are going to respond to situations in advance based upon dialog and plans and the interaction of the Federal agencies, the BLM, the Forest Service, as well as the appropriate State agencies, the counties, and from the standpoint of not only fire planning, but also from the standpoint of how they are going to respond in the most efficient and effective manner.

Mr. SCHAFFER. I would also like to ask just with respect to planning and plotting out these burns and how they occur, some of those forests are so dry right now that it is very easy to see how—in fact, I have heard some people in the Forest Service refer to burns that exceed the plan. They are called bonus burns in the industry vernacular of sorts.

I am curious as to how many of your staff are trained in fire suppression.

Mr. DOMBECK. Let me first say that no, there isn't a burn that is not dangerous and shouldn't be taken very, very seriously whether it is a natural fire or a prescribed burn, and as a result of 1988, and the tragedies of '94 that I was personally involved in, we have enhanced training and safety to an all-time high, I believe, I was with the Bureau of Land Management at that time, but also within

the Forest Service from the standpoint of the programs that we had with the Forest Service as they kicked off a program called Fire–21, which takes a look at the issues across the board associated with fire, the funding, the training, the safety, because we should never, ever let anyone believe that fire is not—can be a very dangerous situation, especially in extreme weather conditions as we have learned the hard way many, many times, so the standpoint of training, the standpoint of safety is I think at an all-time high.

But our workforces are changing, and the numbers of employees that are perhaps in line positions that 30 or 40 years ago maybe a greater proportion of them would have been smoke jumpers, would have been trained specifically in fire, where now, I believe a lesser proportion of some of our people have that training.

Therefore, the action that we have to take is to make sure that we provide it so that we don't have those gaps in skills and training.

Mrs. CHENOWETH. I thank the gentleman from Colorado, and we will have another round of questioning, if you have any other questions in mind.

The chair now recognizes Mr. Kildee.

Mr. KILDEE. Thank you, Madame Chairman. What programs that would lead to forest health is the Administration seeking to give greater emphasis to in the 1997 budget?

Mr. DOMBECK. The following initiative would be—we are looking at timber stand improvement increases, I believe about an $11,000,000 increase in timber stand improvement. The acres treated would increase by about 30,000.

We are looking at about $10,000,000 for insect disease prevention and suppression, and increased emphasis in fuel treatment, and increased emphasis in the watershed restoration. These are in addition to other activities that we are involve in, the training, the monitoring, the research and all these areas.

I think the point that I want to make is that we realize that in many cases we have to make investments in watersheds and those investments include a wide variety of things. We have got roads sometimes that need to be put to bed, sometimes that need to be brought up to standard; noxious weed issues that we have to deal with; a whole variety of forest management practices that could include anything from salvage logging to thinning to a prescribed burning.

When I was out in Deschutes National Forest last week, they showed me some mowing projects they were involved in, and one thing I would like to call your attention to is something that I have put in your folders just to give you a visual of some of the forest health situation. I think that it describes in pictures some of the things I am trying to describe.

The first picture, and this is in Shasta County, California; the first picture shows about 1,500 stems per acre. It is a situation that is very dense, and in low humidity situations, very flashy from the standpoint of the historical situation would have been, these would have been probably Ponderosa pine, and because of fire suppression over the last 100 years, you have had an encroachment of fir species, and a significant fire risk.

The second picture shows work after some management has taken place there, and let me just describe the management that has occurred here, and that is about 2,000 to 3,000 board feet per acre of saw logs were removed, along with about 35 to 40 tons per acre of nonmerchantable material, and what we have done here now is reduce this to about 100 trees per acre compared to 1,500 on the previous photo.

Now, here, we have a photo that is eight years later, and what we are ready to do there is, we are ready to go in with a prescribed burn, giving the right weather conditions, to further reduce some of the fuel loading that is there because of the suppression that has occurred there for about 80 years.

I guess my point is again, it is important that we use every tool at our disposal when we deal with this issue that we have. On the national forest system, we are estimating somewhere in the neighborhood of 39,000,000 acres is at high risk to catastrophic fire.

Mr. KILDEE. At one time when I was growing up, fire was always the enemy in the forest. Now, you can use fire as a friend, as helpful?

Mr. DOMBECK. With great respect. Fire is a natural part of the ecosystem and depending on where you are, the typical situation in the intermountain west is that it burned every seven to 15 years in a low-intensity situation.

The large, catastrophic fires may have occurred in the cycles in centuries rather than decades like the low-intensity fires, and these are the way these ecosystems evolved. Through extensive and overzealous, if you will, fire suppression, the stands have changed in composition, leaving us with a significant issue to deal with, a serious issue compounded by the urban/wildland interface.

If you go around Lake Tahoe or the front range or the west slope or the Sierras where you have got lots of houses, and in many cases, very expensive houses, interspersed in these dense forests. The education issue that is facing us is, in some cases, you see cedar shake shingles on these houses. You see people that are used to a visual that is very dense, much like photo number one, when the historical situation would have been more like photo number three.

So there is this education problem that goes along with the visual landscape, and the fact that over the last several decades, we have preached to put every fire out, and yet, we have got to be very respectful of fire, because we can never assume that it cannot be very, very dangerous.

Mr. KILDEE. Thank you very much. Thank you, Madame Chairman.

Mrs. CHENOWETH. Thank you, Mr. Kildee. The chair now recognizes Mr. Vento.

Mr. VENTO. Thanks, Madame Chairwoman, and I welcome our new chief. I really am looking forward to working with you and I appreciate your testimony today. This is a tough topic, but one I think that merits education and I hope that we can come down with policy that reflects the science rather than what actually favors our own interest.

I appreciate your effort to come here and the Chairwoman's effort to put forth the hearing on an educational basis.

What was the time lapse between these two photographs, photo number two and three? Ten years?

Mr. DOMBECK. Eight years.

Mr. VENTO. Eight years.

Mr. DOMBECK. I believe.

Mr. VENTO. I was reminded—I was at a meeting on Saturday evening, and I was reminded by one of the foresters from the Superior National Forest in Minnesota. He said they had two fires up there this past year. One was a prescribed burn, and one was a natural fire that they tried to put out.

Anyway, on the prescribed burn, they spent some $30,000 to $40,000, maybe even less than that. I don't remember. It might have been $18,000, but on the fire that they tried to put out, they spent $1,200,000.

This is one of the problems that we have, Chief, in terms of when we get into firefighting, we are spending an awful lot of money. For the short-term, I suppose because of the urban interface and some other factors we have to deal with that.

I don't know what they did to the air quality, but I guess they were obviously doing that in compliance with the laws that deal with air quality.

Mr. DOMBECK. From the standpoint of prescribed fire, oftentimes we can deal with somewhere in the neighborhood of $20 to $50 per acre in many situations; sometimes a little more than that, but when we get a catastrophic situation to deal with, it could go upwards to $4,000 an acres.

The fire that I reviewed earlier, last week in the Deschutes National Forest that burned 19 homes in Bend at the urban/wildland interface there, we spent about $1,600 an acre. From the standpoint of management in advance, you can do a lot for $1,600 an acre.

We need to start shifting our management practices so we can begin to make investments to prevent problems before they occur. It is sort of like watch our cholesterol before we have a heart attack.

Mr. VENTO. No one is suggesting that in life or limb. I think in Superior, that was not the case. I think it was just a regular fire that they were trying to put out. But I think that the urban interface, no one is suggesting that when those incidents arise that you don't try to deal with it in terms of life and personal property and as I said, health.

Mr. DOMBECK. Let me just add that part of the importance of planning that we talked about associated with Colorado I think applies here, because it is important that we know in advance what we are going to do.

It is just like having the closest force as the most efficient way to deal with a fire, it is also important that we know what we need to do.

I was at a situation, and this one happened to be in Arizona where we had a trailer park of about 1,000 residents in a very remote area that has a serious fire almost every year, and the average expenditure is about $3,000,000 to $5,000,000 dealing with suppression of that fire.

Now we have a management plan that actually creates a mosaic of vegetation types to dampen the effects of the fire as well as through a prescribed burn or natural fire depending on where the lightning strikes are to actually create a zone around the community so that we have protection from that.

So planning in advance and knowing how to deal with these situations is the way to go versus having to react in the emergency role.

Mr. VENTO. It is a problem. I think that obviously it may not look as aesthetically pleasing if you happen to want to be in the middle of a dense forest, but that is part of the management that we have to advocate, I guess at the same time, and work with local communities to try to make certain they understand.

Forest health is a very interesting issue. I have followed it in detail, but mostly there is an emphasis on salvage logging that tends to override everything else. There is a role for salvage, is there not?

Mr. DOMBECK. Yes, and I think it is important that we use all the tools and logging is certainly a tool, but what do you do when you are in an area where the timber values are not there to carry the cost of management?

Mr. VENTO. Very often, these types of salvage logging efforts—because of the way receipts are divided—are actually below-cost sales. They are money losers unless we get extremely high costs. If you are going to do this right, you should be using some of the new forestry type of plans in these areas, shouldn't you?

Mr. DOMBECK. Yes, and I hope—that is certainly the direction I would like to have again, as I emphasized using all the tools.

It is important that we educate people to the fact that there is an appropriate place for salvage logging. There are timber companies that say to me, we would like to retool and use some of the lower value woods available, looking for new technologies.

At our forest products laboratory in Madison, Wisconsin, we have probably 275 Ph.D.'s, some of the best minds in wood technology developing techniques to use lower value or poorer quality fiber for things in a wide variety of efficiencies.

Mr. VENTO. We are using all our aspen in Minnesota, let me tell you, for fiberboard and other products. I might also say, of course, the road restoration issue, mixed species types of reforestation, watershed management, road restoration, these are enormously important if you look at the damage that is occurring in terms of these forests.

I think getting this on a cost basis is what the ultimate solution is. As I say, this is a good hearing. I am sorry I am going to be running back and forth, because we have another hearing on my Committee on Banking that Congressman Hansen is interested in.

Thank you, Mr. Dombeck, Chief.

Mr. DOMBECK. Thank you.

Mrs. CHENOWETH. Thank you, Mr. Vento. For a second round of questioning, I have just a couple of questions, Mr. Dombeck.

I wonder, in your opinion, how would you describe modern-day timber harvest practices with regard to the overall health of the forest?

Mr. DOMBECK. I think there are, like in all areas, a wide variety of practices developed in everything from helicopter logging to techniques that are less soft on the land than that sort of thing.

In fact, I was reading about not too long ago, some mom-and-pop operations, like those used when I was a kid in northern Wisconsin, where they were still skidding logs with horses.

I am not the logging, the engineering expert, but I hope that in logging technologies, just like all of the things we have been talking about here where there is management that we continually strive for the best and most efficient technologies available to use. We are a society that the development of technology is something important.

We encourage that and are solidly behind that, and there are lots of good, progressive timber operators out there.

Mrs. CHENOWETH. I assume from your answer that you really don't feel—I don't want to put words in your mouth. Do you feel that good, solid timber harvest practices could in any way be in conflict with ecosystem management plans?

Mr. DOMBECK. I think maybe they could in some situations, but I would venture to say that it is probably a social issue more than it is a technology issue. From the standpoint of the debate that I know that you are very familiar with whether we talk riparian zones, roadless areas, those kinds of things, and I think it is one of the most important things that the Forest Service can do. I would hope that the Subcommittee here and that all the interests would move to the areas first where there is the least controversy, and that as we begin to build credibility and build trust on these issues and confidence, because the things that we don't know when we end up in these protracted debates and end up in the court system, that money spent on litigation doesn't necessarily benefit the land or restore the ecosystem or restore the health of the forest.

I see this in a sense as more of a social issue than it is a technology issue, but by that I don't mean to diminish the need to continue the search for new and better, more efficient and effective technologies.

Mrs. CHENOWETH. I am also very interested in knowing how you feel about grazing practices on the national forest, because you mentioned that over in the Deschutes Forest, they were mowing some of the meadows, which I think is something that can be dovetailed into the whole picture of fire suppression.

I know Teddy Roosevelt envisioned using the livestock industry to help keep the fuel load on the forest floor down in terms of grazing practices.

Mr. DOMBECK. Well, the specific situation that I looked at on Deschutes was in the coniferous forest and not a situation where it didn't appear that there were opportunities for grazing in that forest.

But from the standpoint of reducing fuel loading and that sort of thing, grazing is also a tool, and yet some of the forest health issues associated with—again, like the long-term fire suppression where we have encroachment of rangelands by pinion and juniper, for example, there is already a shortage of water and the competition for water by the plants is there, and sometimes—these gradual changes over time based upon the way we have managed the

ecosystems, we need to reverse through active management practices.

Mrs. CHENOWETH. I know it must have been just as fascinating for you as it was for me when I first went into the Deschutes National Forest to see how an emerging forest establishes itself with the pinion pine being a pioneer species, and then behind that, we see the graduated growth of the forest following.

I see I still have just a minute left. I do want to ask you, how many of your staff are actually qualified in fire suppression activities, actually qualified as fire suppression trained technicians?

Mr. DOMBECK. I don't know the exact number. I don't know if Ann does, but we would be happy to provide that information to you. I am proud to say that I carried a red card at one time, and one of my goals this spring was to get qualified again, but with the pace of everything I have to do, I am not sure I am going to have the time to spend out jogging or in the gym to pass the tests.

Again, as I said in the beginning, I am proud of the fact that we have among the best wildland firefighters in the world employed in the Forest Service, and I am real proud of the work that they do. They are very respected in the communities that they work, and it is an interesting group of people doing work that is very satisfying to them and at not very high pay.

Mrs. CHENOWETH. Thank you, Mr. Dombeck. The chair now recognizes Mr. Vento, if he wants a second round of questions.

Mr. VENTO. Thanks, Madam Chair. Just briefly. I note that an interagency task force or group was put together to examine the memorandum of understanding under which salvage logging took place, and there are a number key findings.

Some of them, I think, in fairness are positive. The involvement of the Fish and Wildlife Service in the salvage logging plan added to rather than duplicated the efforts of the Forest Service and BLM regarding compliance with the ESA.

That is a good one, but some of the others are not. They have a negative effect on pre-existing efforts to improve collaboration among agencies—a negative effect on pre-existing efforts because it overrode them, I take it, which is common sense. This was an emergency, and so the existing channels of communication that existed were suppressed.

One of the concerns is that it destroyed the neutrality of dealing with forest health. I think I am saying this right in terms of this finding, Mr. Dombeck. I know that you participated in this or at least some of your associates did.

It said current budget processes within BLM and Forest Services act as an incentive for field units to resort to salvage logging to generate money to pay for forest health projects, even when other projects may be more appropriate.

I would assume that they are talking about forest health here, and that is to say that maybe road restoration would be more important than forest health, watershed restoration, diversified planting of mixed species, prescribed burns. Obviously, this law put in place specific quotas. I think it did mandate cuts, but others will argue that it didn't.

Do you have any comment on these task force recommendations? I notice the final draft of an action plan was due in February. I

don't know if it is out or not, but you might want to comment on that as well.

Mr. DOMBECK. Let me say, I think we did learn several things from the exercise. Number one, I think it got a lot of our policy people from the Washington staff and the various agencies out on the ground to look at things firsthand, and I think that was a positive.

I think from the standpoint of endangered species consultations and things like that, the whole exercise demonstrated that we could—by starting the processes up front, and rather than having the consultation processes in series, it was valuable to us knowing what the rules are and what data was required as soon as we started collecting it.

We coordinated better than ever. There were a variety of positives, but from the standpoint, I think, of some of your latter comments, we have got to understand that sometimes, we need to make investments and that we shouldn't always rely on the value of the fiber that is there to carry the cost, because you have roads, sedimentation problems that you might have to deal with; noxious weeds issues you might have to deal with; stream restoration; high densities of low value or virtually no value wood, those kinds of things, and we need to look at it from the watershed approach versus the values of the merchantable timber that is there as the driver so that in the long haul, that will generate benefits.

Mr. VENTO. One of the problems, of course, is at the same time when timber revenues are down, the various funds that respond to conservation are also flat. So you are appealing to Congress for additional appropriations, modest as they may be, for prescribed burning, for watershed restoration, for road restoration, a host of things, the noxious weed issues that make up this forest health, is that correct?

Mr. DOMBECK. Yes, and I think more and more we are learning, and if it is in agriculture or forest management or whatever, that there are all sorts of interactions, and the thing that we would like to be able to do is use the broadest variety of tools and technologies available in the best and most efficient combination for the long-term benefit of the land.

Mr. VENTO. One of the criticisms that often is raised, of course, is that there is a great controversy about the suppression of fire and whether or not that suppression is actually responsible for in fact the buildup of fuel loads in the forest.

I know that someone is going to come through and say, well, this is what the forest looked like 120 years ago. It was barren and there was nothing there, and now this is what it looks like today. It is in much better condition, obviously under those circumstances.

What is the scientific state of the majority of scientists with regards to forest health today versus what it was in the past?

Mr. DOMBECK. Well, from the standpoint of the proportion of forests that are healthy versus those that are not is a really tough question, because then—what proportion of the tress and the condition of the trees and so on.

But I might say from the standpoint of monitoring and technologies, the sooner that we can identify the problems, the better. Rather than waiting until we have a catastrophic fire situation or rather than waiting until we have got this insect infestation, the

more that we can detect this coming, our early warning system is sort of, you know, keep your cholesterol down and get plenty of exercise to avoid the heart attack, and that is the direction that we really need to be heading in.

Of course, from the standpoint of science and technology, we are learning more and more about the interactions of things and we just need to apply those and I hope we can do it in a good, balanced context, and one of the things that I am looking for is being able to move with a broad support base as we fix our forests, because we do know that inaction is not the solution. In fact, the costs will increase.

Mr. VENTO. My time has expired and I have to leave. Thank you.

Mrs. CHENOWETH. Thank you, Mr. Vento. The chair recognizes the gentleman from Colorado, Mr. Schaffer.

Mr. SCHAFFER. Thank you, Madame Chairman. Before I start, Dr. Bartuska, could you tell me where you came from before you ended up with the agency? Tell me about your background.

Ms. BARTUSKA. I am originally from Pennsylvania and I got my degrees in Ohio and West Virginia, and spent nine years in North Carolina before I came up here working in research in the Forest Service and the university community and then most recently here with the forest health protection staff.

Mr. SCHAFFER. Thank you. Going back to this prescribed burning, on the forests where you know you want to do prescribed burning now, how soon would you start?

Mr. DOMBECK. Well, let me say first that I am not the prescribed—the fire ecologist, but what we look for basically is the window of opportunity from the standpoint of fuel moisture levels.

We always, and there are very strict guidelines that I would be happy to send you if you wish that our experts follow from the standpoint of weather conditions, relative humidity, fuel moisture, the time of the year, all of those kinds of things.

I was again out west last week. They were telling me about a situation, where if they would burn that the direction of the smoke would go over the interstate, then they could not burn because of the air quality as well as the public reaction to that.

So these are things that—every situation within a certain set of parameters is probably different.

Mr. SCHAFFER. What percentage of these lands would you estimate have to have fuel removed ahead of time mechanically?

Mr. DOMBECK. Before they would be burned?

Mr. SCHAFFER. Yes.

Mr. DOMBECK. I would ask Ann to—I would just have to almost take a wild guess. I am not sure.

Ms. BARTUSKA. It is highly variable obviously depending upon the geographic area.

For example, in the south, they almost never are mechanically removing things, and it is a very active program, but in certain parts of the west, mechanical treatment is going to have to be a very high priority first, and it could be ten to twenty percent before you go in and actually do any prescribed burning.

A lot of it is dependent on how much fuels there are, as we mentioned earlier with the urban/wildland interface, there will be conditions where we will not, even though prescribed burning might

be the most desired approach because of the communities there will have do mechanical treatments primarily.

Mr. SCHAFFER. Let me ask a more general question. Some of the Forest Service personnel that I have met with in Colorado believe that they are insufficiently funded to accomplish forest health projects.

Do you think they are right and how do you think we would deal with this?

Mr. DOMBECK. I think the answer is yes, and it is a matter of where we make—you know, as a society where we make—our investments and the priorities that you and the U.S. Congress in consultation with the Administration.

Let me say that as I mentioned, in national forests, we assume now that about 39,000,000 acres are at significant threat of fire, and as I look at the management practices, and I have the numbers here someplace, and I believe we are making process to the tune of about——

Mr. SCHAFFER. How many million acres a year?

Mr. DOMBECK. We would like to be at about 3,000,000 acres a year of treatment and management to get on top of the problem, and I guess—let me say I will respond in writing with the specifics, but I think we are somewhere in the neighborhood of 700,000 acres treated per year is about where we are at now, and we would like to be at about 3,000,000.

Mr. SCHAFFER. In your prepared comments, you mentioned the importance of gathering good data and giving us a good picture of our ecosystems and conditions and so on.

I would like to find out what kind of information does the forest inventory and assessment program provide for our national forest lands?

Ms. BARTUSKA. If you are speaking about the forest inventory analysis program, we have very good coverage in determining what the standing volume is as well as other structures of the forest.

For most of the national forests in the east and throughout the west, that combined with forest monitoring gives us a really good handle on some of the trends going on with other components like soils, condition of the forest.

Mr. SCHAFFER. Thank you, Madame Chairman.

Mr. DOMBECK. I just found the numbers here, sir. The President's budget allows for treatment of between 800,000 and 1,200,000 acres of high priorities for fiscal year 1998, and from the standpoint of planning and so on, we would like to be able to get up to about 3,000,000 or so per year to begin to gain on the issue.

Mrs. CHENOWETH. Thank you, Mr. Schaffer. The chair now recognizes Mr. Peterson.

Mr. PETERSON. Good afternoon and welcome to Washington. I was interested in knowing your familiarity with the Allegheny National Forest located in northwestern Pennsylvania.

Mr. DOMBECK. Well, I have been there. I have never worked there, and I grew up in the Chequamegon National Forest in northern Wisconsin not far from Lake Superior, 25 miles from a town of 1,500, so I am somewhat familiar with the eastern forest landscape and species and so on.

Mr. PETERSON. You are the custodian of maybe the finest hardwood forest in North America?

Mr. DOMBECK. I have heard about it and this is—I am into my second month on the job, but I hope to get up there and see it. I want to get out on the ground as much as I can and not only talk to the employees but talk to the local people that are there and be able to solve as many of the problems that we have locally as well as celebrate the successes.

Oftentimes, I think in the business of natural resource management, we don't spend nearly enough time celebrating the successes because the positive reinforcement and encouragement of employees and constituencies and so on is I think a very powerful educational tool that we can use and should be using a lot more.

Mr. PETERSON. I guess just to quickly familiarize you, it is a forest that I think contributes $12,000,000 to $15,000,000 a year to the treasury while only cutting about half of the recommended cut by the last forest plan, and I guess I would just like to ask you if you support the multi-use concept that has been there which I think has pretty successfully balanced recreation, water quality, hunting, timbering, and oil and gas exploration.

Mr. DOMBECK. Yes. I believe that the multiple-use concepts are among the cornerstones that we have and the fact of the matter is, we know how to do these practices and we know how to do them right in many cases, and in virtually all cases, and from the standpoint of the wide variety of demands and uses of national forests.

Recreation is in a tremendous growth phase today. Forest health is an issue that we have to deal with. The wildland fire issue is an issue we have to deal with. Some of the eastern pest and disease problems are issues that we have to deal with, but from the standpoint of overall balanced use, I believe that is where mainstream America is.

Mr. PETERSON. I just wanted to share with you that it is very much a part of our growing economy in that area. It is the finest hardwood forest in North America.

It is a mature forest. We had a sense a few years ago that there was a move on the national level to really limit or stop cutting, which most people that you might hear later today think would be a mistake, because it is a mature forest that needs harvesting, much of it or a lot of it. It is not, as some would say, that we are cutting down the rain forest. That is just not the case, but it is a mature forest. It is a very important asset economically to the area, and I look forward to you coming up this summer, if that is possible.

I would love to have the chance to spend some time with you, because it is not only a very valuable resource economically, it is a very beautiful forest, and it is just a nice place to visit and a pretty part of Pennsylvania, and we would look forward to your coming.

Mr. DOMBECK. Thank you, I accept.

Mrs. CHENOWETH. Mr. Dombeck, I thank you for being here in the committee with us. I saw a very interesting article in the Washington Times yesterday about timber harvest practices in Brazil.

A representative from the World Bank was indicating that in Brazil, we need to realize that we don't need to set aside vast

chunks of land exclusively for one use, that really, everyone is better off, including the communities, the logging industry, the environmentalists, everyone is better off when we can all work together using the same land, and actually, we achieve a higher standard.

I share with you the fact, Chief, that we have quite a mountain to overcome socially, but together, I think that we can do that and welcome to your new job.

Thank you very much.

Mr. DOMBECK. Thank you.

Mrs. CHENOWETH. The committee will recognize the second panel. On the second panel, we have Dr. Dennis Lynch, Professor of Forest Science, Colorado State University from Fort Collins, Colorado; Martin Moore, Director of Community Development and Planning from Apache County, Arizona; Harry Wiant, President, Society of American Foresters, Morgantown, West Virginia; and Dr. Stephen Schoenholtz, Associate Professor of Forest Resources, Mississippi State University, Mississippi.

Before we get started, I want to ask you to stand and take the oath. Would you raise your right hand?

Do you solemnly swear or affirm under the penalty of perjury that your statements and responses given will be the truth, the whole truth, and nothing but the truth? Thank you.

Without objection, I will now recognize Mr. Schaffer from Colorado to introduce Dr. David Lynch. Mr. Schaffer, thank you very much for bringing Dr. Lynch to us.

Mr. SCHAFFER. Thank you, Madame Chairman, and I appreciate the opportunity to introduce a constituent, and a noted one within his industry and profession as well. In spite of the material in front of us, his name is Dennis Lynch.

Dr. Dennis Lynch has been a professor of forestry and scientist at the Colorado State University in Fort Collins for the past 23 years. Previously, he spent 15 years with the U.S. Forest Service as a forester, district ranger, planning leader, and three years working at Colorado State Forest Service and Land Use Planning Commission.

Dr. Lynch holds a Bachelor of Science in forestry, a Master's degree in business, and a Ph.D. in natural resources administration, all from Colorado State University, I might add.

He has received numerous awards and honors over the years for his work in the area of forestry. I appreciate him coming here today and look forward to his testimony. Thank you.

Mrs. CHENOWETH. Thank you, Mr. Schaffer. Let me remind the witnesses that under our committee rules, they must limit their oral statements to five minutes, but that your entire statement will appear in the record.

We will also allow the entire panel to testify before questioning of the witnesses, and now the Chairman recognizes Dr. Lynch for the first testimony. Dr. Lynch.

STATEMENT OF DR. DENNIS L. LYNCH, PROFESSOR OF FOREST SCIENCES, COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO

Mr. LYNCH. Thank you, Madame Chairman and members of the Subcommittee. I appreciate your inviting me here to present my

views on forest health and management as these relate to the Central Rockies.

At the outset, I want to say that I am attempting to present what I believe are points of consensus gained from discussions with a number of professional forestry colleagues in Colorado and Wyoming, so I am indebted to my fellow faculty members, to the Wyoming State Forester and the Colorado State Forester and his management staff and fire division staff.

I am indebted to the Colorado Timber Association Director, the Wilderness Society forest ecologist, and the Chairman of the Colorado-Wyoming State Society of American Foresters.

In discussing issues of forest health and management related to the Central Rockies, it is important to review the historical interaction of people and forests, as I do in my written testimony.

There are several key points that I would like to draw from that summary. The first is that the forests that we have today in the Central Rockies are a result of a long history of human disturbance and use.

Second, these previously disturbed areas of the past have grown up under protection into today's mature forests.

