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TO DISCUSS OVERSIGHT OF THE FOREST AND RANGELAND RESEARCH PROGRAM OF THE U.S. FOREST SERVICE

HEARING

BEFORE THE

SUBCOMMITTEE ON FORESTRY, CONSERVATION, AND RURAL REVITALIZATION

OF THE

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY
UNITED STATES SENATE

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TO DISCUSS OVERSIGHT OF THE FOREST AND RANGELAND RESEARCH PROGRAM OF THE U.S. FOREST SERVICE

THURSDAY, OCTOBER 27, 2005

U.S. SENATE,
SUBCOMMITTEE ON FORESTRY, CONSERVATION, AND RURAL REVITALIZATION, OF THE COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, DC

The subcommittee met, pursuant to notice, at 10:15 a.m., in room 328-A, Russell Senate Office Building, Hon. Mike Crapo, [Chairman of the Subcommittee], presiding.

Present or submitting a statement: Senators Crapo, Lugar, Lincoln, and Salazar.

STATEMENT OF HON. MIKE CRAPO, A U.S. SENATOR FROM IDAHO, CHAIRMAN, SUBCOMMITTEE ON FORESTRY, CONSERVATION, AND RURAL REVITALIZATION, COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

Senator CRAPO. Good morning. This hearing will come to order.

Demands on our forests are increasing, as Americans call for an affordable wood supply, a protected environment, enhanced wildlife habitat, abundant recreational opportunities and, frankly, living space. And these demands are increasing while we also face unfortunate events such as the hurricanes and fire which take their toll on our resources.

We must be able to meet these challenges, and research is important to ensuring that we have the tools necessary to improve forest conditions and meet emerging needs. However, more must be done than simply conducting research. We must also make certain that the technology developed through this research is reaching those who manage and rely on our forests and our forest products.

Additionally, a strong coordination between the U.S. Forest Service, the research community, and the end users is key to making limited resources meet on-the-ground needs. I continue to assert that enhanced coordinated research will maximize the use of our forests. From better harvesting techniques, to more efficient wood products, to new and innovative uses, we can find ways for this renewable resource to provide more benefits to more people in an environmentally sustainable manner.

Besides improving uses, the better and more focused research will also allow us to mitigate the impact of damaging events like

fire, windthrow erosion, disease, and invasive species. We can meet these challenges, and research can focus our efforts to do so.

As the Forest Service works to address emerging forest research challenges, improvements can always be made. Improved collaboration through joint planning by scientists and administrators of the Forest Service and universities will better enable resources to be targeted toward the most beneficial vision for our forestry research.

We must all work together to see that forestry research receives the necessary support and coordination. The goal of this hearing is to look at the direction, coordination, and long-term plan for forestry research; to examine how we can gain better research coordination; and to review how we conduct technology transfer, coordinate our long-term forestry research focus, and share the workload.

Our witnesses here today are going to share their insight on these issues. And our witnesses today include Ann Bartuska, Deputy Chief for Research at the U.S. Forest Service. And following her testimony, we will hear from a second panel of witnesses which includes university, industry, state forester, extension forester, and environmental interests. I am particularly pleased that the Dean of the University of Idaho Forestry School could be here, and I want to thank you, Dean Steven Daley-Laursen.

I look forward to all of the witnesses and their contributions to our collective goal of maintaining the health and quality of our Nation's forests.

However, what I wanted to do before we turn to the witnesses was to turn to the other Senators for their statements. Right now, you may have noted the bells going off at the beginning of this hearing. That is because we are having a cloture vote on the floor of the Senate with regard to the Labor-HHS appropriations bill, the final appropriations bill for the Senate this year; and so some of the Senators are going to be delayed.

And what I think I will do is to go ahead with your testimony, Dr. Bartuska. And then, as other Senators arrive, we will give them an opportunity to give an opening statement.

And with that, let's go to our first panel. And Ms. Bartuska, you may proceed.

STATEMENT OF ANN BARTUSKA, DEPUTY CHIEF, RESEARCH & DEVELOPMENT, U.S. FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Ms. BARTUSKA. Thank you. Good morning, Mr. Chairman. And I appreciate the opportunity to testify before the committee on the Forest Service's Forest and Rangeland Research Program.

This is the Forest Service's centennial year, and research has been part of the Forest Service since its inception in 1907. Our research programs have a wide geographic extent, an interdisciplinary emphasis, and a steady focus on solving problems and providing science for policymakers and land managers.

We have programs in all 50 states, U.S. territories, and commonwealths. We have long-term research on 83 experimental forests and ranges and 370 research natural areas. We have a cadre of about 2,700 employees; of that, 575 are permanent scientists. And we work across a large array of different research activities.

From public lands to private forest landowners, our goal is to put quality science and information into the hands of the users. And I think that is a goal that I understood you were just sharing with us.

I would like to share some examples of the kind of work that we do, and to talk a little bit about the array of work we have. One of the emphases is science around large-scale disturbances. And the ongoing hurricane response serves as a good example of this type of research.

Both Katrina and Rita caused extensive forest damage. Our southern station worked with Louisiana, Mississippi, Texas, and Alabama state foresters and the forestry associations to assess the extent and volume of timber damaged by the hurricanes. The station also prepared a directory of all of the mills that were in the area, so that private landowners could identify who they could sell their down and damaged timber to.

The station has also then developed groups of scientists around key areas, helping landowners reestablish the forests, repair damaged streams, restore the urban system, and recycle and dispose of damaged lumber and debris; the last with support from the forest products lab and their technology units.

Response to fire is another priority of ours. We have established rapid science assessment teams whose job is to get out, get science into the hands of the users to guide restoration activities, and to provide monitoring following major wildfires. We have also developed numerous different technology tools to get information about how to make homes safe from fire and reduce the risk, our FIREWISE program; so again, bringing our science into the hands of the user community.

And the other example I just want to touch on is the threat of invasive plants and animals. Most notably and most recently, we have established two threat risk assessment centers for invasive species; one in the east and one in the west, consistent with the goals of the Healthy Forest Restoration Act and Title VI, to establish national warning centers. So we really have taken this responsibility fairly diligently.

Just a few examples of what is a much broader program and I think gives a sense of the scope that we are involved in; but I believe Forest Service research is a national asset.

One of the most critical things that we do is provide—through our Forest Inventory Analysis program, or "FIA"—the Nation's forest census. We have been doing this for nearly 75 years. It is the only program that delivers continuous and comprehensive assessments of our forests in a nationally consistent manner across all landowners, and gets that information in the hands of the users as quickly as possible. We are now Internet-ready. In fact, the data can be acquired by anyone who goes onsite to really look at that information.

And then finally, one of our core strengths is our network of 83 experimental forests and ranges. These provide a really broad representation of the forests of the United States. We are actually in any forest type in the U.S. It is a national network that has resulted in long-term data sets that are looking at environmental

change over the last century and answering many of today's pressing questions at landscape and global scales.

A critical part of our success is partnerships. I think that is part of the reason for the hearing today, is to explore all of those different aspects. And I see many of our friends who are here.

To fully realize the benefits of public investments in research, the Forest Service is finding better ways to effectively translate science findings and technology advances into on-the-ground accomplishments. This is a priority for me: establishing new working relationships with our university community, with other science organizations, by taking our more than 1,000 cooperative agreements that we now have with universities and expanding those, being able to give us some flexibility in the types of research we do. I think those are really one of the foundational aspects of our organization.

And then, last, I guess what I would like to close with is really to just bring us back to what we are all about. Our Nation depends on our forests and rangelands to meet a multitude of needs. And our goal is to provide the scientific knowledge and tools necessary to manage, restore, conserve, and increase the productive capacity of our forests and rangeland systems.

I am very enthusiastic about the work we are doing, but I know we have much more to be doing in the future. So thank you very much for this opportunity, and I will be happy to answer any questions, as appropriate.

[The prepared statement of Ms. Bartuska can be found in the appendix on page 40.]

Senator CRAPO. Well, thank you very much, Dr. Bartuska. And I know that we all appreciate the work that you do, and look forward to working with you as we address this issue.

Technology transfer is critical in making the benefits of our research available to end users. And technology transfers enable us to get the most out of our research investment. Can you discuss that with me a little bit? What steps are being taken, and how is the Department approaching the opportunity to promote and improve technology transfer?

Ms. BARTUSKA. Well, we know we have a lot more to do. And I will start from that point, because I think this has been a significant part of my recent tenure with Forest Service Research and Development, is to enhance those opportunities.

One of the things we have done is establish an internal earmark, if you will; set aside a certain amount of money within our R&D budget for science applications that our stations can use to build partnerships, to take their science, and to create new technology tools.

And we also just have a high degree of expectation that when a piece of science is developed, that it will come with it a mechanism to get it into the next step, the hands of the user community. So our fire work is probably one of the best examples. I think it is about 20 percent of our entire program is all about fire and fuels work.

As we do some fundamental research in forested ecosystems, we are also putting together the tools, the training modules that would

bring that information to the user, whether it be a public land manager or somebody from the private landowner community.

I mentioned FIREWISE. We have a series of different technology tools available to get some of the science into modeling, predicting fire behavior, and making it accessible through most recent technologies. That is just one example. But we have made it a commitment. It is, I think, something that we have enhanced opportunities to really be pursuing in the future.

Senator CRAPO. Well, thank you very much. We have been joined now by Senator Salazar, from Colorado. I explained to everybody, Senator, that we had the vote on cloture that pulled everybody away. But I would be glad to turn to you right now for any opening statement that you would like to make, and then the two of us can continue with questioning.

STATEMENT OF HON. KEN SALAZAR, A U.S. SENATOR FROM COLORADO

Senator SALAZAR. Thank you very much, Chairman Crapo. And thank you for holding this important hearing on this very important issue.

I also would like to thank Dr. Bartuska for appearing here today and for the witnesses that have traveled to this hearing from some distances away.

The Forest Service and its programs are extremely important to Colorado, and for most of our states in the West where we have huge inventories of Forest Service lands. My State of Colorado has 21.5 million acres of forest land. That is nearly one-third of all the land in my home state.

In addition, Fort Collins is the home to the Rocky Mountain Research Station, one of the Forest Service research and development divisions—six research stations around the country. And that research center conducts a research program for the eight states of the Interior West region, as well as Wyoming, North Dakota, Kansas, and Nebraska.

The research that is undertaken in Colorado's national forests at CSU, and at UCD at Denver, and at the Rocky Mountain Research Station has an extraordinary value to Colorado and to the Nation. The research helps us understand riparian and alpine ecosystems, and provides invaluable social science research on natural resource planning and sustainable forestry. We are proud of Colorado's cooperative efforts with the U.S. Forest Service in this regard.

While all of this research is extremely important, something of particular interest to me is the Colorado research that is furthering the progress on the national fire plan. Every summer, my state faces the threat of wildfires. Only a few short years ago, Colorado faced some of the worst wildfires in the whole history of the state.

I know that the Rocky Mountain Research Station and Fort Collins account for one-third of all fire-related Forest Service research. And while the Forest Service, at least at the moment, is hard pressed to control the weather, there are some more controllable factors that Forest Service Research and Development has already been doing the research on in Colorado.

According to the 2004 Forest Service reports, 7 million trees, covering over 1.5 million acres, were killed by several different types

of bark beetles throughout the State of Colorado. In addition, in late September of this year, a wildfire burned a part of the beetle-killed forest in just 2 hours in Summit County between Frisco and Breckenridge. Places like Grand County and Eagle County and all along the divide are surrounded by the time bomb presented by these beetle-killed forests. With the next big fire, Colorado could start losing entire towns.

We cannot allow these towns and forests to burn and endanger our citizens and natural heritage. The pine beetle is very serious business in my state. In my mind, this insect is Colorado's forest "public enemy No. 1." The Forest Service research on controlling and eradicating the pine beetle gains urgency every day, as more of these trees are killed and become a fire threat to the communities of Colorado and other places around the West.

I look forward to working with you to ensure that the forests and rangeland research program continues to look into this important issue, so that our forests and towns are in fact protected. And I thank you, and I will have some questions, Mr. Chairman.

Senator CRAPO. Thank you very much, Senator Salazar. Dr. Bartuska has completed her opening statement, so we will just have successive rounds of questions until we are finished.

Dr. Bartuska, another area that I want to talk about is the relationship between the various research partners. And the question I have is how the Forest Service is working to make the most out of its relationships with universities and colleges, in particular, with their tremendous research capacity.

I, personally, think these relationships can really help the Forest Service and the universities both accomplish their missions and foster our research in forestry issues. Do you believe we are getting the maximum out of that partnership, or can we improve there?

Ms. BARTUSKA. I am not sure if you know my background. I actually started in the university, and I have also spent time with the Nature Conservancy, as well as the Federal Government. So I am really committed to the idea that, if we are going to move science forward, we have to do it as a partnership in all of those parties.

I don't think we are doing enough. I think we have sustained a certain level of cooperation with the university and academic community over the years. I believe right now between 12 and 13 percent of our program goes out to universities for extramural projects that really enhance our own work. But I think we can start taking some more creative approaches. And I know there is an interest within the university natural resource deans to be doing that same thing, and taking a hard look at how we work together.

One of the areas that we have talked about is: can we establish more ideas of centers of excellence, where you bring the different types of scientific capacity into one location? It might be a virtual center; it might be a bricks-and-mortar center; but really being able to have more real-time cooperation between our different scientists, as well as those who are involved in the extension function.

I think if we have looked at where we have been most successful with those partnerships in the past, it is where we have been co-located with other research institutions, mostly universities. So places like Boise and Missoula, Montana, where we have a presence right on campus, have really created an environment where

we can have our scientists working with university scientists on a more regular basis.

So I that clearly is an emerging model. There has been a lot of discussion about this. A little bit before my role as deputy chief, there was a National Academy of Science committee on looking at forestry research capacity. It really pointed to the need to have a new model of how we work together.

I guess to me the good news is that, since I have gotten into this job, we have had a series of dialogs among all the different partners about, "How do we do this more proactively, instead of just sort of in an ad hoc manner?" And I think the conversation has really just begun. But it is heartening, actually, that I see the kinds of energy going into it.

And the panel members that you have here have all been talking about the same thing, so it will be good to get their ideas later.

Senator CRAPO. Well, thank you very much. And I don't know if you have had a chance to read the testimony of the other panelists that they have submitted, but as a part of our second panel we will hear from Dean Daley-Laursen, who is the policy chair of the National Association of University Forest Resource Programs. And he believes that a major overhaul of how our forest research entities coordinate is needed. I am not sure if you are familiar with the ideas he is proposing, but what are your thoughts on that?

Ms. BARTUSKA. Well, I actually just saw them.

Senator CRAPO. OK.

Ms. BARTUSKA. I knew that there were discussions taking place. I had the opportunity to meet with the general assembly of the natural resource deans when they were in Fort Worth—I guess it was about two weeks ago now. So I know that there has been some conversation about that.

I don't disagree with it. I think that the scope and the complexity of the issues have gotten so broad, and the resources to do that work have continued to be tight, that if we don't have a new model of working together I think we will not accomplish the science goals that we have.

I have not studied their proposal well enough to know what their concrete specifics are and what our role might be in that. But I know that we have pledged that we would establish a working group with the universities; Forest Service research; hopefully, CSREES; to talk about this very issue and to really set out the next year to be much more proactive about how we have that conversation.

Senator CRAPO. All right. Thank you very much.

Senator Salazar, would you like to ask questions?

Senator SALAZAR. I would have a couple of questions. The first relate to the pine beetle issue, and what I would like to ask you, Dr. Bartuska, is what kind of research is currently underway with respect to how we might be able to bring this infestation under control?

I understand, for example, that there is a preventive spray out there that can in fact address the pine beetle issue. The problem is that it is very expensive. And so when you look at the pine beetle infestation problem that we have, not only in my state, but other places around the West, what is the research telling us at this

point in time that we ought to be doing, and what kind of research is going on at the Forest Service?

Ms. BARTUSKA. OK. Well, it certainly is one of the highest-priority areas of research for our western stations; actually, as well as our southern research station, through their southern pine beetle program. And what I have seen in the evolution of that research is going from the traditional classic just beetle dynamics and beetle population studies to: how does the population interact across the large landscape because of environmental factors and vegetation structure?

So many of the same environmental drivers that have been creating the excessive fuel problem in the West are also tied to the excessive beetle infestations that we have. The bark beetle research that we have in our Rocky Mountain station has continued to be a high priority, and it is one of the cornerstones of that station's work. They intend to carry on looking at the bark beetle population dynamics; again, across the entire landscape.

But—and I think you pointed out—we are also looking for what kinds of mechanisms are available out there to control the spread. Some of it will have to be silva-cultural treatments. There is no way that I think any spray treatment or chemical treatment can address a problem as big as the bark beetles are throughout the West.

If we do some prudent silva-culture management, managing the stands, creating healthier stands, we may be able to protect certain watersheds, especially high-value watersheds. And I think we have some techniques to really protect certain trees when we have high value.

I know in the South one of the concerns is you have a few really old pine trees that you don't want to lose, because they have become icons in the community. So that kind of targeted tree by tree we may be able to do with some chemical treatments and developing that methodology.

There also seems to be some potential for establishing some trees that have greater resistance to bark beetles. I don't know if you are familiar, the mechanism to slow the spread of beetles is they throw out the resin—pitch it out—and that slows the beetle, and it actually reduces the extent of mortality. And there seem to be some trees, some individual trees, that have greater potential to do that. If we could, through our breeding programs, establish more of those trees, we might be able to actually have certain forest stands that have a greater ability to resist the bark beetle.

Senator SALAZAR. Let me ask you, is there anything in addition to what is already going on that we could be doing in the Department of Agriculture appropriations bill? The Senate included an amendment in there asking for a report back from USDA with respect to our efforts on controlling the bark beetle problem.

Do we have enough resources? Are we doing everything we possibly can? If you were queen for the day and your assignment was to go and take care of the bark beetle problem, what additional things would you recommend that we be doing as a country to deal with this issue? Or are we going everything that we can do?

Ms. BARTUSKA. Well, my guess is that I am sure we have gaps in the knowledge to be able to do everything we could do. And I

haven't seen the report to see what kind of an assessment has been done about what our needs are and where our gaps are. That is one thing that Rocky Mountain station has been working through, is establishing their strategy and their priorities about what the future research program will look like.

Not having seen it, I can't really say, I think, what the opportunities are. Certainly, the expansion of looking at the relationship of bark beetle populations, infestations, forest dynamics, and silviculture, and our management across the entire landscape, is a very high priority for us, and it is one that we will continue to emphasize.

I guess I would like to just mention one other thing. That is, part of the reason why the western threat assessment center that was established through the Healthy Forest Restoration Act—this is the one in Prineville, Oregon—that is one of the roles they will have; is to be able to give us some real centralized look at insect problems in the West, and what we could be doing to address them. And they have just established, so I would also like to wait to see what their plans are coming forward with.

Senator SALAZAR. I get asked the question almost every day when I am out in about 40 counties of Colorado, about what we are doing on the pine beetle and what the status of the research is. And I would ask if you could get a letter to me—and perhaps Chairman Crapo would like one, as well, because I am sure it is an issue in Idaho—but that just outlines the research efforts that you have underway to try to control this particular problem. It would be something that would be very helpful to me.

Ms. BARTUSKA. We would be happy to do that.

Senator CRAPO. Thank you very much. Dr. Bartuska, while we are on the issue of timber, since the passage of the Healthy Forest Initiative, I have been very concerned that we find opportunities to deal with the biomass that is generated from the activities that we have incentivized under that initiative. And I am curious to know what the Forest Service has done to develop new commercial opportunities for the biomass that is generated from our timbering activities.

Ms. BARTUSKA. That certainly is an area that we have been putting a lot of energy into, both looking at what our role is, as well as identifying new research. We have worked with the Department of Interior and the Department of Energy, through a team that we have, to have an implementation strategy for improving woody biomass utilization. So we are trying to make sure that we work across the departments to really reduce the redundancies; also, to play to our strengths.

One of the things that we have done through our forest products lab is develop composite structural materials. We have been looking at small, portable energy generation plants that you would be able to move to communities, to be able to use the biomass onsite and turn it right into energy; possibly plug it into the grid, or have it produce the energy for a particular building. The Fuels for Schools program is a good example of that.