Third, each time period from pre-history to the present has been accompanied in its own unique way with a society sense of forest health. In other words, definitions of forest health have subjective societal values interwoven with our ecological estimates.

Fourth, this long period of custodial care and protection in Colorado and Wyoming appears to have allowed shifts in understory plant species, the buildup of forest fuels, increased numbers of trees, and less overall forest diversity.

It is important to recognize that there are distinctly separate forest types in the Central Rockies, and that these vary uniquely from one another and from forests in the other parts of the United States. Therefore, generalizations about forest health may be of only limited application when addressing specific forest situations. Each forest should properly have its own specific criteria related to health and management, and as I will explain later, our approach to the restoration of these forests must change.

In my invitation to testify, I was asked to respond to the question what criteria would you use to determine if a forest is healthy or unhealthy. From my previous testimony, I think you can see why that question is very difficult to answer.

However, from my discussions with colleagues, I have attempted to find some areas of complete or general consensus about overall criteria. The first criteria that we agree upon is an unhealthy forest condition is outside the range of normal forest conditions.

Second, an unhealthy forest does not have a diversity of age classes and successional stages over large areas.

Third, an unhealthy forest does not have a diversity of plant and animal species.

Fourth, natural disturbances are more severe and frequent in unhealthy forests.

Fifth, dead trees and woody debris accumulations are much greater than decomposition rates and removals in an unhealthy forest.

Sixth, an unhealthy forest does not provide a balanced flow of benefits to sustain our society.

I have also been asked to respond to the question, what management tools would you consider most appropriate to maintain or improve forest health.

There is always the option of doing nothing, but I would like to point out that doing nothing carries a price tag. Currently, fire suppression cost per acre in the Central Rockies greatly exceeds the cost we have experienced in demonstration forest restoration projects.

The first management tool that seems appropriate to us is the use of prescribed fire. The results can be quite good in achieving desired changes or they can be quite variable. Prescribed fire is not a precise tool.

Another management tool we believe is quite appropriate in achieving forest health is the use of mechanical equipment to prepare areas for prescribed fire, to thin forests to desired stocking levels, and to remove forest products for our use. Some critics would quickly point out that this is just traditional logging or timber harvesting.

The key point I wish to make is that forest restoration is not traditional logging or timber harvesting. Mechanical removal can be more precise than the use of fire alone. It can achieve results in different forest types that prescribed fire cannot.

I also wish to note that current Forest Service procedures related to timber sale layout, administration, and pricing do not work very well in forest restoration situations.

Lastly, there are combinations of prescribed fire and mechanical restoration techniques that are especially appealing. Mechanical removal can extract materials for use while preparing the fuel bed for follow-up prescribed fire. It gives the manager options when air quality concerns, for example, preclude using fire to fully accomplish a project.

The Forest Service needs some new authorities for changing the way it does business in dealing with forest restoration projects. We suggest that the Subcommittee look careful at the potential for stewardship contracting on national forest lands.

This concludes my testimony. I will attempt to answer any questions the Subcommittee members may have.

[Statement of Dennis Lynch may be found at end of hearing.]

Mrs. CHENOWETH. Dr. Lynch, thank you very much for that valuable testimony. The chair now recognizes Martin Moore for his testimony.

STATEMENT OF MARTIN MOORE, DIRECTOR, COMMUNITY DEVELOPMENT AND PLANNING, APACHE COUNTY, ARIZONA

Mr. MOORE. Thank you, Madame Chair, members of the committee. I come before you today in the capacity of director of environmental planning and research for Apache County, Arizona. I am also at the dissertation stage of a Ph.D. at Northern Arizona University, specializing in western forest resource policy and management. I also serve on the Arizona delegation to the Western Governors' Drought Task Force, and I have worked as a member of the interagency coordinating group on wildland fire with the western

governors in tandem with the Wildland/Urban Interface Fire Policy Review Team.

Currently, we are facing a serious forest health crisis throughout the western States, which threatens adverse ecological, safety, and economic impacts on an increasingly catastrophic scale. These concerns are centered around a definition of forest health that includes the vitality and balance of wildlife populations, health of the forest resource, balance of multiple uses, and levels of catastrophic fire.

A number of scientists, including Dr. David Garrett and Drs. Wallace Covington and Margaret Moore have performed research showing alarming trends in forest resource health in Ponderosa Pine ecosystems.

Drs. Covington and Moore, with comparisons from 1867 to 1987, show a 994-percent decrease in herbage production, a 26-percent reduction in streamflow, and an increase from 24 to 843 trees per acre.

Concerned about the implications of Dr. Covington's research, Apache, Greenlee, and Navajo Counties in Arizona commissioned an independent, scientific study by Dr. Garrett of the health of the Ponderosa Pine ecosystem in the Apache-Sitgreaves National Forest, with comparisons to other southwestern forests.

This study includes a compendium of major scientific research with the full cooperation and assistance of the Apache-Sitgreaves National Forest, utilizing the latest forest stand inventory data, and is watershed-based research.

Dr. Garrett's conclusions, building on Covington and Moore's research, shows from 1911 to 1994, a 391 percent increase on the Apache-Sitgreaves Forest of trees per acre four inches or greater in diameter, with several stands exceeding more than 1,000 trees per acre.

Average maximum stand density index forest-wide is approaching a high danger level with several areas exceeding the high danger threshold.

Herbage biomass has plummeted to its low production levels, largely because of high tree densities. Water yields per acre will further decrease, resulting in continued stream flow reductions and water quality problems.

Fuel loads will rise from the current 20 tons per acre to well over 30 tons, and fuel ladders will dominate the landscape, leading to increasing numbers and intensity of catastrophic wildfire.

This continued downward spiral of forest ecosystems threatens the health and sustainability of recreation opportunities, wildlife and wildlife habitat, timber resources and water resources.

Another forest health indicator is level of fire intensity. Apache County, alarmed about fuel load buildups identified by Dr. Garrett and the Forest Service, conducted a comprehensive study of wildfire hazards and potential impacts throughout Arizona and New Mexico. The results of the study show that more than 224,000 homes are at high to extreme risk, threatening the safety of over 600,000 citizens.

Over 5,000,000 acres are at high to extreme risk of loss and potential costs of fire in relationship to timber resources, livestock, homes, and drains on the Federal treasury could exceed $35,000,000,000.

Dr. Garrett's research shows that the number of catastrophic fires has doubled in 20 years and will continue to rise.

Concerning the vitality and balance of wildlife populations, a third forest health indicator, Drs. Covington and Moore show that instead of wildlife geared toward open, park-like forest, types and numbers have shifted toward wildlife favoring closed canopy structures. This stresses wildlife adapted to open-space environments, threatening the survival of these species.

In addition, ungulates such as elk have erupted in population, eating forest meadows down to the roots, creating erosion and forage reproduction problems, in turn, destroying the grazing resource base for other ungulates and competing wildlife.

Another important indicator of forest health is the ability of the forest to provide for multiple uses. Current laws, regulations, court decisions, and most significantly, unhealthy forest resource conditions combine to form a serious threat to the continuation of human and natural multiple uses.

Based on this testimony and a preponderance of research, it is our contention that every aspect of multiple use is placed in serious jeopardy over the next 50 years in southwestern forests unless the current forest condition is reversed.

The overwhelming body of research shows a need to return forests to a healthy state for the sake of the total forest ecosystem, forest resources, public protection from wildfire, healthy wildlife populations, and every other aspect of forest health including multiple use and human survival.

To accomplish this, Dr. Garrett provides a 50-year prescription which should dramatically improve forest conditions across the landscape. These improvements include increased water yield; doubling of herbage production; increase in average tree size from less than six to 16 inches in diameter; healthy maximum stand density index for healthier, more disease and insect-resistant trees; and a 50-percent reduction in fire fuel load with a return to healthy, low-intensity fires.

This time line includes thinning, prescribed burning, and overstory harvest of high hazard, unhealthy, and overly dense trees of all diameter classes with emphasis on trees 20 inches and smaller, as this would not include healthy old-growth trees. Returning every ten years to treat and control burn is vital to this effort.

Dr. Garrett shows that this prescription, in which mechanical harvest is an imperative player, would result in a per-acre net value of $155, nearly ten times the $16 net value if we continue on our present course.

Added to this is the multi-billion dollar savings of treatment over destruction by catastrophic fire, tree-stand die-offs and drought.

Currently in place, and I will wrap this up very briefly. Currently in place on the Apache-Sitgreaves and Tonto National Forest is an ecosystem demonstration project agreement which we are part of. This agreement, if funded, would help facilitate implementation of forest health projects on these forests.

Madame Chair and members of the committee, the threat to our natural and human environments is real, and the solution is straightforward and affordable. To ignore them is unconscionable from either a scientific, ecological, social, ethical, or economic point

of view. It is our plea that all sides will come together to make the tough choices and act to preserve this nation's forests for ourselves and our posterity.

Thank you for this time, and I look forward to any questions.

[Statement of Martin Moore may be found at end of hearing.]

Mrs. CHENOWETH. Mr. Moore, I thank you for your very interesting testimony. I have been in touch in conversations with Mr. Mark Killian as well as the dean of Northern Arizona University there at Flagstaff.

It is fascinating, the work that has been done there, and I thank you for bringing that to the committee. Thank you very much.

At this time, the chair recognizes Harry Wiant from the Society of American Foresters. Mr. Wiant.

STATEMENT OF HARRY WIANT, PRESIDENT, SOCIETY OF AMERICAN FORESTERS, MORGANTOWN, WEST VIRGINIA

Mr. WIANT. Thank you. I am President of the Society of American Foresters, which is the largest professional forestry organization in the world, over 18,000 members.

It is a real honor to speak before this committee. I am serving on a related committee that is a scientific panel for Congressman Charles Taylor's forest health committee, and that has been a real pleasure also.

I am going to speak with two hats on, first as president of the Society of American Foresters, and second, as a private citizen and forester. They will differ a little bit.

The Society of American Foresters has studied the forest health issue for many years. You will find a written report in my testimony.

We conclude that there are serious forest health and productivity problems in the U.S., but also, forest health is an informal and a very inexact term.

An assessment of forest health has to consider not only the condition of the forest but what do you want out of the forest, the management objectives. Very importantly, forest health is a local issue. A single national prescription is inappropriate.

Now, I am going to express my personal views which aren't too different, but perhaps stated a little different than some of these. Please note in the record that I am not speaking for the Society of American Foresters at this time.

As humans, we experience, all of us, the joys of birth, the vigor of youth, the slowing down with age (and I have gone through several of those stages myself), and finally death. Very few of us would accept the idea that the hands-off approach is appropriate to maintain human health.

Trees and forests are similar. I want to make two main points. A well-managed forest is the healthiest possible, number one, and number two, there is no opportunity to address declining health in an unmanaged forest.

I want you just for a moment to picture a well-managed forest of 5,000 acres. The species are well adapted to the site, and we are going to grow trees until they are about 50 years old, and then we are going to cut them in what is called a final harvest. We call it the rotation age.

If we had a forest like that and managed it for 50 years, what would it look like at the end of 50 years? You would have 100 acres ready to plant or to regenerate naturally. These 100 acres might be scattered around in the forest, but you would have 100 acres like that. You would have 100 acres with one-year-old seedlings, 100 acres with two-year-old seedlings, etc., and you would have 100 acres with mature trees ready to harvest.

You would have logging and access roads that are well-engineered; regeneration you want to be prompt; and soil productivity is maintained. You would have intermediate cuts—we call them thinning to help other trees in the stand to grow to a greater size quicker.

Biodiversity would be great because you would have a good distribution of age classes, and that has been mentioned before. Fires, insects, and diseases tend to be most damaging to trees of certain ages, so this will minimize the danger from fire, from insects and diseases.

Thus, you have the good access roads, appropriate species, good age-class distribution, and good forest management. That is the criteria of a healthy forest.

Likewise, the management tools necessary to have a healthy forest are obvious. One, you would have to have an adequate cadre of professionals. I am talking about foresters, engineers, wildlife managers, and others.

Two, you would have to have the flexibility to manage the forest unhampered by poorly conceived environmental laws, by frivolous appeals, and by tax codes that discourage long-term management.

Three, you need to have a strong forest research program in the Forest Service and universities and in the private sector.

Four, forest management has to remain science-based with a complete tool kit, and that has been mentioned previously, but I want to mention some of the things we can't afford to lose. Prescribed fire, herbicides, selection cutting, clear cutting, seed-tree cutting, we need all those tools.

To put it in a few words, the answer to the forest health problem is more and not less forest management, and the primary responsibility for managing our forests should be in the hands of those best qualified for the job, foresters. Thank you.

[Statement of Harry Wiant may be found at end of hearing.]

Mrs. CHENOWETH. Mr. Wiant, thank you very much, and the chair recognizes Dr. Schoenholtz.

STATEMENT OF DR. STEPHEN H. SCHOENHOLTZ, ASSOCIATE PROFESSOR OF FOREST RESOURCES, MISSISSIPPI STATE UNIVERSITY

Mr. SCHOENHOLTZ. Madame Chairman, committee members, thank you for the opportunity to present my views on forest health this afternoon.

Forest health means different things to different people depending on their forest management objectives and philosophies.

There is general agreement that our well-being and the well-being of future generations depend on productive, healthy forests. However, some perceptions of forest health may vary depending on individual preferences for forest use.

To maintain and manage our forests in an acceptable state for future generations requires us to define forest health broadly enough to encompass the many facets of forest ecosystems.

What do we look for when we try to assess forest health? An assessment of forest health should consider key indicators that can be measured or described periodically to identify trends. We must remember that some key indicators of forest health may vary among different forest ecosystems.

For example, in many forests of the West, water limits plant growth at least for part of the growing season, but excess water may be the limiting factor in southern forested wetlands.

Key indicators may also vary among different management objectives. For example, I would argue that health indicators for intensively managed production forestry might differ from indicators used in managing for wilderness values.

Often, the primary concern when assessing forest health is the vegetation itself. Forest ecosystem health must include a level of acceptable plant productivity and biological diversity which, in turn, depend on the ability of the soil to supply necessary nutrients and water.

Forest vegetation indicators of productivity and diversity would include age, particularly of the overstory trees; structure, which is the vertical and horizontal arrangement of vegetation (a critical component of wildlife habitat); crown condition; foliar injury levels in the crown and the leaves; species composition which is very important for diversity and also for assessing forest product values; species diversity itself which translates into wildlife diversity by providing habitat diversity; growth rates; mortality rates; regeneration rates; species replacement patterns; presence of insects or disease; and presence of exotic species. This is just a partial list of some key indicators looking at the vegetation.

There is also a large range of soil attributes such as chemical, physical, and biological properties that can be used as part of the assessment of forest health. Some of the basic soil indicators would include soil texture, which is the proportion of sand, silt, and clay (soil texture indirectly affects many other soil properties).

We can look at maximum rooting depth where we have deeper soils producing more productive forests and more resilient forests.

We can look at soil bulk density and water infiltration rate. These are related to water and air movement. We can look at plant available water capacity; total organic carbon and nitrogen, which are very importantly related to organic matter; also nitrogen is often a limiting factor in forest ecosystems.

We can also look at pH, which indirectly controls many of the soil chemical reactions in the forest, and finally, we can look at soil strength, which indicates physical damage, particularly compaction-type damage from heavy machinery.

We have a good understanding of expected changes in vegetation over time (and we mentioned the U.S. Forest Service's forest inventory process earlier today) in many of our forest ecosystem types.

We also have a well developed data base of inherent soil properties from our Natural Resource Conservation Service. We have this for much of the country.

If these vegetation and soil criteria indicate deviations from expected trends or levels, then management practices to maintain or enhance forest health should be considered. These management alternatives would include removal of undesirable species, thinning to appropriate tree density or appropriate number of trees per acre, supplemental plantings, use of controlled or prescribed burning, manipulating vegetation to create specific habitat, possibly imposing stricter air quality standards, and fertilization.

Monitoring forest health will require manipulations of large volumes of spatial and time-dependent environmental data. This aspect of monitoring should be developed within a geographic-information-system environment that can accommodate incorporation of new variables and can be developed as an adaptive management tool.

Avoiding degradation of forest health is achieved by accepting management techniques that do not adversely affect the forest or the quality of the environment in which the forest grows. The forest management decision process should be based on potential impacts to indicators of forest ecosystem health.

It is essential that experience, feedback, and adaptability play prominent roles in any assessment of forest health and the management of forests. Thank you.

Mrs. CHENOWETH. Thank you, Dr. Schoenholtz. Now, we will proceed to questioning of the panelists. Each member will have five minutes for their questioning.

I will open with a question to Martin Moore. You mentioned the effects on water resources caused by the high density of trees, and you also noted that more than 5,000,000 acres of forest lands are at high or extreme risk of loss to catastrophic fires.

You mentioned 240,000 homes, perhaps 600,000 humans. That is startling. Could you explain further how fires on these lands will impact water sources and wildlife, and the second question is, what will the impact on the Mexican Spotted Owl be if nothing is done to mechanically remove some of the excessive fuels?

Also, have they yet seen a Mexican Spotted Owl?

Mr. MOORE. Unfortunately, Apache County probably hosts most of the Mexican Spotted Owls in Arizona. There are approximately 220-some-odd Mexican Spotted Owls in the Apache-Sitgreaves Forest in our area that we understand. Some are near interface communities, some are not.

If you don't mind, I will answer the second question first. There was a fire called the HB fire over in New Mexico. It destroyed—they don't know, they are still inventorying, but it did destroy some Mexican Spotted Owl nesting sites.

We had the huge 60,000-acre fire up in the Four Peaks Wilderness area that destroyed the entire Mexican Spotted Owl habitat on top of the Four Peaks Wilderness.

We know of approximately four Mexican Spotted Owl habitat territories that were burned in the 1980's in what was called the Dude fire near Payson, Arizona.

By the way, this is approximate—I believe it is 5,470,000 acres at risk, or something like that was arrived at from the data gathered by the Forest Service from their fire management and fire risk report, and their methodologies largely centered around interface

areas that would include campgrounds, near roadways, and near communities. It may not be reflective of some areas of the interior forest that are away from these areas.

As far as some of these numbers on impacts on streams and that type of thing, the basic process works like this. You get a catastrophic wildfire. A catastrophic wildfire, and I describe it in the written testimony a little bit, is the type of wildfire that burns large acreages, sterilizes soil, destroys land-based and aquatic wildlife, and threatens human life and destroys the regenerative capacity of the ecosystem.

Basically what we have got is a situation where you get a waxy layer down under the soil. You get a heavy rain that comes along behind that and it just happened that those conditions happened just right, or wrong in this case, with the Dude fire. The Dude fire came. They had heavy monsoon rains right after that. There was a lot of tearing up of the riparian bottoms. A lot of soil was washed downstream, and there are a couple of communities downstream, actually out of the forest where a lot of this soil washed in and flattened out the stream beds, and they have had incidents of flooding where homes and bridges were destroyed and that kind of thing.

That is basically what you would be looking at. Then it would destroy the long-term ability of the soil to regenerate. When you sterilize the soil like that, an ability for trees and that type of thing to regrow, especially Ponderosa Pine, is very difficult.

Mrs. CHENOWETH. We have some areas that were burned in Idaho in 1910, and they still don't have any regenerative ability.

Mr. MOORE. Yes. As a matter of fact, if anyone is in Flagstaff and takes a look at the hot fire that burned on I think it was the north side of Mount Eldon, you can see that they have tried time and again to replant trees up there and they just cannot get them to take hold.

Mrs. CHENOWETH. Very interesting. Mr. Wiant, given the criteria you described, maintaining soil productivity, a whole list of very, very interesting, very good criteria, would you say that forest health conditions tend to vary by ownership types with regard to State forests, private forests?

Mr. WIANT. Yes. I think they tend to vary by the amount of management that it is possible to do on them. Unfortunately, I think that some of our national forests are in terrible shape because we have been able to do very little management and able to do less every day, it seems.

I think some of the lands that are in best shape are those held by corporations who have managed them intensively with good forest management, and then our private landowners still need a lot of education, so there are some in between those extremes, I suspect.

Mrs. CHENOWETH. You mentioned the importance of providing flexibility to use a variety of management tools. How do current Federal laws limit a landowner's flexibility to do what is necessary to maintain or improve forest health?

Mr. WIANT. Certainly, our national forests are impacted by the amount of documentation that is necessary before they can do anything. It is extremely expensive to the taxpayers out there, and I happen to be one of them, and I kind of resent that.

Certainly, some of the laws make it very difficult for people. There was a letter by Carl Winger, who was at one time a station director for the Forest Service, in the Journal of Forestry recently, and he was talking about one of the laws, and I think we all know it is very important.

He describes what the country looked like at the turn of the century, and you have seen pictures at the time of the Civil War in the east at least. It looked like the battlefield, the French forests after the battles of the first World War.

The lands were really desolate, hardly any timber left, and I won't read that part to you, but I want to read one part of this letter, the conclusion, and I think it is very important.

He says that current land management practices are threatening or endangering 1,300 species of the survivors of that period, as claimed by the U.S. Fish and Wildlife Service, is simply not believable. How can we claim that the land management practices taking place, at least in the east today, can be threatening species that survived that catastrophic period at the turn of the century? It just doesn't make sense.

Mrs. CHENOWETH. Thank you, Mr. Wiant. It doesn't. How has the Society of American Foresters addressed the question of the legal entanglements that we find ourselves in?

We talked about the socioeconomic problems that we must overcome. What about the legal entanglements that you see? Will any recommendations be forthcoming either from your organization as a whole or what do you recommend?

Mr. WIANT. I think the Society of American Foresters is trying to stay apolitical, and that limits their ability to address some of these things, so my answer to that previous question was my answer not SAF's. I should label or maybe underline it somehow here verbally.

But we have studied some of them, and I think that you would find that we have policy statements that indicate that none of these should limit our ability to practice good forestry, and that should always be kept in mind by policy-makers.

Mrs. CHENOWETH. Mr. Wiant, how diverse is the membership of the Society of American Foresters?

Mr. WIANT. It is very diverse. It ranges, I would say probably there are a few members that think you shouldn't cut any trees and a few members who think you can cut them all and not worry about the environmental consequences, but most members are somewhere toward the center of that distribution, so it is quite a varied organization.

Mrs. CHENOWETH. Thank you. For my final question, I would like to ask Dr. Schoenholtz.

You noted that it is not possible nor is it necessary to consider all aspects of a forest ecosystem in order to assess its condition, yet the Forest Service decisions are frequently challenged because they are not based on the very latest and newest information.

Is this a reasonable standard to hold the Forest Service to? What are your feelings and your thoughts on that one?

Mr. SCHOENHOLTZ. My feelings are, if we try to assess or measure the health of all the components of an ecosystem, it would just be an impossible task if you consider air quality, water quality, soil

quality, vegetation, wildlife habitat, soils, the various components and how they interact.

My goal in presenting today was to try to pick indicators that integrate those various aspects, and in my opinion, the vegetation and the soil are two key general indicators that integrate a lot of the processes that go on in the system.

I don't mean to state that any of them are less important than others. That is a value judgment, but we need to find indicators that integrate many of these processes, and in my opinion, vegetation, including growth rates, diversity, and structure of that vegetation, is an integrator of the soil, water, climate, atmospheric stress, et cetera.

It also provides habitat for all the wildlife species that we are concerned with. So if you are going to spend limited funding, you have to pick key indicators that integrate many of the processes.

Mrs. CHENOWETH. Thank you, Dr. Schoenholtz. The chair now recognizes the gentleman from Colorado, Mr. Schaffer.

Mr. SCHAFFER. Thank you again, Madame Chairman. I have a first question for Mr. Wiant. You mentioned a number of restrictions and impediments that the Federal Government represents from time to time in purposes of private forestry, I presume.

I would like you—you mentioned tax policy as well, just in general, but I would like you to be a little more specific if you could.

What are some areas that we might consider within the context of tax policy that either promote or impede private forestry?

Mr. WIANT. All of a sudden, I am having a slip of memory here. The tax that has been discussed so often that they are hoping is changed, the tax law right now that deals with investments, capital gains.

The capital gains change was made several years ago and has had a great impact on private forestry. They are always very interested in seeing that change to be more favorable to them. That would be the main one I would think of.

This is a long-term investment. You are talking about perhaps 50 years or so before you can recognize any return. An example of this is, I know of a case in California recently where they had 500 acres of forest land that had been managed by a landowner, and after he died, there was a disagreement about the value of the estate. So the Internal Revenue Service required that it be evaluated and a forester attorney, a man who has both qualifications, was able to show that in California because of all the restrictions on forest management and the necessary plans that had to be turned into the State before you could do anything, he was able to show that 500 acres of California forest land had a negative value. As I understand from his report to me, he was told by IRS that you can't show a negative value, but he did win when it got into court.

That is showing kind of the extreme, but when you can show that 500 acres has a negative value because of regulation, there is something wrong with the system.

Mr. SCHAFFER. Dr. Lynch, I have a couple questions for you with regard to my local concerns that I bring here.

Specifically, what forest conditions in the Central Rockies concern you the most?

Mr. LYNCH. I think from this consensus and discussion that I mentioned in my talk, the things that really are of concern to a number of us would be first the fuel buildup that we see in the forests because of protection and custodial care.

We are concerned about the overstocking that exists in these stands. Currently, I believe that we are at a point where we may have more trees than we have ever had on the landscape and certainly, comparative photo studies by Thomas Veblen at the University of Colorado; Ric Laven, our own forest ecologist, pictures of the Manitou Forest, for example, indicate that we have tremendous numbers of trees now that we did not historically have.

We are concerned about the shift in the age classes. Many of our stands are reaching an over-mature, old category and the concern of everyone, the general consensus, was that we need to have a diversity of forest types across landscape areas that would consist of a number of successional stages and certainly, a number of age classes, and we just don't have those.

Another concern would be the species shifts where we see trees that are shade tolerant and understories that historically were not there, at least in our studies, and we are concerned about the presence of exotics. We have a number of exotic species that are in these forests, insect life particularly, that are of concern.

Mr. SCHAFFER. Could you comment on the prescribed burning proposal, how you think it may affect Colorado and other western States?

Mr. LYNCH. Yes. Prescribed burning is not a precise tool. I think that is the overall message to carry. It has some limitations.

The manager of fires can control the amount of fuel and he can control the ignition time and type of ignition. He can't control fuel moisture. He cannot control wind.

So there are limitations here to the use of this tool that are significant. If we are talking about forest restoration of the type that we believe needs to be done in the Central Rockies, we are talking about really burning thousands of acres of land, and we are talking about smoke management problems that are of significant concern, particularly air quality problems in our front range area where we have air quality concerns that are significant now.

Mr. SCHAFFER. Thank you, Madame Chairman.

Mrs. CHENOWETH. Mr. Schaffer. The chair recognizes Mr. Peterson from Pennsylvania.

Mr. PETERSON. Thank you. I have a general question. Mr. Wiant raised the issue, but I think I kind of sensed it in all of your testimonies.

You sort of rated who was managing the land the best, and I think you gave the best grades to the corporations and maybe lower grades to the Federal Government and private landowners, small private landowners.

Is this the sort of common theme I have heard here from all of you that as the Federal owner of a lot of land in this country, we are custodian but we are not really managers; we are not really managing the resource? Did I sense anybody that wasn't saying that in some way or another?

Does anybody want to say that is not what you said?

Mr. MOORE. To comment briefly, I think, at least from our perspective, our concern isn't so much about the ability and capability of the Federal land managers, the silviculturists and that to do their job.

I think our concern is possibly more about the paperwork, need for paperwork requirements, other types of restrictions, endangered species consultations, court cases and other types of forest plan restrictions built by political processes that are tying the managers' hands, and that is the complaint that we have heard from a number of managers in our area.

There are so many things that they see that they would like to have done on the ground. They would like to see a good streamlining of the processes, and we are certainly not advocating the total destruction of the processes, because there are important environmental considerations to take into concern, but at the same time, we are not only destroying the natural ecosystem. We are destroying the communities that are built up around these natural ecosystems because their economies are collapsing.

We have a number of areas back in our part of the State that are having this difficulty, so I would say our answer is help the managers to be able to get out there and manage in the field.

I think Mr. Dombeck's testimony was well taken. They see a number of things that they would like to do to help matters happen. We have seen, for example, we have a wildlife biologist under me on staff, and we see months and months and months of appeals on small timber sales, before you get on the ground and make something happen, so those are definite concerns that we see.

Maybe private landowners or corporate entities may not be faced with nearly as much.

Mr. PETERSON. Anyone else?

Mr. LYNCH. Yes. I would like to comment because I was a Federal forest manager for a number of years, 15 years. I was a district ranger, and as I look at the responsibilities of the past now that relate to the bureaucratic process, and I really mean that, the bureaucratic processes that are in place, managers do not have the flexibility to confront the problems that they once did.

In Colorado, we see private landowners that manage very intensively. We see landowners that have very little education and do virtually nothing and have unhealthy forests as a result.

But when we look at State and Federal ownerships, for example, we have State forest side by side with Federal forests. The State people can address the problems, move quickly, have the opportunities and flexibility and policy to deal with those, where the Federal forest managers just cannot get out of the morass that they are bound with.

These are competent people. I don't in any way wish to malign them. Many of them were my students, and what I see is that the processes have reached the point where they do not have the flexibility they once had.

Mr. WIANT. I would like to second that. I think the Federal lands are suffering from unclear objectives. They really don't know exactly what they should be managing for, the products they need to be producing.

The timber expertise in the Forest Service is decreasing all the time. They are hiring fewer and fewer foresters and they have been doing that for a number of years. So people that really know how to evaluate timber, to manage timber, are decreasing.

The loss of production capacities is impacting us all. In the northwest, the mills haven't just shut down. Many of them have moved out, and once we lose those production capacities, even if we have use for smaller materials, it is going to be a terrific investment over a long time to ever recapture that loss.

Mr. MOORE. I would like to add one more thing briefly. We appreciated, we understood that Congressman Pombo had introduced a bill in relationship to flood control, because I guess California is having severe flooding problems, and to streamline environmental and particularly endangered species processes, to be able to get those projects moving and to get that happening.

We wondered if a similar bill would be a possibility, especially in the extreme areas of wildland/urban interface hazard and possibly a drought situation, if that is something that couldn't be looked at also.

Mr. PETERSON. If I could just respond for a moment. I come from the east, but a lot of the managers in ANF have come from the west.

I agree with you. They are highly skilled individuals and fine quality people, but I guess it appears that the political pressures from whoever have sort of veered us from what was normally a good management practice and a multi-use practice of the tremendous amount of land owned by the Federal Government.

A lot of the rhetoric that has been out on the street is far from the fact, but somehow, we need to have a meaningful dialog so the general public understands the real issues, and when we deal with the real facts, we usually do the right things.

I guess I would like to commend all of you for coming here today and sharing, but I guess somehow, we need to form a plan of getting away from the political pressures and back to allowing good, true managers to manage our national forests, part of our heritage, and one of our most renewable resources.

I hope you will help us do that.

Mrs. CHENOWETH. Mr. Peterson, thank you very much. Gentleman, I thank you very much for taking your time and coming out here, and sharing with us this most valuable and instructive information.

I would invite you to stay for the third panel, if you possibly can, and you are now excused from the witness table, and we will call the third panel.

I call to the witness table Kenneth Kane from Keith Horn, Incorporated, consulting foresters, from Kane, Pennsylvania; Steven Holmer, Campaign Director of the Western Ancient Forest Campaign, Washington, D.C.; Ed Muckenfuss, Regional Manager, Westvaco Company, Summerville, South Carolina; and Bill Wall, Wildlife Biologist, Potlatch Corporation, Lewiston, Idaho.

I would like to call on the gentleman from Pennsylvania, Mr. Peterson, to introduce Kenneth Kane.

Mr. PETERSON. Thank you, Madame Chairman. First, I would like to submit for the record because I was not here when the hearing started, so I would like to submit this statement for the record.

Mrs. CHENOWETH. With no objection, so ordered.

[Statement of Hon. John Peterson may be found at end of hearing.]

Mr. PETERSON. Secondly, Madame Chairman, I want to thank you for first holding this oversight hearing and for giving me the opportunity to introduce a constituent and friend of mine who we are very pleased to have travel here from Pennsylvania today.

I want to commend you for holding this hearing so we can get advice in finding solutions to the threats on the nation's forests. It is an important issue to many of us.

I have the good fortune of representing the Allegheny National Forest, the only national forest in the Commonwealth of Pennsylvania.

For that reason, I am especially pleased to have with us a constituent from Pennsylvania's fifth congressional district, Mr. Kenneth Kane. Mr. Kane is vice president of Keith Horn, Incorporated, a small private forest consulting business in Kane, Pennsylvania.

Mr. Kane brings to this hearing a professional background of 13 years as a private forest manager, coupled with an in-depth understanding of the health and management of the resources on and in the Allegheny National Forest.

He is also chairman of the Pennsylvania Division of the Society of American Foresters. He is chairman of the Pennsylvania chapter of Association of Consulting Foresters in America.

At this time, I would like to welcome Mr. Kane, and I want to thank you for making the journey down here.

Mrs. CHENOWETH. Mr. Kane, excuse me. Before you begin your testimony, as a committee policy, we have all of our witnesses take the oath, so would you all stand, please, and raise your right hand.

Do you solemnly swear or affirm under the penalty of perjury that you will tell the truth, the whole truth, and nothing but the truth, so help you God?

Thank you. Mr. Kane, please proceed.

STATEMENT OF KENNETH KANE, KEITH HORN, INC., CONSULTING FORESTERS, KANE, PENNSYLVANIA

Mr. KANE. Thank you, Congressman Peterson, for the very nice introduction.

Madame Chairman and members of the Subcommittee, I appreciate the opportunity to join you this afternoon to discuss forest health in the Allegheny region, which includes the Allegheny National Forest.

Let me turn now to the two questions which you have asked us to reply to.

Question one, what criteria determines if a forest is healthy? To answer this question for the Allegheny plateau, you must remember that essentially the entire forest in the region was clear-cut between 1880 and 1930. The vast clear-cutting of that era virtually eliminated the beech, hemlock old-growth forest of the region. The hardwood forest which emerged did so naturally without planting.

So, within the forests of the Allegheny region and other second-growth forests in the eastern hardwoods, forest health is typically determined by answering some basic questions.

One, what is the condition of the crown, stem, root, and leaf of the tree?

Two, is there an adequate diversity of trees, shrubs, flowers, and other plant species present in the forest?

Three, are there trees of various sizes?

Four, are preferred tree and other plant species regenerating naturally, or are nonpreferred species becoming dominant?

It is important to emphasize that forest health criteria are defined by the landowner. Public forestry issues are very dynamic, because the objectives of the public change constantly. That is not the case in the private sector, where most forest landowners have two primary objectives, production of wood products and continuity of ownership.

So where do we stand? At present, forest health in the Allegheny region is threatened by native and exotic insects, disease, and mammals.

In addition to those problems, the forests of the region are simply growing old.

Hardwood forests change dramatically between 125 and 150 years of age. Specifically, species diversity drops from a wide variety of shade intolerant species to a handful of shade tolerant species. This decrease in tree species diversity is one measure of an unhealthy forest.

The forests of the Allegheny region are recognized internationally for the high quality hardwood timber they produce. The unique unglaciated soils of the region produce the world's best quality black cherry in stands that reach economic maturity at 80 to 100 years of age.

We have reached the point in time where the Allegheny plateau's biological and economic maturity coincide. Thus, we must address the needs to regenerate these forests for both financial and biological reasons.

But in addition, the public generally prefers to hunt, camp, hike in maturing 70-year-old Allegheny hardwood forests rather than decadent 150-year-old forests.

Having examined the criteria for a healthy forest in our region of the country, let me turn now to your second question, which is what management tools are most appropriate to maintain or improve forest health.

As a practicing forester, I recommend that landowners take certain actions to maintain the health and vitality of the forests within the Allegheny region.

One, employ sound silvicultural practices and professional forestry.

Two, use modern silvicultural methods in timber harvesting scenarios. These practices are site-specific and model natural occurrences.

Three, employ qualified resource managers to monitor forest conditions closely. This is necessary to follow insect populations and assess the effects of disease, drought, and other phenomena.

Four, control large deer populations, increasing the use of silvicultural regeneration tools such as fence enclosures and herbicides. Promote sport hunting to reduce deer overpopulation.

Five, use aerial application of natural pesticides. This is necessary to control exotic and abnormal native insect infestations.

In addition to these tools that are available to the resource manager, I believe that Congress and the Administration have continuing roles to play, and given this opportunity, I offer two concluding suggestions for your consideration.

First, you must continue to fund and promote forest research. Research at the Forest Service's Northeast Experiment Station in Warren, Pennsylvania, has provided the modern silvicultural methods used throughout the Allegheny region. Over 1,100 forest managers have attended the training sessions offered by the station.

Second and finally, there is a pressing national need for education programs for forest landowners, professionals and the public. Professionals need to better understand the modern tools available to them. Landowners and the public need to better understand the forest ecosystem and the necessity of using sound science as the basis for management decisions.

Thank you for the opportunity to present this statement. I will be happy to answer any questions.

[Statement of Kenneth Kane may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Mr. Kane, for your very interesting testimony, and I would like to now call on Steve Holmer for your testimony.

STATEMENT OF STEVE HOLMER, CAMPAIGN DIRECTOR, WESTERN ANCIENT FOREST CAMPAIGN, WASHINGTON, DC

Mr. HOLMER. Thank you, Chairman Chenoweth. Thank you for this opportunity to testify.

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

I would like to begin by saying that I totally disagree with the statement that only managed forests are healthy forests. Our forests did just fine for millions of years before management was invented, and to put it plainly, the lack of humility before God's creation to make that kind of statement, I find rather astounding.

There is increasing evidence that demonstrates that over the past three decades, our national forests have suffered too much logging, too much road building, and too much cattle grazing and fire suppression with little concern about the impact these activities have on our clean water supplies, fish and wildlife, recreational opportunities, and the ecological integrity of forest ecosystems. Too much management is the problem, not the solution.

A recent mapping project by the World Wildlife Fund concluded that only two percent of the original forests remain in the lower 48 States. The Eastside Forests Scientific Society panel report concluded that the few remaining roadless areas in eastern Oregon and Washington are still threatened, and that very little of the old growth Ponderosa Pine ecosystem remains.

The scientists' report recommends no logging of old-growth forests or trees of any species older than 150 years or greater than

20 inches in diameter; no logging in aquatic diversity areas; and to establish protected corridors along streams, rivers, wetlands, and lakes; no logging or road building in roadless areas.

Both the PACFISH and INFISH Federal interim guidelines for protecting imperiled fish stocks concurred with the conclusion that we need to protect roadless areas in riparian zones to restore declining fisheries.

These are the critical first steps toward proper management and rehabilitating faltering forests and aquatic systems in the inland west. The Sierra Nevada Ecosystem Project report came to similar conclusions, and also stated that timber harvest through its effect on forest structure, local microclimate, and fuel accumulation has increased fire severity more than any other human activity. The notion that we can salvage-log the forest to reduce fire risk is not supported by any empirical scientific evidence.

The State of Idaho has over 960 streams which are polluted and rated as water quality limited by the Environmental Protection Agency because of too much contamination in the streams. Over half these streams are being degraded by logging. Flooding, exacerbated by logging and road building in the Coeur D'Alene watershed is steadily sending millions of pounds of lead contaminated sediments into Lake Coeur D'Alene and ultimately, into the city of Spokane's watershed.

In Oregon, seven people were killed this year as a result of mudslides. Numerous scientific studies have been published, including one by the U.S. Forest Service that conclude logging and road building increase the risk of severity of landslides and flooding.

Across the west, fish stocks continue to decline, and many species, such as the Coho Salmon and Bull Trout are being considered for listing under the Endangered Species Act.

The private and public forests of the southeast United States are threatened by unsustainable logging. There are now over 140 chip mills in the southeast, and according to industry and the Forest Service, the growth-to-harvest ratio of softwoods in the south went negative in 1991. Further, hardwood forests are expected to exceed growth within the next two to ten years.

This is not only evidence that the industry is unsustainable, but that chip mills are depleting the forests, thereby impacting water quality, habitats, ecosystem health, and local forest-dependent businesses.

These are the facts as presented by the scientific community, industry, and government agencies. These are the real forest ecosystem health problems which this committee has chosen to ignore in favor of arguments that all come to the same conclusion, more logging.

Claiming to address the overstocking and fuel loading problems caused by fire suppression and grazing cattle, the 104th Congress passed the Salvage Logging Rider which suspended environmental laws and the citizens' right to have those laws enforced and participate in how their own lands were being managed, but no effort was made to address the more fundamental problems of too much grazing and too much fire suppression.

Under the rider, we witnessed the logging of ancient forests that have been protected by the courts. Under the rider, the guise of logging dead and dying trees was used by the Forest Service to log large, live green trees.

Unroaded areas, which represent some of our nation's last unprotected wilderness were entered and logged. The government's own interagency report on the implementation of the rider confirmed these abuses.

In the aftermath of the rider, several lessons are clear. Our environmental laws and public processes should never again be suspended. Ancient forests, roadless areas, and riparian zones need permanent protection, and the U.S. Forest Service needs to be reformed and made more accountable to the public.

To address these threats to the health of our forest ecosystems, we would like to make several recommendations which we would urge the committee to adopt.

Prohibit new road building on the national forests and prohibit the use of purchaser road credits to build new roads; prohibit logging and road building on unstable and potentially unstable national forest land; restore accountability by reforming or abolishing off-budget funds.

As Representative Vento mentioned, the interagency report concluded that the salvage fund created an incentive for the agency to choose logging projects when other activities such as prescribed fire or stream restoration would have been more appropriate, and this is because they get to keep most of the receipts by choosing salvage operations.

The next point is to end money-losing timber sales. The annual report of the White House Council of Economic Advisors shows that the Forest Service spent $234,000,000 administering the timber sale program than were returned in receipts.

Generally, the Forest Service subsidizes timber extraction from public lands by collecting less revenues than it spends on timber program costs, the report says. We urge the committee to end subsidized logging in the national forests.

At Senator Craig's recent forest management workshop, the GAO testified that during 1995, the Forest Service spent $215,000,000 of the taxpayers' money that they cannot account for. We urge the committee to use its oversight authority to find out what happened to the taxpayers' $215,000,000.

Further, we urge the committee to look at the full range of values our forests provide, such as clean water, fish and wildlife habitat, and recreational opportunities.

According to the Forest Service's resource and planning assessment, by the year 2000, recreation in the national forests will produce over $1 billion for the economy while logging will only produce $3,500,000. The value of clean and stable water flows from our forests is estimated in the trillions.

Recently, Chief Michael Dombeck testified, "The unfortunate reality is that many people presently do not trust us to do the right thing. Until we rebuild that trust and strengthen those relationships, it is simply common sense that we avoid riparian, old growth, and roadless areas."

We urge the committee to support Chief Dombeck's effort to reform the agency and restore the public's trust by adopting his common-sense recommendation and the other recommendations in this testimony including the restoration of eastern old growth, since there is almost no old growth left in the east.

The idea that we need to cut down the eastern old-growth forests is simply absurd. We need to restore old growth ecosystems in the eastern United States.

In closing, I would like to quote a Republican president who helped make this a great nation by protecting some of our national forests, Teddy Roosevelt, who said, "The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value."

I believe the United States is a great nation, but I feel that we are now risking that greatness by lacking the foresight and courage that made us great to begin with. We can choose to squander our remaining unprotected wild places, or we can be revered by future generations as Teddy Roosevelt is for having the vision and greatness to protect our nation's natural heritage.

Thank you for this opportunity to testify.

[Statement of Steve Holmer may be found at end of hearing.]

Mrs. CHENOWETH. Thank you, Mr. Holmer. The chair would now recognize Ed Muckenfuss, a regional manager from Westvaco Company.

STATEMENT OF ED MUCKENFUSS, REGIONAL MANAGER, WESTVACO COMPANY, SUMMERVILLE, SOUTH CAROLINA

Mr. MUCKENFUSS. Madame Chairman and members of the Subcommittee, thank you for this opportunity to contribute my ideas on what constitutes a health forest and what management practices contribute to establish and maintain them.

My name is Ed Muckenfuss, and I am Southern Regional Manager of Westvaco Corporation's Forest Resources Division. In my Region in South Carolina, we manage nearly 500,000 acres of company forest and advise private landowners who own another 400,000 acres.

Westvaco owns forest land primarily to provide a sustainable source of wood fiber for its mills. We also manage them to provide habitat for wildlife and clean water for the lakes and streams that adjoin them.

The key word here is manage. We firmly believe that in order for a forest to be healthy, it must be actively managed.

Healthy forests are forests that are growing vigorously and that have a diversity of age classes and forest types which enables them to resist disease and insect epidemics and helps to reduce the intensity of wildfires when they occur. The diversity of forest ages and types also provides a range of habitats for wildlife.

While some percentage of old-growth habitat is desirable, extensive areas of old-growth conditions or any single age class condition puts the entire forest at risk for catastrophic insect attacks and wildfires.

The photograph you see here is an aerial view of some of our forest in Kentucky. This forest is actively managed to maintain

healthy tree densities and various forest types interspersed across the landscape.

We consider this a healthy forest that achieves our objectives of providing a sustainable supply of wood fiber for our mill, diversity of wildlife habitats, and protection of the lakes and streams adjacent to the forest.

There are criteria that we use to determine the health of our forests. Number one, suitability of tree species to the site; two, the density of the trees relative to the ability of the site to support them; three, diversity of age classes across the landscape; four, the amount of fuel loading on the site; five, the condition of riparian areas for protecting lakes and streams; six, diversity of forest types across the landscape; seven, the relative abundance of noxious insects and the disease incidence rate; and eight, the availability of nutrients to sustain vigorous tree growth.

As I have said, healthy forests are the result of good, active management. Older forests eventually become overcrowded and lose their vigor, making them susceptible to disease and insect epidemics. Without management, these conditions set the stage for catastrophic events like the fires in Yellowstone National Park.

Here are the management practices that we use to improve or maintain forest health. Number one, good inventory information; two, landscape scale planning that provides for protection of riparian areas and diversity of age classes and forest types; three, provisions to regenerate with tree species appropriate to the site; four, intermediate stand treatments to control density and fuel conditions; five, careful inclusion and management of old growth or overmature stands; six, soil amendments as necessary to maintain productivity for intensive management; and seven, effective control of insect and disease epidemics.

In many ways, forests are like people. When they are young and growing, they usually can withstand pathogens and parasites with their natural defenses. As they grow older, they become increasingly susceptible, and therefore, require more care.

Inadequate management has put many forests in the United States at risk. In some forests, neglect has skewed forests toward stands of older age classes and allowed many stands to become overcrowded and overloaded with fuels.

In other forests, poor management practices have removed most of the healthy and vigorously growing trees, leaving the old and weak.

In either case, these forests are ripe for epidemic of disease and insects and the catastrophic wildfires that often follow.

We believe that by applying the management practices I have outlined, these forests can be returned to healthy conditions and provide for the needs of many generations to come. Without adequate levels of management, however, they will increasingly fall victim to catastrophic events which will result in losses that will deprive our children of their benefits.

Thank you again for this opportunity to express my views on this important subject.

[Statement of G. Edward Muckenfuss may be found at end of hearing.]

Mrs. CHENOWETH. Thank you very, very much. That is a very impressive picture, and I thank you for your testimony.

The chair now recognizes Bill Wall, from my own district in Idaho, an outstanding wildlife biologist, and I thank you very much for being here with the committee this afternoon.

Dr. Wall.

STATEMENT OF BILL WALL, WILDLIFE BIOLOGIST, POTLATCH CORPORATION, LEWISTON, IDAHO

Dr. WALL. Thank you, Madame Chairman and members of the Subcommittee. I currently serve as chair-elect of the AF&PA Wildlife Committee, and for the past five years, have worked to develop landscape management processes Potlatch Corporation in Idaho.

I would like to share with you some thoughts, and I am going to share four key points up front, and then get into answering the two questions that were asked of the panel.

First, I think we should consider that forest health should be equated with sustainable forest system health, not merely green trees.

Second, the intermountain west is a forest system in a health crisis and is right now beyond acceptable biological risk. The application of active forest management including timber harvest and controlled fire or silvicultural tools for restoring forest system health, and analysis tools which are the new ones that we have been generating over the past ten years or so. Our capabilities have really expanded, such as ecological landscape classification systems, GIS-based landscape planning, watershed analysis are all tools that we can use to help guide our active forest management to restore health in our forests.

Third, forest health criteria must be defined on the ecological capability where forested landscapes are located. Ecologists have described how physical land characteristics, weather disturbance factors interact to define different types of forest ecosystems across the country.

Fourth, each region will have a different criteria which affects risks to various forest values, thus general health criteria must be applied specifically within the ecosystem one is addressing.

Health and management criteria must also address several spacial scales from forest stands to watersheds to broader landscapes. We must not reach an either/or scenario of healthy trees or other forest values such as wildlife habitat. Rather, we should take an approach of both-and, healthy, diverse forest landscapes, healthy watersheds, as well as wildlife habitats.

To answer the first question on some of the criteria for considering healthy systems, the appropriate ecological representation of all the floral composition and structure across landscapes is one key. Each forest system has a broad range of conditions which are necessary for healthy forest systems. A healthy system is one that has a full, diverse array of those forest structures and communities.

Sustainable site productivity is the next key. Maintenance of soil characteristics which sustain the productive resilience of forest systems is critical. Sustainable and functional watersheds, quality stream conditions for salmon and fish, at least in our area, are dependent on functioning riparian habitats.

A healthy forest is one that maintains a full complement of functional habitats for native species across broad landscapes which encompass a variety of ownerships and land management objectives, and finally, acceptable risk from catastrophic disturbance such as wildfire, disease, insect outbreaks, as well as flooding.

Disturbance to forest systems, whether natural or manmade is necessary to maintain functioning and specific values of timber, water, and wildlife.

Now, some suggestions on some of the analysis tools and management techniques which can be applied to achieve those sorts of goals.

One, it has been interesting that industry has taken a lead role in the northwest in developing watershed analysis capabilities. These can be used to define risks to watershed functions from unhealthy forest conditions, to develop site-specific best management practices for the specific watersheds in which they are applied rather than a cookie-cutter approach which we have seen out of the Federal agencies, and define restoration and active forest management needs for reducing risks within those watersheds.

Ecological landscape classification systems help us to define the ecological capability of the ecosystem in which we are working, to understand historical disturbance regimes resulting in stand and landscape conditions, and to help us define appropriate ecological representation accross landscapes.

A GIS-based landscape planning process is the new tool that is allowing us to begin planning for those various conditions.

Finally, timber harvest and silvicultural methods that recognize the needs within these ecosystems that help us create the right structure and composition of vegetation across the landscape in addition to providing for wildlife habitat, functioning watersheds, and the types of economic returns that we need to maintain our communities in the west.

Finally, the thing that has really impressed me in the opportunities that exist relative to this issue and many other forest and natural resource management issues are the new partnerships that are beginning to develop, those that are being developed between public and private.

I have participated in quite a few and have been very excited about the outcomes of those. Also, the ability of industry to work at times with the Forest Service to develop new types of information, new tools, and to apply those to reach the ecological as well as economic goals that we are attempting to across landscapes. Thank you.

Mrs. CHENOWETH. Thank you, Dr. Wall, very much, and I thank the panel for their testimony.

We will now recognize the members for questions, and I want to remind the members we have five minutes for questioning, and I would like to first recognize the gentleman from Colorado, Mr. Schaffer.

Mr. SCHAFFER. Let me start by going back to a question that I had asked earlier with respect to prescribed burns. I would like to hear you all respond to this whole topic, the Babbitt proposal that has been announced and just where you see this fitting in in sound

forest management practices, in particular, for Mr. Holmer's comment that no forest management would be preferable.

What about this Babbitt proposal of management by prescribed burn?

Mr. HOLMER. Our concern has been that there has been an overemphasis on management. We support the idea of prescribed burning, and we will support thinning in the urban/wildland interface.

We do feel that the old growth areas, the unroaded areas, the riparian zones need to be put off limits as the key first step to restoring the ecosystems, and I think that you will find that if those steps are taken, it will also do a great deal to help deal with the problem of polarization, because the most contentious timber sales that people deal with are in these critical areas, and so by realizing the ecological importance as well as the social conflict that is surrounding these areas, by resolving that, I think you will find that it is easier to come to grips with how to manage the rest of the landscape, and again, I think prescribed burning and restoration of national fire regimes is the only way that in the long run we are going to be able to accomplish that.

Mr. SCHAFFER. Any of the others?

Dr. WALL. Fire in many of our forest systems has always been a natural disturbance factor, and there are many species that depend on fire being introduced, but fire can also be catastrophic and destroy wildlife habitat as well as the types of riparian zones that Steve is wanting us to protect and maintain.

It is a judicious use of fire that we are looking for and one that we can control in most cases, not to say that on occasion, wildfires will occur, especially in wilderness areas, et cetera.

To back up and say that we should exclude fire again I think would be a definite mistake. Fire is an integral tool, and as was suggested earlier in this panel, we need to have all the tools in our toolkit, and we need to be able to use those appropriately in the appropriate times.

Mr. MUCKENFUSS. Fire is an absolutely essential tool in the southeast. It is a matter of timing and conditions. There is no question that fires will burn in the southeast sooner or later.

Through the judicious use of prescribed fire, we are able to apply this very important management tool with proper timing and under conditions which create low-intensity fires that help reduce fuel loading as well as to create additional benefits from the standpoint of habitat for wildlife and so forth.

Fire has traditionally been used in the southeast by Indians and early settlers to do the same things that we accomplish with fire, and should we lose fire, it will change the entire ecosystem of the east coast for the worse.

There is not a tool that is more important to manage forests and that applies no matter what snapshot in time you would like to pick as to what kind of forest you would like to have. It is extremely important for longleaf, wire-grass ecosystems as it is for plantations.

Mr. KANE. I would concur that the use of fire is a critical tool; however, in the east, it is not as widely used as it is in other parts of the country because in our area, we have approximately 11 fire days that would qualify for prescribed burning.

However, it is going to be used to a limited extent in our area to reestablish some species that were lost because with the advent of science and the internal combustion engine, the wildfires that ran through the east during the steam years from the steam locomotives really allowed more species diversity and allowed the oak species to be more prevalent in the current forest than what we believe it can be in the future forest, because of just the nature of the species.

We are going to use prescribed burning even in the east, so it is a critical tool.

Mr. SCHAFFER. Madame Chairman, I don't have any more questions. Thank you.

Mrs. CHENOWETH. Mr. Schaffer, thank you very much. The Chair now recognizes Mr. Peterson.

Mr. PETERSON. Mr. Holmer, if you were suddenly appointed by the President and confirmed by the Senate to be the czar over all of public land, when and where would we cut timber?

Mr. HOLMER. Excuse me? Would I support——

Mr. PETERSON. If you were given the role of being in charge of our national forests, you were just absolutely in charge, where and when would we cut timber, or wouldn't we?

Mr. HOLMER. That is an interesting question. Our organization does not support any specific level of timber target. We have not taken a position on no logging, but what we do support is the use of conservation—biology, and the latest scientific information.