And we have been looking at different types of housing materials that could be used using different types of forest biomass. We have also been looking at how do we use the small-diameter material in

new products, in new innovative products, working in part with state and private forestry in our cooperative forestry programs to establish new businesses that are all around, these new markets and new materials.

So it is both creating the research to identify that new type of material; but then also, the technology transfer approach through state and private forestry. And then several different organizations, including working the Agenda 2020 partnership with industry and universities, are looking at biomass as a fuel, ethanol production, biomass as part of a bio-refinery concept.

So I would say we have a fairly good core set of activities that are taking place. Our forest products lab, again, is the leader in that. We have got utilization units, though, all around the country. And I think we have the platform to really making that work.

I think we probably could do more. We will continue to do more. And that is one of our collaborations with the Department of Energy, is to get them to recognize that woody biomass is as good as agricultural biomass in some of the programs that they have. But I feel very confident that, through our national strategy, we are making the right progress.

Senator SALAZAR. Mr. Chairman, if I may just for a second?

Senator CRAPO. Yes.

Senator SALAZAR. I have an Energy Committee hearing that is going on.

Senator CRAPO. Oh, definitely. Please, go ahead.

Senator SALAZAR. So I am going to be departing in just a second. But following up on your line of questions, it seems to me that with the major emphasis that we will be putting into the whole notion of renewable energy and energy independence in this country, that the concept of how we use these biomasses in a productive way is very important.

And I think that it may be useful for us to also get from the research service an overview of how we can take these dead trees that we are finding all over the West and try to put them into some kind of productive use.

I know that in my State of Colorado, up in Walden and Jackson Counties, there is a co-generation facility that is using some of the pine beetle trees to provide heating and electricity for the school building. So it would be useful for me if we could get that kind of a report from you.

Senator CRAPO. I think that would be very helpful, as well. And maybe we should clarify a little better than we did, Dr. Bartuska, that you are willing to respond to both the pine beetle question and this question on the utilization of biomass.

Ms. BARTUSKA. Yes. We will be happy to do that.

Senator CRAPO. We would very much appreciate that. I think that would be very helpful.

Senator SALAZAR. Thank you, Mr. Chairman.

Senator CRAPO. Do you have any other questions that you want to ask right now, or do you need to get on to your next hearing?

Senator SALAZAR. You asked the very question I was going to ask.

Senator CRAPO. All right. Well, I truly appreciate working with you, Senator Salazar. And we have a lot of common issues, and I look forward to working with you on them.

Senator SALAZAR. Thank you, Mr. Chairman.

Senator CRAPO. Thank you.

Getting back to the question of our utilization of biomass, at the end of your response, Dr. Bartuska, you indicated an example of trying to get the Department of Energy to be more aware of and focused on the potential of utilization of woody biomass.

One of the things that I have observed is, as we identify new uses—and, frankly, new products—that can be commercially implemented utilizing this biomass that is generated from our Healthy Forest Initiative, one problem we have is developing markets for them.

And I know that the Administration has looked—I think there is an executive order that the agencies look at ways in their purchasing and the implementation of their missions; that they look to the utilization of biomass. From what I have observed, however, it is not working very well. The other agencies are not doing it as well as I think we expected that they would, and had hoped that they would.

And I would just like to ask your thoughts on the issue of: across the Administration, are we getting the necessary attention focused on how to get these markets generated by utilizing the purchasing power of the Government, as we move into trying to utilize these biomass products?

Ms. BARTUSKA. I am not totally familiar with all of the different opportunities out there from the other departments. I do know that because of this working group on woody biomass utilization there has been increased discussion going on by the three departments I mentioned—Energy, Interior, and Agriculture. So I think that we are now starting to get the ideas into the hands of these other departments; and certainly, a lot of the opportunities there.

One of the things we recognize is that we have done, in some ways, a hit-or-a-miss approach, where we have had maybe one scientist or manager approaching someone else and conveying the opportunity; and not done it systematically. So as part of a response to that, we have just established a biomass coordinator position operating out of our national office that will try to bring all of the different components together, and to be a principal link to other agencies and departments.

I think we also have hopes that the new energy bill will be a platform for us to bring some of those ideas forward at the higher levels and at the Secretary-to-Secretary level, to increase that visibility.

Clearly, it is going to take multiple approaches. And I think at every different level of Government we are going to be having to have this conversation. We are really in some ways just getting started. I don't think we are there yet. But it seems more and more we have got the pieces in place to deliver.

Senator CRAPO. Well, thank you. I appreciate that. And I would encourage you to utilize your position in your department to keep the pressure on.

I will just give you one example that I am aware of. We had a product developed in Idaho. I don't know the exact name for this, but it would be utilizing some of the small timber for stream breaks; which was very helpful both in terms of firefighting and responding to erosion problems, and also environmental improvement of habitat in the streams.

But what seemed to me, at least, was that those in other agencies who could use this were already very comfortable with previous products—which didn't work as well, in my opinion. But those who issued the purchase orders had the relationships with the providers and so forth in other contexts, and just were not really that interested in focusing on trying to help develop the markets for this new biomass.

And somehow, we have got to get the message, as you just said, all the way through to different levels of the Administration; that it really is a policy objective that we are seeking to implement here. So I just encourage you to help do that.

We have been joined by two more here, and I would like to give both Senator Lincoln and Senator Lugar the opportunity to make an opening statement and ask any questions, if they would like to. So we will turn first to you, Senator Lincoln.

STATEMENT OF HON. BLANCHE LINCOLN, A U.S. SENATOR FROM ARKANSAS

Senator LINCOLN. Thank you, Mr. Chairman. And it is certainly a pleasure to share this Subcommittee with you, and continue our work to ensure the health of our Nation's forests.

I have said it on many occasions: I have been so proud of the partnership that Senator Crapo and I have been able to forge; particularly during the Healthy Forest Restoration Act, and in some of the other issues that we have been working on. It is a very positive step that I think that we have taken together that has brought about some results. I have certainly seen them in my state, and I know he has in Idaho, as well.

And certainly, like the Chairman today, I see today's topic of today's hearing a very significant component to the health of our forests. I am once again pleased to join the Chairman in looking at how our forest research dollars can best contribute to the manageability and the sustainability of our forests.

We in Arkansas had a very comprehensive meeting in the last 2 weeks with a lot of different entities through our forest system, to really talk about not only how we could be doing a better job, but what other opportunities are out there, and how we need desperately to really use the opportunities of research and the tools of research to be able to maximize again the manageability of our forests, the sustainability, and the health and growth of those real treasures for us.

So we are fortunate today to have Miss—It is "Bartuska"?

Ms. BARTUSKA. Bartuska.

Senator LINCOLN. Bartuska, with USDA's Forest Service. And we want to thank you. Your Department certainly provides our Nation with invaluable technical research, and that is important to us as we are out in the field. We thank you.

And we are also pleased to have with us today another partner in this effort, from Arkansas, one of our very own, Mr. Scott Simon, who joins us from the Arkansas Chapter of the Nature Conservancy. We have had in our office and with the Forest Service in Arkansas a wonderful working relationship with the Nature Conservancy. They have been invaluable to me and to my office, and I think to the Forest Service as well.

And Mr. Simon plays an integral role in making what we do here in Washington work out there in the real world. And we are very, very grateful. He is a tremendous resource for our state and, as I said, to me, personally. So, pleased that he has joined us today, and look forward to his testimony.

Welcome all of our panelists that will be here today. Mr. Chairman, I will submit my entire written statement for the record. But I do want to reiterate my support for the Chairman in taking on what I think is a critically important issue. Research is absolutely necessary, as we see all kinds of different conditions that are changing around us—whether it is weather patterns; certainly, multiple other conditions and variables that have an effect on our forests.

It is important for us to utilize the kinds of research that we can produce, if we are serious about it, in making sure that we do look toward the sustainability of our forests.

Just on one note, I had my children out in the forest last weekend—took me about 2 days to scrape all the mud and rocks and leaves and dirt off of them, after they had spent an entire weekend out in the forest and along the riverbed. But it also was unbelievable to see the curiosity, the real respect that it generated in two 9–year-olds to be able to have a forest to play in.

And I think that we all share that goal and that really deep devotion to making sure that what we do is preserved, those forests, for future generations. And with research, we know we can do it correctly, and we can do it for many, many years in the future.

So thank you so much, Dr. Bartuska. We appreciate your being here and what you do. And I certainly will look forward to working with the Chairman on such an important issue. And welcome to Scott Simon. We are glad he is here. Thank you, Mr. Chairman.

Senator CRAPO. Well, thank you very much, Senator Lincoln. I, too, want to say once more how really important our working relationship is to me. I think we have said this before: we got elected to Congress at the same time, and we have worked closely together ever since, and done a lot of good things.

Senator LINCOLN. Yes.

Senator CRAPO. And I appreciate that working relationship that we have.

Senator Lugar.

STATEMENT OF HON. RICHARD LUGAR, A U.S. SENATOR FROM INDIANA

Senator LUGAR. Mr. Chairman, it is a privilege to be here today with you and Senator Lincoln, and to listen to these distinguished panelists and Dr. Bartuska leading off.

Let me just say that I have two major interests in today's hearing. First of all, in behalf of the 54,000 people in Indiana who are

employed in the hardwoods industry, we are intensely interested in the competitive aspects of those industries and those jobs, and have become involved in a log scanning project with Purdue.

And one of the questions that I will raise, but that you might want to cover initially, is whether log scanning research is a part of the USDA portfolio now. By log scanning, I mean the ability to utilize a hardwood log to obtain more board feet from it than is currently the situation.

It is a competitive advantage in which our technical abilities need to be employed. It is not the only one, but it is indicative at least of the work that our staff in Indiana is trying to do, along with the Purdue Hardwood Regeneration Center and the research people there, in practical ways of working with the industry.

In addition, as you know, the Purdue Center is working out what might be called the state-of-the-art: how do you arrive at the best walnut, oak, maple, or what-have-you? On my own farm, we have some of the Purdue research proceeding with the grafting of trees and an attempt really, over the course of time, to find the best breed; in part, because our country will be more competitive if we have these trees and we know more about them.

As I revealed in the last comment, I am interested in your testimony as a tree farmer, as somebody who consumes this information. We have about 200 acres in hardwoods, along with 200 acres of corn and 200 acres of beans: a good portfolio, and a farm that is situated inside the city limits of Indianapolis. So as a result, I must say, the beauty of the beans and the corn is evident, but the neighborhood likes the trees best.

And they are beautiful. And I have been planting some of them in plantations for the last 25 years, learning from foresters in our state and around the country what we are doing right and what we are doing wrong; having had foresters from around the world come through and, sort of with an "author meets the critics" session, listen to what they think about American forestry practices; and then, the opportunity to visit with some of these people in their home countries, likewise.

What is evident is that we have great opportunities in the United States, because we do have great forest resources. And some of these resources have been chopped down in China, for example, or in other countries. And therefore, issues arise as to whether we should export logs to China or other places that don't have them: an interesting reverse protectionism, of sorts.

And all of these issues may be beyond the testimony today; but I raise them because they really are vitally important, not only to farmers and to producers, but to the industries that are reliant upon these folks. And my guess is that the up-side potential for these industries is really unlimited, if we do our homework now, if the research efforts are available at USDA or with the resident colleges that may be helpful; quite apart from the extraordinary input from ingenious American industry involved in this.

So I appreciate the hearing. And I thank you, Mr. Chairman and Senator Lincoln, for making this possible.

Senator CRAPO. Well, thank you very much, Senator Lugar. I didn't realize until today that your farm was inside the city limits. That has got to be an interesting experience.

Senator LUGAR. It poses some unusual problems.

[Laughter.]

Senator CRAPO. Well, Dr. Bartuska has already given her opening statement, and I have asked a number of questions. And so, Senator Lincoln, if you have questions, let's go to you right now.

Senator LINCOLN. I think it is a broad question and so, for whatever I may have missed in your comments earlier, I think we start next year really looking in great earnest at our Nation's foreign policy, as we prepare for the 2007 farm bill. And I guess whatever question I may have is, what are the opportunities that you see in that upcoming legislation to further the efforts of forest research?

Are there some specifics there that you hope to see us focusing on in the farm bill that would really further research? I just know from the meetings I have had at home, there has been an enormous desire, particularly in our home state, to further the research that we have in the forestry industry.

Ms. BARTUSKA. Well, I can partly, I think, answer that, since in the Forest Service we have just begun our discussions of, "What role would we be playing in the farm bill, what information, what ideas do we want to send forward?" Historically, there have been forestry titles in past farm bills, and in fact one of them I know was focused on forestry research. So there is certainly an opportunity to be looking at that.

We were talking quite a bit with the Department, of course, about what role a lot of the conservation titles that currently exist in this farm bill might have, and expanding it to address forestry-related issues in a much more comprehensive way.

So to answer your question, I think those pieces are out there. We have not, I think, spent enough time to say, "This is the platform that the Forest Service and the Department want to bring forward." But I do think it is a rich opportunity that we are talking about it now and taking advantage of what we saw in the past farm bill.

Senator LINCOLN. Thank you. I know it is somewhat premature, and I am certainly not asking for specifics or details. But I do think it is an opportunity—certainly for me, and I think the Chairman as well—to let you know that I am definitely thinking of those things. And I hope that you will work with us over the coming months, as we kind of prepare ourselves for that; because there are some, as you said, rich opportunities to engage in those discussions. Thank you.

Senator CRAPO. Thank you. Senator Lugar?

Senator LUGAR. Secretary Bartuska, you have mentioned in your testimony this science you can use—sort of a user-friendly department. And this may just show my lack of grasp of all that you do, but what kind of publications do you put out, that reflect the extraordinary gamut of research that you do, that are available to farmers at that level?

I would gather perhaps people in academic institutions may see the product of your efforts, or perhaps some of your efforts are giving grants to the institutions so that their work can come forward.

But I ask this, once again getting back to my tree farmer role. The Walnut Council of Indiana puts out a publication; we have some tree farmer publications that are state or national, and they

reflect bits and pieces of the research that is going on in America. But I have often thought, as I come to these hearings and I hear extraordinary issues that are being brought to the fore, "Where is this research?" Do I need to send staff coming through USDA or the Library of Congress?

In other words, can you give us some idea of the availability of the findings and the materials in a user-friendly way?

Ms. BARTUSKA. I can give you sort of a broad-spectrum approach. First, I would have to say that, just as any research organization, where the performance of a research organization is based on peer-reviewed publications, there clearly is a responsibility of our science to deliver that. But over the years, we have increasingly been focusing on how do you translate that science into a form that others can read and use. And it is all across the board.

In some cases, it is through our National Agroforestry Center, for example. It is tips for the landowners. It is, how do you put in a stand of trees or a wood lot that actually can maximize the return on that piece of ground.

We do have a "How do you?" and "What is the value of riparian forests to buffer?"—a very simple, threefold kind of document that in very clear English shows with pictures and diagrams the value of that riparian tree buffer to reduce land runoff into streams, help contribute to water quality.

So we are trying to do more of those. We have actually a great publication—and you mentioned, Senator Lincoln, about your children—a thing called "The Natural Inquirer," which is translating into terms that middle-school and high-school students can use complex scientific issues. And in fact, our biggest seller was all about planning.

Now, can you imagine kids wanting to learn about planning? I mean, I have a hard time wanting to learn about planning. But that was an incredible tool; and bringing educators to help write that and get the right visuals and the diagrams. And it really made it a captive publication and very popular. So we are trying to create more and more of those.

I wanted to mention again the National Agroforestry Center, which was recently moved to the southern research station. It is operating out of Huntsville, Alabama. And this is one of their principal roles, is to communicate and work and network with the different farm and forest organizations through the region. And actually, they have a national responsibility to broaden out that connection, so that we are producing tools that those particular landowners can use.

So I am increasingly proud of what our scientists are doing. And we are finding that some judicious hiring of people who are trained as technology transfer specialists, as opposed to scientists, is really paying off in big dividends for us.

Senator LUGAR. Well, this is good news. Just as a practical matter, do you publish a bibliography of publications? If I ask a staff member to come over there, would you have a list of these things? I am trying to reduce this down to the grassroots, where I can carry around a piece of paper, or a magazine, or encourage others to utilize these publications. And I would not be raising the question if I felt that I was over-supplied now.

Ms. BARTUSKA. Yes, I——

Senator LUGAR. It is the other way around. I need, really, some help, and I am trying to figure out how I get it.

Ms. BARTUSKA. We probably don't have in one place all the publications that have ever been produced. I think we actually are producing over a thousand a year.

Senator LUGAR. Well, I wouldn't need all of those.

[Laughter.]

Ms. BARTUSKA. No, you wouldn't. So you probably want by subject.

Senator LUGAR. Yes.

Ms. BARTUSKA. And you actually ask a good question. I do not think we have in one place a list of all of the most commonly used publications around a particular topic. But we might have more than I realize; and so something like that. And I can take it back to our office, and see what they have.

Senator LUGAR. If you would, and just in the spirit of the question, see what you have, so that—you know, we might order some. We might figure out how to get our hands on them, and make them available to people.

Ms. BARTUSKA. Well, that would be great. And I will take that back.

Senator LUGAR. Great. Thank you.

Ms. BARTUSKA. And I have staff back here who are making notes quickly.

Senator LUGAR. Very good.

Senator CRAPO. Senator Lincoln?

Senator LINCOLN. In all this good conversation, I thought of one more question. In the meeting that we had in Arkansas on a university campus, talking with forestry industry folks, Forest Service folks, and others, realizing the really integral relationship, or the integral part that those relationships play, maybe you might comment on the partnerships. I know that partnerships between universities, the Forest Service, our non-profit groups, as well as interest groups—they have all played a very integral role in getting to the ultimate, in terms of both research and making sure that we have as much information as possible.

You might comment on your approach to that, as well as your thoughts on how important it is to have good strong partnerships among a diversity of groups.

Ms. BARTUSKA. Well, and as I said earlier in my testimony, it is one of the most important things that I think we have to do, is establish those partnerships and really enhance them. For one, the questions that we have out there, the science issues, are so complex that no one organization can do it all.

I came into this job in January of 2004, and I think I have now had five or six meetings, I think, with the university deans—Steve will probably correct me if I am off a little bit—on exactly that issue. It is not only what are the major science priorities we should be working together on, but how do we enhance that partnership?

And so I think both myself and my office, as well as our station directors, are very committed to making that kind of thing happen. I think it is just critically important for all of us because the costs of doing science has gotten so high that, if you don't work together,

you are not going to be able to solve and answer all of the problems that we have out there. So it just is good business, too, to do that.

The actual implementation I think is really variable. It probably varies as much as the geographic distribution of our research sites. In some cases, it is very robust and active, where our dollars are leveraging others' dollars five- or ten-to-one; in other places, it is maybe just one partnership, and they could probably be encouraged. But that is something that the station directors are quite aware of and really trying to encourage.

Senator CRAPO. All right. Well, Dr. Bartuska, we really do appreciate the time and the effort that you have given to not only appear here today, but the work that you do on behalf of the research that is done.

Ms. BARTUSKA. Thank you.

Senator CRAPO. And with that, we will excuse you. And we will move on to our next panel.

While our next panel is coming up, I will introduce them. Our next panel consists of Mr. Steven Daley-Laursen, who is the Dean of the College of Natural Resources of the University of Idaho; Mr. David Canavera, Manager of Research and Development, Ecosystems Project, at MeadWestvaco Corporation; Mr. Bob Schowalter, who is with the South Carolina Forestry Commission; Mr. Robert Daniels, Extension Professor at the Mississippi State University; and Mr. Scott Simon, Director of The Nature Conservancy, the Arkansas Chapter, Little Rock, Arkansas.

Gentlemen, we appreciate each of you being with us. My staff tells me we have reminded you that we would like to ask you to try to keep your comments to 5 minutes, so we have an opportunity to have more time for some give-and-take during our questioning period. So I would encourage each of you to pay attention to that clock that is front of you, so we can stay on time here.

Senator LINCOLN. But you haven't installed the buzzers, like Chairman Grassley.