They are a few examples of this being conducted on a limited scale such as the Northwest Forest Plan. There is a new report out on the Sierra Nevada ecosystem, another process underway in the inland west in Idaho, Montana, eastern Oregon and Washington.

We would want to look at the whole ecosystem. In our view, our forests have been seriously overcut for the past three decades, so it could be quite possible that we are in a deficit situation right now, which would mean giving the forest time to heal.

Another key problem is the lack of protection for critical components of the ecosystem, such as old growth, roadless areas, and riparian zones, so restoring those areas and protecting those areas would be my first priority.

Mr. PETERSON. What part of the country are you from and where have you spent most of your personal time in the forest?

Mr. HOLMER. Actually, mostly in the east. I went to high school in the suburbs outside of Philadelphia, and I went to college at Penn State, so I have spent a fair amount of time on the Allegheny, and as my resume there says, I have been to national forests in 14 different States, and I have also had extensive experience with overflights and having a chance to see our forests from the air.

Mr. PETERSON. Do you believe the Allegheny National Forest has been overcut?

Mr. HOLMER. I am not familiar enough with the situation in the Allegheny to say that. I would say from my personal experience there, I was shocked at how many roads I saw. You can travel down certain roads seemingly in the middle of nowhere, but it seemed like it was a suburb because there were so many spur roads going off to the side to drill pads or timber sales or one activity after another.

I would have to say I was somewhat shocked at how industrialized that forest was.

Mr. PETERSON. Who do we own the forest for?

Mr. HOLMER. Well, the forests are owned by the American people, and the mandate is fairly clear, to protect the full range of values on public lands, and there is abundant evidence that not all the values are being protected right now.

When you look at the problem of clean water, when you look at the problem of declining biodiversity, there is every indication that not all the values are currently being protected, and when you look at the root cause, things like road building, logging, and grazing repeatedly come to the front as the reasons why these other values are being diminished.

Mr. PETERSON. I guess having spent my entire life very close to the ANF and often in the ANF, I would take some exception to you. I am an avid hunter myself, love to hike and spend time in the woods, in the forest, and I guess I would like to ask you how many people will go five miles off a road today?

When you talk about these huge blocks that are to be locked up, you are talking about a minute number, part of the society today that will travel a mile from their car because they are afraid.

I believe in having some real diversity, having some old growth, but how much, how big, for whom? I want to tell you, it is a very small part of the population that get five miles from their car under any circumstance in any forest.

Mr. HOLMER. I understand what you are saying, but I think that one of the values that these forests provide are fundamental ecological services, so recreation isn't always the key factor to look at.

We get a lot of clean water supplies off our national forest lands. This last year, the city of Salem, Oregon, had to close down their water treatment facility because there was so much sediment in their streams.

When you look at the full range that the forests provide, roadless areas are the key refuges for our biodiversity and they help control our water flows and help prevent flooding by remaining intact.

There is a lot of fundamental services that most people don't even think about, and most economists have been unable to quantify up to this date.

Mr. PETERSON. I guess I am here to say for the record that the Allegheny River and the Clarion River that flow from the ANF are the finest quality water-wise today than they have been in many, many years, and I think it is because of good practices, a lot of good environmental policy.

We have made great progress, and I can't let you get away with saying that we are not going in the right direction, that we haven't improved water quality in that region, because we have.

Mr. HOLMER. I appreciate you saying that, and I do know that there are some very beautiful places on the Allegheny that I enjoy visiting very much.

Mr. PETERSON. A quick question for Mr. Kane. You mentioned about education for the private landowner. The largest part of timber, at least in the east—I don't know that it is true in the west, is still owned by private landowners and small plots.

Is government playing an adequate role in helping people understand the value of their forests?

I know of cases where somebody only owned 20 acres. They sold it for a pittance, but it was worth quite a lot of money if it would have been marketed properly and cut properly.

Mr. KANE. That is exactly the case. The education is truly a moving target. In the computer age as information is doubling in less than a decade, there is so much for people to know out there, and they own a piece of property for income and to pass something on to their children and for many reasons, but they don't take the time to truly understand the ecosystem.

I think the education process is not only for the landowner, but for the general public. Very few people in the general public truly understand the forest and what it provides to them and how, and how managing the resource is so much more important than just hands off, because there is no way with the population of our society and the impacts our society has had on the forest ecosystem that we can say hands off, because even by standing back, we have touched it.

Mr. PETERSON. I would like to thank you personally and all of you for coming today.

Mrs. CHENOWETH. Thank you, Mr. Peterson. Bill Wall, I have some questions for you. That doesn't surprise you, does it?

Dr. WALL. Not at all. Thank you.

Mrs. CHENOWETH. Among the criteria that you described, you mentioned the state-of-the-art forest management practices and controlled fire. What practices are you referring to specifically for the record, and do both public and private landowners have these practices available for their use?

Dr. WALL. Yes, they do have them available for their use, but at this point, I think the timber industry has figured out, has taken the lead in figuring out some of the tools that we are applying to landscapes in understanding how to use computer technology and have the actual data in hand in order to apply those techniques.

We have some historical mistakes to correct, and we are learning very rapidly with those, and I would also suggest that our abilities to gather data, process that information and develop an overall feedback and learning process as we apply these things, the buzzword is adaptive management, is there inside industry and they are taking those sorts of lead roles at this point.

We have the opportunity to work with our neighbors on public lands to help generate the types of information that we need and to work to apply that information.

The specific techniques on the ground that are beginning to be applied are a completely different way of road building as well as timber harvesting techniques that are far more sensitive, that take into consideration physical site characteristics, and then turn around and apply specific types of applications to specific types of land that historically, we were not able to quantify or classify in the past.

Using those sorts of techniques has allowed us to understand much better how to manage our forest resource and to apply that, not only to the timber values that we are seeking, but also to main-

tenance of biodiversity of wildlife habitat as well as our functioning riparian and aquatic systems.

Mrs. CHENOWETH. You recommended using a coarse filter approach for landscape planning. Could you help me understand that better and also explain it for the record?

Dr. WALL. Sure. There was a lot of discussion earlier from various folks on this panel about a diverse array of structures and composition across the landscape.

A coarse filter approach is an approach to a broad scale landscape rather than a stand-by-stand approach, although we recognize the need to use the stand-by-stand approach, in taking the full complement of wildlife species that exist across that landscape, quantifying the types of habitats needed by those various species, and then through a planning process, making sure that we apply the appropriate techniques across space and through time to maintain the habitats necessary to maintain the species that we would find in any one location.

Along with that is an understanding of the ecological background or capability in which you are working which can be completely different depending on where you are. Even in Idaho, the fact that we have on our land base specifically a range from 40 or about 35 inches of rainfall all the way up to 80 inches of rainfall means that we have to think through the application of maintaining habitats and the application of specific practices depending even on just rainfall conditions.

What we are talking about is taking a broader scale approach to understanding how to maintain habitat through time and across space.

Mrs. CHENOWETH. And Dr. Wall, as you take that approach, are you considering the native species in the entire course of the forest? Are we moving back to replanting and reforesting to the native species so that they will be more resistant to attack, whether it be fire or insects or whatever it might be?

Dr. WALL. Most definitely. In fact, we are depending again on our ability to classify the site. We are putting species and in some cases, five different species within one stand back on specific sites.

Potlatch specifically has worked with the Forest Service through time to develop resistant strains of white pine, and in order to bring white pine back into the ecosystem which was native there, it is necessary to return to some early successional stages, because that species is not shade tolerant and does need sunlight.

We are actively working to restore some of the white pine sites as well as maintaining all of the rest of the native species that exist in northern Idaho on our land base.

Mrs. CHENOWETH. I have one more question for you, Dr. Wall. Will the Forest Service's ecoregion assessments, such as the Columbia River Basin ecosystem management project, help address the issues that we are trying to address as far as healthy forests and necessary criteria? Will it help on the public lands?

What is your feeling about that?

Dr. WALL. Well, it has tremendous potential, but at the same time, potential and reality are two different things, and the ability to apply the understanding that is gained from broad scale assess-

ments is, as we well recognize, a problem associated with the realities of regulations and the bureaucracy in which they work.

The other thing that I would suggest is that broad scale looks help us set context for the large scale. Where we make the mistake, I think, is in learning how to apply ecosystem management is trying to take information from the broad scale and bringing it all the way down to a very fine scale or local situation.

What, in my mind, has to happen after working in ecosystem management concepts for the past ten years is that we need to understand that broad scale context, but at the same time, we have to build site-specific strategies underneath that in order to achieve the specific goals, so we end up working from stands to watersheds, to landscapes, and then this broad scale context, so what we end up with is a simultaneous top-down approach which is a look at the broad scale, but building with good, fine information and capability at the fine scale and meeting somewhere in between in order to meet the objectives that we are setting for ourselves.

Mrs. CHENOWETH. Thank you, Dr. Wall. I appreciate all of your testimony very, very much. Mr. Holmer, I really appreciate your testimony today. We haven't always agreed, and most times, we don't, do we? But I am really surprised that no other environmental organizations wanted to take the opportunity to testify today.

I appreciate your being here, I really do. I would like for you to tell your colleagues in the environmental community that the record will remain open for about ten days if they would like to submit testimony for the record.

I also would like to invite you very sincerely to our forests out in the west. The dynamics out there are quite different than the forests in the east, and our fuel load in many areas in western forests are about 12 feet tall, and it really is a puzzle as to what to do. Because of our very strict ambient air quality standards, we can't even burn trash piles, so we really wonder about how far we can go in managing the forest by fire.

I thank you very much for your testimony, gentlemen, all of you. Thank you very much. I wish we had more time, but I will study your testimony and be very open to hear from any of you any time. Thank you very much.

[Whereupon, at 4:40 p.m., the Subcommittee was adjourned; and the following was submitted for the record:]

STATEMENT OF JOHN E. PETERSON, A U.S. REPRESENTATIVE FROM PENNSYLVANIA

Madame Chairman, it's a pleasure to be here today to participate in this oversight hearing in the Forest and Forest Health Subcommittee. This hearing is especially important to me as I represent the only national forest in Pennsylvania, the Allegheny National Forest. I look forward to the dialogue we are about to open concerning the management of our nation's forests and criteria for determining healthy forests.

The Allegheny National Forest (ANF), more than 500,000 acres, lies completely within my Congressional District (PA-5). The ANF is a unique and diverse asset that is enjoyed by residents of the Commonwealth and visitors from across the nation.

Although my views about the beauty and diversity of the Forest are subjective, the ANF does indeed have a very long list of attributes. Nearing the top of that list is worldwide recognition of the hardwood timber that grows on the Forest, black cherry in particular. In fact, the ANF is the single-largest source of high-quality black cherry.

While many of us are familiar with forest health problems as they relate to Western states, the forest health concerns of Eastern forests can be quite different. However, one common, pervasive problem is weather. On the ANF, it has been periodic drought that has caused notable damage. Specifically, in 1988 and 1989 almost 18,000 acres experienced significant oak mortality. Also, tornadoes and hail storm damage has been detrimental to health of the Forest.

As an Eastern forest, the ANF experiences threats from exotic sources like the forest tent caterpillar, gypsy moth, and cherry scallop shell moth. In 1994 alone, cherry scallop shell moth severely defoliated cherry on close to 40 percent of the ANF as it was the primary tree pest. Given these problems of such complex nature, research becomes a prime tool in determining methods to treat and prevent repeated instances.

Madame Chairman, I would be remiss if I did not mention how pleased I am to have with us here today a constituent from my District, Mr. Kenneth Kane. Mr. Kane is Vice President of Keith Horn, Incorporated, a small group of consulting foresters from Kane, PA. I believe Mr. Kane's expertise in the field of private forestry as a hands-on manager makes him uniquely qualified to testify about forest management tools and the criteria of determining a healthy forest.

I look forward to hearing from all of our panelists today as this Subcommittee seeks answers to these very important questions concerning the health and longevity of our nation's resources.

STATEMENTBY THE HONORABLE GEORGE RADANOVICH, A U.S. REPRESENTATIVE FROM CALIFORNIA

Thank you, Chairman Chenoweth, for providing this forum today to discuss the issue of forest health. No single issue is more important in this Subcommittee than addressing the long-term health of our federal forests. It is just that simple.

Your decision to focus this hearing on "what criteria should be used to determine if a forest is healthy or unhealthy, and what management tools are most appropriate for maintaining or improving forest health," is a sound one. In order to better address the needs of the forest, we must first understand both what has worked and what we have done wrong in our management of this valuable resource.

Furthermore, we need to re-examine the role of the courts in our forest management plans. Today, the laws guiding federal forest lands are often made not by sound scientific evidence, but instead by the courts. Lawsuits filed by extreme environmental organizations have contributed to the substantial reduction in timber harvests in recent years—including the salvage of dead, dying and diseased timber necessary to reduce the fuel load that has built up in our national forests. As we move forward in this process, we must remember that lawyers and judges don't improve the health of our forests, forest managers do.

Our national forests—I believe—are in critical condition. The volume of dead, dying and diseased trees has reached epidemic level in recent years. These severe conditions have produced a rash of wildfires in recent years, destroying wildlife and habitat and forcing a substantial reduction in timber harvest levels not only in my district, but also the entire nation. For the sake of our forests, we must reverse this disheartening trend.

Sound science, education and a recognition that the forests provide both an ecological and economic role in society are necessary in order to move away from the conflict and controversy that has surrounded our forest debates and towards a locally-driven consensus-based forest management program. A forest is a sustainable resource. If properly managed, it can provide equally for both the environment and the economy. A healthy forest is a win-win for both the environment and the communities who depend on the forest for their livelihoods. That is why we must place forest health legislation at the top of our agenda in this Subcommittee.

Again, thank you Chairman Chenoweth for putting this hearing together today. I look forward to the testimony of our witnesses today as we begin a very important dialogue on the management of our federal forests.

STATEMENT OF HARRY V. WIANT, JR., PRESIDENT, SOCIETY OF AMERICAN FORESTERS, ON BEHALF OF MYSELF AS A PROFESSIONAL FORESTER

Mrs. Chairman, my name is Harry V. Wiant, Jr., President of the Society of American Foresters (SAF). The over 18,600 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, edu-

cation, 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 to discuss the subject of Forest Health and to 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.

I wish to point out that I speak here today in two distinct capacities. First, I will address the views of the elected Council of the Society of American Foresters as expressed in its recent report entitled *A Framework for Considering Forest Health and Productivity Issues* prepared by SAF's National Task Force on Forest Health and Productivity. I wish to submit the full report for the record. I will also speak as a forester and citizen independent of the Society of American Foresters who is concerned with forest health issues.

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 is one we have struggled with in recent years. Our recent report 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.

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

I will now express my personal views, once again pointing out that these are not necessarily the opinions of the Society of American Foresters, which I would like noted in the record.

As humans, we experience the joys of birth, the vigor of youth, slowing down with age, and, finally, death. With proper attention to health, our productive years may be extended. Few of us believe a "hands-off" approach is appropriate to maintain human health. Trees, and forests, go through similar phases. Believing that a vigorously growing forest, within the limitations of site quality and age, that is not seriously threatened by insects, diseases, fire, or other hazards is healthy, my over 40 years of experience as a forester leads me to the firm convictions that:

A well-managed forest (along a spectrum from intensive management to wilderness management), with management addressing landowner or societal objectives, is the healthiest possible.

In an unmanaged forest, there is no opportunity to address declining health.

Picture a well-managed 5,000-acre forest, comprised of trees well adapted to the site, and being managed with a rotation age (the age at which the final harvest of trees occurs) of 50 years. After 50 years of management, 100 acres (perhaps not in a single location on the forest) are being regenerated by natural or artificial means, 100 acres have 1-year-old seedlings, etc., with 100 acres ready for the final harvest. Logging and access roads are well engineered, regeneration is prompt, and the soil productivity is maintained.

Hazards to forest health, such as fire, insects, and diseases, generally are most damaging to trees of given ages. The age-class distribution of the well-managed forest minimizes those risks. With proper intermediate cuts (cuts made to provide spacing for crop trees to maintain vigorous growth, to salvage diseased and damaged trees, etc.), productivity and biodiversity are generally maximized.

The criteria to judge whether a forest is healthy becomes obvious:

Soil productivity is protected and maintained with well-engineered logging and access roads and prompt regeneration.

The forest is comprised of species well adapted to the site.

There is an approximately balanced age-class distribution.

Well-maintained logging and access roads facilitate forest management and protection.

Fuel levels, diseases, insects, and other potential hazards (deer, for example) are at reasonable levels.

The management tools necessary to maintain or improve forest health are evident also, including:

An adequate cadre of professional foresters, wildlife managers, recreation specialists, engineers, hydrologists, and others is available to provide the expertise needed to produce the commodity and non-commodity values desired.

There is flexibility to manage the forest, unhampered by poorly conceived "environmental" laws, frivolous appeals, and tax codes which discourage long-term investments in timber management.

There are strong forest research programs in the USDA Forest Service, universities, and the private sector.

Forest management remains science based, and the "toolkit" available to managers (prescribed fire, herbicides, selection method, clearcutting, etc.) is maintained.

To put this in few words, the cure to our forest health problems is more and not less forest management! The primary responsibility for managing our nation's forests should be in the hands of those best qualified by training and experience, the foresters.

Thank you.

STATEMENT OF HON. STEPHEN H. SCHOENHOLTZ, ASSOCIATE PROFESSOR, FOREST AND WILDLIFE RESEARCH CENTER, MISSISSIPPI STATE UNIVERSITY

Madam Chairman, Committee Members:

Thank you for the opportunity to present my views on useful criteria to assess forest health, and management tools appropriate to maintain or improve forest health. Forest health means different things to different people depending on differences in forest management objectives and philosophies. Therefore, defining forest health is currently a topic of intense debate. There is general agreement that our well-being and the well-being of future generations depends on productive, sustainable, healthy forests. However, some perceptions of forest health vary depending on individual preferences for forest use. To manage and maintain our forests in an acceptable state for future generations, requires us to define forest health broadly enough to encompass the many facets of forest ecosystems.

Evaluating forest health is a daunting task. Forest components such as plants, animals, soil, water, and air have many complex interactions that we may recognize, but do not fully understand. Evaluating and monitoring health of some components may be difficult and/or expensive. Forests are constantly changing. This must be recognized when assessing their health. Some indicators of forest health at one stage of forest development may not be important at other stages. Furthermore, separating human-induced change (e.g. increased ozone or acidic deposition, historic farming, tree harvesting, burning) from natural change (e.g. wildfire, insect outbreaks, severe storms) can be difficult. Finally, the question of scale must be addressed in the assessment of forest health; that is, forest health can be considered at the stand level (10's of acres) or at regional or national levels (millions of acres).

What do we look for when we try to assess forest health? We must keep in mind that forests consist of components in addition to trees. These components include other vegetation, animals, soil, air, and water. An assessment of forest health, therefore, should consider key indicators that can be measured or described periodically to identify trends. Key indicators should also effectively integrate the status of all forest ecosystem components. It is neither possible nor is it necessary to consider all of the processes and components of a forest ecosystem in order to make useful assessments about forest health or the consequences of forest management for forest health. We must focus our efforts on identifying key indicators, the knowledge of which will permit acceptably accurate assessments of forest health. We must remember that some key indicators of forest health may vary among different forest ecosystems, among different spatial and temporal scales, and among different scientific and managerial objectives.

There is great merit in trying to identify indicators of forest health in spite of the difficulties involved because these indicators are essential for understanding and predicting forest health. To be useful in society over a range of ecological and socioeconomic situations, key forest health indicators should meet the following suitability criteria (after Doran and Parkin 1994): integrate ecosystem properties and processes; be accessible to many users and applicable to field conditions; be sensitive to variations in management and climate; and where possible, be components of existing data bases.

Measurements of forest vegetation meet these suitability criteria. Vegetation is often the component of primary concern when assessing forest health. However, it also provides habitat for animal communities and it interacts with other ecosystem components such as soil, air, and water. Forest ecosystem health must include a level of acceptable plant productivity. This productivity depends on development of

efficient leaf area and on maintaining low stress levels in plants. This, in turn depends on the ability of the soil to supply necessary nutrients and water.

A list of basic forest vegetation indicators includes: age; structure; crown condition; species composition; species diversity; growth rate; mortality rate; foliar injury; species replacement patterns; regeneration rate; presence of insects or disease; and presence of exotic species.

We have a good understanding of expected temporal patterns in many forest ecosystem types. If these criteria indicate deviations from expected patterns, then management practices to maintain or enhance forest health should be considered.

These management alternatives include: removal of undesirable species; thinning to appropriate tree density; supplemental planting; use of controlled burning; fertilization; manipulating vegetation to create specific habitat; and imposing stricter air quality standards.

Soil is recognized as a critical component of forest ecosystems and, as such, quality of soil has a profound effect on the health and productivity of a given ecosystem. Soil is a dynamic, living, management-responsive resource whose condition is vital to both forest ecosystem function and to global balance. Health and quality of soils determine plant, animal, and human health. Criteria for indicators of soil quality and health relate mainly to their utility in defining ecosystem processes and integrating physical, chemical, and biological properties, their sensitivity to management and climatic variations, and their accessibility and utility to society. Ultimate choice of specific indicators for assessing soil quality and health will depend upon identification of strategies for sustainable management of our forest resources.

There is a large range of soil attributes, such as chemical, physical, and biological properties and processes that can be used to indicate soil quality. Some of these attributes have wide utility and can serve a range of purposes.

These basic soil indicators include (after Doran and Parkin 1994): soil texture; maximum rooting depth; soil bulk density and infiltration; plant-available water capacity; total organic carbon and nitrogen; pH; electrical conductivity; and soil strength.

Other measurements will probably be needed depending on management objectives, local conditions, and existing data bases.

Our knowledge of factors affecting forest health is incomplete. To be acceptable evidence of change in forest health these conditions must be met: (1) changes in vegetation must be attributable to differences in environmental conditions (e.g. soil properties, air quality, climate); (2) changes must be evident for a sufficient time so that short-term, temporary differences are not mistaken; and (3) judgements should be based on adequate knowledge of forest factors affecting health.

Monitoring forest health will require manipulations of large volumes of spatial and time-dependent environmental data. This aspect of monitoring should be developed within a Geographic Information System environment that can accommodate incorporation of new variables and can be developed into an adaptive management tool.

Avoiding degradation of forest health is achieved by accepting management techniques that do not adversely affect the forest or the quality of the environment in which the forest grows. If a negative effect is an unavoidable consequence of the management goal, then future forest health problems need to be averted by incorporating the appropriate ameliorative techniques into management decisions for the forest. This requires an understanding of what has been changed in a negative way and the correct ameliorative practice needed to restore forest health.

Although we lack empirical evidence for judging the degree to which some criteria can be altered without concomitant loss of forest health, we must harness what we know about forest ecosystem function in a form that is useful for managers and policy makers in order to help those responsible for making effective decisions about forest management and environmental regulations. The forest management decision process should be based on potential impacts to indicators of forest ecosystem health. Since our knowledge base is incomplete it is essential that experience, feedback, and adaptability play prominent roles in any assessment of forest health.

Literature Cited:

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Doran, D.C. Coleman, D.F. Bezdicek, and B.A. Stewart (eds.), Defining Soil Quality for a Sustainable Environment, SSSA Special Publication Number 35, Am. Soc. Agronomy, Madison, WI.

STATEMENT OF MIKE DOMBECK, CHIEF, FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Madam Chairman and members of the Subcommittee:

I am pleased to appear before this subcommittee for the first time as Chief of the Forest Service. As some of you may know, I am no stranger to the Forest Service, having grown up 25 miles from a town of 1,500 people in northern Wisconsin's beautiful lake country, in the Chequamegon National Forest. In my Forest Service career, I have worked at various levels of the organization in the West, Midwest, and Washington D.C., before going to the Department of the Interior. I am glad to be back. I am accompanied today by Dr. Ann Bartuska, Director of our Forest Health Protection Staff.

Success Stories in Forest Ecosystem Restoration

Today, I will begin my testimony with several concrete examples of efforts to restore the health of our nations forests. These examples demonstrate we can improve the conditions of forest ecosystems.

Longleaf Pine in the Southeastern United States

Of all the southern pines, many consider the longleaf pine the most valuable in terms of quality of wood products, the most aesthetically pleasing, and the most resistant to fire and to insect and disease attacks. In presettlement times, approximately 60 million acres of longleaf pine stands extended from East Texas through the lower coastal plain to Virginia. This ecosystem was maintained by frequent low-intensity fire from lightning strikes or human-caused ignition. By the early 1900's, the area of longleaf pine forests had been reduced to about 3 million acres, mainly due to the exclusion of fire from the ecosystem and because of extensive conversion of forest lands to agricultural uses.

We are now artificially regenerating longleaf pine on the most appropriate sites where it originally grew. We work with other federal agencies, state forestry organizations and private land owners in this effort. We are also involved in cooperative research on longleaf pine ecosystems with partners such as the Alabama Alliance with members representing Tall Timbers Research, Inc., universities, private landowners, and environmental organizations. The Forest Service is now making restoration of longleaf pine ecosystems a priority as the national forests revise their land and resource management plans. Through these efforts, we are establishing new stands of longleaf pine and are providing a wide array of ecological, social and economic benefits.

Seedling Resistance to White Pine Blister Rust

In 1909 and 1910, white pine blister rust was from contaminated nursery stock from Europe and was introduced to the east and west coasts. The first infection in Idaho was discovered on the Cour D'Alene National Forest in 1923. Since then, it has spread throughout the white forest pine type in Washington, Oregon, Idaho, and western Montana. In the west, blister rust has typically killed 90 percent or more of the western white pine. Stands where white pine formally dominated have been converted to grand fir, cedar, hemlock and Douglas-fir. Control efforts were largely successful in the east, but proved ineffective in the vast expanse of western wildlands.

Disease-resistant white pines were observed in infected areas. In the 1950's and 1960's, we began a successful breeding program to develop resistant white pines. Today, we have saved the species from extinction and are reintroducing resistant white pine seedlings as fast as we can working toward the restoration of the western white pine ecosystem in our Northern Region.

Prescribed Fire and Thinning on the Boise National Forest

The past decade brought severe drought and fire to the Boise National Forest in south central Idaho. Catastrophic wildfires burned as never before and the damage to the forest ecosystem and dependent communities has been severe. The conditions that have made the Boise so susceptible to catastrophic fire are evident. Once fire resistant forests dominated by ponderosa pine have been replaced by far more dense stands of trees—including many of species that would be naturally limited—existing under conditions that cannot be sustained. These overstocked, highly stressed stands have resulted in fuel loads that, when ignited, experience very largestand-replacement fires far more often than historical conditions provided.

The Boise National Forest has been a leader in identifying addressing forest health problems in ponderosa pine ecosystems. Using the latest technology to identify areas at highest risk to catastrophic fire, the Boise prepared over 16,000 acres for prescribed burning this year. Through the increased use of prescribed fire and landscape-wide thinnings, we are changing tree composition, stand structure, and

tree density to restore ponderosa pine ecosystems. The value of this work is obvious. It costs $20 to $50 an acre for prescribed burning compared to $400 to $4,000 an acre to suppress wildfires.

Before turning to the issue of forest health and how to measure it, I would like to talk about the broader issue of management of National Forest Systems (NFS) lands.

Management of The National Forests

There is an ongoing dialogue in this nation over how national forests and rangelands should be managed. This dialogue is healthy. Dialogue and information are the essence of democracy. The people we serve, all of the people, are now more fully engaged in defining our course. The task for the Forest Service is not to dictate the outcome. Rather, we need to be the facilitators, the suppliers of knowledge and expertise, the educators and communicators who help people search for solutions.