Senator CRAPO. On the Finance Committee they have a foghorn that goes off.

[Laughter.]

Senator CRAPO. Oh, we have got that here? All right!

[Laughter.]

Senator CRAPO. So anyway, gentlemen, we will proceed in the order that I introduced you. Dean Daley-Laursen, please start. Thank you.

STATEMENT OF STEVEN B. DALEY-LAURSEN, PH.D., DEAN, COLLEGE OF NATURAL RESOURCES, UNIVERSITY OF IDAHO

Mr. DALEY-LAURSEN. Thank you for the opportunity to testify with the Committee today. My name is Steve Daley-Laursen. I am the Dean in the College of Natural Resources at the University of Idaho, and also the Policy Chair for the National Association of University Forest Resources Programs. We are 69 universities across the country where scientists, educators, and extension specialists advance the health, productivity, sustainability, and competitive status of the Nation's forests through research and education at the graduate and undergraduate levels, outreach, and technology transfer.

I want to express great appreciation, Senator Crapo, for your style of bringing partners together to discuss issues and seek solutions. You are well known in the State of Idaho for being a leader in that regard. It is a pleasure to be here in the spirit of collaboration.

Today I am going to try to accomplish two things in the short time I have. One of them is share with you the elements of the new vision of our university forest resource program association, (a vision for America's forests); and then offer some thoughts that we are kicking around with our partners on the enhancement and redesign of our federally funded forestry research and technology transfer system. We foresee a working network of partnerships to rebuild research capacity.

So first, to the vision. Our organization has developed this vision with three elements:

First, forests will be managed and conserved to meet changing human needs based on local knowledge plus ever-improving science and technology;

Second our forests will be vibrant, resilient, dynamic ecosystems that sustain a full array of forest benefits derived from conservation and management strategies across everything from preservation zones to intensively managed zones;

And finally, forests will be a constant source for learning about relationships between people and natural resources, benefiting people and all other forms of life.

I would like to spend the rest of my time sharing with you some of the thoughts, that we have been ginning up within our organization about the redesign reform, improvement and enhancement of our natural research technology transfer system around forestry. And again, some of these thoughts are real-time; some have been ginning up for the last year and a half or so.

So why do we need redesign and enhancement? I think it has been touched on. I would to stress that there are many changes in our working environment. I don't need to list them. They are in the written testimony. But we feel the system of research and technology transfer has not kept up with those realities of our changing world.

Increasing demand for research and outreach with reductions in public funding creates a tense situation.

The once strong cooperative research relationship between the Forest Service and universities has become more competitive than collaborative. It's no one's fault. It's the working conditions—and it is not really efficient or strategic. Fiscal conditions exacerbate this situation. And with limited funds and a lack of cooperative strategies, we will continue to diminish the science capability of both the Forest Service and the university system, ensuring a failure at addressing the Nation's greatest issues in forests.

Significant challenges, but surely also opportunities, as we as leaders realize, We can redesign and enhance the system when we are all paying attention. And we ought to do reform with the best interests of the forests and a variety of end users at heart.

So it is really a call for coordinated leadership. We will only make the system work well again if we work together across the partners that the Senators have invited today.

I would like to just tick off for you some of the steps we are taking toward reformation of the system. They are aggressive. I think they are leadership steps, and they are in concert with the partners at the table here. We can come back for more detail on any of them that you would like to ask questions on.

First, our organization is sponsoring the national forestry summit in early January, titled "Forest Research for the 21st Century: Defining Strategic Directions and Rebuilding Capacity for the Research and Technology Transfer Enterprise." I have included in my written testimony a list of objectives for the summit, and I would encourage you to take a look at those.

Action two: a formal strategic planning process for the redesign of the McIntire-Stennis program, catalyzed partly by our own self-assesment over the last few years, but also by Congress' leadership in raising important questions about base and competitive funding over the past year. Funded by a grant from USDA-CSREES, we are conducting a multi-stakeholder process to determine best approaches to research priorities, models for allocating base and competitive dollars, and suggestions for methods of assessment that will satisfy all parties involved.

Early stages in those discussions have led to the following categories: innovations suggested in base funding and competitive funding combinations; adopting of collaborative investment models, where the Forest Service would invest more in the potential of the universities; increasing nimble qualities in the Forest Service system; assessment systems, and so on.

I also want to stress the importance of regional programs. They are burgeoning; they are growing; and if we do our partnerships right, we will be able to support some very important regional programs.

Third and fourth are the RREA strategic planning and assessment, I am sure Professor Daniels will mention; and the Outlook Project being led by Deputy Chief Bartuska, getting at decision-makers' needs in forestry.

So our member institutions stand ready to invest our intellectual energy in this process of working together. We appreciate the opportunity to be here, and look forward to working with you in the development of legislation over the next couple of years. Thank you.

[The prepared statement of Mr. Daley-Laursen can be found in the appendix on page 45.]

Senator CRAPO. Thank you very much.

Mr. Canavera.

STATEMENT OF DAVID CANAVERA, MANAGER, FOREST ECOSYSTEMS PROJECT, FOREST RESEARCH, MEADWESTVACO CORPORATION, ON BEHALF OF THE AMERICAN FOREST & PAPER ASSOCIATION

Mr. CANAVERA. Thank you, and good morning, Mr. Chairman. My name is David Canavera. I am the Manager of the Forest Ecosystems Project for MeadWestvaco Corporation in Summerville, South Carolina.

My testimony today is on behalf of the American Forest and Paper Association, where I serve as chairman of the AF&PA's for-

est science and technology committee. This particular committee has a long history of reviewing publicly supported forest research and working with the forest industry to identify research priorities.

As you know, and as Senator Lugar alluded to, we are very fortunate to have very vast forest resources in our country. But we also stand at a crossroads today, because the ability to maintain healthy and sustainable forests is closely linked to the ability of the United States forestry sector to compete globally.

New industrial capacity growth in our industry is now more common in other countries where forestry, labor, and environmental practices are often not as responsible as those in the United States, and inherent land productivity is higher than in the United States. As a result, jobs are being exported; domestic demand for industry's products is increasingly being met by producers in other nations who do not share our high standards and commitment to sustainability.

For example, today it takes four times as much land to support a pulp mill in the southern U.S. than it does in South America. This represents a competitiveness gap in forest productivity that should and must be closed.

The Forest Service and other USDA agencies play a central role in advancing forestry research in the United States, and its history of doing so is fairly impressive. Enhancements in tree growing, milling, and product technologies, and in fostering wildlife habitat, water quality, other ecological forest outputs, have been possible in large part because of research conducted by the Forest Service, universities, and the private sector.

However, the past is not necessarily prelude to the future. We have substantial challenges ahead of us. The dollars for funding research are fewer; the competitive challenges greater. We have to develop national research strategies that will lead to bold and substantive new innovations. The entire forestry research community—and especially the Forest Service—should be positioned to make giant leaps in research to meet these economic and environmental challenges.

If we were to compare the state of forestry research with that of other disciplines, like medicine, engineering, and agriculture, forestry research lags far behind. Consider for example, research in molecular biology is uncovering innovative ways to treat human diseases by targeting and destroying harmful cells. But the field of molecular biology with respect to tree species is comparatively underfunded and underdeveloped.

In my prepared document, eight priorities to research as identified by the forest science and technology committee are listed. These areas are aimed at maintaining the sustainability of our Nation's forests; using the wood produced in them as a renewable source of material for energy and for carbon sequestration; and in making our industry more globally competitive.

And within the context of these priorities, there are several activities and focus areas where USDA should place its emphasis. These include Agenda 2020, which is a technology-driven research partnership involving the Department of Energy, the Forest Service, and the private sector. Through Agenda 2020, research is targeted to those technologies that are most promising for advancing

forest productivity, increasing wood utilization, producing energy and chemicals, and improving ecological functions of forests.

Next are integrated forest biorefineries. The forest biorefinery concept will enable production of energy and chemicals, along with traditional uses of ligno-cellulosic materials.

Third is the Forest Inventory and Analysis. The importance of the FIA program cannot be overstated. Without the basic metrics to track and monitor changes to our forests, we will not understand how our forests work and function.

Fourth is the topic area of biotechnology and tree improvement, especially the Loblolly Pine Genome Initiative. The application of biotechnology to forestry, especially sequencing the genome of an important conifer tree species such as loblolly pine, promises to open new frontiers in forestry research; enabling, among other things, more efficient breeding programs and ecological restoration.

Finally is the area of forest products utilization, where more efficient and innovative forest product utilization technologies are needed.

Now, none of the above initiatives or programs is possible without collaborative partnership among stakeholders. For example, the industry participates in several research cooperatives or works directly with universities to support a number of organizations that support research, such as the Southern Forest Research Partnership. And of course, we have a good working relationship with the Forest Service Research and Development Program at the national level and the regional levels.

Within the context of CSREES, in particular, I would like to point out that the National Research Initiative—NRI—competitive grants program is one in which I recommend that the establishment of a separate NRI panel be done for forestry. This would particularly relate to forestry, forest ecosystems, and including forest products.

So in conclusion, I would like to emphasize that targeted research is needed to support sustainable forestry and healthy forests. Sustainable forests are linked to a healthy and competitive forest products sector. Without a viable forest products industry, there is no economic incentive for investing in sustainable forests.

Our challenges are substantial. Thank you. I look forward to working with you.

[The prepared statement of Mr. Canavera can be found in the appendix on page 54.]

Senator CRAPO. Thank you very much.

Mr. Schowalter.

STATEMENT OF BOB SCHOWALTER, STATE FORESTER OF SOUTH CAROLINA, SOUTH CAROLINA FORESTRY COMMISSION, ON BEHALF OF THE NATIONAL ASSOCIATION OF STATE FORESTERS

Mr. SCHOWALTER. Good morning, Mr. Chairman and members of the Subcommittee. On behalf of the National Association of State Foresters, I am pleased to have the opportunity to testify before you today on the Forest and Rangeland Research Program of the USDA Forest Service.

NASF is a non-profit organization that represents the directors of the state forestry agencies from the states, U.S. territories, and the District of Columbia. State foresters restore, manage, and protect state and private forests across the U.S., which together encompass two-thirds of our Nation's forests.

Forest Service research is integral to the advancement of science of professional forestry. With the reality of flat or even decreasing Federal funding available to forestry research, it is important that the Forest Service focus on the highest research priorities and coordinate activities with states, universities, and the private sector.

First, I wish to highlight an example of coordination that has led to improved success in a research project. The Forest Inventory and Analysis Program is a 70–year-old program that has successfully incorporated new partners. State agencies now help collect and analyze data, as well as publicize results. The program provides critical information to decisionmakers, including data on forest health and sustainability. We applaud the Forest Service's efforts to seek user input in the program, and the development of a new FIA strategic plan.

Even with this success, state foresters wish to see a more transparent decisionmaking process in selecting and funding research. A transparent process would reduce concerns about overlapping and conflicting priorities among universities and other research partners.

Forest Service research has established a successful track record of addressing issues focused on the national forest system. The focus of the agency has now shifted away from timber production on those lands. Forest Service research needs to shift its research priorities to growing issues, such as timber production on private lands, ecosystem services, non-timber forest products, and conservation of private lands.

The case for an increased focus on state and private forestry issues is compelling. Two-thirds of the Nation's drinking water comes from private lands owned by more than 10 million landowners. These 500 million acres of private forests comprise two-thirds of all forest land in the country.

The southeastern United States is the world's greatest producer of timber, and has a significant impact on the regional, national, and international economy. Timber, at $22.5 billion annually, is the Nation's second-largest crop, behind only corn. From ozone reduction and cooling in urban areas, to clean water and recreational opportunities in suburban and rural areas, our Nation's forests, public and private, provide a variety of benefits to society.

These benefits, collectively known as "ecosystem services," are outputs that benefit society as a whole. Opportunities exist to develop markets for trading credits for these ecosystem services, and to help private landowners enter that marketplace. NASF believes Forest Service research must take the lead in developing values for these services.

Extensive damage done to forests by hurricanes, wildfires, and other natural disasters has put disaster recovery and restoration needs in the national spotlight. Convincing private landowners to restore their forests, and not to subdivide and sell their lands for development, is a challenge for the forestry community. Research

into landowner attitudes, motivations, and trends in response to catastrophic natural disturbances is essential. This research should be used to guide outreach, education, and incentive work with private landowners.

Successful forest management by private landowners requires viable markets for timber. Researchers at the Forest Products Lab in Madison, Wisconsin, are finding new uses for small-diameter timber that is removed in hazardous fuel treatments. This technology is also applicable to material removed from hurricane-damaged forests and those damaged by insects and disease. Without markets, many private landowners are simply not able to complete restoration work.

Our Nation's private forest lands are poised to make a contribution to the Nation's energy needs. Further research is needed to better understand the impact and opportunity of biomass energy from private forests. NASF supports the expansion of the forest biomass research program at the Forest Products Lab and in other Forest Service research programs.

In summary, the Forest Service Forest Rangeland and Research Program has a history of success in supporting on-the-ground forestry through technical research aimed at pressing forestry issues. The future success of the program depends on its ability to adapt to new societal and forestry issues. We encourage the Forest Service to work with the on-the-ground users of forestry research when setting priorities and designing projects.

We look forward to opportunities to provide additional user input into the agency's research and planning process. With sufficient funding and coordination with universities, state agencies, and the private sector, this program will continue to lead forestry research into the 21st century.

I thank you for the opportunity to be here today. I will be glad to answer any questions you may have.

[The prepared statement of Mr. Schowalter can be found on the appendix on page 60.]

Senator CRAPO. Thank you very much.

Dr. Daniels.

STATEMENT OF ROBERT A. DANIELS, EXTENSION PROFESSOR, FORESTRY DEPARTMENT, MISSISSIPPI STATE UNIVERSITY

Mr. DANIELS. Good morning, Senators. I am Bob Daniels, from Mississippi State University, Forestry Department. I am an Extension specialist there. I want to thank the Society of American Foresters (SAF) for this opportunity for me to be able to testify this morning.

I feel qualified, I guess you would say, to be on this panel in one way, because I started my career in Forest Service research; but I have spent a lot of my last 20 years or so, you might say, in the "user" community, in the Extension service, Extension natural resources. Also, I am a leader within SAF, serving on the national council. So I have had a great opportunity to get around and speak with a lot of my compatriots, not only in Extension at the universities, but lots of foresters on the ground.

I have given you a lot of similar statements that have been mentioned here by some of the previous witnesses in my written com-

ments, so I won't go over some of those. But I guess more than ever, our forests today are under increasing pressure. We have greater needs than we ever have had from our forests in this country.

And with regard to forest research within the Forest Service, it is extremely important, obviously. Well, all of us have been saying that. But today I guess I would say that greater collaboration and emphasis on high-quality collaboration is needed more than ever. And partnerships that some of us have been talking about—Dr. Bartuska earlier—they are important for us to create more efficient and effective means for translating research.

And that is really where I think I bring my greatest emphasis to this panel, is talking about the transfer of research information. And that has been a question from some of the Senators already. Many folks in the user community rely on us in the Extension community, Extension foresters, to find and to translate the information. Senator Lugar was talking about, trying to find some publications earlier.

Extension, however, or the land-grand university system, is not directly connected to the Forest Service; not nearly as well as it needs to be, in my opinion. We can talk about that in questions, perhaps.

But I have given you an example of a piece of research that was translated recently into some really good user information, I think, that can be used by some of the Katrina victims down in Mississippi, having to do with timber price dynamics after a natural disaster or catastrophe like this. And we can talk about it perhaps later. Time won't permit me now to go through some of that.

But interpretation of research and application of that research is really what Extension is all about, and what I think is really needed in the system that we have been talking about. The technology transfer system that has been mentioned already.

And I wanted to mention—and I am sorry Senator Lincoln left—that translation (of research findings) occurs not just to tree farmers and other users like landowners, but also down to youth audiences, as well. And that is something we could talk about. I know she would be interested in that.

But there has been a lack of attention, I would say, given to the importance of Extension over the years, and funding has been limited, and linkages have been weak. I think that is a very important thing that we can do, is to try to emphasize some strength in some of those linkages. And SAF believes that a strong relationship and formal linkage between the Extension natural resources groups and the Forest Service would be very beneficial and is needed in the future. Many times, researchers don't have the incentives to ensure that their research gets passed along and applied, so that is something we can look into and strengthen and shore up.

In summary, I guess I would make a few suggestions. Partnerships between Forest Service research and universities and other groups should be more greatly utilized. Consistent funding for research, of course, is urgently needed. When speaking and considering about forestry research, the entire knowledge transfer mechanism, including outreach and Extension, should be discussed in that whole equation.

Currently, Forest Service research and other research connections with the user community can be improved by a couple of quick things I can tick off. One is, create this formal link between Extension and Forest Service research, and particularly state and private, also. There are some linkages there already. Create incentives for researchers to think about outreach and Extension when projects are first being planned. Include that in your planning from the very beginning. And provide funding for outreach of technical information in project proposals when they are written, also.

So these things can, you might say, include some of the technology transfer infrastructure that we already have, when projects are being planned. I thank you for your attention, and look forward to question time.

[The prepared statement of Mr. Daniels can be found in the appendix on page 64.]

Senator CRAPO. Thank you very much.

Mr. Simon.

STATEMENT OF SCOTT SIMON, DIRECTOR, ARKANSAS CHAPTER, THE NATURE CONSERVANCY

Mr. SIMON. Good morning, Mr. Chairman. Good morning, Senator Lugar. My name is Scott Simon. I am the Director of the Conservancy's chapter in Arkansas. And we appreciate you including us in this discussion.

The Conservancy's million members also appreciate the work of your Committee. You have oversight over a significant number of programs, and you have had some major accomplishments, which we are seeing benefits of on the ground that I wanted to highlight.

The Nature Conservancy supports sustained funding for the Forest Service research program. We share the goal with Congress and the Forest Service that our national forests are a treasured resource and they are to be used and enjoyed for the variety of benefits that they provide. And we see the research arm of the Forest Service as instrumental in ensuring that we receive those benefits.

We think Forest Service research is most successful when it accomplishes, or has as part of it, three main themes, which I will highlight. First is connection to on-the-ground conservation and on-the-ground land management that will reduce the risks to the forests. We think that gives us the best bang for our buck, our tax dollars.

Second is when the research is designed as a long-term investment to solve some problem or challenge that is facing all our forests. And then, third, as many of the other panelists have described eloquently, is that the research is conducted collaboratively, with other partners, private and public and universities.

An example of the first one, research conducted on the ground, I wanted to use one from Arkansas that is applicable to this Committee. Several years ago, people in Arkansas recognized that there were major problems in the forest. Over a million and a half acres of oaks were dying from an outbreak of a native insect, because the woods were too dense. And this committee helped us highlight the problem, and a team was formed immediately afterwards, led by the Forest Service.

They came together and, in traditional Forest Service style research, developed desired future conditions on what the forest should look like, based on historical data; started implementing treatments on about 200,000 acres, which is sizable in Arkansas on the ground; and then over the last 3 years, have monitored the progress to see if we are actually achieving it, and what is the most effective way.

One of the main benefits of this research, in addition to the sustained health of our forest, is that the local communities and the people who live there have an increased trust of the Forest Service because they participated in the plan, even helped with the monitoring, and they drive by it every day and see these more open, healthier forests.

A second example of these themes would be the Southern Forest Resource Assessment, and the benefits of a long-term project. The forests in the South provide a significant amount of our Nation's lumber. They also harbor an incredible array of plants and animals.

But the assessment identified some major alarming trends. The forests are being fragmented and converted at a rapid rate—rapidly than we knew about in each individual state. And that is because much of the land ownership is changing in the south. Timber companies are divesting of most of their land, and urban centers are rapidly expanding as people move to the South. And what is happening is we are losing those values from those forests, and it is having an economic impact on the area, as the timber industry changes.

The Southern Forest Resource Assessment was critical in identifying these problems. The solution is really to develop a regional or national strategy, to be able to conserve these forests for all the values we enjoy. And we look forward to working with the Committee on the upcoming farm bill in ways that we can integrate some opportunities with the farm bill.

And then the third example is collaboration. I mean, we believe different partners bring different perspectives, ideas, and resources to any research project. An example of this is the LANDFIRE Project, which was developed under the National Fire Plan and the Healthy Forest Restoration Act.

It is a cooperative effort between the Department of Agriculture, the Department of Interior, and the Nature Conservancy. And its purpose is to develop the information, the data, the maps, the models, for us to assess the problems in the forests around the country, the altered fire regimes, the threat to communities, and to prioritize where we should work best to reduce these threats to the forests and to protect the values which we value. And it has been very successful.

So in summary, the research projects that we believe have been most successful, they have those three themes: a connection to on-the-ground implementation that allows the managers to use the work immediately and the research results; second, projects that are long-term, that though the final report may come out years in the future, there is still information gathered that managers can use; and then third, collaboration with other organizations and agencies.

Thank you very much for having the Conservancy testify, and we would be happy to answer any questions.

[The prepared statement of Mr. Simon can be found in the appendix on page 68.]

Senator CRAPO. Thank you very much. I would like to thank the entire panel. You all stayed very close to your time limits, and that gives us the opportunity to have some good interaction with you.

We also want to thank you for your written testimony and the efforts that you have gone to to help this Committee get a better handle on making sure that we have the best forest research program that we can possibly design and make it work well.

Dr. Daley-Laursen, I would like to ask a couple of questions of you first. How would you suggest that more flexible dollars could be brought into the research system to enhance our capacity to respond to these emerging critical issues?

Mr. DALEY-LAURSEN. Thank you, Senator. Let me go to some of the insights that I said I could expand on a bit, that are beginning to emerge from our conversations. First of all, to reiterate that the base funding-competitive funding combination is a very important one, and the flexible funding generally shows up in the competitive category.

And it has been bandied about a bit over the last several years, how might that competitive funding be accumulated. Just a suggestion, that perhaps it could be a pool, or pools, that have the following generative characteristics. These pools come about on an annual or multi-year basis. They come about as allocations from a variety of interested mission agencies, and possibly other partner organizations that might be interested in the issues that are identified as priority; not just one agency.

So the flexibility draws from a variety of places. For example, EPA or others might be involved on energy. Traditional forestry and big science stuff might draw from USGS, and so on. So specific priority issues. Also, you might have RFP management by an external body, a non-profit organization or something like that, loosening up more flexible resources within the Government for distribution.

Also, we might suggest that the Forest Service could adopt a collaborative investment model, where investments might be made in universities where they have strengths, and then investments be made in the Forest Service where they have strengths; and we don't try to cover the entire world, both organizations cover all the geography and all the issues. This could also result in some additional efficiencies.

How much do universities and the Forest Service have of their base funding tied up in infrastructure and personnel? It is probably around 90 percent, on average, for both organizations. And this is a significant issue that both organizations need to undertake, and we will in our summit.

It would be better, we think, if the Forest Service could move, with its large research budget, toward being more of a broker of flexible resources as a result of making some of those kinds of changes. Those are just some initial thoughts.

Senator CRAPO. All right. Thank you very much. I noted with interest your comment that there seems to be more competition than

collaboration in the process currently, if I understood you correctly. Could you elaborate on that a little bit?

Mr. DALEY-LAURSEN. In the simplest form, Senator, it is the fiscal crisis, No. 1, and No. 2, and maybe equally important—and when I say fiscal crisis, I just mean low expectation that we are probably going to see large increases in budget with large increases in demand for our service. But second, and probably equally important, is our attitude and our behavior.

Regardless of the structure of a system, if the organizations are not, by their own mission, seeing a responsibility to collaborate at the conceptual level—in other words, think strategically about what the issues are, how they can put their resources together in a partnership form to complement each other—if you are not doing that in the most fundamental way, you are probably less efficient than you might be.

Senator CRAPO. Thank you very much.

Mr. DALEY-LAURSEN. So, the efforts to pursue those things.

Senator CRAPO. I have got a whole bunch of questions, but, Senator Lugar, why don't you take a shot for a minute here?

Senator LUGAR. Thank you, Mr. Chairman. I want to ask a question that was stimulated by Mr. Canavera's testimony, in line with Mr. Simon. Currently, in our part of the country the ash borer is having an impact, principally on ash trees in Michigan, but nevertheless the ash borer has been spotted in northern Indiana. That will not be the end of it.

And essentially, the strategy has been to chop down large swaths of ash trees, with the hope that the borer could not transfer. But nevertheless, that has not been successful. In due course, why, we are going to have a premature harvest of the entire ash tree population, if something is not found.

Now, this gets back to the research thing—without parochially dwelling on Purdue; but this one I am most familiar with because I visit with these people constantly about these problems. Two years ago, they began at least a concerted effort to try to find out how this wave of destiny is going to be met. As is often the case with research projects, people talk in terms of 5 years, 10 years. There is no particular hint that it may be successful at all. It is much like, in a much more cosmic sense, we are all beginning to discuss the avian flu, and so we keep going through all sorts of manifestations of that problem.

The ash borer is not of that variety, but having seen the dutch elm disease when I was a boy, or a teenager, completely eliminate dutch elm trees in our part of the state, why, I am struck by how important this is.

Now, genetic aspects of this are very important, and this is why—I don't call it a genome project at Purdue—but they are trying to find out really what is the constituency of a hardwood tree. It is obviously important, I am told, to try to get to how you would effect a change in the genetic part, if that is to be a part of the solution to the ash borer or any other sort of problem.

But I am curious as to what your perceptions are, as we have these waves. And you mentioned one, Mr. Simon, in your testimony of a disease a while back. It is a problem now in the conservancy

of our resources, but a very practical problem to various people who have need of these logs, in terms of our industry.

And I am just curious about your perceptions of what sort of progress we are making on genetic research, and whether, in the case, say, of the ash borer, this is the proper course to follow in terms of the research and how to meet the dilemma.

Mr. SIMON. Thank you, Senator Lugar. We believe, like I think the rest of the panel, that the non-native pests that invade our forests are a major economic threat, in addition to the other threats to recreation and wildlife habitat, and it is a major problem.

Though APHIS is responsible, with the Department of Agriculture, to try and keep them from entering the country, I think when they are here, and we have identified that they are a problem, it is the responsibility—the leadership of the Forest Service research arm is most critical and needed, working with the universities, to help combat it.

I am not very familiar with the ash borer in your state, sir; but in similar issues that we have had in the South, we have tried to address them in two main ways. The first is by taking a good look at our forests themselves, and ensuring that they are in the healthiest condition possible. There is abundant information that indicates that healthier forests are able to withstand both native, but also non-native, pests better. So forests that are not too dense, that are not competing for nutrients and water, and the trees aren't stressed. And that plays into a lot of other national goals.

And then, the second—and I don't know that there is a quick fix—but the research is really understanding the biology and the natural history of the critter, of the animal and how it responds to the trees; and also, understanding the trees, as you described, and what their genetic susceptibilities are. And then, once we know how it works and how the trees are susceptible and how the insects take advantage of them, we can develop some biocontrols. But that is the only way I know to address it.

Senator LUGAR. Do you have a thought, Mr. Canavera?

Mr. CANAVERA. Yes, I do, particularly along the lines of growing better trees, where we could build in genetic resistance to particular insects and diseases. In loblolly pine in particular, we have made tremendous progress in this area. We have had devastating problems with the fusiform rust, which is a major disease in the Southeast. And we have made just tremendous gains in our traditional breeding programs to that disease.

And certainly, with the advent of molecular biology, with the advent of genes that we know impart resistance to particular insects and disease, we now have the ability to use these genes and put them into a particular species of interest—for instance, the green ash—and very conceivably, develop trees which are resistant to this insect.

You mentioned dutch elm disease. That is another very good example of where we could use this technology. Chestnut blight is a very good example of where we could use this technology.

And I think the biggest help we could get from USDA at this time would be in studying these trees in the environment, to see how they do; and the whole deregulation process, seeing how these trees perform across a broad ecosystem. So we need to study the

impact of these introduced genes in the environment, the impact they have on native insects, on native diseases and trees.

So it is a very good area. I think it is a very fruitful area. I think it is one which we should be—for instance, the program at Purdue is, I think, being very innovative in applying cutting-edge technology to forestry. Thank you.

Senator LUGAR. Thank you.

Senator CRAPO. Thank you very much. Let me go to you, Mr. Schowalter. With regard to your testimony, you raised the issue of the process of gathering user input through the Forest Inventory Analysis program. Is the FIA program the best method for engaging users, in your opinion?

Mr. SCHOWALTER. We have been pleased with the results that have been undertaken in the past several years. This is a new approach, a relatively new approach, to hold the user group meetings, hold them across—I am particularly familiar with the South—hold them particularly across the South, and get all the users—industry, private consultants, environmental groups—all those to meet together and have input into the whole process.

And I think it accomplishes several things. It does have the groups. You get a better group dialog going. You get an understanding of what each group is looking for, and sort of the recognition that there are going to have to be some compromises made, that everybody can't have everything they would like. So I think that helps the Forest Service a little bit in helping set priorities.

And then, it just gives them the opportunity to hear from a wide variety of people at the same time. They sometimes can tend to be focused on their needs, and getting that outside input is very beneficial.

So it has worked well for that program. I am not going to say it is the best vehicle for all their programs, but certainly, I think it is something that has worked well there.

Senator CRAPO. All right. Thank you. And also, in your testimony you encouraged the Forest Service to shift its research priorities more toward private lands issues. Could you expand a little bit on the factors that you are focusing on there that encourage that recommendation?

Mr. SCHOWALTER. Well, they have done an excellent job on National Forest System lands, of course. But the private landowner represents the largest single block of forest land in the U.S., two-thirds of it, so it is certainly something that needs some attention as well.

With the decline of timber availability in the West on public lands, we have seen a shift to private lands. At the same time, the whole forestry community has undergone some significant change in industry. Globalization has forced a lot of industry to look overseas. So the private landowner is caught in some quandary: there is a demand for timber, on the one hand; but there is an uncertainty that the market is going to be there for it in the future.

And so the role the Forest Service research can play is in helping develop new markets. And that can be markets not just for timber, but for these ecosystem services that I mentioned.

Traditionally, the public has looked at clean water, clean air, aesthetics, those kinds of things, as being a sort of a "freebie" that

they get from forest land. And there are some possibilities with carbon sequestration—I always have trouble with that word—and water quality, to develop some trading programs, credits, that might work to help get some value back to the landowners.

So I see several areas of research that could be very beneficial to private landowners, that I think would help the Nation's forests overall.

Senator CRAPO. Thank you. Dr. Daniels, in your testimony, you mentioned the need for a formal connection between the Forest Service and CSREES. What specifically do you envision as the components of a stronger relationship and formal linkage between the extension service and the Forest Service?

Mr. DANIELS. Well, I would say that, well, we do have two different divisions, you might say, under USDA here. We have the Cooperative Extension System, what used to be the Cooperative Extension System, CSREES, which has a natural resources division; tends to be, you might say, agriculturally dominated, all of the crop constituencies. But that is where I sit at the land grant university, with cooperative extension.

But we have no formal connection, you might say, to the Forest Service. We have been cooperators traditionally over the years; known one another and so forth; but there are no funding linkages and there are very, I would say, relatively informal linkages between Forest Service research and we who, in extension, natural resources, who see—well, we are a technology transfer organization. And to my mind, we are an under-utilized one. We are sort of on the team already, but we sit on the bench a lot, you might say.

So what I envision are greater linkages between the Forest Service in the research division and those of us who can translate that research, take that research and run with it, you might say, to the users, the user communities out there.

And if we can be brought into the fold on a larger extent, and particularly so that researchers in their own mind think about technology transfer from the inception of a research project, rather than as an afterthought—the example I gave there attached to my testimony has to do with timber price dynamics after a natural catastrophe. This is a paper that I found was written by two of the Forest Service Southern Experiment Station scientists, published back in 2000.

But it was published—and I think Dr. Bartuska mentioned earlier today about the importance of peer-reviewed journals to researchers—it was published in the American Journal of Ag Economics. Now, I try to watch research publications, but I don't see that one. A lot of users don't see those kinds of publications.

So I was able to find this. These researchers looked at the timber price dynamics after a natural catastrophe like this. They wrote a little model to try to model how prices would change. And it so happens that, to test their model, they used timber prices after Hurricane Hugo in 1989 in South Carolina.

What they found is that after a catastrophe like this, of course, we have a big supply bulge. The prices go down because so much timber is damaged. But after the salvage period is over, the residual timber has an enhanced value. It increases in value, once all

the salvaged timber has been either utilized or is no longer any good.

So what we have been able to do is use that to construct some what I think is extremely good advice to forest landowners. If you have a damaged stand of timber, maybe you have 40 percent of the pine saw timber that is still in good condition. Don't let anybody say to you, "We need to clear-cut the whole thing and start over," because that 40 percent is going to have an increased value in about a year's time, probably.

So I guess what I am saying is, that is an example of how a piece of research has been brought out or developed by the Forest Service; but there is a need for folks who can look at it, understand what it means, and put it in common language so that that tree farmer out there doesn't make a decision mistake when something like this comes along.

So I would like to see greater linkages between us. We don't have common meetings at this time, for example. We see one another at a Society of American Foresters meeting perhaps, or somewhere like that, but there is no formal time for us to come together and really compare notes. So I would like to see some of that.

And as I have mentioned, I would like to see researchers begin to think more about that application of the research that they are developing, from the very beginning; and have some technology transferrers—if that is a word—in on things from the very beginning. I think it would be a benefit to all of us, and it would be a real efficiency move, as Dr. Laursen was talking about.

Senator CRAPO. Thank you. Senator Lugar?

Senator LUGAR. Thank you again, Mr. Chairman. Dr. Daniels has underlined a point I was attempting to make with the previous witness, and that is——

Mr. DANIELS. I caught that.

Senator LUGAR [continuing]. Somewhere there is a lot of good information out there in America.

Now, a part of the role of our Government ought to be to make that information available to a lot of people. Speaking just from my role, again, as a tree farmer, information available to me is very small. I don't want to be difficult about it, but I would say somebody in America may be doing something, but I don't know about it.

I am intensely interested in it, not only as a member of this Committee, but as a tree farmer. So in any event, I am hoping we can sort of loosen up and find out where these papers are, and who is reading what or who is writing what; because the practical comment that you made there is profoundly important.

On the basic question in my state, it comes down to this. We have these 54,000 jobs and an industry that is threatened but that needs hardwood. And so they say it takes 70 years for a black walnut to mature. If somebody doesn't plant some black walnuts in the State of Indiana now, conceivably we may get them from wherever, but that is less likely—in fact, unlikely to be economical in terms of transportation costs and all the rest of it.

So why would anybody in Indiana want to plant black walnuts, or anything else? Now, essentially, I can say, "Well, you have got 10 acres there that you are not doing anything with. You used to

have dairy, but there is nothing there now. Why not try out walnuts?" Or various anecdotal situations of this variety.

Well, when I begin to press, "What are the economics of this? Why should somebody invest money in planting those trees, as opposed to the stock market or something else?" Hard pressed; without just simply the good humor of it, or they are beautiful, or you'll love the experience, or so forth.

And what I am really driving at is the need for the plethora—and we don't need all the investment letters we all receive almost daily of people who want our money for the stock market, the bond market, esoteric projects in South America. There are good reasons, I believe, to invest in planting trees. And they are the joy of doing so; but they can be, over the course of generations, a very profitable thing to do, likewise.

Now, one of the ways they might be that has been touched upon by Mr. Schowalter is the carbon sequestration issue. We have had hearings before this Committee for at least 5 years, going through this. In Illinois, at least some market was established. We even had somebody give us some quotes 1 day. But to say the least, you really have to press awfully hard in America to find anything out about this, and this is so important.

For example, here I am with my 200 acres of trees sitting there. They are not going to go anywhere. To the extent that I was able to make a contract, because of the carbon that I am sequestering through those trees, and here right in the middle—not in the middle of Indianapolis, but inside the city limits—a lot of carbon floating around, as a matter of fact; a power and light company would be interested in these sorts of things.

And yet, the inability, in terms of our research and our elements of Government, to get people together on these issues is just profound. It simply is not occurring, even though it is floated often as an esoteric idea in hearings like this.

And I am sort of trying to come to grips with how we tell somebody it is a good investment to plant trees; it is a good investment to keep them standing there really for long periods of time, and to care for them.

Now, beyond that, I would just say that it appears to me that we are going to have to try to think through what the actual marketing situation is. You mentioned sometimes people are fearful because they are not sure a market will be there.

Now, before Senator Lincoln left—and she will not feel I am betraying her confidence—but she was anecdotally picking up on one of your points, "One of my factories in Arkansas that was dealing with hardwoods went to China. And as a matter of fact, they are buying the trees that are in Arkansas to take them to China, right along with them."

Now, it is conceivable that we may, during some phobic period in American history, stop trees from getting outside Indiana, or quite apart from the United States; but I doubt it. My guess is, the market for the trees is going to be there. It may not be in America.

And that is the importance of working with industry, to sharpen up the niches in which we can have an advantage. I mentioned this more careful utilization of every board foot out of a hardwood log—tremendously important. We can do those kinds of things to get an

edge. We will have to do them. For our furniture people in Indiana simply to say, "Our market is being stolen. What are you going to do for us?" Well, not very much, unless you shape up your business plan.

But the amount of information—I would just get back to this—floating around as to how this might be profitable for anybody is pretty thin. And I just conclude, Mr. Chairman, by saying there are some people who spend a lot of time with this—more than the Chairman and I can.

I was reading of the success of the Harvard endowment. Now, they have invested in trees as a part of their portfolio. Well, my eyes lit up. How in the world would they have come to that conclusion? Well, they have come to the conclusion because they have had some time to analyze the long-term value of this kind of investment and how it stacks up with all sorts of other things. And this is an extraordinarily successful endowment plan; sort of the gold standard, of sorts, in Forbes or what-have-you that rate these situations. But trees are a part of this portfolio.

And so it appears to me that there is some information out there, but it is not really getting down to this person I want in Indiana to plant 10 acres of trees, or 30 acres; do something that really enhances. Now, thank goodness, some people are doing it anyway, because they simply love forestry; and more power to them. But to be serious about this, we will need to do this.

So my plea is to each of you, in your own way, as advocates within your group, as it was with our Assistant Secretary of Agriculture, to help us disseminate the information that really gins up enthusiasm for what we are talking about today.

That is really not a question.

[Laughter.]

Mr. DANIELS. You needed that to vent. You needed that. Yes.

Senator LUGAR. I get so carried away by the testimony and by the occasion. Do any of you have any comments on all of this?

Mr. DANIELS. I would make a comment. I spend part of my time in extension in Mississippi. See, I teach a little short course for forest landowners, called "Analyzing Your Forestry Investment."

Senator LUGAR. Oh, there you go.

Mr. DANIELS. And the whole idea is applying, you might say, economic decisionmaking to growing trees. Now, we have an advantage in Mississippi over Indiana, I would say. Our rotations are shorter and—well, pine saw timber values are a little bit lower than number-one walnut logs, but there is a whole lot more of them. So I tell landowners—and it is easy to show, in present value analysis—that growing pine saw timber in the South is a good place to put your money.

And I am quick to say that it is not the first place; it is not a "get rich quick" kind of enterprise. And it is something that you shouldn't put your money there first. If you are a family person, you need to have insurance and savings and all those other things. But once you do have a little bit of extra money, it certainly is a competitive place to invest your money. And I am confident it could be shown for walnut in Indiana. But there are other reasons.

Senator LUGAR. But you have a disciplined course of study——

Mr. DANIELS. Absolutely.

Senator LUGAR [continuing]. In which you are able to impart to students this sort of information.

Mr. DANIELS. Well, for forestry students, natural resource economics or forest economics is a required course. So that is coming through in our education system.

Senator LUGAR. Yes.

Mr. DANIELS. But it is a case that can be made.

Senator LUGAR. Pardon me, Mr. Chairman, just one more anecdote. We have a lot of yellow poplar in Indiana. It grows along creek beds and rivers and so forth——

Mr. DANIELS. Great tree.