Today, faced with competing demands, new pressures on the land and greater challenges than ever before, resource management has become more contentious and more heated. We in this room can help to change that. I believe that if we work together, we can usher in a new era of resource stewardship and a deeper commitment to conservation; a commitment marked by a willingness to hear all sides of the debate; a commitment to remain open and responsive to new ideas, new values, and new information; a commitment to leave our lands healthier and our waters cleaner.

I call this commitment of working with people to maintain and restore the health of the land, collaborative stewardship. Collaborative stewardship rests on one very basic premise: We simply cannot meet the needs of people if we do not first secure the health of the land.

Forest Health in the United States

While our forests are generally healthy, past timber harvest practices such as selective removal of pine overstory in the Inland West with the subsequent ingrowth of fir understory and the elimination of fire from these fire-dependent ecosystems have increased the risk of catastrophic wildfires, and increased the severity of drought, insect infestation, and disease. Serious forest health problems do exist and forest management practices must be improved based on the best available science.

Most people support the goal of sustaining healthy forest ecosystems. Yet, over the past year, the words "forest health" have become unnecessarily value laden and incorrectly characterized to imply "log it to save it." If we are to move beyond the divisiveness associated with implementation of the salvage rider, we must begin a more productive and credible dialogue about "forest health." To so do we must abide by three principles.

First, unhealthy conditions in our forests developed over many decades—any solution will require time and commitment to implement. We must look at restoration of forest health as an investment: an investment in the land; an investment for our children's futures; an investment that will ensure productive, healthy and diverse national forests.

Second, restoring forest health in not simply a forestry issue. A healthy forest is one that maintains the function, diversity, and resiliency of all its components, such as wildlife and fish habitat, riparian areas, soils, rangelands, and economic potential and will require active management. It will require road maintenance and obliteration; use of prescribed fire; grazing management; thinning of green trees; salvage; and, other forest management practices. We must use all available tools and continue our search for new ones.

Third, we must more effectively communicate the many environmental and economic benefits of restoring forest health as well as the consequences of inaction. If people do not support restoration of forest health, then all of our best efforts will be wasted.

I would like to concentrate my remarks today on how we can work together to develop a strong network of healthy forests.

Forest ecosystems are dynamic and ever changing. We now know the futility of trying to maintain static and predictable forest conditions. We recognize that natural disturbances such as fire, flood, insects, disease, and hurricanes are not only inevitable, they are necessary to maintain the health, diversity, and productivity of a forest ecosystem. Understanding the role and function of natural disturbances and the effects of human-induced ones is prerequisite to restoring and sustaining healthy ecosystems. How we integrate these relatively straightforward concepts into our restoration efforts is the challenge.

Inventory and Assessments

Establishing priorities for restoration projects requires a clear understanding of forest ecosystem conditions and trends. Programs such as Forest Inventory and Analysis and Forest Health Monitoring provide information to assess national conditions and trends. These data assist us in the development of regional assessments such as the Interior Columbia River Basin Assessment, the Sierra Nevada Ecosystem Project, and the Southern Appalachian Assessment. At this regional scale, all of the critical issues are described, alternative solutions proposed, and implementation considerations identified as background material for potential land management decisions. The point is that without good base-line data, we cannot make good management decisions.

Actions

The Forest Service has identified a series of management actions to address the critical issues of forest health mentioned. These include:

•Increasing the role of prescribed fire and fuels treatment;

•In partnership with the Animal and Plant Inspection Service, reducing the introduction, spread, impact and increase control of exotic pests—both plant and animal;

•Accelerating restoration of riparian functions;

•Increasing thinning in dense forests;

•Increasing monitoring of forested and rangeland ecosystems;

•Increasing use of science in resource-decision making;

•Increasing technical and financial assistance to non-industrial private forest (NIPF) landowners.

The Forest Service will work with its partners using these priority actions to address critical forest health issues.

Specifically, the FY 1998 budget proposes a significant increase in fuels management under our wildland fire management proposal. The fact is we have less of a "fire" problem then we do a "fuels" problem. We must make fuels management a significant part of our overall fire management program and, ultimately, this investment in fuels reduction will result in long term savings in fire suppression costs. We have also proposed increases for timber stand improvement activities and forest vegetation management. We hope you will support the 1998 budget proposal.

In addition, we will shortly share with you a legislative proposal to create a new permanent fund called the "Forest Ecosystem Restoration and Maintenance Fund". This fund would provide additional resources for reducing fire hazards and improving the structure and health of forests.

Another specific action involves cooperative efforts encouraged by our State and Private Forestry programs. Increasingly, the nation is dependent on non-industrial private forest lands (NIPF), which comprise 50 percent of privately owned forest lands, to meet timber demands. Some NIPF lands are not as healthy or productive as the owners would like. The Forest Stewardship Program and the Stewardship Incentives Program provide technical and financial assistance to NIPF owners in meeting their objectives for good land stewardship.

Other programs such as Economic Assistance and Agroforestry help develop the linkages between healthy wildland communities and healthy human communities. The Urban and Community Forestry program provides financial and technical assistance to communities in how to plant species of trees that are less likely to succumb to insects and diseases and other damaging agents. As you can see, forest health is not simply a salvage issue; it is an ecosystem restoration issue with broad opportunities and complex solutions.

One Approach to Forest Ecosystem Restoration

An outstanding example of the type of collaboration necessary to restore forest health is happening in the eastside forest ecosystems of Oregon. A blue ribbon panel of scientists convened by Governor Kitzhaber identified ways we could speed the healing of these ecosystems, methods which may be broadly applicable to all forested regions of the West. The Kitzhaber report embraces the full spectrum of forest and watershed management and restoration activities such as riparian restoration, noxious weed management, prescribed fire, grazing management, and thinning. It also contains a common sense recommendation that initial forest ecosystem restoration efforts focus on less controversial areas avoiding riparian, old growth, and roadless areas.

I have asked Governor Kitzhaber, Congressman Bob Smith of Oregon, and a broad range of public interests—environmental and industry—how we can move forward and begin the restoration of the eastside forest ecosystems. Last week I spoke with the Governor and his collaborative citizen's council. I have already met with the heads of the Fish and Wildlife Service, National Marine Fisheries Service, the Environmental Protection Agency, and the Bureau of Land Management to discuss how we can constructively employ the approach outlined by Governor Kitzhaber. All

parties have expressed strong interest in moving ahead with restoration of our forest ecosystems. I believe this is the sort of approach that will help rebuild trust and support for forest ecosystem restoration activities.

Criteria and Indicators for Forest Health

Because the issue of forest health transcends national boundaries, we have been working internationally to address forest health concerns. Building on our Forest Inventory and Analysis and Forest Health Monitoring programs, the United States, as one of 12 countries, was signatory in 1995 to the Santiago Declaration. Signatory countries contain more than 40 per cent of the world's temperate and boreal forest lands. This landmark document lists 7 criteria that characterize how we must manage for sustainable forestry along with indicators for measuring sustainability. The criteria include: conservation of biological diversity; maintenance of productive capacity of forest ecosystems; maintenance of ecosystem health and vitality; conservation and maintenance of soil and water resources; maintenance of forest contribution to global carbon cycles; maintenance and enhancement of long-term socioeconomic benefits to meet the needs of societies; and legal, institutional and economic framework for forest conservation and sustainable management.

Summary

The message I wish to leave you with is that we can accelerate the healing of our forests. And we can do so in a balanced and measured approach. This is not about the "cut it to save it" misnomer that presently surrounds the words "forest health". It is about sitting at the same table with the regulatory agencies, state, other land managers, and citizens and taking action before we are confronted with incredibly costly—both socially and environmentally—conflagrations.

The consequences of inaction far outweigh the fiscal costs of forest ecosystem restoration. Catastrophic events such as floods, fire and landslides, are occurring at increasing frequencies with ever more devastating consequences. Noxious weeds are diminishing the productivity of hundreds of thousands of acres of public land. Devastating fires are increasingly encroaching upon the urban-forest interface. Last year alone, over 6 million acres of public land burned. Healthy forests will provide the resiliency to minimize the severe consequences of these events. Without decisive action these problems will only worsen.

Restoration will not be quick. And in fact, it will be very expensive. But we must look at these sorts of activities as investments in the land—investments that will immediately reduce the risk of catastrophic fire and, in the long run will greatly enhance forest productivity, health, and diversity. It took many decades for today's unhealthy forest conditions to develop; it will take many years to reverse them.

Thanks for inviting me to be here today. I'd be pleased to answer any questions.

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

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

Increasing evidence demonstrates that over the past three decades, our National Forests have suffered too much logging, too much roadbuilding, and too much cattle grazing and fire suppression with little concern about the impact these activities have on our clean water supplies, fish and wildlife, recreational opportunities and the ecological integrity of forest ecosystems.

The Facts: Our National Forests Imperiled

A recent mapping project by the World Wildlife Fund concluded that only 2% of the original forests remain in the lower forty eight states. The Eastside Forests Scientific Society Panel report concluded that the few remaining roadless areas are threatened and that very little of the old growth Ponderosa pine forest remains. The report recommends: no logging of old growth forests or trees of any species older than 150 years or greater than 20 inches in diameter; no logging in aquatic diversity areas and to establish protected corridors along streams, rivers, lakes and wetlands; no logging or roadbuilding in roadless areas.

Both the PACFISH and INFISH federal interim guidelines for protecting imperiled fish stocks concurred with the conclusion that we need to protect roadless areas and riparian zones to restore declining fisheries. These are critical first steps towards proper management and rehabilitating faltering forest and aquatic ecosystems in the Inland West.

The Sierra Nevada Ecosystem Project report came to similar conclusions and also stated that, "Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity. " The notion that we can salvage log the forests to reduce fire risk is not supported by any empirical scientific data.

In the state of Idaho, over 960 streams are polluted and rated as "water quality limited" by the Environmental Protection Agency because of too much contamination in the streams. Over half of these streams are being degraded by logging. Flooding, exacerbated by logging and roadbuilding in the Couer d'Alene watershed is steadily sending millions of pounds of lead contaminated sediments into Lake Couer d'Alene and ultimately into the city of Spokane's watershed. In Oregon, seven people were killed this year as a result of mudslides. Numerous scientific studies have been published, including by the U.S. Forest Service that conclude that logging and roadbuilding increase the risk and severity of landslides and flooding.

Across the West, fish stocks continue to decline and many species such as the coho and bull trout are being considered for listing under the Endangered Species Act. Over 70,000 jobs of a once booming commercial fishing industry have been lost because the fish are gone. Clean drinking water for millions of Americans originates on the National Forests and yet there is no protection for this resource. Last year, the city of Salem, Oregon was forced to close down its water treatment system because of the huge amount of sediments filling the river. The City of Portland estimated that it would have cost $200 million to build water treatment facilities if the Bull Run watershed that provides their water was not protected from logging and roadbuilding.

The private and public forests of the Southeast are threatened by unsustainable logging. There are now over 140 chip mills in the Southeast that average over 300,000 tons of chips a year, 100 of these were sited within the last ten years. At 300,000 metric tons of chips per mill per year, nearly one million acres—1,562 square miles—of southeast forest are being fed annually to the chip mills. And because chip mills grind up trees of any size, clearcutting is the most common method of logging used to feed the mills. According to industry and USFS, the growth to harvest ratio for softwoods in the South went negative in 1991. Hardwood harvests are expected to exceed growth within the next 2-10 years. This is not only evidence that the industry is unsustainable, but that chip mills are depleting the forests, thereby impacting water quality, habitats, ecosystem health and local forest-dependent businesses. In addition, chip mills employ very few workers. A typical chip mill has a sourcing radius of 75 miles yet only employs from 4 to 10 people and the hardwood consumed by a single chip mill in one month could run an average size sawmill for an entire year. Hardwood chip exports increased 500% from 1989 to 1995.

These are the facts as presented by the scientific community, industry and government agencies. These are the real forest ecosystem health problems which this Committee chooses to ignore in favor of arguments that all come to the same conclusion: more logging.

The Lessons of the Logging Rider

Claiming to address the overstocking and fuel loading problems caused by fire suppression and grazing cattle, the 104th Congress passed the Salvage Logging Rider which suspended environmental laws and a citizen's right to have those laws enforced and participate in how their own lands were being managed. But no effort was made to address the fundamental problems of too much grazing and too much fire suppression.

Under the rider we witnessed the logging of Ancient Forests that had been protected by the courts. Under the rider, the guise of logging dead and dying trees was used by the Forest Service to log large, green trees. Unroaded areas, which represent some our nation's last unprotected wilderness were entered and logged. The government's own Interagency Report on the Implementation of the Rider confirmed these abuses.

The logging rider ignored science by suspending procedural laws such as the National Environmental Policy Act that requires the best available information be applied before the government takes a proposed action. The logging rider allowed the agency to ignore economics and offer timber sales that they knew would lose money. The agreement implementing the rider reinstituted timber targets. This kind of discredited mandate forces the agency to "get-the-cut-out" by making bad management decisions that ignore scientific evidence and economic common sense, and that have devastating consequences for the environment.

The logging rider overturned the fundamental notions of democracy by banning citizen appeals and the system of checks and balances that has made our system work by allowing the Forest Service to ignore the objections of other federal agen-

cies. Eliminating citizen appeals and meaningful judicial review has no place in the American system which is based on the right of every citizen to participate and ensure that the government is not acting above the law.

To their credit, Clinton Administration officials admitted that signing the rider was the worst mistake of their first term and they issued the Glickman Directive which halted some but not all of these abuses.

In the aftermath of the rider, several lessons are clear. Our environmental laws and public processes should never again be suspended. Ancient Forests, roadless areas and riparian zones need permanent protection. And the U.S. Forest Service needs to be reformed and made more accountable to the public.

Restoring Accountability

To address these threats to the health of our forest ecosystems we would like to make several recommendations which we urge the Committee to adopt.

Working in conjunction with over forty other organizations, we have developed a Grassroots Forest Initiative to identify some specific ideas to help restore accountability to the agency and help stop the abuses that continue to threaten our forest heritage. Here are the four points in the initiative:

1. Prohibit new roadbuilding on the National Forests by ending any appropriation for new roads and by prohibiting the use of purchaser road credits to build new roads. Given the ecological importance of roadless areas and with over 370,000 miles of logging roads, eight times the length of the Interstate Highway, and a massive backlog of roads in need of maintenance, it does not make sense to build new roads.

2. Prohibit logging and road-building on unstable and potentially unstable national forest land. Recent landslides in the West have demonstrated some of the "hidden costs" to public safety and the environment of subsidized logging and road building on steep, unstable slopes.

3. Restore accountability by reforming or abolishing off-budget funds. There is a growing consensus that the various off-budget funds—the Knutson-Vandenberg (KV), Brush Disposal and Salvage Funds—which total nearly a billion dollars a year, must be either reformed or abolished. The Interagency Report on Implementation of the Rider concluded that the salvage fund created an incentive for the agency to choose logging projects when other activities (such as prescribed fire or stream restoration) were more appropriate, because the agency could keep most of the receipts for the salvage logging operations. We strongly oppose tying restoration projects to timber sale receipts.

4. End money-losing timber sales. The annual report of the White House Council of Economic Advisors shows that the Forest Service spent $234 million more than it collected in timber receipts in 1995. "Generally, the Forest Service subsidizes timber extraction from public lands by collecting less timber sale revenues than it spends on timber program costs," the report says. According to the Government Accounting Office (GAO) the timber sale program lost nearly $1 billion from 1992-1994. For the sake of both the environment and the taxpayer, it is time to end subsidized logging on the National Forests.

This initiative has been signed by over one hundred groups including the Sierra Club, The Wilderness Society, California Wilderness Coalition, Inland Empire Public Lands Council, Oregon Natural Resources Council, Northeast Ohio Sierra Club, Northwest Ecosystem Alliance, and the Western North Carolina Alliance.

At Sen. Craig's recent forest management workshop the Government Accounting Office testified that during 1995, the Forest Service spent $215 million dollars of the taxpayer's money, that they cannot account for. We urge the Committee to use its oversight authority to find out what happened to the taxpayer's $215 million, determine why the agency can't account for it and document how they will ensure this abuse of the public's trust will not occur again.

We urge the committee to look at the full range of values our forests provide such as clean water, fish and wildlife habitat, and recreational opportunities. According to the Forest Service Resources and Planning Assessment, by the year 2000, recreation on the National Forests will produce over $100 billion dollars for the economy while logging will only produce $3.5 billion. The value of clean and stable water flows from our forests is estimated in the trillions.

Old Growth, Roadless Areas and Riparian Zones Need Protection

In testimony before the Senate Energy Committee on February 25, 1997, Chief of the Forest Service Michael Dombeck testified, "The unfortunate reality is that many people presently do not trust us to do the right thing. Until we rebuild that trust and strengthen those relationships, it is simply common sense that we avoid riparian, old growth and roadless areas." We urge the Committee to support Chief Dombeck's effort to reform the agency and restore the public's trust by adopting his common sense recommendation and the other recommendations in this testimony.

In closing, I would like to quote a Republican President who helped make this a great nation by protecting some of our National Forests, Teddy Roosevelt, who said, "The Nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value."

I believe the United States is a great nation, but I feel that we are now risking that greatness by lacking the foresight and courage that made us great to begin with. We can choose to squander our remaining unprotected wild places, or we can be revered by future generations as Teddy Roosevelt is, for having the vision and the greatness to protect this nation's natural heritage.

Thank you for this opportunity to testify.

STATEMENT OF KENNETH C. KANE, KEITH HORN, INC., CONSULTING FORESTERS, KANE, PENNSYLVANIA

Madame Chairman and members of the Subcommittee, I appreciate the opportunity to appear before you today to discuss forest health on the Allegheny region which includes the Allegheny National Forest (ANF). You have asked those testifying before the Subcommittee to address two specific issues:

1. What criteria determine if a forest is healthy or unhealthy? and
2. What management tools are most appropriate to maintain or improve forest health?

I will address both of your questions directly. However, let me first provide some background information which will help set the stage for my presentation.

My name is Kenneth C. Kane. I am Vice President of Keith Horn, Inc. consulting foresters in Kane, Pennsylvania. I am a graduate of Penn State's School of Forest Resources where I received a Bachelor of Science degree in 1982. I have lived in the Allegheny region my entire life and have studied and worked with the forests of this region for over 20 years. For the last 13 years, I have been a full-time, hands-on manager of private forest land. I am Chairman of the Pennsylvania Division of the Society of American Foresters and also Chairman of Penn Chapter of the Association of Consulting Foresters of America. I am also president of the Kane Area School Board and active in other community and industrial organizations, including the Allegheny Forest Alliance. I am testifying on my own behalf.

The Allegheny National Forest

For many years, the Allegheny National Forest has been the single largest source of high-quality black cherry, a species of wood in great demand here in the United States and around the world. Continued harvest and regeneration of the ANF's black cherry trees is a top priority for hardwood lumber producers located near the ANF and for veneer manufacturers throughout North America.

It is fair to say that the ANF is the flagship national forest in the Northeast. In the last seven years (fiscal years '90-'96) the ANF produced $132.6 million in timber sale revenues. The Forest Service estimates that costs attributable to the ANF timber program during that period were $29.1 million. Thus, the net profit to the United States was $103.5 million. Of that amount, $33.8 million was returned to the counties through the Twenty-Five Percent Fund. [Attached is a chart (Fig. 1) which illustrates the ANF's profitability.]

Fortunately, Madame Chairman, the ANF has no widespread threatened or endangered species listings or other over arching legal/political issues driving its timber program into a tail spin of oblivion. However, there are other challenges ahead, and we must act now to protect the enormous values of this national forest.

The ANF: A Forest at Ever-increasing Risk

Like other national forests in the Eastern US, the Allegheny National Forest is a second-growth forest with mostly even-aged timber stands. In general, these stands were created 50-90 years ago and are now extremely well-stocked with black cherry and other valuable hardwood trees. Black cherry is a shallow rooted tree species; mature trees are highly susceptible to wind-throw damage. Thus, the stands on the ANF that are heavy with mature black cherry trees are at ever increasing risk.

Attached to this statement are two charts that illustrate my point. The first (Fig. 2) shows the distribution of timber stands by 20-year age classes. As you can see, nearly all of the timber stands on this 503,000 acre national forest are either 51-70 or 71-90 years old. The second chart (Fig. 3) illustrates the fact that the ANF is an incredibly productive timber-growing forest. More than four-fifths of this forest is highly suited for the production of black cherry, oak, and other species.

As mentioned earlier, the ANF is the single most important source of high quality black cherry logs. Given the importance of this species to the domestic furniture business and to America's veneer and lumber exports, we need to do everything possible to ensure that the ANF will always be a source of black cherry. That's why we have to maintain and improve the health of this and other national forests.

Question One: What Criteria Determine If a Forest Is Healthy?

To answer this question for the Allegheny Plateau, you must remember that essentially the entire forest in the region was clear-cut between 1880 and 1930. [Such clear-cutting was very common throughout the East. In fact, nearly all eastern hardwood forests are the result of the clear-cuts which occurred at or near the turn of the century.] The vast clear-cutting of that era virtually eliminated the beech-hemlock, old-growth (climax) forests of the region. The hardwood forests which emerged did so naturally (without planting).

So, within the forests of the Allegheny region and other "second-growth" eastern hardwood forests, forest health is typically determined by answering some basic questions:

•Individual Tree Vigor. What is the condition of the crown, stem, root, and leaf of the tree?

•Species Diversity. Is there an adequate diversity of trees, shrubs, flowers, and other plant species present in the forest?

•Size Class Diversity. Since not all trees grow at the same rate, are there trees of various sizes?

•Presence of Desired Natural Regeneration. Are preferred tree and other plant species regenerating naturally or are non-preferred species becoming dominant?

It is important to emphasize, however, that forest health criteria—like other forest management parameters—are defined by the landowner. One of the reasons why national forest health seems to be a moving target is that public forestry issues are very dynamic. In other words, the objectives of the landowner (the public) changes constantly. That is not the case in the private sector, where most forest landowners have two primary objectives: (1) production of wood products; and (2) continuity of ownership. [Some forest lands in our region have been held by the same family since 1855.]

So, where do we stand? At present, forest health in the Allegheny region is threatened by native and exotic insects, disease, and mammals. The Gypsy Moth and Beech Scale Nectria complex are two examples of exotic threats and over-browsing by white tailed deer (which reduces desired vegetation such as hardwood seedlings and thus species diversity) is an example of a native mammal threat.

In addition to these problems, the forests of the region are simply growing old. Typically, forest professionals find that forests in the Allegheny region that are 50 years of age are generally healthier than forests which are 75 years old, which are healthier than forests that are 100 years old, etc. This is attributed to the fact that hardwood forests—like humans—experience reduced resilience as they approach the end of their natural life span (which is about 125 years for the forests and a bit less for humans). Hardwood forests change dramatically between 125 and 150 years of age. Specifically, species diversity drops from a wide variety of shade intolerant species (including black cherry, ash, tulip poplar, etc.) to a handful of shade tolerant species (mostly sugar maple, hemlock, and beech). This decrease in tree species diversity is one measure of an unhealthy forest.

As mentioned earlier, the forests of the Allegheny region (especially the ANF) are recognized internationally for the high-quality hardwood timber that they produce. The unique unglaciated soils of the region produce the world's best quality black cherry in stands that reach economic maturity at 80 to 100 years of age. We have reached the point in time on the Allegheny Plateau where biological and economic maturity coincide. Thus, we must address the needs to regenerate these forests for both financial and biological reasons.

But, in addition, the public generally prefers to hunt, camp, hike, etc. in maturing 70 year old Allegheny hardwood forests rather than decadent 150 year old forests. This is attributed to reduced diversity in the oldest forests and the presence of dense underbrush (e.g. beech brush, striped maple, and fern) which result from deer over-browsing. Also, the 150 year old forests are generally less "scenic" because they are more likely to have a higher percentage of beech infested with the Beech Scale Nectria complex (an exotic disease which causes the trees to snap off at mid-stem).

Question Two: What Management Tools Are Most Appropriate?

Having examined the criteria for a "healthy" forest in our region of the country, let me turn now to your second question which is: What management tools are most appropriate to maintain or improve forest health? As a practicing forester, I rec-

ommend that landowners take certain actions to maintain the health and vitality of the forests within the Allegheny region:

•Employ Sound Silvicultural Practices and Professional Forestry. [This is self-explanatory.]

•Use Modern Silvicultural Methods and Timber Harvesting Scenarios. These practices are site specific and model natural occurrences.

•Employ Qualified Resource Managers to Monitor Forest Conditions Closely. This is necessary to follow insect populations and assess the effects of disease, drought, and other phenomena.

•Control Large Deer Populations. Increase the use of silvicultural regeneration tools such as fence enclosures and herbicides. Promote sport hunting to reduce deer over-population.

•Use Aerial Application of Natural Pesticides. This is necessary to control exotic and abnormal native insect infestations. [This was done with great success in 1994 cooperatively on both private and public land in Northwestern Pennsylvania and Southwestern New York against an unprecedented population of the Elm Spanworm and Forest Tent Caterpillar. Similar efforts have also worked effectively against the Gypsy Moth.]

In addition to these tools that are available to the resource manager, I believe that Congress and the Administration have continuing roles to play. And, given this opportunity, I offer the following thoughts for your consideration:

•Continue to Fund and Promote Forest Research. Research at the US Forest Service's Northeast Experiment Station in Warren, PA has provided the modern silvicultural methods used throughout the Allegheny region. Significantly, over 1,100 forest managers have attended the training sessions offered by the Station.

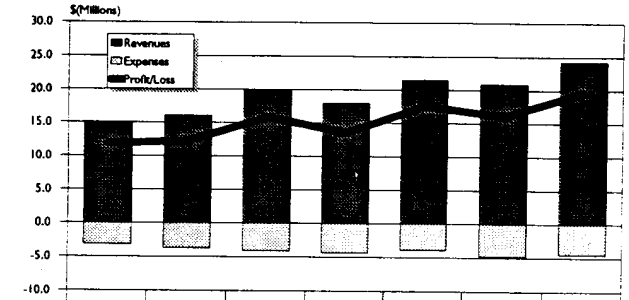
•Enact Tax Incentives. The Internal Revenue Code needs to be changed to provide tax incentives for private, non-industrial landowners to follow sound forest management practices. Particular emphasis should be given to changes to the capital gains and estate taxes.

•Increase Forest Education. Finally, there is a pressing national need for education programs for forest landowners, professionals, and the public. Professionals need to better understand the modern tools available to them. Landowners and the public need to better understand the forest ecosystem and the necessity of using sound science as the basis for management decisions.

Thank you, Madame Chairman, for the opportunity to present this statement.

Fig. 1: Allegheny N. F. Timber Cash Flow Analysis

Fiscal Years 1990 to 1996

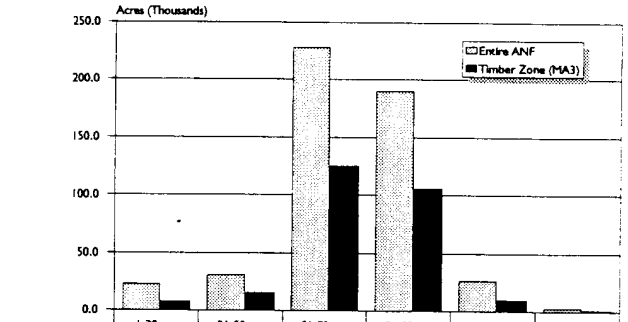


	1990	1991	1992	1993	1994	1995	1996
Profit/Loss	11.8	12.2	15.8	13.5	17.5	16.0	19.7
Expenses	-3.3	-3.8	-4.2	-4.4	-4.0	-4.9	-4.6
Revenues	15.1	16.0	19.9	17.9	21.5	20.9	24.3

Source: US Forest Service, Timber Sale Program Information Reporting System.