Senator LUGAR [continuing]. Almost like weeds. That is not comparable to your good logs in Mississippi. But nevertheless, it may be the board-foot value of a 10th, or even a 15th, of a veneer walnut log, let's say. Now, I routinely have harvests of poplar trees on my farm, because they grow, as I say, very, very rapidly.

Mr. DANIELS. They do.

Senator LUGAR. In the past, the value wasn't so good. But now our forest industry—that is, the furniture people—other people have come in, with the benefit of research, and they said, "If you add a particular substance to this poplar—" I don't know whether it stiffens up the log, or it changes the—"but you can get a mighty good piece of furniture out of this. This is not the same old poplar it used to be, the combination."

So as a result, what is sort of a short-term situation here can become a long-term business in the manufacture of this thing. And it is this combination of these two groups working together—those who are the growers, the private owners; and the industries and the research community—that can transform even these cycles that are not so long for some of our logs.

Thank you.

Senator CRAPO. Well, thank you very much, Senator. And we always tend to run out of time in these hearings before we run out of questions; although I do want to ask another couple of questions before we wrap up here. And certainly, Senator Lugar, if you have got any more, we will do that.

But Mr. Daley-Laursen, I wanted to ask you if you would talk for just a moment about the concept of organizing our research at the regional level, and what your thoughts are on that, and how we can best achieve that type of an objective, if we should.

Mr. DALEY-LAURSEN. Thank you, Senator Crapo. And if I could, Senator Lugar, I will send you a letter with some comments on your question on genetics, and also on the last conversation. Very good questions, and things that we are all worrying about.

Senator Crapo and Senator Lugar, the point about regionality was, first and foremost, to say that the best and brightest people are figuring out that this is a very efficient and effective way to operate. I think it is partly because, for ecological reasons, cultural reasons, political reasons, economic reasons, regions have identity, and regions have character; and so issues are common in them, and so there are efficiencies in people coming together. I want to state that that is a simple point, but a profoundly important point.

So good people are rallying at the regional level. There are examples right now of places where The Nature Conservancy, Forest

Service, state and private forestry, NASF, universities, whatever, in various combinations are coming together around policy, law, and science, at the regional level. They are coming together around watershed cooperatives, paired-study watershed cooperatives that can only really be done across massive landscape and, largely, industry-university cooperation.

Fire management and restoration is another one where there is a regionality.

And the last example I would share with you relates to Senator Lugar's point. Web-based interfaces for landowners, that bring together at that interface people who are scientists who have data information, models, and predictive ability. On the other side of the interface is the landowner or the person who is in the business of making decisions about whether land should be converted: TNC folks like Bill Gann, working investments in nature; industry folks wondering, "Should we convert to a TEAM or a REIT, and who do we trade with?"; small landowners who are like so many millions of others—38 percent of the housing starts in this country are in the wildland urban interface; landowners who are faced with decisions every day about, "In my heart and my head, how do I make a decision about whether that should become a housing project, or whether I should keep it in my family? Can I make money? On what?" So that is another way that regionally we are beginning to see some cooperation.

Senators I wanted to—and I could go around and around and on and on about this, extolling the virtues of various groups that are already making this happen. You both probably heard at the White House conference many examples of collaborative conservation, as it was dubbed by the Administration. I would urge people to look at the 150 examples. Almost all of them have a regional flavor to them, and can give us some instruction.

And the last thing I would suggest is that we have some models out there that we could play with more: the USGS model of cooperative fisheries and wildlife programs that bring agencies and universities together around regional issues; cost-sharing situations; CESUs, cooperative ecosystem study units. These are mechanisms that currently exist that we can use to build on the power of regional programs.

Senator CRAPO. Well, thank you very much. And as I indicated, I have a lot more questions than we have time. In fact, we have already started to push ourselves a little bit, with regard to other obligations.

So I am going to have to wrap up the hearing; although I do have a number of questions for each of the witnesses, and would ask if you would mind if we could submit them to you in writing and get some responses from you on them.

And other Senators may want to do the same thing. So we will try to collect any of those kinds of questions that others who weren't able to get here, or who didn't get to ask all their questions, might want to ask you to respond to.

I again want to thank all of our witnesses for the excellent input that you have provided. This is a very critical issue, and one which we intend to pay very close attention to. I think you can see that there is a real desire to make sure that we get things working even

better than they are now, and to improve our performance here. And we look forward to working with you as we seek to achieve these objectives.

With that, this hearing is adjourned. And thank you again, all, for your support.

[Whereupon, at 12:13 p.m., the Subcommittee was adjourned.]

APPENDIX

October 27, 2005

STATEMENT OF
ANN BARTUSKA
DEPUTY CHIEF, RESEARCH & DEVELOPMENT
BEFORE THE
UNITED STATES SENATE
SUBCOMMITTEE ON FORESTRY, CONSERVATION,
AND RURAL REVITALIZATION
COMMITTEE ON
AGRICULTURE, NUTRITION, AND FORESTRY
CONCERNING
FOREST AND RANGELAND RESEARCH PROGRAM

October 27, 2005

Mr. Chairman and Members of the Subcommittee
Thank you for the opportunity to testify before you today on the Forest Service's Forest and Rangeland Research Program.

Background
Research has been part of the Forest Service mission since the agency's inception in 1905. From the Incident Command System to the oriented strand board used in home construction, Forest Service research provides the information and solutions to sustain forest and rangelands and the values they provide for people. Our research programs have a wide geographical and temporal scope, an interdisciplinary emphasis, and a steady focus on solving problems and providing science for policymakers, whether the science addresses invasive insects, degraded river ecosystems, or sustainable forest management practices. Our broad program areas are: science policy, planning and inventory; vegetation management and protection; wildlife, fish, water and air research; and resource valuation and use.

Our research studies take into account the interconnectedness of the ecological, economic, and social landscapes, even as they examine parts of it to add to the general sum of knowledge.

We have programs in all 50 states, U.S. territories, and commonwealths including long-term research on 83 experimental forests and ranges, and 370 research natural areas. The enacted FY 2006 Interior and Related Agencies Act included approximately $282 million for research. We employ approximately 575 permanent scientists and dozens of post-doctoral fellows who work across a range of biological, physical, and social science fields to promote sustainable management of the Nation's diverse forests and rangelands.

Science You Can Use
Forest Service Research and Development scientists carry out basic and applied research to study biological, physical, and social sciences related to very diverse forests and rangelands. Public lands that make up the National Forest system comprise 1/20 of the entire land base in the United States. Our research promotes ecologically sound

management of these vast natural resources. We also serve the Nation's private forest landowners, and we investigate new ways to process and recycle wood into products.

One of our major focuses is large scale disturbances. Large-scale disturbances, whether fire, hurricane, climate change, or invasive species, are a fact of life and a significant concern for resource management. We need to understand these changed patterns and provide the science to practitioners so they can manage the effects of disturbances more effectively. Some of the questions we are exploring include: What are the desired conditions for landscapes that have undergone a large-scale disturbance? How effective are alternative treatments for restoration and recovery? How do we integrate disturbance into our near and long term management?

The ongoing hurricane response serves as an example of our attention to large scale disturbances. There have been 93 hurricanes of Category 3 or greater that have made landfall on the Gulf Coast since 1851. In addition to the extensive human and economic damage caused by the hurricanes, they are also a major disturbance factor in the areas ecosystems. Both Hurricanes Katrina and Rita caused extensive forest damage. Our Southern Station worked with Louisiana, Mississippi, Texas and Alabama State Foresters and forestry associations to assess the extent and volume of timber damaged by the hurricanes. The Station prepared a directory of all the mills in the area so private landowners can identify to whom they can sell down and damaged wood. The Station is also organizing teams of scientists that can help landowners reestablish forest, repair damaged streams, restore urban forests, and recycle and dispose of damaged lumber and debris. Using knowledge gained from research conducted on past major hurricane events such as Hugo, our scientists are providing science and technology information to assist in rapid forest recovery and regeneration, fire risk reduction, habitat recovery, woody biomass utilization, and economic recovery. Our researchers also often work with managers to conduct rapid sciences assessments that help to guide restoration activities and monitoring following major wildfire events, such as the Hayman Fire in Colorado in 2002, or the Southern California fires of 2003.

As more and more communities develop and grow in areas adjacent to fire-prone lands in the wildland/urban interface, wildland fires pose increasing threats to people and their property. With support from the Joint Fire Science Program and funding support through the National Fire Plan, our fire researchers work closely with managers in the Forest Service and other agencies in identifying and restoring fire-adapted ecosystems and rehabilitating burned areas. Other results include models that evaluate effects of thinning and burning treatments to reduce the risk and severity of wildfires, and improved methods for predicting emissions and smoke dispersal. We are mapping the wildland-urban interface. Many of the tools in FIREWISE were developed by our fire scientists. FIREWISE shows homeowners how to protect their homes with a survivable, cleared space and how to build their houses and landscape their yard with fire resistant materials.

The threat of invasive plants and animals has become a significant environmental and economic issue. Research is underway to understand these species and to develop integrated management tools and to monitor the introduction, spread, and damage to

ecosystems. The Forest Service has established two Threat Risk Assessment Centers for invasive species in the East and the West. These Centers address the goal of Title VI of Healthy Forest Restoration Act to have an integrated national Early Warning System to identify, detect and rapidly respond to environmental threats. The centers are focusing on multi-scale assessments, monitoring, and evaluation of forest health threats.

Research programs in recreation are looking at risks, trends, and emerging issues in recreation use. Recently we completed an inventory of the amount and condition of forested recreation lands and developed education programs to encourage outdoor recreationists to treat the outdoors with respect.

Our forest bioenergy and biomass program addresses many elements of the National Energy Strategy, Healthy Forest Initiative, Healthy Forest Restoration Act of 2003, National Fire Plan, and Energy Policy Act. We are looking at developing cost-effective methods for using the large amounts of forest biomass thinning materials from fire-prone forests which is a key to making healthy forest management practices more economical. We are evaluating new uses for small diameter trees and underutilized tree species. For example, researchers at the Forest Products Laboratory in Madison, WI, have developed a playground surface material using inexpensive wood chips and polyurethane that could make playgrounds, paths, and other recreational facilities accessible to people who use wheelchairs or other mobility aids.

We are looking at the links between land use and water. Forest Service scientists are evaluating ways to protect streams from accelerated erosion after a severe wildfire. They are exploring alternative land uses including increased planting of trees along streams to improve water quality along the Mississippi River. Scientists are collaborating with Federal, State, and local agencies and universities in the Great Basin watersheds to help landowners restore degraded riparian areas.

Forest Service Research- A National Asset

For almost 75 years the Forest Inventory and Analysis (FIA) program has been the nation's forest census. FIA is the only program delivering continuous and comprehensive assessments of our forests in a nationally consistent manner across all landownership. At the end of fiscal year 2004 FIA implemented annual inventories in every region in the country, covering 76% of the Nation's forests. Inventory results and core tables are available to users through Internet applications enabling individual landowners to assess their forest investments.

The Forest Service manages a series of Experimental Forests and Ranges as authorized by statute. Almost all of the Experimental Forests are located on National Forests and they represent regional landscapes over a very broad range of environmental conditions, some having continuous data collection for nearly 100 years. In several cases, the Experimental Forests serve as anchors for national forest system long term ecological research sites. Taken as a national network, the resulting long-term datasets are

invaluable in looking at environmental changes over the last century and in answering many of today's pressing questions at landscape and global scales.

Partnerships

To fully realize the benefits of public investments in research, the Forest Service is finding better ways to effectively translate science findings and technological advances into on-the-ground accomplishments. We are looking at models for a more integrated and streamlined approach to enable FS R&D to accelerate the application of science findings and technological innovations. A new initiative on science application will use new communication techniques and technologies to connect research users with science findings and will adopt a performance-based model for evaluating the impact of science findings and tools.

We work extensively with cooperators to deliver user-friendly products and services to the public. We have more than 1,000 cooperative research agreements with partners across the country. We are looking at innovative partnerships with universities and exploring new models for cooperation including establishing competitive grants program within Forest Service research.

Agenda 2020 is a partnership between the forest products industry, government, and academia with the goal of addressing important natural resource issues, including: advancing the global competitiveness of the forest products industry by building technological leadership; improving the sustained management of forest resources; improving the economics of energy self-sufficiency and taking advantage of biomass as a fuel source; increasing the economic viability and use of recycled wood and paper materials. One example of an Agenda 2020 project is funding the research into the collective, landscape-wide effects of diverse management objectives in upper Michigan that includes two industrial owners, state and federal lands, and many private owners with the goal of developing techniques for cooperative strategies aimed at sustainable forest management.

Effective and efficient application of science findings is a critical factor in improving government performance and credibility. We are working to implement the Research and Development criteria from the President's Management Agenda. This has given the Forest Service a great opportunity to reemphasize, streamline, and invigorate the critical processes of science application.

Summary

I see Research and Development's relationship within the Forest Service growing ever stronger in this new century as we continually seek ways to live in harmony with our dynamic environment. We can no longer afford to view the human community as something separate and apart from natural resources. The interconnections between society and the environment are profound and must be the basis for our future endeavors.

Our Nation depends on our forests and rangelands to meet a multitude of needs -- wood fiber for paper and structural wood products for housing and furniture, clean water to

drink, recreation, and a wide variety of other benefits. Our goal is to provide the scientific knowledge and tools necessary to manage, restore, conserve and increase the productive capacities of forest and range systems. The outcome of our research will enable healthy ecosystems to sustainably produce needed outputs and minimize environmental risks, to maintain and enhance forest health and productivity.

This concludes my statement, I would be happy to answer any questions that you may have.

Testimony to the Subcommittee on Forestry, Conservation and Rural Revitalization of the United States Senate Committee on Agriculture, Nutrition and Forestry;

Oversight of the Forest and Rangeland Research Program of the USDA Forest Service

October 27, 2005; 10:00 AM; Senate Russell Office Building 328A

Steven Daley-Laursen, Ph.D.
Dean and Professor, University of Idaho College of Natural Resources and
Policy Chair, National Association of University Forest Resources Programs (NAUFRP)

Senator Crapo, good day and thank you for the opportunity to testify to this subcommittee on Forestry, Conservation and Rural Revitalization of the US Senate Committee on Agriculture, Nutrition and Forestry. My name is Steven **B. Daley-Laursen**. I am Dean and Professor of the College of Natural Resources, **University of Idaho,** and also national policy chair for the **National Association of University Forest Resources Programs** (formerly NAPFSC).

My situation at the University of Idaho is representative of the other members of our NAUFRP organization. I lead a college with five academic departments, seventeen B.S., M.S. and Ph.D. degrees in forestry, range, fisheries, wildlife, natural resource social science, public policy and tourism, conservation biology and forest products. We have 600 undergraduate and 250 graduate students, and our faculty generate over $12 million in competitive external grants and contracts per year. Some other NAUFRP member colleges and departments are larger and some smaller, but all share the same challenges, commitment and vision that I will share with you today.

NAUFRP. NAUFRP, formerly NAPFSC, was formed in 1981. The organization comprises 69 of our nation's prestigious universities and represents university scientists, educators and outreach specialists. Our purpose is to advance the health, productivity, sustainability and competitive status of our nation's forests through university-based natural resource education, research, outreach and international programs. NAUFRP's member universities consistently provide reliable, objective and innovative research on forest ecology, management, utilization and policy. Our research is relevant to end user needs, often motivated by interaction between researchers at our institutions and practitioners who own and manage working landscapes. Our education programs develop future leaders and science-based knowledge, create intellectual capacity and advance cutting edge technology to sustain forest resources.

NAUFRP institutions connect educators, professional managers, scientists, conservation leaders, policy makers, landowners, and forest users to jointly address diverse ecological and human challenges related to forests. NAUFRP sees investment in the research on the health, productivity and sustainability of our nation's forests as a wise investment in the quality of life in our country and in the competitive position of our nation in the rapidly evolving global marketplace. In short, we see our role as providing leadership, knowledge and technology for an adapting society on a changing landscape.

We know we're not in this effort alone, and our ability to affect the challenges of the future depends on successful cooperation and coordination with our partners in the larger system of forestry research and technology transfer providers.

My goal today is to share with you some of NAUFRP's bold new vision for America's Forests and some options for reform and redesign of the forestry research and technology transfer system in our country. This research and technology transfer system is the vehicle for achieving our vision. We think this system has room for improvement, and we are exploring models for better coordination and cooperation between the USFS, universities and other partners, and more effective investment of resources in forestry research and its delivery to a variety of user publics.

Why reform and redesign the system? Forestry research and technology transfer is operating in a rapidly changing environment, with significant challenges and opportunities. There are changes in the conditions of the nation's forest resource, in society's uses and issues related to the forest, in the way research is performed, and in the fiscal environment that has traditionally funded research.

Contemporary natural resource and forestry-related issues are more complex than in the past and present new types of challenges to the research and technology transfer community. For example, there are significant changes in people's relationships with the land and an increase in the public's common interest in forests as national treasures that produce fish, wildlife and water as well as wood. There is heightened concern about the role of forests in national security, natural catastrophes and international competitiveness. Forests are being converted to new and different uses. Over 38 percent of new housing starts are now in the wildland-urban interface. There are massive, recent and ongoing changes in ownership patterns and management objectives of forest owners. Responding to tax policies that disfavor vertically integrated forest corporations, the majority of forest industry players have converted from integrated corporations to Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs) supported by equity capital on shorter-term management and investment cycles. Shareholders in these new corporate structures are taxed at 50 percent or less than their predecessor companies. There are signs that traditional forest industry manufacturing will in some cases convert to bio-energy and fuel production. There is an increasing interest in sustainable management and its application to a variety of forest conditions. There is a new confidence in cooperative conservation that stimulates state and private sector leadership in conservation and balances regulation and volunteer stewardship and related interests in reform of natural resource laws and policy. There is a whole new global economy of bio-materials, a desire to establish markets in a broad array of natural capital and ecosystem services, and significant increases in energy cost which affect forest operations, global competitiveness and interest in wood as a source of liquid fuel. All of these changes have direct effects on investments in forestry research.

Significant changes in the fiscal environment include diminishing public resources to support research infrastructure and programs, the reduction in USFS income and revenues due to massive reductions in the creation of wealth from the nation's federal forests, and the advent of unusually intense and expensive natural catastrophes including fires, storms and other climate related changes consuming large amounts of discretionary government and agency resources.

We in the nation's university forest resource programs have talented scientists and educators committed to the research and outreach mission of our institutions, but we are operating under

increasing demands, changing priorities and shrinking budgets. There is a lack of strategic coordination between research providers in state and federal agencies, a lack of combined flexibility to address urgent and emerging natural resource issues, and a need to better serve the public, policy makers and professional land managers through integration of research and technology transfer within and between our institutions. This sea of change calls on us as leaders to be adaptable and visionary in shaping our public institutions to serve effectively and efficiently in a new world – at least as adaptable and visionary as we educate our students to be.

In response to this challenge of change, there are adjustments we can make in our individual organizations, but any redesign will be most effective if we do it together, federal and state agencies working as full partners in a system of research providers and funders. Currently, the players are disjunct. It is wise for the players in the systems to "get together" to identify a common vision, set strategic directions for the nation's forest resources research agenda, and optimize our investment and use of precious resources. This type of coordinated planning and implementation is needed to cover the costs of short and long term research, interdisciplinary and disciplinary research, regional initiatives, basic and applied science and the application of results to people's needs and issues.

We believe there is a need for bold redesign of the research and outreach system, not just a shifting of the deck chairs, and not just a change in course or direction for any particular player. This is a call for coordinated leadership on behalf of the collective forest resources research and outreach system and the people it serves. We cannot make or find our way as an effective research and outreach enterprise of the future if our separate institutions are doing redesign, adaptation and planning as separate ships on a turbulent sea. We need to be coordinated in the design process, seeing our potential as a coordinated system, capitalize on strengths and special talents of our respective organizations and working around the threats and weaknesses of our individual organizations.

We must rally our research and technology transfer enterprise for optimal return on our nation's investments. We must define a bold, new, common vision for a richer future of America's forests and a research, outreach and education agenda to achieve it. We must redesign our institutional systems for carrying out that agenda, becoming more nimble, efficient and effective, and do this with more interdependence and complementarity between the parts of the USFS, universities and their other partners in the system.