Fig. 2: Distribution of Timber Stands by Age Class

Allegheny National Forest

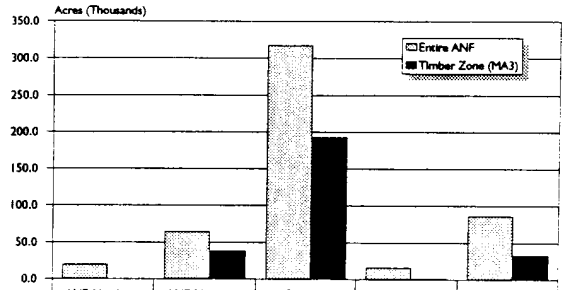


	1-30 yrs	31-50 yrs	51-70 yrs	71-90 yrs	91-110 yrs	111+ yrs
Entire ANF	23.0	31.0	228.0	190.0	27.0	3.0
Timber Zone (MA3)	7.7	15.6	125.0	105.9	10.0	1.1

Source: USFS, "Analysis of Timber Harvest Program Capability," Allegheny National Forest (11-95), Table 1, p. 13

Fig. 3: Timber Stocking and Site Index Analysis

Allegheny National Forest



	ANF-Northern Hardwoods Low Stocking	ANF-Northern Hardwoods Medium Stocking	ANF-Northern Hardwoods High Stocking	Oak Low Site Index	Oak High Site Index
Entire ANF	20.0	64.0	317.0	16.0	86.0
Timber Zone (MA3)	0.0	38.3	193.0	1.2	32.8

Source: USFS, "Analysis of Timber Harvest Program Capability," Allegheny National Forest (11-95), Table 1, p. 13

TESTIMONY OF

G. EDWARD MUCKENFUSS
SOUTHERN REGIONAL MANAGER
WESTVACO FOREST RESOURCES DIVISION

ON BEHALF OF
WESTVACO CORPORATION

ON

FOREST HEALTH

BEFORE THE
SUBCOMMITTEE ON FORESTS AND FOREST HEALTH
HOUSE COMMITTEE ON RESOURCES

MARCH 18, 1997

Ms. Chairman and Members of the Subcommittee, thank you for this opportunity to contribute my ideas on what constitutes healthy forests and what management practices contribute to establishing and maintaining them. My name is Ed Muckenfuss and I am the Southern Regional Manager of Westvaco Corporation's Forest Resources Division. In my Region, we manage nearly a half million acres of company forests and advise private landowners who own another 400,000 acres.

Westvaco is a member of the American Forest & Paper Association (AF&PA) and is firmly committed to AF&PA's Sustainable Forest Initiative℠ (SFI). This program, which was developed with strong leadership from Westvaco, requires AF&PA members to commit to ensuring that future generations of Americans will have the same abundant forests that we enjoy today. Member companies are obliged to extend the practice of sustainable forestry beyond their own forests to other forestland ownerships that they may influence - even to operations in other countries.

Westvaco owns forestland primarily to provide a sustainable source of wood fiber for its mills but we also manage them to provide habitat for wildlife and clean water for the lakes and streams adjacent to them. The key word here is manage. We firmly believe that in order for forests to be healthy, they must be actively managed.

Heathy forests are forests that are growing vigorously and that have a diversity of age classes and forest types which enables them to resist disease and insect epidemics and helps to reduce the intensity of wildfires when they occur. The diversity of forest ages and types also provides a range of habitats for wildlife. While some percentage of old growth habitat is desirable, extensive areas of old growth conditions, or any single age class condition, puts the entire forest at risk for catastrophic insect attacks and/or wildfires.

(Aerial Photo of Diverse Forested Landscape)

This is an aerial view of some of our forest in Kentucky. This forest is actively managed to maintain healthy tree densities and various forest types interspersed across the landscape We consider this a healthy forest that achieves our objectives of providing a sustainable supply of wood fiber for our mill, diversity of wildlife habitats and protection of the lakes and streams adjacent to our forest.

Here Are Criteria That We Use to Determine the Health of Our Forests:

1. Suitability of tree species to the site(s)
2. The density of the trees relative to the ability of the site to support them
3. Diversity of age classes across the landscape
4. The amount of fuel loading on the site
5. The condition of riparian areas for protecting lakes and streams
6. Diversity of forest types across the landscape

7. The relative abundance of noxious insects and the disease incidence rate
8. The availability of nutrients to sustain vigorous tree growth

Species - Site Relationship

Tree species are adapted to certain site conditions such as soil moisture, elevation, and temperature. Some tree species are very adaptable and can thrive over a wide variety of conditions, others have exacting requirements. Healthy forests have species that are suitable to their site conditions. Unhealthy forests can result when tree species populate a site during short periods of favorable conditions only to become physically stressed during normal periodic extreme conditions that are not favorable. These trees often succumb to insect attacks and become the fuel that supports catastrophic wildfires.

Tree Density

The density of trees in a forest's various canopy layers is an important component in maintaining forest health. Different sites can support variable levels of tree density. Keeping the tree density at proper levels to avoid frequent, excessive physical stress enables the trees to better withstand insect attacks and disease.

Diversity of Age Classes

By varying the ages of stands across a landscape, the risks of insect epidemics, disease incidence, wildfire and windthrow can be reduced. Some of these risks are more prominent at one age, or stand development stage, than others. By staggering stand ages, a whole forest is not at the same level of risk, problem areas are usually isolated to individual stands making them more manageable. The various stand ages also provide different types of wildlife habitat for different species allowing a broader array of wildlife to thrive on the forest than a single age or serial stage forest.

Fuel Loading

Many forests types are naturally adapted to tolerate periodic wildfires with minimal damage. However, these forest have limits and when fuel loads from fallen leaves, branches and underbrush get too high, wildfires can severely impact them. In healthy forests, fuel loads are relatively low, so if a wildfire does burn the stand, it burns at low intensity which is tolerated by the overstory trees.

Protecting Riparian Areas

Streams and lakes are part of the forest landscape. These water bodies and their aquatic systems are dependant on the surrounding forests for the inputs that maintain and protect them The condition of forest riparian areas is important if these sometimes fragile aquatic systems are

to be protected.

Diversity of Forest Types

Every forest has a range of site conditions. Carefully favoring those species better adapted to specific site conditions avoids the physical stress conditions which can lead to insect attacks and disease incidence. The diversity of a forest can vary greatly. Homogenous areas, like many flat coastal plain sites, allow limited diversity of forest types. In hilly terrain, with a wide range of site conditions, we find a greater diversity of forest types.

Noxious Insects and Disease Incidence

Well maintained, healthy forest stands typically have low endemic levels of noxious insects and disease, but healthy trees usually can easily resist them. However, if forests become physically stressed, the population of noxious insects and disease can grow to epidemic proportions. Frequent insect and disease epidemics are a sign that a forest health problem exists.

Availability of Nutrients

In most natural forests nutrients are replaced by rainfall and weathering of mineral soil faster than the trees use them. However, in some forests that are intensively managed for wood fiber production, there is a danger that the nutrient pool can be depleted. On these areas, nutrient pools should be monitored and replenished if necessary.

As I said, healthy forests are the result of good active management. While many forest stands naturally maintain a healthy condition for a time, eventually most become overcrowded and lose their vigor making them susceptible to disease and insect epidemics. Without management, these conditions set the stage for catastrophic events, like the fires in Yellowstone National Park

Here Are the Management Practices That We Use to Improve or Maintain Forest Health:

1. Good Inventory Information
2. Landscape scale planning that provides for protection of riparian areas and diversity of age classes and forest types
3. Provisions to regenerate with tree species appropriate to the site
4. Intermediate stand treatments to control density and fuel conditions
5. Careful inclusion and management of old growth or over mature stands
6. Soil amendments as necessary to maintain productivity for intensive management
7. Effective control of insect and disease epidemics

Good Inventory Information

In order to manage for forest health, forest managers need frequently updated information about the locations and condition of the forests they are managing. Information required would include soils, topography, geology, species, age, density, and previous treatments.

Landscape Scale Planning

Planning for forest management has to encompass an entire landscape simultaneously. To achieve diversity across the landscape, forest stands cannot be managed in isolation, management decisions for one stand will influence adjacent stands so those influences must be considered. In areas with numerous ownerships, diversity often results simply from the diversity of management objectives, but government planners may want to offer some incentives to achieve desired results.

Regeneration with Appropriate Species

Forestry professionals are trained in matching species to site. In most instances this is not a problem. Problems occur when incompatible species invade a site during periods of favorable conditions. When this occurs, thinning or some other treatment may necessary to avoid the physical stresses that would occur during periods of unfavorable conditions like extended droughts.

Intermediate Stand Treatments

Thinning and prescribed burning are the most frequently used treatments. These treatments reduce stand densities and fuel loads, which reduce the risk of insect epidemics and catastrophic wildfires.

Inclusion of Old Growth

Some old growth or over mature forest may be desirable for some management objectives, primarily wildlife habitat related. Forest managers need to be careful in placing these areas to minimize the exposure of the rest of the forest to insect attacks and high intensity wildfires that frequently start in old growth conditions. Preventive measures such as prescribed burning in adjacent forests may be useful strategies to buffer old growth areas.

Soil Amendments

Intensive silvicultural systems may eventually deplete the nutrient pools on some forest sites. When these intensive systems are employed, nutrient levels should be monitored and augmented as necessary to maintain the site's fertility.

Insect and Disease Control

Forests, that are growing vigorously, routinely ward off insect infestations and diseases with natural defense mechanisms. However, even healthy forests can be physically stressed during unusual weather conditions or threatened by epidemics from nearby stands that are not well managed. In these situations measures to check the spread of the infestation are sometimes required.

Conclusion

In many ways forests are like people. When they are young and growing they usually can withstand pathogens and parasites with their natural defenses. As they grow old, they become increasingly susceptible. By carefully maintaining tree densities at levels the site can support and limiting fuel loads, vigorous growth can be maintained for decades even centuries for some forest types. But eventually all forest stands reach an over mature condition commonly known as old growth where they become susceptible to pests and the resulting epidemics that put the whole forest at risk.

Inadequate management has put many forests in the United States at risk. In some forests, neglect has skewed forests toward stands of older age classes, and allowed many stands to become overcrowded and overloaded with fuels. In other forests, poor management practices have removed most of the healthy and vigorously growing trees, leaving the old and weak. In either case these forests are ripe for epidemics of disease and insects and the catastrophic wildfires that often follow.

We believe, that by applying the management practices I have outlined, these forests can be returned to healthy conditions and provide for the needs of many generations to come. Without adequate levels of management they will increasingly fall victim to catastrophic events, and will result in loses that will deprive our children of their benefits.

A Framework for Considering Forest Health and Productivity Issues

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

A Framework for Considering Forest Health and Productivity Issues

A Report of the
Society of American Foresters

Prepared by the
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Forest Health and Productivity

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A Framework for Considering Forest Health and Productivity Issues

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PREFACE

The Society of American Foresters (SAF) National Committee on Forest Health and Productivity was established in the wake of controversy about the findings and recommendations of the 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 controversy were still running high. Memories of the uncomfortable "Critical Issues Forum" at the 1993 National Convention in Indianapolis, Indiana, remained vivid, and it was apparent that the issue was very divisive within SAF. Committee members held widely varying opinions about the task force's report. They expressed accordingly 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 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 controversy over the task force report developed. Guided by a Charter, the committee's aim 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

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 SAF members 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 as a small step toward the organization's 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 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." 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 increasingl 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 last 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 1995). Some would like this role to b advocacy for certain forest management objectives. Others would like the role to be contribution of scientific expertise. Some members are critical of the organization for not anticipating nationa 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 Foreste members, and careful reflection about what comprises a healthy forest, the committee drew thre conclusions: forest health is an informal and technically inexact term; a single national prescriptic 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 b 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 199

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 leve Objectives need to be specific to the forest condition and land ownership and based on the uniqu 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 ca 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 hel 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 (Angermier 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 issue: 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 abou forest conditions and policy to resolve forest health issues is needed. SAF Council should take lead, considering linkages among SAF units, between SAF and other professional organization: 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 strong foundation in physical, biological, and social sciences.

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

Communicate. SAF members, individually and through SAF activities, should communicate the forest health and forest productivity consequences of laws, regulations, policies, and managem activities. Many local and regional actions to resolve forest health issues will have further reach 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 SAI 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 fore itself. Leadership at the state, regional, and local level can play a significant role in helping soci and landowners identify common expectations of our nation's forests, and in determining management objectives that are realistic given the ecological limitations of each forest site. The

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 accepte the report but did not adopt the draft position statement. In the following months, differences o 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 th 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 fore 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 wa 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 or forest health and productivity issues to the general public.

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Staff Liaison: **Lawrence W. Hill**
Director of 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 Polic 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 Jun 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 ethic 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 soun 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.

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The Honorable Helen Chenoweth, Chair
Committee on Resources
Subcommittee on Forests and Forest Health
United States House of Representatives
Washington, DC 20515

Testimony of Martin D. Moore, Director
Environmental Planning and Research
Apache County, Arizona
March 18, 1997

Madam Chair, Members of the Committee:

Thank you for this opportunity to testify. For the record, my name is Martin D. Moore. I currently serve as Director of Environmental Planning and Research for Apache County, Arizona, and Executive Director of the Eastern Arizona Counties Organization. In these capacities, I oversee and conduct scientific and policy research, and work with State and Federal agencies to restore a balanced approach to environmental management. Currently, I am at the dissertation stage of an interdisciplinary Ph.D. at Northern Arizona University specializing in Western forest resource policy and management.

Currently, we are facing a serious forest health crisis throughout the Western United States which threatens adverse ecological, safety, and economic impacts on an increasingly catastrophic scale. These concerns are based on scientific criteria centered around a definition of forest health that includes:

- The vitality and balance of wildlife populations
- Health of the forest resource
- A balance of multiple uses sensitive to the needs of the natural and human environments
- Levels of catastrophic fire risk and hazard

I. Health of the Forest Resource[1]

A number of scientists and forest management professionals, from the 1950s to today, have noted a continual degradation in the health and vitality of Western Pine Forest ecosystems, and the resources they provide.

Most recently, Dr. David Garrett, and Drs. Wallace Covington and Margaret Moore have performed significant research which point to alarming trends in forest resource health in Ponderosa Pine ecosystems.

Drs. Covington and Moore identified several significant overall trends, based upon research of 8 sampling plots in a 16,200 acre study area, with comparisons from 1867 to 1987. These include:

- A 994% decrease in herbage production, meaning the amount of food available for wildlife, wildlife prey species, and introduced ungulates (e.g. livestock and elk)
- A 905% increase in the basal area of trees per acre
- A 26% decrease in streamflow
- An increase from 24 to 843 per acre
- A decline from 109 to -1.5 on the scenic beauty index

The results shown here, though drawn from a fairly constricted landscape, agree with the findings of other scientific studies throughout the Western States.

Concerned about the implications of Dr. Covington's research, Apache, Greenlee, and Navajo Counties in Arizona commissioned an independent, in-depth scientific study by Dr. David Garrett of the health of the Ponderosa Pine ecosystem in the Apache-Sitgreaves (A-S) National Forests, with comparisons drawn to the other Forests of the Southwest Region. This study includes a compendium of all the major literature and scientific research from the late 1800s to today, utilizes the latest forest stand inventory data over a broad geographic spectrum, and was performed with the full cooperation and assistance of the Apache-Sitgreaves National Forests.

Dr. Garrett's conclusions in this study confirm the findings of Drs. Covington and Moore, that the health of our Southwestern Forests is in serious decline. These results show:

- From 1911 to 1994, a 391% increase on the A-S Forests of trees per acre 4 inches or greater in diameter (dbh), from 34 to 133 trees per acre, with several stands exhibiting more than 1,000 trees per acre. Included in these changes over time are increases in all diameter classes up to 20 inches, and a 50% decrease in the number of trees over 20 inches in diameter.

- Average maximum stand density index across both is approaching high danger level (meaning threats of epidemic disease, insect outbreaks, and tree die-offs), with several areas already exceeding the high danger threshold. Without a comprehensive treatment of these forests, the stand density index may exceed the high danger threshold across the A-S Forests within the next eight years.

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[1]Forest resources include wildlife, wildlife habitat, food sources for wild and introduced ungulates, timber, water, scenic beauty, and recreational opportunities

- Herbage biomass has already plummeted to its low production levels of only 90-100 pounds per acre, which is stressing wildlife and introduced ungulate populations, particularly in a time of drought. With a drought emergency still present in many areas of the Southwest due to insufficient snowfall, this situation will only worsen.

- Water yields per acre will continue to decrease from current levels of 9+ inches to about 8 inches, resulting in continued streamflow reductions, and exacerbated water quality problems.

- Fuel loads on the forest floor will rise from the current level of 20 tons per acre to well over 30 tons. In addition, fuel ladders will continue to dominate the landscape, leading to ever increasing incidents of catastrophic wildfires.

The continued downward spiral of forest ecosystems identified by Dr. Garrett threatens the health, vitality, and sustainability of such forest resources as:

- Water and land-based recreation opportunities. *As the quality and availability of environmental conditions decline or are destroyed by catastrophic wildfire or forest die-offs, opportunities to participate are diminished.*

- Wildlife and wildlife habitats. *As the canopy closes and vast acreages are destroyed by fire, density, insects, and disease, available food sources disappear. This creates competition for increasingly scarce resources such as water, forage, and prey species, setting the stage for wildlife population crashes, and possible extinction.*

- Timber Resources. *Increasing densities, insect infestations, and disease are stressing tree stands, resulting in unhealthy and unnaturally thin conifers. The average size on the A-S Forests in 1994 was <6 inches in diameter (dbh). This creates negative impacts for both industry and the ecosystem, which require larger, healthier trees for economic and environmental sustainability. This threatens the continuous supply of timber mandated by Forest laws.*

- Water Resources. *Increasing numbers of trees require increasing amounts of water to survive. This results in soil dehydration, reduced groundwater recharge, and declining streamflows, subsequently threatening riparian ecosystems, groundwater supplies for forest interface communities, and the overall supply of water mandated by Forest laws.*

II. Catastrophic Fire

Another forest health indicator is level of intensity of fire. A catastrophic wildfire is that type of fire which:

- Burns large acreages
- Sterilizes the soil
- Destroys land based and aquatic wildlife
- Threatens human life
- Destroys the regenerative capacity of the forest ecosystem

Apache County, alarmed about the fuel load buildups identified by Dr. Garrett, Drs. Covington and Moore, and the Forest Service, conducted a comprehensive study of wildfire hazards in interface areas, and potential impacts of catastrophic wildfire throughout Arizona and New Mexico. The results of this study, based on scientific forest, census figures, market trends, and cost-benefit / socioeconomic impact methods, showed that:

- More than 224,000 homes are at high to extreme risk of loss, threatening the safety of over 600,000 citizens in Arizona and New Mexico alone.
- Five million plus acres of forest lands from pinyon-juniper to pine to aspen stands are at high to extreme risk of loss to catastrophic wildfire, threatening wildlife populations, soil stability, riparian resources, water supplies, and flood prevention.
- Potential costs in terms of lost timber resources, livestock, homes, and drains on the federal treasury exceed $35 billion dollars in the two states.

Dr. Garrett, studying the likelihood of these catastrophic fires occurring, concluded that based on forest conditions, the incidence of large, catastrophic fires has double in twenty years, and will continue to rise. The National Commission on Wildfire Disasters also shows that large wildfires are on the rise nationwide, and will continue to rise in frequency and intensity unless management trends are reversed.[2]

III. Vitality and balance of Wildlife Populations

Drs. Covington and Moore, studying the impacts of changing forest densities, show that wildlife populations have changed in terms of make up and balance from the 1860s to today. Instead of wildlife geared toward open, park-like forest, types and numbers have shifted toward wildlife favoring closed-canopy structures. This stresses wildlife adapted to open-space environments, threatening the survival of these species.

In addition, introduced ungulates such as elk have erupted in population to the point that numerous forest meadows are eaten down to the roots, creating erosion and forage reproduction problems. This in turn threatens the prey base of endangered species, and destroys the grazing resource base for ungulates and competing wildlife such as deer.

IV. Multiple-Use Balance

The federal regulations point out that an important indicator of forest health is the ability of a forest to provide for multiple-uses sensitive to the needs of both the natural and human environments. Current laws, regulations, court decisions, and most significantly, unhealthy forest resource conditions, combine to form a serious threat to the continuation of human and natural multiple uses. These are inclusive of:

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[2]As an indicator of this growing concern, over 6 million acres burned in 1996, destroying hundreds of homes, wilderness areas, and critical endangered species habitat. This was almost double the amount of acreage burned in a normal fire year.

- Wildlife, including and array of threatened and endangered species
- Recreation
- Timber resources
- Ecological and human water use
- Aspen reproduction and understory vegetation development
- Scenic beauty
- Economic benefits

Madam Chair, based on this testimony, and a preponderance of research, it is our contention that every aspect of multiple-use is placed in serious jeopardy over the next 50 years, unless the current forest condition is reversed.

Needed: Solutions

The overwhelming body of research shows a need to return the forests to a healthy state for the sake of:

- The total forest ecosystem
- Forest resources
- Increased public protection from the ravages of wildfires
- Healthy wildlife populations
- Every aspect of forest health discussed today, including multiple-use and human survival

To accomplish this, the studies of Dr. Garrett and Drs. Covington and Moore state that thinning of a range of diameter classes, fuel load reductions, and prescribed fire are essential management tools for forest health restoration. Drs. Covington and Moore are now involved in initial test projects.

Dr. Garrett, building on this work, provides a 50-year prescription, which if followed, should dramatically improve forest health conditions across the landscape. These improvements include:

- An increase of one inch of water yield per acre within the next decade, dramatically increasing spring and surface water flow

- A doubling of herbage production from 90 to 180 pounds per acre

- An increase in average tree size from <6 inches to 16 inches in diameter (dbh).

- Soil rehydration in riparian areas, improved groundwater recharges and a greater resistance to drought.

- A reduction of the maximum stand density index from 45 (near high danger threshold) to 20 (healthy density). This means healthier, more disease and insect resistant trees

- A 50% reduction in fire fuel load, and a return to less catastrophic and more healthy, low-intensity fires

This time line would include commercial and pre-commercial harvest thinning, prescribed burning, and overstory harvest of high hazard trees, unhealthy trees, and overly dense trees and other vegetation, including trees of all diameter classes with special emphasis on trees 20 inches and smaller, as this would not include healthy old growth trees. Returning every ten years to treat and control burn is vital to this effort, as is recycling and refining the time line over the long term, to ensure the future vitality of the forest.

It is absolutely critical that mechanical harvest is a vital player in Forest Restoration Management Plans. Without mechanical harvest, in a time of constricting budgets, forest health and fire hazard reduction will become impossible tasks. The Forest Service reported that its timber program operated in the black in fiscal year 1995, meaning a decreased taxpayer burden.

Dr. Garrett, in the economic phase of his report on how to pay for restoration, shows that following his prescription, in which mechanical harvest is an imperative player, would result in a per acre net value of $155 dollars, which is nearly ten times the $16 dollar net value if we continue on our present course. Added to this is the multi-billion dollar savings of treatment over destruction by catastrophic fire and tree stand die-offs.

Currently in place on the Apache-Sitgreaves and Tonto National Forests is an Ecosystem Demonstration Project Agreement, signed by the National Forest Supervisors, Fish and Wildlife Service, Arizona Game and Fish, Arizona's Governor, and the Eastern Arizona Counties Organization. This agreement, if funded, would be an important step to facilitate implementation of Forest Health Inititiave Projects in the Southwest Region.

Madam Chair, members of the Committee, the threat to our natural and human environments is real, and the solutions straightforward and affordable. To ignore them is unconscionable from either a scientific, ecological, social, ethical, or economic point of view.

We agree with the Western Governors' Association Drought Action Plan, which concludes that harvesting, thinning, and prescribed fires are critical elements in a return to forest health to mitigate the effects of drought and fire. We also agree with them that it is imperative that all sides join in the effort to affect the changes necessary to achieve a return to forest health.

It is our plea that all sides will come together to make the tough choices, and act to preserve this Nation's forests for ourselves, and our posterity.

Thank you for your time. I look forward to any questions you might have.

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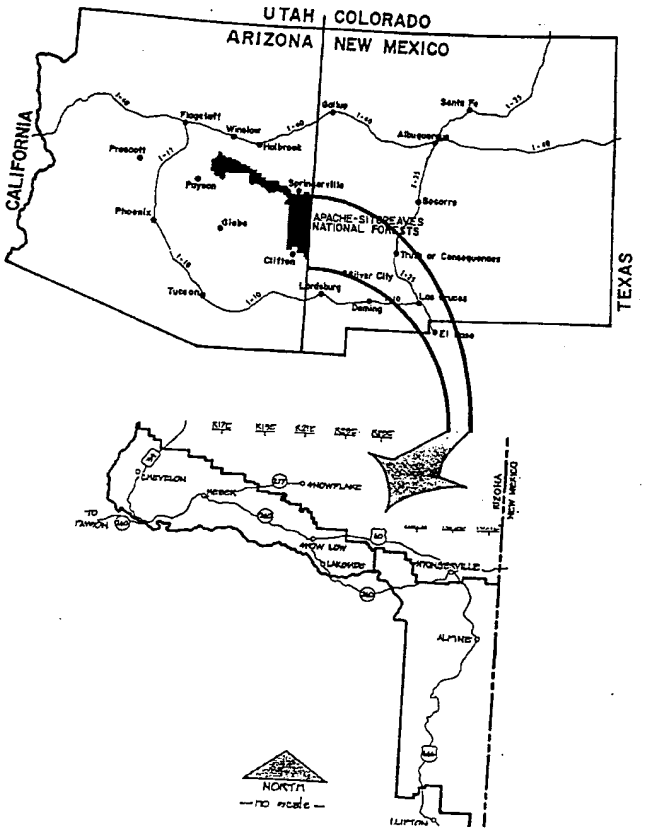


Figure 3. Location of the Apache/Sitgreaves National Forest in the Southwestern Region.

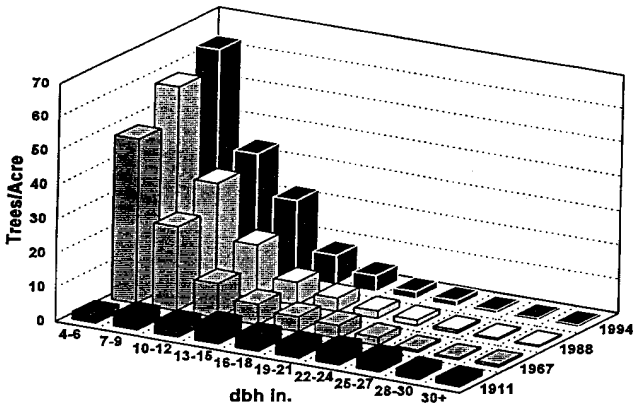


Figure 5. Comparison of trees per acre on the Apache/Sitgreaves in 1911, 1967, 1988 and 1994.