A Bold New Vision for America's Forests.

Forests, their resilience, beauty, extensive and diverse values and significance in our lives inspire our university research and education programs. Forests sustain and enrich the well-being and quality of human life of individuals, communities, our nation and our world. We recognize the complexity of forests and the interdependency of forests and humans and the challenges these present. Our organization has developed a new vision for *America's Forests* that catches up to new knowledge about nature and changes in the relationship between society and our nation's forests.

NAUFRP's vision is now being released to partners nationwide has several parts. Here's a snapshot of that vision:

- Our forests will be managed and conserved to meet changing human needs based on local knowledge plus ever-improving science and technologies,

- They will be vibrant, resilient, dynamic ecosystems that sustain the full array of forest benefits derived from conservation and management strategies that range from preservation to highly focused production of forest resource goods and services,
- They will be constant sources for learning about relationships between people and natural resources for the benefit of people and all life.

We will continue to work with our partners on the definition of this vision, but just as important is the redesign and implementation of a coordinated, interdependent and *smart-funded* research and technology transfer system that makes it possible to achieve the vision.

Designing an Effective Research-Technology Transfer Enterprise: New Models for Coordination, Cooperation and Funding

Leaders in the forestry research and technology transfer enterprise are taking initial steps to: 1-identify science and information needs of forestry decision makers, professional scientists and policy makers; 2-prioritize future research topics; and 3-design new models for funding and operation of a cooperative, interdependent system of forestry research and technology transfer. Activities underway include the National Forestry Research-Technology Transfer Summit, the Outlook Project, the McIntire-Stennis strategic planning project, and the RREA strategic plan and strategic assessment projects.

National Forestry Research-TT Summit. In January 2006, NAUFRP is sponsoring a National Forestry Summit titled, *Forest Research for the 21st Century: Defining Strategic Directions and Rebuilding Capacity for the Research and Technology Transfer Enterprise*. We have invited a group of resource professionals, educators and research scientists and stakeholders with whom we will coordinate and cooperate to achieve our new vision for America's Forests. This summit has three major objectives:

- Define new forest-based knowledge and science needed to advance the health of forests and the competitive position of our nation,
- Define the new knowledge, skills and qualities needed in the next generation of natural resource research scientists and technology transfer experts to address emerging new issues and to rebuild and sustain excellent forest research and technology transfer capacity, and
- Recommend an effective and progressive funding allocation model to ensure support for high priority research and technology transfer and the development of needed intellectual capacity and infrastructure.

The summit is designed to pull our research community together around a common forest vision and develop a research and education agenda to achieve it. It will orient us as a community to current and future forces of change, a common interest in our forests, and new paradigms of sustainable management. This summit is an important foundational piece for the development of a strategic forestry research and technology transfer agenda and will help to inform any redesign of our system of coordinated research programs and the resources to support them. I have attached a fact sheet on the summit with this written testimony.

McIntire Stennis Strategic Planning. This project is being funded by a grant from USDA-CSREES and conducted by a multi-stakeholder planning team under the leadership of NAUFRP. The purpose is to help CSREES and its affiliated land grant and public universities identify best models for

the allocation of McIntire-Stennis funds to priority forestry goals in research, education and technology transfer. The planning process will address: 1-setting future research priorities, 2-models for allocating base and competitive funds to universities, and 3-managing the assessment and accountability of the program as a whole. The last objective includes a specific charge to better integrate the reports of individual states' research programs to elucidate the full extent of program cooperation and integration across states and universities around regional research priorities.

Early stages of the McIntire-Stennis planning process have yielded some useful ideas for consideration in redesign of the research enterprise, including the following:

- There is a need for some base funding for each of the institutions plus pools of competitive funding available to all institutions and their partners. Base funding is imperative to support research and technology transfer capacity, including personnel and infrastructure for the long term interests of the enterprise. Competitive funds are needed to support a nimble research program focused on solving current problems in the shorter term and to leverage other funding sources.
- Competitive funding could be located in a pool or pools, generated on an annual or multi-year basis by donations/allocations from a variety of interested mission agencies and possibly other partner organizations (e.g., USFS, USGS, NOAA, DOE, DOD, EPA, etc.) and focused on specific, high priority issues with criteria appropriate to the forestry issues of the day. RFP management could be performed by a non-profit or consultant organization outside government. Criteria could require integration of research and technology transfer goals and activity in any funded project.
- Some suggest that the USFS needs to be more nimble by reducing the proportion of its budget dedicated to permanent personnel and infrastructure, releasing more funds to support competitive programs conducted by or with their partners. Competitive funding could be placed in pools with funds from other agencies as mentioned above.
- Funding mechanisms and allocations need to recognize and support scientists in NAUFRP member institutions who are involved in both "forestry research" as traditionally defined, and in other "bigger science" programs across the biological, physical and health sciences. Both types contribute to the sustainability of our forests for individuals, communities and our nation.
- Funding and collaboration need to be inclusive of and attentive to priorities of Tribal and Black colleges.
- Regional programming is underway among states, can be further expanded, can be facilitated by vehicles like Cooperative Ecosystem Studies Units (CESUs), needs to be better represented in assessment and accountability reports, and can be optimized through some redesign of the funding and other aspects of research-technology transfer enterprise.
- Accountability and reporting can be better utilized in support of programs, including more leveraging. All funded projects must indicate intended deliverables and effective, rigorous annual assessment and certification processes. Assessment must be applied annually to justify continuation of multi-year projects.
- The research, graduate education and technology transfer enterprises need to support and encourage research with local relevance and international significance and reach.
- Technology transfer needs to be performed even more on a regional basis and with direct relevance to local needs and high priority research.

Other insights have emerged from initial discussions about how to improve the functional relationship between USFS Research and university research enterprises. Notable is the sharing of examples of truly impressive regional projects currently underway. These current efforts are in various formative stages and are models to support and emulate. They address major forestry issues of our time, draw upon expertise in a variety of institutions, elucidate the true values and efficiencies of partnership, transcend political boundaries and generate broad political support, and achieve significant results and impacts if funded with sufficient base and competitive resources for appropriate lengths of time. But, each of these can be made even stronger and more effective by taking next steps in coordination and cooperation between universities and agencies. I provide four examples, among others, that deserve further support and that can give us insights to redesign of our enterprise.

- Regional public policy and law consortia working on common issues at the science-policy interface on public and private lands,
- Regional watershed cooperatives that cross significant and expansive ecological and cultural ranges, integrate ecological science and industrial management, and have implications for sustainable management, ecosystem services markets and migratory fish survival.
- Fire management, ecology and restoration studies that integrate work on fuels management, carbon-water relations, pre-and post-catastrophe management and restoration regimes under different ecological, climatic and cultural conditions.
- Web-based technologies that provide an interface between working professionals and landowners who make critical decisions about the sale and use of land and forests and the science community who generates data, information, models and other analytical tools useful in those decisions. Examples already exist in the arenas of fire ecology and management, and forest land valuation and stand modeling, among others. This type of interface is particularly useful to professional and landowners with technical skills and is increasingly relevant to one of our nation's most critical issues, namely land use decisions and deals being made by NGOs, NIPF owners, industries and consultants.

A variety of models for support of regional programming can be explored. Most agree we can do a better job of supporting this activity. Centers can be virtual or physical. They can be based at one institution where a critical mass of relevant expertise and infrastructure exists, or they can virtually exist as a core group of scientists and stakeholders from a group of partner institutions with their physical home as the target landscape on which they do their research or the cyberspace they jointly manage.

Ongoing planning discussions regarding McIntire-Stennis will be embedded in the National Forestry Research-TT Summit and in other venues over the next several months. Ultimately, the results and any proposals for redesign of the research enterprise will be examined alongside results of two other planning processes I will now briefly describe, RREA strategic planning and assessment and the USFS Outlook Project.

RREA Strategic Planning and Assessment. The Renewable Resources Extension Act is up for reauthorization in the current Farm Bill. A five-year strategic plan for RREA was completed in 2005; the Extension Committee on Policy has indicated a desire to increase funding for RREA, and the Extension Committee on Organization and Policy Forestry Task Force has sanctioned a study of the assessment procedures for RREA programs. Within the coming months, we will have a detailed plan for

measurement of specific intended outcomes and impacts of RREA programs under the new strategic plan. This is an opportune time to consider redesign of the funding models and program prioritization processes for RREA, in pursuit of the RREA vision and additional integration of research and technology transfer goals and activity. Similar evaluation could be conducted to determine best models for integration of programs and resources between USFS Research and State and Private Forestry and between research and technology transfer systems of the USFS and universities.

USFS Outlook Project. Another important foundational piece in identifying the research program agenda and functional models for its implementation is the USFS-sponsored Outlook Project. As mentioned by Deputy Chief Bartuska, the USFS is providing leadership for a series of Outlook workshops to "identify a broad research agenda to address decision makers' needs over the next twenty years using a multiple futures approach." This process will "identify diverse sets of decision makers' needs and key scientific data, information , knowledge and tools to address those needs." Participants include decision makers and scientists from industry, NGO's, government and universities.
As we move through the coming months, we will stay in constant contact and merge the results of these activities and processes with the several vision and planning processes initiated by NAUFRP.

In Closing…

The past 50 years have been tumultuous for America's forests and citizens who utilize them. Conflict over differing values and uses has damaged communities, weakened relationships, compromised trust, caused industry closings and left managers of public forests caught in the crossfire of competing opinions about their roles and future. Gridlock mentality fails to recognize the complexity and uniqueness of individual forests, and that at appropriate geographic scales and over time a mosaic of forests can be many things for many people.

Our nation can move toward a new paradigm and vision for forests. The path needs to be paved with common commitment to meet broad goals and shared needs through respect for different values, stewardship based on broader purposes and in consideration of global forces of change by people who live on and with the land, and agencies as facilitators of efficient production and collaborative conservation. Working toward this common vision requires a financial investment in education and research about the role, value and services forests can provide for the greater good. An investment in our nation's forests is an investment in our future.

We acknowledge that while we know much about forests, there is much yet to learn. NAUFRP is scientists and educators serving as a link in the interactions among professional resource scientists, managers and diverse forest users. NAUFRP member institutions pledge our intellectual capital to help our nation forge a new pathway for forests. We seek partners to compel a national commitment to our nation's forests and join us in the social, economic and ecological imperative to them healthy and productive. And, as universities, we recognize these efforts rely on strong science sustained through excellence in research, education and outreach. We want to ***explore values, share commitment and apply science to create lasting forests.***

We recognize that redesign of the forestry research and technology transfer enterprise is a larger calling than can be addressed or accomplished by any one organization or provider. It is a calling to partnerships and coordination among providers like those represented in this hearing today. It will be

important for our research and technology transfer community to work as one system in these deliberations and planning processes and in communication with policy makers and key stakeholders to the nation's research-technology transfer enterprise. Over the coming year, policy makers will have opportunities to affect the authorization and appropriations in support of the enterprise. We are here to help in the deliberations.

NAUFRP is leading in the design of new ships and fleets, not just moving chairs on the decks. We are eager for redesign in cases where old structures are inconsistent with current demands and conditions. We are a dexterous organization of 69 members with a highly focused agenda and sense of responsibility to current and future generations. We are willing and able to pursue prototype designs and test new models.

Our leadership for redesign of the research-technology transfer enterprise, our involvement in the process of other agencies, and our testimony today is all meant to be constructive and catalytic. We see substantial challenges and very real opportunities to better the enterprise on the behalf of science, citizens and forests. There are opportunities to affect authorizations and appropriations as we examine the Farm Bill and other natural resource legislation over the next two years. We want to continue working with Congress and the agencies to improve and enhance our enterprise. We welcome your questions and are at your service in this endeavor.

If we achieve our new vision for the nation's forests, no doubt our legacy will be one of unprecedented leadership and partnership.

Thank you for the opportunity to testify.

ATTACHMENT

FOREST RESEARCH FOR THE 21ST CENTURY: DEFINING STRATEGIC DIRECTIONS AND REBUILDING CAPACITY

A National Summit
to Define the Future of Forest Research

Sponsored by: National Association of University Forest Resources Programs
(formerly NAPFSC)

The competitive status of the nation and the future of natural resources management require investment in research and education about the role, value, and potential for forests to serve the greater good. Such investment will require an organized and concerted effort to articulate a clear and important agenda for forestry research, demonstrate the importance of such research to the nation's economic development and competitive position, and define the expertise and attributes of the next generation of forest scientists. As such, we are organizing and sponsoring, along with agency, industry, academic, and non-profit partners, a national summit focused on the future of forest science and the mechanisms and structures needed to support it. Specific goals for the summit are to:

1. define new forest-based knowledge and science needed to advance the health of forests and the competitive position of the nation;

2. define the new knowledge, skills, and qualities needed in the next generation of natural resource research scientists to address emerging new issues and to rebuild and sustain excellent forest research capacity;

3. recommend an effective and progressive funding allocation model to ensure support for high priority research, and the development of the needed intellectual capacity and infrastructure.

The focus of the summit will be to grapple with and define new and evolving arenas of scientific need and knowledge development rather than to simply enumerate the "issues" of the day. The summit will be an invitation-only work session that will follow a retreat format and involve leaders and active scholars from all pertinent sectors. Our hope is the summit will encourage a bold new vision and direction for forest science and endeavor to break new ground on applications of science and technology in forest-based research and education. It is critically important that the summit provide recommendations on "how" to accomplish change as well as defining "what" needs to be addressed. We have involved colleagues across sectors as a program committee that is developing a detailed agenda and defining optimum processes for an effective, engaging, and credible summit. We seek participants committed to creative thinking, focused work, and contributing to the development of an exciting new vision for forest research and scientific capacity-building for the future.

Prepared Testimony for the Record

David Canavera
Manager Forest Ecosystems Project, Forest Research, MeadWestvaco Corporation
on behalf of the American Forest & Paper Association

Before the
Forestry, Conservation and Rural Revitalization Subcommittee
Agriculture, Nutrition, and Forestry Committee
United States Senate

October 27, 2005

INTRODUCTION

Good morning, Mr. Chairman. My name is David Canavera, and I am the Manager of the Forest Ecosystems Project for MeadWestvaco in Summerville, South Carolina. I have been involved with forestry research since I earned my B.S. degree in forestry from Michigan Technological University in 1965 and my Ph.D. in Forest Genetics from Michigan State University (1969). I served as a Peace Corps Volunteer where I conducted forestry research at the National School of Forestry in Curitiba, Parana, Brazil (1970-72); and have taught forestry classes and conducted forestry research at Tuskegee University (1972-74) and the University of Maine (1974-80). I joined MeadWestvaco in 1980 to head up its genetics and tree improvement research. My testimony today is on behalf of the American Forest & Paper Association (AF&PA). I serve as chairman of AF&PA's Forest Science and Technology Committee, a committee comprised of industry representatives with a particular interest and expertise in forest-related research. The Forest Science & Technology Committee has a long history of reviewing publicly-supported forest research and working with the Forest Service in identifying research priorities for its Research and Development program. AF&PA is the national trade association representing forestland owners, manufacturers of solid wood products, and producers of pulp and paper products. The U.S. forest products industry had sales of over $230 billion in 2004 and employed 1.1 million people. The industry accounts for about 7 percent of U.S. manufacturing.

We are fortunate to have vast forest resources in our country, but we also stand at a crossroads today because the ability to maintain healthy and sustainable forests is closely linked to the ability of the U.S. forestry sector to compete globally. This is becoming increasingly difficult in a globalized economy. New capacity growth is now more common in other countries, where forestry, labor and environmental practices are often not as responsible as those in the U.S. As a result of the competitive disadvantages faced by U.S. producers, jobs are being exported and domestic demand for our industry's products is increasingly being met by producers in other nations who do not share our high standards and commitment to sustainability. Without an economically healthy and viable forestry sector, support and investment in sustainable forestry – and all of the ecological and environmental benefits that go along – will go lacking. A competitive U.S. forest sector provides powerful incentive for landowners to maintain forests as forests. Research may well be the critical element needed to ensure this sector remains globally competitive.

The Forest Service and other USDA agencies play a central role in advancing forestry research in the U.S. The history is fairly impressive. Many innovations in forest management and wood utilization have stemmed from federally-funded research. Today, we are able to grow more wood fiber faster than 50 years ago, or even 20 years ago. This means, among other things, we can continue to grow more of what we use, disturb less land, and store carbon at a faster rate. We are also more efficient in using forest resources. Industrial wood productivity has increased by 40 percent since 1952. Attention to forest ecological health has greatly increased. The enhancements in tree-growing, milling and product technologies, and in fostering wildlife habitat, water quality and other ecological forest outputs have been possible in large part because of research conducted by the Forest Service, the universities, and the private sector.

However, the past is not necessarily prelude to the future. We have substantial challenges ahead. The dollars for funding research are fewer and our competitive challenges greater. We have to develop research strategies that will lead to bold and substantive new innovations. The entire forestry research community, and especially the Forest Service, should be positioned to make giant leaps in research to meet the economic and environmental challenges.

If we were to compare the state of forestry research with that of other disciplines, like medicine, engineering, and agriculture, forestry research is way behind. Consider, for example, that research in molecular biology is uncovering innovative ways to treat human disease by targeting and destroying harmful cells. If we knew more about the genetic make-up of different species of trees, or invasive organisms, we could also develop technologies to, on the one hand, select desirable attributes for specific commercial purposes or, on the other, control or eliminate undesirable influences. Perhaps chestnut blight or Dutch elm disease could be eradicated. Perhaps threatened ecosystems could be better protected. Perhaps we could grow more wood fiber with higher quality on fewer acres at less cost. Growing more fiber on fewer acres means less land disturbance, making enormous contributions to sustainable forestry – and improving our competitive prospects.

Today, it takes four times as much land to support a 500,000 ton pulp mill in the U.S. than it does in South America. That represents a competitiveness gap in forest productivity that should and can be closed. In the U.S., we have millions of acres at risk of fire, insects and disease. The agencies should be conducting research that can both make U.S. forest-based production more globally competitive, and solve the most challenging ecological restoration and forest health problems.

The industry has done and continues to do its share of forestry research. AF&PA members are committed to sustainable forestry for all forestlands and encourage funding for research programs that advance sustainable forestry. In fact, the Sustainable Forestry Initiative® (SFI) program, participation in which is required for all AF&PA member companies, includes in its standards an objective "to improve forestry research, science, and technology, upon which sound forest management decisions are based." Participants are required to report financial and in-kind support of research addressing multiple aspects of forest ecosystem functions. In 2004, SFI® program participants invested $78 million in various kinds of forestry-related research. The industry funds research directly and through in-kind contributions of scientists and other resources.

It makes industrial land available for the establishment of research plots and participates in research cooperatives with universities and the U.S. Forest Service. The industry directly supports the National Council on Air and Stream Improvement (NCASI), an organization that conducts peer-reviewed research on forest ecology, water quality, wildlife and silviculture. We also participate in the Southern Forest Research Partnership, an organization with the mission of developing "collaborative relationships that provide new and revised research knowledge to enable the Southeast to remain competitive in the global forestry market while enhancing the forest landscape and assuring that this natural resource will be sustained indefinitely."

In wood utilization research, forest products companies have for decades contributed to the work conducted at the Forest Products Lab (FPL) and regional Forest Service experiment stations. Collectively, industry's direct and in-kind contributions to the FPL, alone, are estimated to be $2-3 million annually. AF&PA member companies provide an annual review (dating back to the 1970s) of Forest Service utilization research. They have co-sponsored the Research Demonstration House ($200,000 industry contribution) that serves as a showcase for FPL's research; and have underwritten research into critical safety issues.

CURRENT AND FUTURE NEEDS

Despite the investments to date, there is a great deal more to be done. In particular, I want to emphasize the role that research can and should play in enhancing forest productivity, improving wood utilization, developing systems to measure forest health and resources, and finding improved ways to use forests for environmentally friendly products and services. Specific areas that demand greater attention include:

- A far better scientifically-based understanding of our nation's forests to consistently achieve ecological, social, and economic objectives.
- The development of high efficiency softwood tree propagation systems; softwood species make up the majority of the nation's reforestation seedlings and building products.
- A national strategy for advancing and applying scientific understanding of forest genetic resources, including but not limited to: species and provenance testing, breeding plan development, deployment of material with different levels of genetic diversity, and sequencing the pine genome.
- Hardwood production systems capable of competing with Eucalyptus plantations in the southern hemisphere.
- Reliable quantitative estimates of the value of wood quality improvements to manufacturing in terms of energy efficiency and product quality.
- A national strategy for integrating technology, policy and economics to spur development of "precision forestry" and "landscape management" as components of sustainable wood production systems.
- Reliable quantitative estimates of the potential of different forest management systems to sequester carbon and reduce greenhouse gas emissions, including the use of wood for sustainable domestic energy production.
- A national strategy for gathering and analyzing information on the current and potential contributions of managed forests to sustaining water quality and biodiversity.

Within the context of these priorities, as we look at the research conducted by the U.S. Forest Service and by other USDA federal agencies, there are several activities and focus areas that are especially critical:

- **Agenda 2020:** Agenda 2020; the industry's technology alliance, was initiated in 1994 in partnership with the Department of Energy to improve energy efficiency and accelerate the delivery of new technologies to our manufacturing processes. Now organized as a membership alliance within AF&PA, Agenda 2020 is building on a decade of tangible results to expand its federal and state partnerships, and establish new international and cross-industry collaborations. Current federal partnerships, in addition to the existing efforts with the Department of Energy, include projects with the U.S. Forest Service and the Cooperative State Research, Education and Extension Service (CSREES) programs of the USDA, as well as the National Science Foundation. Agenda 2020's technology initiatives leverage these collaborative partnerships to drive innovation in the forest products industry's processes, materials, and markets. Technology objectives are defined to address shared industry and national strategic goals. The research, development and deployment (RD&D) projects coordinated through Agenda 2020 provide the foundation for new technology-driven business models. The objective is to create options to meet industry's competitive challenges, while contributing solutions to strategic national needs associated with energy, the environment, and the economy.

- **Integrated Forest Products Biorefineries**: Through Agenda 2020's *Advancing the Forest Biorefinery* initiative, the forest products industry can evolve existing infrastructure to develop Integrated Forest Products Biorefineries (IFPB) — geographically distributed facilities that process both forest and agricultural materials to produce renewable "green" bio-energy and bio-products. This can be done while preserving existing traditional product lines, creating higher skilled and better paying jobs, strengthening rural communities, and opening new domestic and international markets for forest products companies. These IFPBs would contribute to reducing greenhouse gas emissions and dependence on foreign fossil fuel by substituting domestic, renewable ligno-cellulosic materials as the feedstock for products now derived from nonrenewable carbon. If fully developed and commercialized, these technologies could produce enormous energy and environmental benefits for the industry and the nation both, including contributing to a diversified, more secure national energy supply. IFPBs have the potential to annually produce nearly 2 billion gallons of ethanol and another 1.09 million barrels (oil equivalent) of other renewable transportation fuels. Early estimates show an industry-wide potential to reduce fossil energy consumption by over 250 TBTUs/yr, with an additional benefit of cutting approximately 40 million tons of carbon emissions annually.

- **Forest Inventory and Analysis (FIA)**: The FIA program conducted by the Forest Service is the most comprehensive data collection and analysis program that exists to assess the sustainability and health of the nation's forest resources. FIA's core mission is to provide reliable information on the nation's public and private forestlands. We are pleased that FIA has made progress over the last few years in implementing its annual forest inventory system, but there remains work to be done. The Forest Service has an obligation to achieve its stated goals to cover 100 percent of U.S. forest lands, fully implement the annual

inventory, expedite data availability and analysis, improve working relationships with the states, and modernize FIA management systems. FIA has made progress, but it is not there yet.

- **Biotechnology and Tree Improvement:** Current research efforts in cloning technologies and understanding genetic interactions in trees are sorely lacking. A national strategy is needed for advancing and applying scientific understanding of forest genetic resources, including but not limited to: species and provenance testing, breeding plan development, deployment of material with different levels of genetic diversity, and sequencing the pine genome. The Forest Service is coordinating an initiative to sequence the loblolly pine genome. The ***Loblolly Pine Genome Initiative*** offers tremendous potential, but will require a major federal commitment and targeted resources. The genomics phase is the data-gathering process. With the genetic information, functions of individual genes can be explored. This could speed up testing, selection and commercialization of improved planting stock.

- **Forest Products Utilization**: The Forest Products Lab and regional Forest Service experiment stations conduct important research on the efficient and effective use of wood fiber. Improved wood utilization contributes to the environment in many ways. Just as one example, exploration of small diameter wood use and bioenergy production can help address the forest health problem caused by overcrowding and forest fuel build-up. Also, since the emerging field of nanotechnology is expected to be a critical driver of global economic growth and development, the application of nanotechnology science to wood-based lignocellulosic materials offers the potential to sustainably meet the wood-based needs of present and future generations.

In addition to the Forest Service Research and Development Program, important contributions are made through the USDA Cooperative State Research, Education, and Extension Service (CSREES) and the universities that partner with the agency. There is a significant need for practical research and outreach designed to produce and measure healthier, faster-growing forests. We are supportive of the following research programs:

- **Cooperative Forestry Research (McIntire-Stennis) Program:** This program is the foundation of forest resources research and scientist education efforts at universities. It provides cutting-edge research on productivity, technologies for monitoring and extending the resource base, and environmental quality. The program is a federal-state-university partnership and one that has been highly effective in leveraging the federal investment and producing results; in fact, program funding is matched more than three times by universities with state and nonfederal funds.

- **National Research Initiative (NRI) Competitive Grants Program:** NRI grants are a significant source of funding for basic and applied research on forest resources, including their management and utilization. Last year, however, less than 6 percent of the $180 million funding was allocated to forestry research proposals. Given the considerable potential of the program to contribute to the nation's sustainable forestry research needs, the percentage of NRI funding allocated to forestry research should be increased, with specific

focus on grants that support forest productivity, wood utilization, and biorefining technologies. I also recommend the establishment of a separate NRI panel to coordinate projects that relate to forestry and forest ecosystems, including forest products.

- **Renewable Resources Extension Program (RREA):** This program provides the foundation for extension and outreach efforts delivered to private landowners through universities. Cutting-edge forestry research is of limited benefit unless it can be effectively delivered to the nation's forest landowners.

CONCLUSION

Targeted research is needed to support sustainable forestry and healthy forests, both through a greater understanding of the status of our nation's forests and through the development of processes that enable economic utilization of fiber removed. Research helps find innovative ways to promote and enhance forest sustainability and provides scientifically sound data that benefits both public and private forests. In February, 2005, the National Council on the Science of Sustainable Forestry (NCSSF) convened a workshop on the global outlook for timber. The consensus among the presenting analysts and participants was that there is a strong correlation between the economic viability of forests and their sustainable management. They identified globalization as a challenge and raised concerns about the prospect that the U.S. was losing its competitive edge. The workshop noted that this, in turn, has potentially negative impacts on forest investments, reduces forest management opportunities, and makes other land uses more attractive than forestry.

Research can play a critical role in improving the competitiveness of the forest products sector. Efforts to achieve and maintain healthy forests are enhanced by research investments in enhancing forest productivity, addressing the threats of insect and disease, quantifying carbon sequestration, and understanding forest management decisions on wildlife, water quality, biodiversity, landscapes and habitats.

AF&PA looks forward to working with this Committee and others to help continue critical forestry research and to develop innovative new research programs that advance sustainable forestry on our nations' forestlands. Thank you for the opportunity to testify, Mr. Chairman. I would be happy to answer questions from the Committee.

Testimony of Bob Schowalter
State Forester of South Carolina
On behalf of the National Association of State Foresters

Before the United States Senate
Committee on Agriculture

October 27, 2005

USDA Forest Service Research and Development Program

Good morning Mr. Chairman and members of the Committee. On behalf of the National Association of State Foresters, I am pleased to have the opportunity to testify before you today on the past, present, and future of the Research and Development Program of the USDA Forest Service. NASF is a non-profit organization that represents the directors of the state forestry agencies from the states, U.S. territories, and the District of Columbia. State Foresters restore, manage, and protect state and private forests across the U.S., which together encompass two-thirds of our nation's forests.

The Research and Development Program of the USDA Forest Service, the largest forestry research organization in the world, is integral to the advancement of the science of professional forestry. States, universities, and private industry work in coordination with the Forest Service to plan, implement, and publicize forestry research, covering everything from forest products utilization to urban forestry.

Coordination

With the reality of flat or even decreasing federal funding available to forestry research, it is important that the Forest Service focus on the highest research priorities and carefully coordinate research activities with states, universities, and the private sector. Each type of research organization has its strengths and weaknesses, and we must recognize these differences when coordinating activities.

First, I wish to highlight several examples of coordination that led to successful research projects. The Forest Inventory and Analysis Program (FIA) has been a successful cooperative venture between the Forest Service and the state forestry agencies for nearly 70 years. Our state agencies are an integral component of the program and not just users of the data. We now help collect and analyze data, as well as work with partners to deliver the results. The information that the FIA program provides to us and other users drives many of the decisions we make at the state level. FIA provides us with the "pulse" of the forests, including such important factors as forest health and sustainability, so that we can make more informed policy decisions in our states and at the federal level. NASF commends the Forest Service for bringing FIA users together regularly to seek input on the program from those with the closest ties to its application. We applaud the development of a new FIA strategic plan and encourage the Forest Service to work more closely with states as partners in the program, rather than just users.

Loss of forest cover due to development has become a top issue in recent years and has served to galvanize many dissimilar organizations together. The Forest Service worked closely with state forestry agencies to publish a recent study, known as *Forests on the Edge*, that identifies watersheds where private forestland is most threatened by development. The report highlights a combined area of more than 44 million acres of private forestland where housing density is expected to increase dramatically by 2030. Studies such as this have brought together diverse interests to conserve private forestland.

Under the authorities of Title IV of the Healthy Forests Restoration Act, the Forest Service is carrying out research on how silviculture can be used to improve forest health and mitigate the negative effects of insects and diseases. The results of these "applied silvicultural assessments" can be used by the states and others when working with private landowners. We encourage the Forest Service to work closely with universities, cooperative extension, and state forestry agencies when developing a plan for the dissemination of this information. Technology transfer is an important piece of this plan.

A recent report by the National Research Council entitled *National Capacity in Forestry Research* highlights the need for the forestry research sector to adapt to changes in the forestry establishment. The Southern Forest Research Partnership is an excellent example of a new model of cooperative forestry research. This new partnership brings together universities, federal and state governments, non-governmental organizations, and industry to coordinate research and technology transfer activities, attract public and private funding opportunities, and reach across organizational boundaries. Current research priorities of the Southern Forest Research Partnership include biomass energy production and carbon sequestration, the economic value of southern forests, and the forest's role in providing clean water. I encourage the Forest Service and other research partners to look to this partnership as a successful model for moving forestry research forward.

I believe it is important to closely examine the current structure of forestry research coordination among the Forest Service, states, universities, and the private sector. State Foresters wish to see more transparency to highlight the mechanism in place and the method for decision making. Due to this lack of transparency, forest research at the university level can sometimes be perceived as overlapping and showing conflicting priorities. A well-understood process would go a long way to clarifying the coordination among universities and make better use of federal funding opportunities.

Technology Transfer

The state forestry agencies have for nearly a century been delivering the results of forest research to those who need it most: landowners, foresters, communities, and policymakers. We accomplish this through a variety of mechanisms, including technical assistance, education, and outreach. As we all know, research is of little value if the information and lessons learned are not delivered to those outside the realm of research.

State Foresters feel strongly that technical research should be relevant to its applied use. After all, it is the applied use that ultimately results in the usefulness of research. We

encourage the Forest Service to work with the on-the-ground users of forestry research when determining research priorities and designing new research projects. Successful research begins and ends with the users. As both users of applied research and providers of technical research, state forestry agencies are poised to become more involved with the Forest Service and other research partners to provide additional user input into the agency's research planning process.

Looking to the Future

The Forest Service, through its Research and Development Program, has established a successful track record of research activities focused on issues within the National Forest System and elsewhere. Years of research and development on silvicultural systems for managing timber in the National Forests enabled the agency to become a leader in efficient timber production over the past several decades. As the focus of the agency has now shifted somewhat away from timber production on the National Forests, so too should research priorities. We encourage the Forest Service to continue this trend and focus research priorities on growing issues, such as carbon sequestration, ecosystem services, non-timber forest products, and conservation of private lands.

The case for an increased focus on State and Private Forestry issues is compelling: Two-thirds of the nation's wood and drinking water come from private lands owned by more than 10 million landowners. These 350 million acres of private forests comprise 60 percent of all forestland in the country. The southeastern United States is the worlds greatest producer of timber and has a significant impact on the regional, national, and international economy. Timber, at $22.5 billion annually, is the nation's second largest crop, behind only corn. We believe these key facts will shape the future of forestry in this country over the next century.

With an increasing population, especially in urban areas, Americans are becoming more aware of the important role forests play in contributing to our high quality of life. From ozone reduction and cooling in urban areas to clean water and recreational opportunities in suburban and rural areas, our nation's forests – two-thirds of which are privately owned – provide a variety of public benefits to society. These public benefits, collectively known as "ecosystem services," are the natural processes and outputs that benefit us as a society, most of which are either too complex or expensive to replicate artificially. NASF and the Forest Service have been working together and with other partners to develop markets for trading these ecosystem services and to help private landowners enter this marketplace. Before credits for ecosystem services can be established and traded, a value for each type of service must be determined. NASF believes the Forest Service Research and Development Program must take a lead in this initiative.

Agriculture Secretary Mike Johanns spoke at the White House Conference on Cooperation Conservation about the need to promote markets for ecosystem services and the formation of the new Market-Based Environmental Stewardship Coordination Council. He stressed the importance of these markets in helping to maintain working

lands across the country. We support Secretary Johanns and look forward to working with USDA to ensure these markets become a reality.

The damage done to forests by hurricanes and other natural disasters has been especially apparent this year. Forests in many southeastern states from Texas to Florida were hit hard by several strong hurricanes over the past 4 months. Extensive damage to these forests has put disaster recovery and restoration needs in the national spotlight. More attention, however, is needed for research opportunities relating to these and other catastrophic natural disturbances. One of the greatest challenges facing State Foresters in these affected states is convincing landowners to restore their forests and not to subdivide and sell for development. We encourage the Forest Service to explore research into landowner attitudes, motivations, and trends in response to catastrophic natural disturbances. This research could be used to guide our outreach, education, and incentive work with these private landowners.

Successful recovery from large-scale natural disasters, whether storms or fires, requires viable markets for timber removed from these disturbed areas. The Forest Products Laboratory, located in Madison, Wisconsin, has been working to solve utilization problems for more than 90 years. Researchers at the Forest Products Laboratory are finding new and creative uses for the small diameter-timber that is removed in hazardous fuel treatment projects. This technology is also applicable to the range of material removed from hurricane damaged forests, as well as areas damaged by insects and diseases. Without markets, many private landowners are simply unable to complete the much-needed restoration work. Our nation's private forestlands are poised to make a contribution to the national energy needs. However, further research is needed to better understand the impact and opportunity of biomass energy from private forests. The Forest Products Laboratory fills a pivotal role in the development of these markets and therefore needs adequate funding to fulfill this responsibility. NASF supports the expansion of the forest biomass research program throughout the Forest Service.

Conclusion

The Forest Service Research and Development Program has a long and successful history of supporting on-the-ground forestry through technical research aimed at the most pressing forestry issues. States, universities, and the private sector work closely with the Forest Service research program to coordinate research activities and priorities. The future success of the program will depend on its ability to focus resources on those problems most pertinent to society. Markets for ecosystem services, clean water, and climate change are three examples of forestry where the Forest Service should focus its efforts. NASF will continue to work closely with the Forest Service to ensure its excellent technical research is closely aligned with real-world applications. Together with universities and the private sector, we have the ability to lead forestry research into the 21st Century.

Thank you for the opportunity to testify today. I am pleased to answer any questions you may have.

Dr. Robert A. "Bob" Daniels
Testimony before the
Senate Committee on Agriculture, Nutrition and Forestry
Subcommittee on Forestry, Conservation and Rural Revitalization
On behalf of
the Society of American Foresters
October 27, 2005

Good morning Senators. My name is Robert A. Daniels. I am an Extension Professor in the Forestry Department at Mississippi State University and currently a member of the Society of American Foresters' Council. As an SAF Council member representing Mississippi, Louisiana and Texas I was elected by my fellow foresters to represent them for a 3-year term.

The Society of American Foresters (SAF) represents more than 15,000 forestry professionals dedicated to the care and management of the nation's forests and associated forest resources. As in any profession, research and the new scientific information that it creates are critical to foresters ability to offer the most effective care and stewardship of the forest resources under our responsibility. The Forest Service's Research and Development Program is a critical component of forestry research in the United States. The program is the backbone that maintains forest science capacity within the entire US forestry community.

I feel uniquely qualified to comment on the Forest Service Research and Development program since I've been a part of the program, as well as a "user" of the program's outputs. I spent part of my early career in Forest Service research working for the Southern Experiment Station in forest genetics research from 1977 to 1981. Since then I've been part of the "user community" in a unique role of interpretation of research and applying it to help landowners better manage their forestlands.

The comments I offer are based on my perspective as a "research user" in consultation with many other users around the country. They also reflect the needs and goals of the forestry profession as a whole.

Today, more than ever before, the nation relies heavily on forests and the clean water, air, wildlife habitat, recreation, and forest products that forests provide. At the same time, forests face growing threats in a dynamic and constantly changing world, where wildfire and insect and disease outbreaks are increasingly intense, invasive species continue to spread, and development pressures and other demands pose risks of permanent loss of forests. Unfortunately, in these times of increasing information needs, the nation has a Forest Service research arm that has had a 50 percent decline in numbers of scientists – from 985 scientists in 1985 to 468 today. This precipitous disinvestment in research capacity is incongruent with the challenges we face to assure a sustainable forest resource in the US and speaks to the need for consistent funding for research both within the US Forest Service and in universities across the country.

The Forest Service can never have all the research scientists needed to address these complex issues alone. Consequently, greater emphasis should be placed on collaboration with other research bodies such as the forestry schools, private forest industry, financial institutions now

investing heavily in forests, non profits, and others. Not only will these partnerships result in greater leverage of current resources, they will create more efficient and effective research and also help build capacity for the future by supporting the students and infrastructure within the nation's forestry schools and colleges.

Equally important is the transfer of research information to forest managers and landowners. We have also seen federal disinvestment in this function. Just like in other fields such as medicine, the results from forestry research must be placed in the hands of practitioners for society to realize the benefits. There also needs to be a feedback mechanism where practitioners' needs are brought back to researchers for continued technical advancement. This cycle of information transfer, from the researcher, through outreach and technical assistance specialists like myself, to the practitioner on the ground, can only be effective when the loop is connected back to the researcher for continued improvement.

I'd like to share a current example of the knowledge transfer system from my work in response to the timber damage by Hurricane Katrina in Mississippi. I recently used a study done by Forest Service researchers from the Southern Research Station, "Timber Price Dynamics Following a Natural Catastrophe" by Prestemon and Holmes, 2000, to help formulate advice for landowners with damaged timber stands. I've attached a copy of the research to my written testimony.

The research identified that standing timber prices after a disaster like Katrina will be driven down, but then values will increase after the salvage period is completed. The increase in past cases has been between 6 and 32 percent. The practical extension of this information for forest landowners is that it makes good sense to save as much as possible until after the salvage period is over because that residual timber's value will go up. This way a landowner can lower the financial damage he or she suffers from the storm and could ultimately mean the landowner is able to keep their land in forest, a goal that can otherwise be extremely difficult to realize after such an event.

The research paper has a nugget for policy makers too. Because of the increase in value of standing timber after the salvage period, some landowners will have the opportunity for a financial enhancement when they sell timber after the salvage period is over. Landowners who own larger and dispersed tracts are the ones most likely to benefit from these higher prices over longer timeframes. Hence efficient policy actions to help victims recover might focus on smaller landowners who had all their timber assets completely destroyed and can't benefit from the timber value increases after the salvage period is passed.