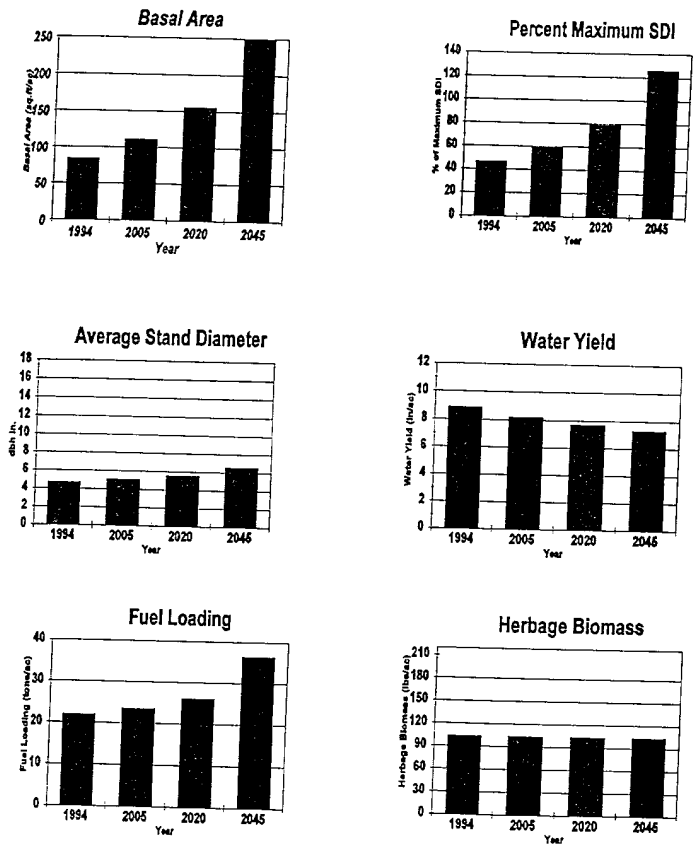
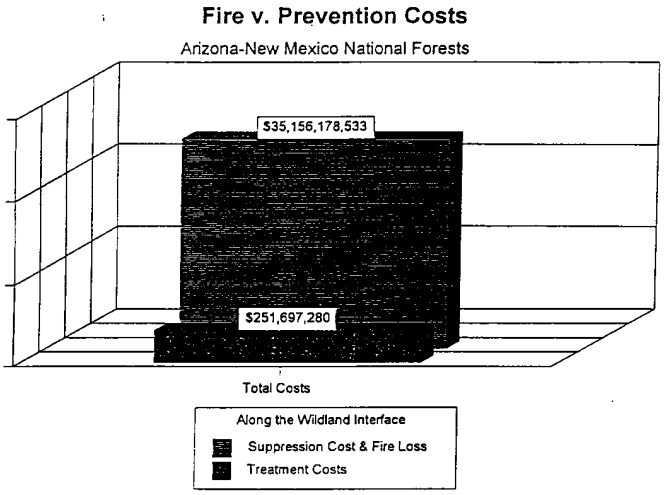


Figure 9. Changes in resource outputs on six selected analysis areas under the no treatment alternative.



Note: Suppression Costs = Timber Value + Total Value Loss of Homes + 1992 Projected Cost of Suppression
Prevention Costs = 1992 Projected Cost of Treatment

Figure 11

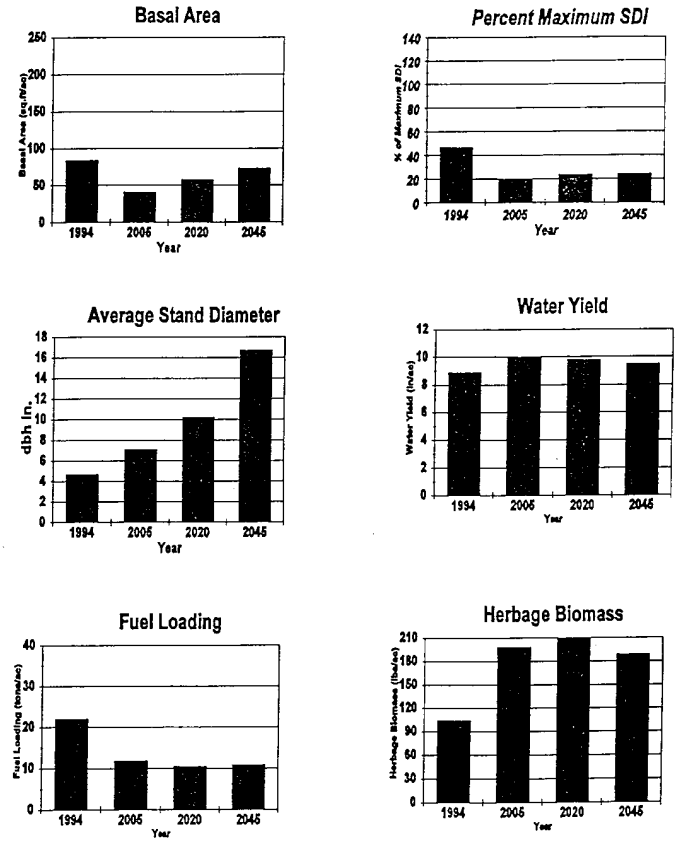


Figure 10. Changes in resource outputs on six selected forest analysis areas under the presettlement forest treatment alternative.

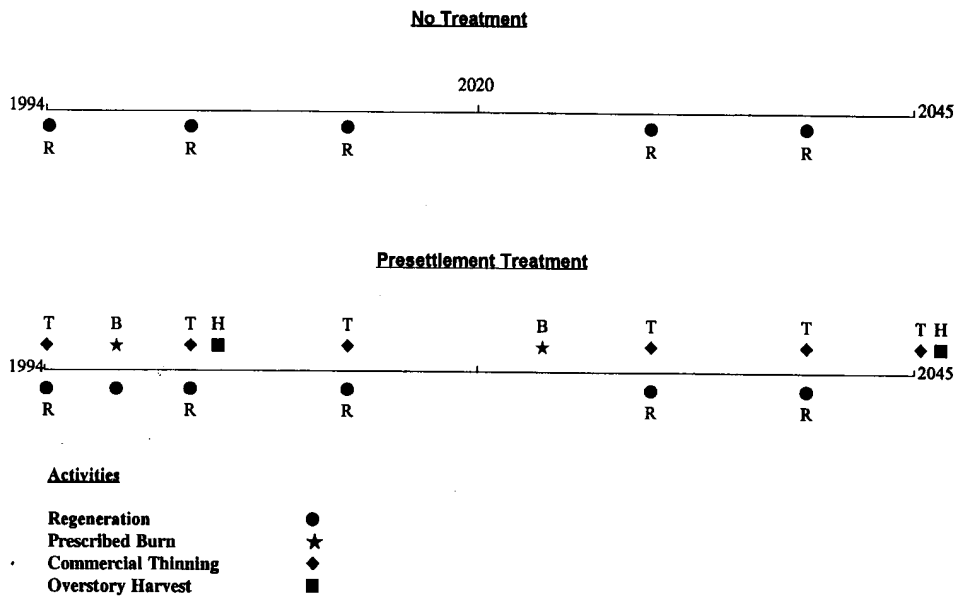


Figure 11. Time sequence of activities in the no management and presettlement management alternatives: 1994-2045

STATEMENT OF
DR. DENNIS L. LYNCH
PROFESSOR OF FOREST SCIENCES
COLORADO STATE UNIVERSITY
Before the
Subcommittee on Forests and Forest Health
Committee on Natural Resources
United States House of Representatives

Concerning Criteria for Forest Health and Appropriate Management Tools
To Maintain or Improve Forest Health

March 18, 1997

CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Introductory Comments

Thank you for inviting me to present my views on forest health and management as these relate to the Central Rockies. At the outset, I want to say that I am attempting to present what I believe are points of consensus gained from discussions with a number of professional forestry colleagues in Colorado and Wyoming. I am indebted to a number of people, including my fellow faculty members in the Department of Forest Sciences, specifically Dr. Chuck Grier, Dr. Doug Rideout, Dr. F.W. Skip Smith, Dr. Phil Omi, Dr. Ric Laven, and Dr. David Betters, also Wyoming State Forester Tom Ostermann, Colorado State Forester Jim Hubbard and his forest management and fire division staff members, specifically Bill Wilcox, Dave Leatherman, Mike Schomaker, Phil Schwolert, Bernie Post, and Chuck Dennis, as well as Colorado Timber Industry Association Director Gary Jones, Wilderness Society Forest Ecologist Greg Aplet, and Chairman of the Colorado/Wyoming State Society of the Society of American Foresters Clint Kyle, for their insights on the topics before us today. These gentlemen cover a wide range of expertise including forest soils, forest economics, silviculture, fire science, forest ecology, forest entomology, forest pathology, and forest management. I will attempt to be faithful to both the content and spirit of the information they shared with me.

Brief Overview of Forest History in the Central Rockies

In discussing issues of forest health and management related to the Central Rockies, it is important to briefly review the historical interaction of people and forests. It is likely that humans have been using these forests for 9,000 to 10,000 years. Prehistory natives used materials from the forest and were known to achieve levels of forest health they found useful by igniting fires to drive game, clear brush to see enemies, and perhaps improve berry picking and wildlife habitat. It is also likely that their abandoned campfires escaped from time to time and set fire to surrounding areas. We

believe that forest conditions of that period were probably much different than conditions today.

From about 1859 and during the period of settlement in the Central Rockies, vast quantities of materials from the forest were used for the building of homes and towns, industry, railroads, mining, and to provide heat in our cold winters. In addition, fires were set to clear land, expose the geology to find potential mining sites, as well as for a host of purposeful and purely recreational reasons. Escaped fire was apparently quite common. Therefore, human disturbance of the forest was both intensive and extensive. Very few areas were left untouched. Early records indicate that only those areas that were virtually inaccessible escaped disturbance by humans.

At the turn of the century, with the establishment of forest reserves and parks, the exploitation of the forest and uncontrolled fires were curtailed by federal forest rangers. The first forest service ranger, incidentally, was Bill Kruetzer of Colorado who worked initially on the Plum Creek Forest Reserve southwest of Denver. From that point on, attempts were made to control all human and natural disturbances. Specifically, all wildfires were suppressed, efforts were made to control insects and diseases, and unregulated cutting of the forest was prohibited. Logging was permitted only by contract and then on a relatively small scale. Very large areas of Colorado were replanted with trees grown in forest nurseries from seeds taken from a wide variety of sources. Generally, the administration of the federal forests in Colorado and Wyoming during this time can probably best be described as custodial. The purpose being to protect the forests from any degradation and promote recovery, while supporting local economies with water, wildlife, recreation, and limited amounts of wood and forage.

At the end of World War II, the nation started a building program that called for the expansion of timber cutting on the National Forests. The effort to "put out the cut" began to build through the 1950's and 1960's. Mistakes in judgement were made about how and where that should be done. As a result, some forest areas were disturbed at levels that caused considerable controversy and concern.

During the late 1960's and early 1970's, the mood of the nation moved toward environmental concerns and the enactment of a wide variety of policies aimed at protecting our environment. The primary focus of the Forest Service began to change to land use planning and environmental protection. For three decades, substantial areas of forests were included in Wilderness areas. Implementation of forest management activities for the production of commodities declined. Public attitudes seemed to resent human disturbance of forest areas. For example, removals have been much less than growth or even mortality for some time since then.

There are several key points to be drawn from this admittedly brief and simple summary. ***First***, the forests that we have today in the Central Rockies are the result of a long history of human disturbance and use. Very few forest areas are original and untouched. Concerted efforts have been made to protect, through wilderness and park designations, these untouched areas. ***Second***, many forest areas today are the result of tree planting and rehabilitation efforts or resulted naturally from the protection of areas from post settlement disturbance. Studies of paired photographs taken at the turn of the century and more recently, consistently suggest that forest areas have recovered and even increased substantially. The previously disturbed areas of the past have grown up under protection into today's mature forests. Several of us speculate that Colorado may have

more trees now than at any previous time in recorded history and that our forests are tending toward older age classes.

Third, our forests generally have been protected from disturbances that society found unacceptable and have been made to conform to standards society found desirable. Importantly, each period of time from prehistory to the present, has been accompanied in its own unique way, with a societal sense of forest health. In other words, definitions of forest health have subjective, societal values, which are interwoven with our ecological understanding of forest structure, function and processes. ***Fourth***, our forests have changed through time. This long period of custodial care and protection appears to have allowed shifts in understory plant species, the build up of forest fuels, increased numbers of trees, and less overall forest diversity. In short, today's forests seem to be at the edge or outside the range of what we expect to be normal conditions or what ecologists refer to as the range of normal variability.

Brief Overview of Forest Types

The previous historical summary presents a very general overview of the Central Rockies forest situation as a whole. It is important to recognize, however, that there are several distinctly separate forest types in the Central Rockies that are uniquely different from each other and from forests in other parts of the United States. Our continuous forests begin at the edge of the Great Plains in the east and extend to timberline near 11,000 to 11,500 feet in elevation, then descend along the western slope of the Rockies to high desert canyon lands. Several distinct forest types are located along this elevational gradient. At the lowest elevations and in the driest conditions are the pinyon pine and juniper woodlands. Located just above these woodlands are ponderosa pine, Douglas fir and mixed conifer forests that may be intermingled with aspen forests. Aspen forests are also found at the next elevation along with lodgepole pine forests. Our highest and coldest forests are Engelmann spruce and subalpine fir with occasional and limited areas of limber pine or bristlecone pine forest found just below the alpine tundra.

Generally, Colorado's forests are located on relatively young soils, in rugged terrain, with limited moisture, frequent temperature extremes, and relatively short growing seasons. Specifically, each forest type has its own unique structure and processes. Natural disturbance regimes associated with fire, insects, and disease may be quite different in each forest type. For example, fire frequencies in ponderosa pine may vary from 2 to 30 years while spruce-fir forests may have intervals of 300 to 650 years. Thus, management activities must take these ecological differences into consideration.

Therefore, generalizations about forest health may be of only limited application when addressing specific forest situations. Each forest should properly have its own specific criteria related to health and management and, as I shall explain later, our approach to the restoration of these forests must change. This problem is further compounded by the lack of a complete database of forest information. While considerable time and effort has been spent on forest inventories in the past. That information is dated and does not address the complex questions we are confronted with today. Inventories have not kept up with our understanding of the environment. We have complete consensus that we must have support in gathering more complete forest information in the Central Rockies and that integrated research efforts are essential.

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Criteria

In my invitation to testify, I was asked to respond to the question, "What criteria would you use to determine if a forest is unhealthy or healthy"? From my previous testimony you can see why that question is very difficult to answer. Such criteria will have subjective societal values intermingled with ecological estimates. These further vary depending upon forest ownership and landowner objectives. However, from my discussion with colleagues I have attempted to find some areas of complete or general consensus about overall criteria for forest health in the National Forests of the Central Rockies.

- **An unhealthy forest condition is outside the range of normal forest conditions.** There appears to be complete consensus that a healthy forest would be within what we would estimate to be its range of natural variability. We expect forests to vary in structure and function over time, but there should be continuing integrity of processes associated with the forest type. When forests appear to be changing in ways that are not normal, we suspect that the situation is unhealthy. For example, we have large areas of forest today in Colorado where shade tolerant understory species are dominating stands. Under normal conditions we would expect those species to be occasional or at least much less frequent. We also have increasing numbers of exotic species of insects and plants invading areas where they are not natural.
- **An unhealthy forest does not have diversity of age classes and successional stages over large areas.**
  There appears to be complete consensus that a healthy forest would have a diversity of age classes and successional stages, from early to late, distributed in balanced proportion across landscapes. The history of protection and custodial care previously described leave us with forests that are unhealthy because we lack diversity of age classes and stages.
- **An unhealthy forest does not have a diversity of plant and animal species.** We have complete consensus that in a healthy forest, we would expect to find a diversity of plant and animal, from common to rare, that are typical of the forest type. The lack of age classes and successional stages described above currently limit this aspect of forest health in many of our forest areas.
- **Natural disturbances are more severe and frequent in an unhealthy forest.**
  We expect to have natural disturbances within a healthy forest. Insects, diseases, weather, and fire create natural disturbances endemic to different forest types. We would also expect that human disturbances could be tolerated and even be beneficial in healthy forests. Even major events such as large fires, flooding, and epidemic insect outbreak may occur in healthy forests, but we would expect those events to be rare rather than common. Today, there is some evidence to indicate that insect outbreaks and large fires are becoming more severe and common than we should expect.

- **Dead trees and woody debris accumulations are much greater than decomposition rates and removals in an unhealthy forest.**
  We expect that trees will die naturally and coarse woody debris will accumulate in healthy forest. However, we also expect that decomposition, fire, and humans will remove dead trees and debris. When levels of mortality and woody debris build up over years without such removals, the situation becomes unhealthy. Our sense is that such buildups have reached critical levels in our forests in the Central Rockies.

- **An unhealthy forest does not provide a balanced flow of benefits to sustain our society.**
  This is where our sense of the societal values related to forest health comes in. Healthy forests produce more benefits that wood fiber. We expect clean air and clean water from them. When forests burn uncontrollably we reap air quality violations and the potential for subsequent erosion and flooding. When forest canopies close and rain or snow is evaporated back into the atmosphere before reaching the forest floor, we lose valuable water supplies for an arid area. National Forest conditions should not be a threat to life and property of visitors or adjacent private and state landowners. National forests should benefit rural communities and support sustainable agricultural and recreational economies, in addition, to fulfilling national interests. As my colleague, Dr Rideout put it, "When mortality and growth exceed harvest levels and we have unpleasing esthetics, insect, disease, and fire problems, is this in the national interest? If it is not then we need active management."

Management Tools

I have also been asked to respond to the question, "What management tools would you consider most appropriate to maintain or improve forest health?"

To respond to this, I suggest that there must be some sense of priorities associated with this question. There is always the option of doing nothing. I believe that this option will be exercised in our forest areas now protected by wilderness and park designations. In those areas, we can expect that natural processes will run their courses, but will have substantial impacts both within those areas and in the adjacent forestlands outside. As we saw in Yellowstone Park fires, catastrophic events can be so severe, even in protected areas, that some form of human intervention (in the Yellowstone case over $200 million worth) may be required. In the following discussion, my comments are directed to the National Forest areas outside wilderness protection, but my point here is that doing nothing carries a price tag. Currently, fire suppression costs per acre in the Central Rockies greatly exceed the costs we have experienced in demonstration forest restoration projects. It seems clear that we will pay to suppress events that threaten us or we do not wish to tolerate and we can lose benefits and products through inaction.

- **Prescribed Fire**
  The first management tool that seems appropriate to us is the use of prescribed fire. This tool attempts to closely mimic the natural fire process. Fires can be ignited, by trained personnel, to reduce the presence of unwanted plant species, encourage regeneration of other species, and to reduce some

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overstocking and fuel build-up problems in forests. Prescriptions for the fire must be carefully written to achieve the desired results. The manager can control the amount of fuel and the type of ignition, but successful burning also depends upon fuel moisture and wind conditions, which are outside the realm of human manipulation. In ideal situations, prescribed burning costs can be relatively low. The results can be quite good in achieving desired changes or they can be quite variable. Prescribed fire is not a precise tool.

There are a number of concerns that need to be addressed when considering this tool. The Forest Service has less than half of its staff qualified to participate in fire suppression. Even fewer are skilled at the use of prescribed fire and skills are very important when using this tool. It is important to recognize that the task of restoring healthy forests in the Central Rockies will require the use of prescribed fire on a scale never before attempted. The management of smoke from the fire is of concern and it is becoming more difficult to secure burning permits and avoid air quality violations. Prescribed fire is not without risk and escaped fires can be quite costly. Thus the use of fire in heavily inhabited areas is controversial. We also know that large acreage's of our forests have such heavy fuel buildups or ladder fuels of such proportion that use of prescribed fire by itself would be quite dangerous. In addition, prescribed fire is easier to apply in forest types like ponderosa pine, but much more complicated in lodgepole pine or spruce-fir where some of the heaviest mortality and fuels exist.

- **Mechanical Removals**

  Another management tool we believe is quite appropriate in achieving forest health is the use of mechanical equipment to prepare areas for prescribed fire, to thin forests to desired stocking levels and to remove forest products for our use. This tool attempts to mimic the processes associated with insects, disease, weather, and fire, except that in some cases useable material can be removed for forest products. Some critics would quickly identify this as traditional logging or timber harvesting. *A key point that I wish to make is that forest restoration is not traditional logging or timber harvesting.*

  In my applied research work in Southwestern Colorado, I have come to see mechanical removal as a forest restoration technique of choice. It certainly is not traditional logging or timber sale administration as usual because material of all age classes, whether merchantable or unmerchantable, are removed to accomplish a specific forest restoration objective. In the study I am participating in, trees are being removed to achieve a desired forest condition based on research by Dr. Bill Romme of Ft. Lewis College. Most of the large old growth trees are being left (these would have been taken in traditional logging) and all of the small, deformed trees are being removed. This is proving to be an expensive and exacting process, but it is achieving the desired societal and forest restoration results.

  Mechanical removal, therefore, can be more precise than the use of fire alone. It can achieve results in different forest types that prescribed fire cannot produce. It can provide products that benefit local economies and supply us with the wood we need for a multitude of products. The procedure

has certain disadvantages, however. It is expensive to try to remove all of the fuels and it could result in nutrient losses if it did. If roads are required in association with removals these can lead to undesirable impacts. It requires skilled workers who have a clear understanding of the objectives to be achieved. It may require unique and innovative methods and equipment. And, in forest restoration work, the unmerchantable material must go somewhere for use. Unfortunately, the history of custodial care and the rejection of tree cutting as a useful tool have resulted in the loss of small wood processing firms. They were simply starved out by lack of supply and inappropriate pricing. Now, we must rebuild small, value added, processing firms in rural areas that can utilize this material.

Also, current Forest Service procedures related to timber sale layout, administration, and pricing do not work very well in forest restoration situations. When there are multiple objectives to be achieved, current procedures require dealing with these as several separate single purpose projects. This adds time, complexity, and expense to what should be relatively straightforward efforts. I also continually encounter concerns, both from industry and environmental groups, that the Forest Service is not consistent in administering removal projects carefully and equitably.

We believe that forest restoration efforts using mechanical removals will require new thinking and new techniques both for the Forest Service and the industry, but this is a tool that can provide revenue from the forest and a flow of benefits to rural communities and the nation.

- **Combinations of Mechanical Removal and Prescribed Fire**

  Lastly, there are combinations of prescribed fire and mechanical restoration techniques that are especially appealing. Mechanical removal can extract materials for use while preparing a fuel bed for follow-up prescribed fire. This allows the fire manager control over the amount and type of fuel present. Thus, fire can be utilized in forest types and situations where it previously would have been extremely risky or inappropriate. It can result in a treated forest that meets the criteria previously outlined. Fuel loading of forests can be substantially reduced by both mechanically removing material and by burning it in place with fire. This method still has the inherent concerns for each tool previously discussed. However, it gives the manager options when air quality concerns, for example, preclude using fire to fully accomplish a project. It does however present a more complete and precise solution for certain forest types than either of the other methods standing alone.

As I previously indicated, some sense of priorities for the use of these tools is necessary. We believe that management activities must first be directed to areas where life and property are at risk. These are areas where catastrophic wildfire is quite likely. Dr Phil Omi of Colorado State University has developed a plan for a Western Forest Fire Research Center (WESTFIRE) which would provide integrative research into ecological, socio-economic, and environmental effects of forest and range fires. It would also provide insights into cost-effectiveness of mitigation effects aimed at reducing consequences of wildfires, and extend the knowledge base on trade-offs between wild and prescribed fires. This type of integrated research would identify priority areas for

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treatment and suggest appropriate combinations of management tools. Such integrative research is sorely needed.

We also believe that rural communities threatened by the loss of jobs and the migration of people are also critical priority areas. These communities must be supported by good forest management and value added forest product manufacturing to balance their employment base. Forest restoration efforts could provide a needed sustainable base for employment.

As I noted before, the Forest Service needs some new authorities for changing the way it does business in dealing with forest restoration projects. We suggest that the subcommittee look carefully at the potential for stewardship contracting on National Forest lands. This procedure could resolve problems typically associated with multi-objective projects, it could reduce present administrative entanglements, and lower costs associated with forest restoration projects. It would allow the Forest Service to trade low value materials for services designed to achieve desired objectives for forest restoration. We think that stewardship contracting offers a way to achieve levels of desired forest health and it should be fully explored.

Summary

Our history includes a long involvement of humans with forests in the Central Rockies. Our current population trends suggest this involvement will increase. I found areas of general and even complete consensus among professionals on forest health criteria which I presented here today. Specific criteria are needed, however, by forest type to address the uniqueness of each. Even so, we have abundant examples in the Central Rockies of unhealthy forest conditions. Better inventory methods, perhaps even annual updates, along with integrated research will be necessary to support the implementation of forest restoration programs. Management tools are available to us to commence the task of forest restoration. They are not, in my opinion, the traditional tools of the past. Forest restoration will require innovation and new thinking on the part of everyone involved. We need skilled personnel in the planning, mechanical removal, and prescribed fire operations that will be a part of forest restoration. We need to build new products, markets, and value added production facilities for materials removed from forest restoration projects. Cooperation among federal, state, and local entities are essential for success. Current Forest Service timber sale procedures and pricing do not effectively or efficiently deal with forest restoration problems. Stewardship contracting is a possible solution. If this is done right, costs can be substantially less than those costs experienced by doing nothing and reacting to catastrophic events. Perhaps with innovative restoration methods, new product development, and new markets these projects can be made to show a profit and restore rural community vitality.

This concludes my testimony. I will attempt to answer any questions the subcommittee members may have.

The University of Montana
MAR 17 1997

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March 14, 1997

Honorable Helen Chenoweth, Chair
House Subcommittee on Forests and Forest Health
1337 LHOB
Washington, D. C. 20515

Dear Chairperson Chenoweth:

Mr. Bill Simmons requested me to appear before your subcommittee on February 18, 1997, to address the questions of Forest Health. I respectively declined because of time and travel expense constraints, but Mr. Simmons said that I could submit a written response for your consideration.

Credentials: Currently Associate Director of the Montana Forest and Conservation Experiment Station and a Research Professor of Forest Ecology and Silviculture. I have been teaching graduate courses in Forest Landscape Ecology and Management for the past six years and Continuing Education in Ecosystem Management. I am actively involved in Landscape Ecology and Landscape Assessment research with private and federal organizations and have recently drafted two State of Montana response papers for the Society of American Foresters national policy task force on "Forest Health". I am also serving on a National Panel for the Ecological Society of America to develop standards for a National Vegetation Classification System to improve research and management communication dealing with vegetation management. I was a Forest Service Research Scientist from 1961 to 1981 and have been at the University of Montana since 1981. (Resume' attached)

Question # 1 -- What criteria would you use to determine if a forest is healthy or unhealthy? This is a loaded question! I can specify criteria for the 18 acres of forest land that my wife and I own because we have documented our goals and objectives through the national Forest Stewardship Planning program. I can provide professional advice to any private owner or public manager, if they are able to clearly define their goals and objectives. The problem with providing professional advice to public land managers is their logical inability to clearly define the management objectives for public lands. The principles of multiple use, public land ownership, and the respect for multiple values in a democratic society precludes a dictatorial approach. Compromise is necessary, area by area.

Permit me to illustrate the polarity of the problem:
Example A. If the landowner objectives are to produce economic quantities of useable wood fiber over a long time frame, then a healthy forest would have mostly healthy trees: good vigor, free to grow, and low risk of mortality from insects, diseases, and fires. Vigor Ratings and Risk Ratings have been published by researchers for several of our tree species and forest types.

Example B. If the landowner objectives are to maintain (preserve) natural processes and save all the ecosystem parts, then a healthy forest would have good representation of dead and dying trees, and sizeable amounts of woody debris representing a full array of natural decomposition and recycling processes.

This illustrates the polarity (black vs. white) of the problem. Legislators and public land managers are pulled both ways by strong lobbies. (The enclosed copy of a popular article by Jane Braxton Little, "To cut or not to cut: how to manage healthy forests" American Forests, Autumn, 1996, p.19-31, provides an excellent current overview of the problem you are addressing.) However, common sense dictates that responsible management of public lands in the face of polarized controversy requires a "strong middle" advocacy.

Where is the strong middle? Recently, the inspired leadership of balanced Ecosystem Management advocates, such as Dr. Hal Salwasser, and Dr. Jack Ward Thomas, have captured the support of forest management and some ecological professional organizations and of many professionals within the agencies. But, public support is desperately needed from other institutions.

At the University of Montana, we have established a Masters of Ecosystem Management degree to help train professionals to lead in the conflict resolution process. Northern Arizona University has rededicated it's Forestry School as a School of Ecosystem Science. Many other forestry schools in the Nation are taking similar steps to train future professional leaders to deal with issues of increasing difficulty.

Question # 2 -- What management tools or methods would you consider most appropriate to maintain or improve forest health? In reference to question 1, the answer again depends on stated goals and objectives of the landowner:

Example A -- Timber Production Goal -- A heathy forest can be maintained by planting genetically resistant seedlings, by changing species composition to less susceptible species through regeneration and thinning practices, by reducing stand density through thinning, by saving the "best trees" in partial harvesting operations, by the use of prescribed burning, by the use of safe herbicides and pesticides, and, yes, even by clearcutting to sanitize an infected stand and starting over with healthy seedlings of a preferred species. Active management is absolutely essential for forest lands where production of wood is a desired and high priority goal. Yet, most practicing professional foresters are perfectly willing to modify active management practices and tradeoff short-term economic benefits to protect reasonable, scientifically-based, environmental values.

Example B -- Ecosystem Integrity Goal -- The most extreme case is illustrated by those who believe that humans are an intrusion in natural ecosystems and that any interference leads to an unhealthy forest. Yet, many dedicated ecological scientists are doing research to determine the nature and magnitude of the effects of human activities on parts of the ecosystem. Lack of knowledge and fear of irreparable damage lead many to subscribe to stopping most active management activity until we gain more

knowledge. This has produced a stalemate and shackles for active public land management programs.

How can the U.S. Congress and Administration provide leadership and direction?

New Perspectives and Ecosystem Management Policy developed by the USDA Forest Service appears to be the most rational, common sense, approach to conflict resolution for public lands and is the best example of national leadership in policy development to appear in the last decade.

The Ecosystem Management concept suggests that a balance of sustainable development and sustainable environments can be agreed upon for specific areas of land. It recognizes that the same balance is not appropriate for all social and ecological settings. It probably represents a desperate attempt for an agency to succeed in it's management mandate, in spite of all the roadblocks that have been established by polarized stakeholders, afraid to let the other side "win".

Congress and the Administration must support the good ideas developed within the Agencies they administer. Give the public agencies the opportunity to succeed. Stop thinking that these issues can be resolved by "quick fixes" such as "riders" or legislation written by lobbyists. Write legislation to empower federal land management agencies to carry out their mission and resist legislation aimed at special interests. Many have called for a formal public land law review to resolve current legislative conflicts. If we as a nation truly want to maintain the public land trust, then we must support the dedicated professionals entrusted with management of that public land.

I wish you well in the difficult task you face in dealing with the fearful and frustrated stakeholders on both sides of the forest health issue. On the other hand, I have the utmost confidence in the ability of our professional land managers to determine and practice the "balance" of "Ecosystem Management". This requires affirmation of public employee trust and responsibility, funding of management needs, and funding of the essential research needed to determine and document the concept of "balance".

One additional document that would be helpful in your deliberations is the Task Force Report on Forest Health prepared recently by the Society of American Foresters. I was impressed with their efforts and recognition that "forest health" cannot be defined nationally, nor until management objectives are clearly defined. The answer is in empowerment and facilitation of collaborative decision-making at local levels, not in hastily conceived national mandates that result in, at best, a short-term political fix that doesn't provide a lasting means of solution.

Sincerely yours,

Robert D. Pfister, Research Professor of Forest Ecology
Montana Forest & Conservation Experiment Station

cc: Bill Simmons

Robert D. Pfister RESUME' 2/21/97
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Education and Training

B. S. in Forest Management, Iowa State University, Ames, Iowa - 1960
M. S. in Forest Management (Silviculture/Botany), Oregon State Univ.,Corvallis, Oregon 1964.
Ph.D. in Botany (Minor in Soils), Washington State University, Pullman, Washington 1972.
Systems Ecology Short Course, University of Wisconsin, 3 weeks, 1971
Simulation Modeling Short Course, Colorado State Univesity, 3 weeks, 1974

Teaching Experience

1969 -1981 - Numerous agency habitat type short courses including For. Service, BLM, & BIA
1970, 1972 to 1978, 1990, 1991, 1993 - Developed and taught an elective 3-credit (Forestry 464) course, "Forest Habitat Types, Succession and Land Management, University of Montana
1970 -1994 - Numerous guest lectures to Adv.Silviculture, Wildlife, and Plant Ecology classes at Univ. of MT
1974 -1994 - Principal instructor for a one-week annual continuing education short course on forest habitat types, succession and management implications, University of Montana
1979 -1983 - Instructor for autecology, succession, and vegetation classification in the CEFES programs at the Univ. of Mont. and Wash. State Univ.
1983 - 1991 - Instructor for land and resource classification systems in the TREES (Continuing Education Program) at Northern Arizona University, Flagstaff, AZ.
1988 - Taught Forest Ecology (For. 310), Univ. of MT (with Dr. Paul Hansen)
1988 - Taught Forest Ecology Lab (For. 315), Univ. of MT
1988 - 1989 - Instructor for ecosystem concepts, classification, and vegetation monitoring in BMP Monitoring and Non-Point Source Pollution Workshops, Boise, ID and Reno, NV
1990 - Instructor for land classification in Landscape Ecology Short Course, Univ. of MT.
1991 -1997- Princ. Instruct. & Coordinator for annual"Ecology and Management of Forest Landscapes" Continuing Education Short Course, Univ. of MT.
1992 -1997--Coordinate new graduate course, "Forest Landscapes: Ecology and Management"
1995- Co-developed a two-week module for Continuing Education in Ecosystem Management Program -"Integration of Landscape Ecology with Social System Structure, Function & Change."

Recent Administrative Experience

Director of Mission-Oriented Research Program, Univ. of MT, 1981-Present
Associate Director of Montana Forest and Conservation Experiment Station 1990 to Present
Director of Inland Northwest Growth and Yield Cooperative 1984-1993.
Coordinator of Montana Riparian Association 1986 - Present
Study Team Coord. -Flathead Cooperative Study on Forest Practices & Water Quality 1989-1991
UM Coordinator--Landscape Ecology Integration--Bitterroot EM Coop. Study. 1994 -Present
Chair of Steering Committee--Western Montana Learning Center Program--1994 -- Present

Research Experience (USDA Forest Service, Intermountain Research Station)

1961 - 64 - Assistant Silviculturist in "Silviculture of White Pine" Moscow, Idaho
1964 - 67 - Associate Silviculturist in "Silviculture of White Pine" Moscow, Idaho
1967 - 70 - Leader of "Silviculture of Larch & Spruce" research work unit, Missoula, MT
1970 - 81 - Leader of "Forest Ecosystems" research work unit, Missoula, MT

Graduate Student Supervision

Chair for two Ph.D. and six M.S. ; member of five Ph.D. and four M.S. committees.

National and International Standing

Invited speaker at National SAF Conventions - 1975, 1980, 1987, 1989
Selected as USDA Forest Service Ecologist for USA-USSR Exchange Visits in 1976
Presented paper and attended IUFRO Meetings and Field Excursions in Oslo, Norway in 1976.
Visited site classification experts in Stuttgart and Munich, West Germany in 1976.
Invited speaker for Canadian Land Classification Symposium, Vancouver, B. C. in 1977.
Invited speaker for the Second USA-USSR Man and Biosphere Reserve Symposium in 1981.
Invited speaker for the Fifth Int. Forest Regen. at High Latt. Workshop, Fairbanks, AK in 1983
Invited speaker for IUFRO Symp. on Site and Prod. of Fast Grow. Plant., in South Africa, 1984.
Invited speaker for Ninth North American Prairie Conference, Moorehead, MN in 1984.
Invited speaker for IEA/BE Inten. Harv.--Long-term Product. Workshop, Georgetown, SC, in 1987.
Invited speaker for Sym. on Land Class.. Based on Veg.: Appl. for Res. Mgt., Moscow, ID in 1987.
Invited speaker for Forest Soils Symposium, Boise, ID in 1990.
Invited speaker for Land Classification Symposium in Southwest, Charlotte, N.C. in 1991
Invited speaker for National Workshop to Define Forest Sustainability, Reston, WV in 1992.
Invited speaker for National Ecological Society Symposium, Madison, WI in 1993.
Invited participant for National Vegetation Data Standards Workshop, Madison, WI in 1993
Invited participant in National Vegetation Classification Organizing Comm., ESA, 1994
Appointed to National Vegetation Classification Task Force, ESA, 1995

Society Membership	Offices Held
Society of American Foresters	Chairman of Section Natural Areas Committee (1966-67)
	Vice-chairman of National Ecology Working Group (1975-76)
	Regional coordinator for SAF Cover Type Revision (1978-80)
	Chair-Elect of Montana SAF (1991) -- Chair (1992 and 1993)
Northwest Scientific Assoc.	Chairman of Forestry Section (1967-68)
	Trustee (1970-73)
Ecological Society of America	
National Vegetation Classification Organizing Committee, 1994	
National Vegetation Classification Task Force, 1995	
Sigma Xi (National Scientific Society)	
Gamma Sigma Delta (National Honorary Society of Agriculture)	
Xi Sigma Pi (National Forestry Honorary)	

Publications ----Approximately 50 peer-reviewed publications in Station Publications, Proceedings and Journals.

Major Fields of Interest and Expertise

Plant Ecology (Vegetation, Site, and Land Classification), Soils,
Timber Management (Silviculture), Multi-resource Evaluation and Planning
Landscape Ecology and Management, Ecosystem Management

Academic Experience (School of Forestry, University of Montana)

1970 - 1981 - Faculty Affiliate - Guest lectures and graduate student committees
1981 - Pres. - Director of Mission-Oriented Research Program (currently 20 %)
1984 - 1993. - Director of Inland Northwest Growth and Yield Cooperative.
1984 - Pres. - Adjunct Research Professor -Ecology and Silviculture (20 %)
1986 - Pres. - Coordinator of Montana Riparian Association (5 %)
1990 - Pres. - Associate Director of Montana Forest and Conservation Exper. Station (30 %)
1994 - Pres. - UM Coordinator for Bitteroot Ecosystem Management Research Coop. (15%)

STORY AND PHOTOGRAPHS BY JANE BRAXTON LITTLE

To cut or not to cut? If you think the question is academic, you haven't heard the answers lately.

At a time when forest management needs trust and cooperation, the loudest voices are instead suspicious, accusatory, and self-serving. Some come from Americans outraged by what they say is mile after heart-wrenching mile of timberlands devastated by heavy cutting—once-productive forests turned into gully-washed wastelands left to bake in summer, erode in winter. Shouting from the opposite extreme are business owners, family breadwinners, and rural community leaders dismayed by hundreds upon thousands of acres of forest locked up, for now or forever. They envision trees dying and rotting while the towns that depended on them waste away or, worse yet, burn up in catastrophic wildfires.

logging driven by commercialism. Timber industry critics have cynically applauded the referendum for "finally telling the truth" about the Sierra Club's philosophy.

And it won't help in the long run, say forest managers across the country. Reduced harvesting on federal lands simply puts more pressure on private forests, inevitably forcing some owners to cut more trees than they otherwise would or should. "People are still using wood," says Stan Hamilton, Idaho state forester. "Closing down the national forests isn't the answer."

The industry has fought back against the Sierra Club's referendum, endorsing a bill to replace the salvage rider with permanent legislation allowing emergency forest health activities. If the Forest Health Protection and Restoration Act is not passed, its sponsors grimly predict that entire towns and forest tracts throughout the West will go up in the flames of wildfires.

R NOT TO CUT

now to manage healthy forests

Land owners and resource specialists dedicated to long-term healthy ecosystems are scrambling to escape the mud slung in the name of forest management. They are cutting some trees and not cutting others, trusting that conscientious management will provide forests and a range of tangible and intangible forest products well beyond any of their individual lives. But they are working in a political maelstrom. Outraged factions at both ends of the spectrum have unleashed their frustration in a spate of legislation, referendums, and ballot initiatives.

The timber industry convinced the 104th Congress to pass emergency legislation that, through the end of 1996, allows logging of salvage and certain green old-growth tracts on national forest land without the normal appeals process. Attached to legislation responding to the Oklahoma City bombing, the 1995 salvage rider authorizes the sale of millions of board-feet of timber under conditions that may not meet current environmental standards. Opponents have dubbed it "logging without laws."

In apparent retaliation, Sierra Club members in April approved a referendum advocating an end to all commercial logging on publicly owned lands. Led by a faction of militant members, the "zero cut" initiative allows harvesting some trees and selling the material when it is justified by forest health. But the club policy now in effect calls for eliminating all national forest

"If Washington continues to do nothing, disaster looms on the horizon," warns Congressman Wally Herger (R-CA), one of the backers. Environmental opponents call the arguments "political hype" that play on the public's hysteria over fire.

This cut-no-cut battle, focused in Washington, is being waged in microcosm in Maine over a measure placed on the November ballot by the group Ban Clearcutting. Coordinated by Jonathan Carter, former Green Party gubernatorial candidate, the referendum bans all clearcutting and restricts timber harvests to a set of strict standards that proponents say will return Maine's northern forests to health. Governor Angus King has called it "a campaign to shut down the Maine woods." He called a special session of the legislature, which adopted a competing measure to appear on the November ballot.

Ban Clearcutting is "a draconian measure which deceives the people of the state of Maine," says Vic Berardelli, a spokesman for the opposing Citizens for Healthy Forests and Economy.

"We're talking about the future of the forest," counters Carter. "This measure is a product of the timber industry's inability to operate sustainably and out of respect for the public's interests."

The polarized finger-pointing across the country has caused many forest professionals to return to the most basic question:

Dawn breaks over Rock Lake in Bucks Lake Wilderness, part of California's Plumas National Forest.

Why care for forests? That answer is simple, they say. Private or public, large or small, forests provide what Americans want: sawlogs for construction, profits for shareholders of companies that work the forest, and solitude to inspire a poem; carbon storage and marbled murrelet habitat; sugar pine shakes and spectacular sunsets; biomass and birdsong. To keep forests healthy—to keep them at all—diverse factions will have to work hard and work together, says Kirby Beam, a Georgia landowner who manages 850 acres of nonindustrial forest with his wife, Lynda.

WHY CARE FOR F

"We've got to trust one another. There's been a lot of false hopes, and people have done terrible things on both sides. But we're going to have to try for the sake of the trees. Isn't that what we have in common?"

Trust among public forest advocates today may be as elusive as the proverbial hunted snipe, but it was once a given. For most of the century since the creation of the national forest system, the public has had confidence that its timbered land was in good hands. Designed specifically for public interest, including protecting timber supply and water quality, national forests were only lightly harvested during the first half of the century. After World War II timber needs boomed, and by the 1950s, industrial timber owners had heavily cut their own private lands, knowing that the national forests remained as a source of timber. Having diminished in the short-term their supply of private material to log, industry officials turned to the 191 million acres tended by the U.S. Forest Service. Annual timber sales, which had averaged less then 2 billion board-feet a year during the agency's first half-century, jumped to nearly 14 billion in the 1960s, based on sustained yield projections and goals.

Recreational use of national forests increased along with logging. By 1976 backpackers and skiers, anglers and hunters were streaming into the woods at 20 times the numbers before and immediately after World War II. As their recreational pursuits took them, deeper into the forest, they became disturbed by what they found. Many others who were upset were not environmental purists but ranchers, water district managers, and rural chamber of commerce leaders—people who had historically supported development on public lands. They watched their livelihoods slough off like erosion from an overcut hillside. The combined outcry placed new demands on national forest managers. Along with lumber and other wood products, the public insisted that national forests also provide for wildlife, watershed, and recreation.

The agency did not transform gracefully—or quickly, in part due to conflicting policy directions from Congress, which

continued to mandate high timber sale targets. Environmental group in the 1970s and 1980s launched a barrage of lawsuits to force compliance with the law. Court decisions imposed more and more restrictions on the Forest Service, culminating in Federal District Judge William Dwyer's 1991 opinion on the northern spotted owl. Dwyer castigated the agency for its "deliberate and systematic refusal" to comply with federal wildlife laws. Coupled with new agency policy directives, logging on national forests all but stopped.

It was out of that impasse in the early 1990s that a bizarre breed of coalitions emerged, starting in the Pacific Northwest. Lifelong enemies began reaching out to one another, finding a middle ground that both could accept. "Very strange alliances began forming," says Sami Yassa, a scientist with the Natural Resources Defense Council. "People took their lumps, but both sides decided to try." In California, then-U.S. Forest Service Regional Forester Ron Stewart adopted a 1993 plan to protect the California spotted owl that relied on scientific data. It was a compromise for all sides, says Yassa, but they agreed to accept it.

To develop a national vision for forest management over the next century, timber industry, academic, and environmental leaders gathered forest users from all 50 states and the District of Columbia at the Seventh American Forest Congress held in February in Washington, DC. Despite their cavernous philosophical differences, the 1,300 participants found many areas of agreement in recommending where to cut and where not to cut.

In this burgeoning climate of compromise and tentative trust, the salvage rider struck like a hurricane from hell. "It was the final blow that put people in a state of outrage and disillusionment," says Michael McCloskey, chairman of the Sierra Club. Its response was the "zero cut" initiative. "There is a lack of confidence that commercial logging will ever be done in an environmentally protective way," McCloskey says.

Rests?

Lack of confidence pervades forest management today. For many land owners and forest professionals, it goes beyond endemic distrust of particular political adversaries to include political solutions in general. If the years of in-fighting and waffling government policies have had any long-term benefit, it may be in the reaction from on-the-ground forest managers. Frustrated by the polarity and exhausted by the indecision, forest owners from woodlots in Tennessee to million-acre tracts in Oregon are turning to the elements fundamental to the future of forests: soil, water, trees. They are focusing on natural resources.

"We've been going about it backwards," says Laurel Ames, executive director of the Sierra Nevada Alliance, a coalition of regional environmental groups. Jobs and the local economy are critical; the threat of wildfire is not all hysteria; species are truly being endangered by loss of habitat. But the solutions that will keep economies healthy, communities safe, and wildlife protected begin with the resources in the woods. "We have to figure out how to deal with the forests first, then the rest," Ames says.

To shift their focus to forest plants and animals, managers are relying more and more on local people whose experience spans several decades and whose caring transcends politics. Their expertise combines with a willingness to solve problems on the ground, allowing new approaches and techniques. "Things are happening locally," says Tom Nelson, chief forester for Sierra Pacific Industries.

As a co-founder of the Quincy Library Group, one of dozens of community alliances *(see "The Quincy Library Group," January/February 1995)*, Nelson is working with local environmentalists, elected officials, and business owners to implement a plan that steers salvage logging into areas of national forests surrounding small towns. The plan is designed to produce material for local sawmills while making the towns safer against the threat of wildfire.

"We can't manage natural resources on the Western slope of the Sierra Nevada from inside the Washington beltway," Nelson says.

To guarantee their forest ecosystems survive to benefit future generations, managers are turning more and more to science. Soil studies are determining the effect of ground cover on nitrogen content and the quantity of timber a site can produce. Climate studies are measuring forests' potential to store carbon and the long-term effects on global warming. Fire studies are establishing optimum temperatures for low-intensity burns that return woods to a more natural state. More of the science is aimed at long-term forest health, sustainability, and functioning ecosystems.

By applying scientific research and local knowledge to improve collaboration and knowledge among the local community, forests can support local economies without negative impacts on the ecosystem.

White pelicans are among the species that rely on a healthy ecosystem that includes clean water. The best way to provide that is hotly debated.

"We need to be conservative and long-term in our approach but not stupid about the real economic pressures on a forest," says Richard Donovan, director of Smart Wood. His nonprofit company is working toward sustainable forest management worldwide through technical assessment, monitoring, and evaluation of forest ecosystems that certify "green" products from qualifying forests.

The goal of managing forests for future generations has prompted the American Forest and Paper Association to launch its own program, the Sustainable Forestry Initiative. "We have an interest in sustainable forestry—an economic interest as well as a deep interest in the environment," says Luke Popovich, an association spokesman.

Collins Pine Co. General Manager Larry Potts inspects an all-aged stand...

In 1995 the association began requiring compliance with its Sustainable Forestry Initiative as a condition of membership for the approximately 200 trade groups, forest industry and paper companies it represents. Ten dropped out; 17 others did not meet the minimum standards. Members certify themselves according to guidelines developed by the AF&PA. An independent advisory panel may also make an on-site inspection to analyze their data.

Along with setting new standards for its members, AF&PA is conducting training sessions for loggers that introduce principles of hydrology, riparian habitat protections, and basic Environmental Protection Act requirements. Including loggers is critical to the future of forests, says Popovich. "With all the intentions in the world and all the politics by our green detractors, at the end of the day we're not going to improve forests if the logger on the ground doesn't get the message."

What Matters Is the Forest

Not everyone is enthusiastic about the Sustainable Forestry Initiative. Yassa, the NRDC scientist, is among those who have challenged the timber industry program as a self-serving agenda that will do little to assure long-term forest health. But Smart Wood director Donovan views it as a positive trend. "Even the most conservative elements in industry are talking about sustainability. It's focusing on the forest—saying what matters is the forest."

Some managers who have been committed to long-term forest health for decades are beginning to enjoy the payoffs. The benefits vary with their particular objectives, ranging from the beauty of fall color to the black ink of a bottom line.

Collins Pine Co. reaps commercial success and national recognition on top of the long-term satisfaction of managing a sustainable ecosystem. Collins' 94,000-acre mixed conifer Almanor Forest in northeastern California has produced 30 million board-feet a year for 50 years without clearcuts or herbicides. It retains the hush of an old-growth forest while supporting a local sawmill.

"We think what we are doing makes sense for the forest and the community," says Larry Potts, general manager of the company's Chester, California, operation.

Still, the company asked for an independent analysis to be sure. The eight-month evaluation used a comprehensive forest conservation scoring system developed by Scientific Certification Systems (SCS) of Oakland. When it was completed in 1993, Collins Pine became the first privately owned forest in North America to earn independent certification under the SCS forest conservation program. The company is marketing its lumber through a Home Depot program that promotes products with certified environmental accomplishments. President Clinton honored Collins and Home Depot with a 1996 award for sustainable development.

In central Massachusetts, managers of a forest surrounding Quabbin Reservoir believe their long-term goal of a healthy ecosystem will produce high-quality water for their 2.5 million customers in Boston. They have asked Smart Wood to evaluate their 58,000-acre forest to validate a strategy that includes some intensive management within the watershed. The Massachusetts Audubon Society has criticized the plan.

Over the years, the predominantly white pine and red oak forest around Quabbin has become an even-aged stand vulnerable to insect infestation and hurricanes. Diversity would make it more resilient, says Thom Kyker-Snowman, a natural resource specialist with the state division of watershed management. His long-term plan includes cutting half-acre openings in the old stands to allow young trees to develop. On southeast-facing slopes near reservoir outlets, these young stands are disaster insurance. If a hurricane flattens an even-aged stand, both nutrients and sediment will wash into the water, degrading it for up to five years. But the young forest will be spared, continuing its aggressive growth and reducing the loss of nutrients.

...and watches a logging operation at its Almanor Forest in California. The timber company was North America's first to be independently certified as sustainable.

"It's controversial to say we can improve on nature's design... But we believe we can practice forest management intensively and not only not disturb

[continued on page 31]

To Cut or Not to Cut *[continued from page 22]*

the water quality, but actually improve it." Smart Wood's evaluation is scheduled for completion late this year.

The benefits of a long-term forest management plan go well beyond a glass of good water in Boston. They include economic prosperity for private timber companies and for rural economies. They include rich habitat for well-stocked plants and animals as well as those that are endangered. Some ecosystems are improved by cutting, others by no cutting.

For Kirby and Lynda Beam, sound forest management is simply the return for the privilege of owning the land. Their forest near Savannah was Georgia's first stewardship farm under a government program promoting sustainable forest management. They harvest some stands heavily; some land they will not even cross with a bicycle. The Beams' goal is to do well by the resources they inherited. Their grandson represents the seventh generation to walk through the trees to the creek and know that his grandparents, and theirs before them, stood on the same piece of dirt.

"For him to look at that forest and think it's like that because that's how God made it—that's foolishness," says Kirby. "What we have today and what he will have is because of the way we managed. We've got to do a good job."

For forests to continue to supply both tangible and intangible products to an ever-demanding public, forest professionals must work together on the ground they manage. By focusing on the trees, the water, and the soil, they can make the decisions about where to cut and where not to cut, which will sustain forests as complete ecosystems into the distant future. AF

Forest Health as Political Football

In 1994, after two years of scientific work exploring "forest ecosystem health" issues in the Inland West and Northern Rockies, American Forests mounted a public information campaign focusing on conditions that differed from historic patterns.

Many of the region's forests now were much more dense and characterized by historically less dominant species.

We concluded that an increasing human presence and activities such as grazing and logging since the late 1800s were largely responsible. The most significant reason: the exclusion of wildfire, which for centuries had shaped and maintained the region's forest ecosystems. An informed public discussion of forest ecosystem health, we believed, was the first step in a long process of restoring more vigorous, resilient, and yes, healthy conditions.

At the request of the House Agriculture Committee, we began work on legislation to address the risks these conditions posed, engaging national environmental and forest industry representatives. After some progress, the discussions hit several obstacles and closed down. Then came the elections of 1994, new Congressional leadership, and a very different political climate.

The extensive and destructive wildfires in 1994 provided a "teachable moment," when we could get media attention. We sought a policy debate about the risks that altered forest conditions posed to both natural resources—including wildlife, fish, water and soil, as well as trees—and human communities. And we wanted to spotlight ways forest ecosystems might be restored within a range of normal historic patterns.

Instead, a debate erupted over the millions of acres of forest that had burned and how to capture the remaining economic value of the burned trees, prevent further damage, and rehabilitate the forests. "Salvage logging" took center stage in 1995's policy debate, confusing the forest health issue and diverting attention from critical questions about restoring forest ecosystems.

Erroneously citing forest health restoration as a key purpose, the new Congress soon passed a legislative rider to expedite salvage logging. It also permitted logging of some controversial old-growth-forest timber sales. Environmentalists attacked, calling forest health a ploy of logging interests. As the controversy grew more political, we lost the opportunity to discuss forest health restoration policies and practices, including thinning or the use of prescribed fire as a tool in fire-dependent forests. The window on our teachable moment slammed shut, and not even 1996's widespread fires could open it.

One important way American Forests is now addressing the issue is in partnership with regional groups, in places where forest health is a widely perceived concern. In northern California and southern Oregon, we have been working with the Lead Partnership Group, a consortium of 10 community-based organizations whose members range from environmental to forest industry groups. We are participating in, and learning from, their efforts to address forest health in their region, and we're helping them bring these issues and solutions to national attention. In the current policy environment, and perhaps beyond, working with community-based groups may be the most promising means of resolving natural resource issues.

—*Dan Smith and Gerald Gray*

"Proceedings of the Lead Partnership Group Roundtable on Communities of Place, Partnerships, and Forest Health" is being published this fall. For order information, call 202/667-3300 ext. 237, or visit our Web site: http://www.amfor.org.