This kind of interpretation and application of research results are what Extension natural resources professionals do with research results and demonstrate the cycle of knowledge transfer mentioned earlier. The cycle does not always work in this way, because of the problems with disinvestment in extension and outreach capacity. Funding has traditionally been limited and linkages with the Forest Service researchers weak or in some cases non existent. This is of great concern to SAF and the profession --if a link in this cycle is not utilized it is difficult to get the information that can improve forests and their management out to those responsible for forest management.

Practicing Foresters and some landowners do their best to keep up with research results through Forest Service efforts like their "Dividends from Research publications," newsletters and web pages but it is increasingly difficult. Many tell me they rely on Extension foresters to find and translate research that they can use. However, Extension foresters are part of the land-grant universities and the Cooperative State Research Education and Extension Service of the US Department of Agriculture and are not directly connected administratively to any of the Forest Service divisions. At the regional and local level there is cooperation in varying degrees.

SAF believes that a stronger relationship and formal linkage between the Extension Service and Forest Service research is needed. A stronger connection with those in State and Private Forestry and State Foresters can also be helpful in making sure research is utilized and applied. Many times, forestry researchers are not given the guidance or incentives to reach out with their research to ensure on the ground application. Extension can play a huge role in making this happen, working with both Forest Service researchers and university and other private researchers. Extension and other outreach and technical specialists have a unique connection with those on the ground managing forests, with the landowner communities, and with county and local government officials. Involving these extension and outreach specialists initially in research project formulation can also better shape the research and its applicability to users, serving as a feedback mechanism bringing emerging issues forward from the users. Better utilizing this partnership to both get research on the ground and get feedback to better inform new research is critical.

In summary, I'll offer the following points for your consideration as you examine the Forest Service Research and Development Program and forestry research in general:

- Forestry research capacity within the Forest Service Research and Development program has declined. Partnerships with universities and others should be utilized to a greater extent to mitigate this decline. Consistent funding sources are also critical to ensuring investments in the long-term nature of forestry research.
- When speaking of forestry research, the entire knowledge transfer mechanism should be discussed.
- Current Forest Service Research and Development and other research entity connections with the user community can be improved by:
    - Creating a formal link with Extension and State and Private Forestry outreach and technical specialists
    - Creating incentives and guidance for researchers to involve education and outreach specialists in research project formulation
    - Providing funding for outreach, education, and transfer of technical information in project proposals upon initiation.

Thank you for the opportunity to speak with you today. I look forward to answering any questions you might have.

Mississippi State University Extension Service

College of Forest Resources
Forest and Wildlife Research Center
@ mississippi state university

Research Note 2005: 5 Forest Management and Economics September 28, 2005

Timber Price Dynamics Following A Natural Catastrophe

In the aftermath of Hurricane Katrina, many Mississippi forest landowners are concerned about the value of their damaged timber and are asking how the timber market will behave in the coming months and years. An article published in 2000 may provide an answer.

Jeffrey P. Prestemon and Thomas P. Holmes of the U.S. Forest Service developed a theoretical model to describe the short-run and long run effects of large catastrophes on natural resource prices. Because trees take a long time to grow, large reductions in timber stocks can lead to a price shift due to increasing scarcity and enhancement in value of remaining stocks. The authors studied the reaction of timber markets in South Carolina after Hurricane Hugo in 1989 as a case to test their model.

After analysis the authors come to two main conclusions that may help guide Mississippi landowners after Katrina. First, that southern pine stumpage submarkets are informationally efficient and that prices adjust efficiently to new information within the reporting period (2 to 3 months). They also conclude that catastrophic weather events cause a short-run supply pulse associated with a negative price spike and a long-run enhancement to residual forest stock. This means that once the timber salvage of Katrina with its price decrease is over, a longer-term increase in price may be anticipated. Indeed they reported that it happened in the Hugo case. The longer-term price increase for the sawtimber left after Hugo ranged from 6 to 32%.

These findings suggest that Mississippi landowners should try to retain all the pine sawtimber possible through the salvage period in anticipation of a price increase to follow. In Mississippi's case the price increase seems likely since a large reconstruction effort in New Orleans and on the MS Coast will commence in the near future.

To view the entire publication click here (http://www.srs.fs.usda.gov/pubs/ja/ja_prestemon015.pdf). For questions about this research contact the authors. The complete citation is:

Prestemon, J. P. and Thomas P. Holmes. 2000. Timber Price Dynamics Following A Natural Catastrophe. American Journal of Agricultural Economics. Vol. 82 (February 2000). pp. 145-160.

The Research Notes series is a cooperative effort of the MSU Department of Forestry, the Forest and Wildlife Research Center and the Mississippi State Extension Service to update forestry clientele and the public of current research at Mississippi State University. Prepared and distributed by:

Bob Daniels
Extension Professor

Worldwide Office
4245 North Fairfax Drive
Suite 100
Arlington, Virginia 22203-1606

TEL 703 841-5300
FAX 703 841-1283
www.tnc.org

STATEMENT OF SCOTT SIMON
DIRECTOR, ARKANSAS CHAPTER OF THE NATURE CONSERVANCY
BEFORE THE
FORESTRY, CONSERVATION AND RURAL REVITALIZATION SUBCOMMITTEE OF THE SENATE AGRICULTURE COMMITTEE

Oversight Hearing on U.S. Forest Service Research
October 27, 2005

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to discuss the Forest and Rangeland Research program of the U.S. Forest Service. I am Scott Simon, Director of The Nature Conservancy's Arkansas Chapter.

The Nature Conservancy is dedicated to preserving the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. The Conservancy has more than 1.1 million individual members. We currently have programs in all 50 states and in 30 other nations.

The Conservancy's work is grounded in the best available science, partnerships with landowners and land managers, and tangible results in local places. Because our approach is science-based, research is an important component of everything we do. Much of the highest-quality research on issues related to biodiversity conservation has been generated by the U.S. Forest Service and its regional research stations, and we view that research as an important investment in land management and conservation practices. We appreciate the work of this Committee in its oversight role.

Today, I would like to express the Conservancy's support for sustained funding for Forest Service research. We share the goal of Congress and the Forest Service to maintain the health and quality of our Nation's forests so they can provide the full range of public benefits. Research can most effectively assist in reaching this goal when it is closely tied to conservation and management activities on forested lands.

I would like to make three general points. First, Forest Service research should be aligned with, and improve, on-the-ground conservation and land management activities that reduce risk to forest health and sustainability. Second, research needs sustained support so that it can play a meaningful role in long-term conservation and threat abatement. Third, to address the complex ecological and social issues facing land managers today, and to further the

goals of cooperative conservation, research partnerships between the U.S. Forest Service, other agencies, academia and private organizations are essential.

1. **Research should be aligned with and improve on-the-ground conservation and management activities.**

Research is most effective when it improves management, and it is therefore important to integrate research closely with land management practices. The Forest Service must evaluate potential research projects in terms of their ability to meet and measure agency goals, to reduce risk to forest health, and to transfer results and lessons learned to other places.

Restoring Forest Health in Arkansas

For example, in Arkansas where I live, the Forest Service and its partners recognized an increasingly hazardous situation building on the Ozark and Ouachita National Forests. Forest health was declining, insect and disease outbreaks were getting worse, forest fuels were growing more hazardous and land management was not addressing these challenges at a scale large enough to have an impact.

To address these problems, Forest Service researchers at the Southern Research Station are working with The Nature Conservancy and other partners to address the risk posed by changes in forest health through the development of desired future conditions, testing management regimes, and monitoring that proves that management is moving forest conditions toward the desired healthier state on more than 500,000 acres.

Using this research, land managers have been able to establish desired future conditions, identify the management activities needed to reach the desired conditions, and design ways to measure progress towards healthier forests. When land management challenges occur, researchers are able to draw from existing and ongoing watershed and ecosystem studies to assist land managers.

The resulting success is threefold: first, there has been rapid and measurable improvement in forest health; second, the research results are applicable to forests (and forest management) region-wide; and third, there has been an in increase in public trust, as local stakeholders have seen the Forest Service reach the desired future conditions identified in the Forest Plan, and have participated in monitoring and management activities.

Restoring the Habitat of the Ivory-Billed Woodpecker

In the Delta of eastern Arkansas, the Big Woods Conservation Partnership is closely aligning research with on-the-ground management to address new questions raised by the rediscovery of the ivory-billed woodpecker. This includes developing desired future conditions, modeling the habitat needs of the woodpecker, and testing the implementation of activities that increase the desired habitat.

Region-wide, Forest Service researchers are currently using the information generated by the Forest Inventory and Analysis (FIA) network to assess potential habitats for ivory-bills elsewhere within their historic range. We did not expect the ivory-bill to appear in Arkansas, and it is important to use the research findings that we already have through the FIA system to direct our efforts toward other areas in which birds still might be occur.

Ongoing work in the Research Stations

I would like to highlight a few other Forest Service projects across the country where research will have practical management implications:

- In Oregon, the Pacific Northwest Station is conducting a statewide landscape assessment of forest, grass and shrub vegetation by watershed, across all ownerships. The assessment will provide a basis for land management planning and priority-setting on federal and state lands.
- In Pennsylvania, the Northeast Research Station is helping public and private land managers develop strategies to increase both natural regeneration and successful planting of underrepresented species, particularly in oak forest ecosystems.
- The North Central Research Station has funded a two-year challenge cost-share position with The Nature Conservancy. Scientists will use ecological modeling to establish desired future conditions across five million acres of public land in Minnesota and Ontario. The results will be used to inform collaboratively-developed fuels treatments and land management strategies that benefit a range of users.
- The Rocky Mountain Research Station is leading a collaborative research program to better understand how prescribed fire can be used to reduce fuels and concurrently increase avian diversity in western ponderosa pine forests. Information from this study will provide managers with tools to reduce fuels, protect communities, and improve bird habitat.
- Pacific Southwest Research Station is conducting long-term population trend analysis, monitoring, and an ecological needs assessment for species in the Sierra Mountains, including places the Conservancy has identified as high-value conservation areas.

We encourage this Committee and the Forest Service to provide the leadership and resource investments to fund and support research that will further the agency's conservation goals in particular places. While research should never hold up needed action on the ground, it should be done at a scale appropriate to the land management issue and provide data and information that will assist land managers in meeting their objectives quickly and cost-effectively.

2. Congress and the USFS should make long-term investments in research, in order to support effective conservation and threat abatement.

The natural resource scientific issues we face are complex and multi-faceted, and must be addressed at large scales and over long time periods. The history of research in the Forest

Service is a long one, with many sustained studies of watersheds, fire, and pathogens providing data and information not apparent in shorter term studies. I'd like to address long-term investments in research in the context of two conservation issues that are of deep importance to The Nature Conservancy: the urgent need to conserve Southern Forests, and the very serious threat that non-native forest pests and pathogens pose to forest health.

Conserving Southern Forests: the Value of the Southern Forests Resource Assessment

One of the Conservancy's highest priorities is the conservation of the rapidly fragmenting forests in the Southern U.S., which provide some of the richest biodiversity in the country but which face a range of imminent threats. As we work with partners to develop policy solutions to these threats -- which is no small challenge -- we are extremely fortunate to have the Southern Forest Resource Assessment (SFRA), produced by the Southern Research Station, to provide the factual underpinnings regarding the condition of Southern Forests.

Southern Forests provide a wide range of values to the people of the South and to the country as a whole including watershed protection, environmental services such as reduction of air pollution, storage of carbon and flood mitigation, recreational opportunities, and habitat for an incredible range of plant and animal species. The southern states are home to an estimated five million family forest landowners.

However, social, environmental and economic forces are now causing a rapid change in Southern Forests: large industrial forest companies that have accumulated and managed forest land in the South for generations are rapidly divesting of their land holdings; forest based industries are being affected by global economic trends; and land prices are soaring, making traditional forest uses uneconomic in some parts of the region. Parts of the South are growing in population and urbanizing rapidly through metropolitan region expansion and recreational and retirement home development in important forested landscapes.

These trends increase the risk that the economic and environmental values provided by Southern Forests will be lost. Due to the changes in land ownership (and hence land use and management), jobs are being lost, water shortages are increasing, recreational space is declining, and habitat for many species is threatened. The Conservancy is working with the Forest Service and other partners to explore ways to understand and address these threats, in order to conserve the heritage of Southern Forests and the vitality of the Southern forest-based economy. We look forward to working with this Committee to address these issues in the context of the 2007 Farm Bill.

I want to emphasize that it would be impossible for us and our partners to find solutions to the threats to Southern Forests had the Southern Research Station not produced the Southern Forest Resource Assessment. That thoughtful and insightful assessment, developed with the assistance of experts in a range of social, economic and environmental fields, has become the single most credible and comprehensive source of economic and ecological information regarding Southern Forests. By identifying current forest conditions in the South and predicting trends for the future, it provides the data and analysis critical to

development of policy solutions by Congress as well as state and federal agencies. The next step will be to develop a comprehensive strategy to conserve our Southern Forests.

We strongly encourage the Committee to support further work in updating the SFRA and conducting similar comprehensive analyses in the future. Such studies should include research on the impacts of natural disasters and global economic forces on Southern Forests, and studies that might aid in strengthening and perpetuating the Southern Forest economy. In general, we believe that this kind of long-term investment in research should be replicated elsewhere in the U.S.

Abating the Threat of Forest Pests and Pathogens

Forests today are beset by numerous threats that require long term investments. One of the most critical is non-native forest pests and pathogens. Everyone has heard of the chestnut blight, which eliminated the dominant and most economically valuable tree of eastern forests. Currently such threats as hemlock wooly adelgid, sudden oak death and emerald ash borer are degrading the health of our eastern forests. The financial impact of each new invader is enormous. For example, emerald ash borer threatens seven billion ash trees across the U.S. with an estimated value of $282 billion, or 30 to 140 times the insured losses from Hurricane Wilma's strike on Florida. Sudden oak death is a severe threat to southern and northern red oak, the most valuable hardwood timber trees on the continent and critical components of many forested ecosystems. The threat non-native pests and pathogens pose is not new but is now putting forest health at greater risk.

With the increase in global trade, the potential for new introductions continues to rise. The World Trade Organization documented a 7% average annual rise in global trade from 1995 to 2000, more than twice the rate of growth in world GDP. A recent study by USDA APHIS, Michigan State University and the University of Montreal estimates that 42 new insect species became established in the United States between 1997 and 2001. These may well include agricultural and forest pests.

Responsibility for control and prevention of entry rests with USDA APHIS, but Forest Service research has a critical role in addressing these threats—particularly in terms of biocontrol treatments and understanding the biology of the invasive organisms in question. While adequate funding for rapid intervention (largely through APHIS) can sometimes eradicate infestations before they become established, Forest Service research is essential in managing those infestations that do succeed in becoming established. Controls are unlikely to be cost effective until we know which mechanisms work, and how they interact with the biology of particular pests and pathogens. Yet the number of research entomologists and pathologists has declined, and Forest Service research stations are being required to address an ever-broader range of useful disciplines such as computer mapping. According to the National Research Council, funding for forest-protection research fell 56% between 1980 and 2001.

We encourage the Committee to support robust funding for Forest Health research to address forest pests and pathogens, including research on the impact of increased global

trade, the effectiveness of various treatments, the biology of individual organisms, the potential economic impact of new invaders such as the emerald ash borer, and the economic tradeoffs involved in various control strategies. Sustained research can guide the implementation of activities that will help manage this risk to forest health.

3. Research should be conducted collaboratively with partners.

As I stated above, the ecological and social issues that the Forest Service confronts are complex, often long-term and large scale, and it is a rare case when one entity alone can undertake research sufficient to fully understand a particular subject Partners bring different perceptions, experiences, resources, and insights to land management issues; partnerships are worth more than the sum of their parts. I would like to highlight two USFS/TNC research partnerships that illustrate the benefits of collaboration and may serve as examples for other collaborative research efforts.

Using LANDFIRE to Set Priorities for Restoration of Fire-Adapted Ecosystems

In July 2004, the Forest Service, the Department of the Interior and The Nature Conservancy entered into a 5-year, $5 million cooperative agreement as part of the larger $40 million LANDFIRE project, to develop a comprehensive set of data layers and software needed to support the National Fire Plan, the Western Governors Association's 10-year comprehensive plan, the President's Healthy Forest Initiative, and the Conservancy's long-term conservation goals. LANDFIRE data and models will help federal agencies and their partners join forces to conserve biodiversity, reduce wildfire hazards to community and firefighter safety, assess threats to ecosystem health, and plan strategically at regional and national levels.

The Rocky Mountain Research Station's Missoula Fire Sciences Lab (the lead partner), with its long history of success in fire research and a cadre of fire researchers, is completing the majority of data analysis, modeling and mapping. The Conservancy, including a diversity of field practitioners and academic researchers, is creating reference models and helping expand the audience for the project. The U.S. Geological Survey is directing its expertise to remote sensing and map development. The result of this collaboration is that, for the first time ever, the Forest Service, DOI and other federal, state and private land managers will have comprehensive, peer-reviewed, ground-truthed data to set priorities for restoring fire-adapted ecosystems in the United States. This Committee and others have identified altered fire regimes as one of the most serious ecological and safety challenges facing land managers in the U.S. today. LANDFIRE – the necessary first step in comprehensively addressing these challenges – simply could not be done by one organization alone.

Partnerships between the USFS, The Nature Conservancy and Academia to Understand the Effects of Climate Change on Forest Ecosystems

The Conservancy and the Forest Service are currently engaged in two partnerships to research the effects of climate change on forested landscapes. In the Tahoe National Forest in California, The Nature Conservancy and the Tahoe NF have joined with the University of California, Berkeley, Stanford University, Colorado State University, the California

Department of Parks and Recreation, and The Conservation Fund, in a research project that will 1) detect whether climate change has caused vegetation zones in the Sierra Nevada to shift in altitude, and 2) provide data on the potential of California forests to sequester carbon and reduce global climate change. The results will help improve the ability of government and private organizations to adapt forest management practices to a changing climate, and to quantify the ecosystem service of carbon sequestration.

Separately, The Nature Conservancy, the Pacific Northwest Research Station, and Oregon State University are collaborating on scientific research to determine where climate change may cause the most extensive shifts in global vegetation. The research data will help inform global conservation priorities and natural resource management practices.

As with LANDFIRE, no individual organization has the resources or expertise to address these complex issues alone: each partner provides scientific expertise, state-of-the-art technology, data, and/or the necessary land base, as well as staff and funding. Additional benefits extend far beyond the Forest Service and its partners. The cutting-edge research in these projects can serve as a model to better understand the capability of forests to store carbon, and to reduce impacts of, and adapt to, global warming. And the data and methods can help the USFS develop a role for the agency in addressing climate change, in developing payments for ecosystem services, and potentially in assisting the development of a forest carbon market, in California or nationally.

As Congress and the agencies develop ways to further the goals of cooperative conservation, we encourage continued support for collaborative research projects that are geared towards meeting common missions and goals and that take advantage of the expertise of diverse organizations.

Mr. Chairman, this concludes my testimony. I would be glad to answer any questions the Committee has.

DOCUMENTS SUBMITTED FOR THE RECORD

OCTOBER 27, 2005

UNITED STATES SENATE
Subcommittee on Forestry, Conservation and Rural Vitalization
Committee on Agriculture, Nutrition and Forestry
A Subcommittee Hearing to Discuss Oversight of Forest and Rangeland Research
Program of the U. S. Forest Service
Thursday, October 27, 2005, 10:00 am in Senate Russell Bldg 328A

My name is Steven L. Thorson. I am Business Development Director for Forest Concepts, LLC. We are a research, design and manufacturing firm specializing in the development of value added products from the utilization of small diameter timber and biomass to promote implementation of the Healthy Forest Restoration Act (HFRA) and also economic development programs and job creation in rural communities. We have been recognized in publications throughout the country a leading innovator in the small diameter initiative. I am pleased to submit this testimony to the Forestry Subcommittee and ask that my testimony be made part of the permanent record of this proceeding.

We have been supporting this issue for a number of years. We worked diligently for the passage of HFRA as a method for protecting forest health, promoting economic development and creating jobs. On March 16, 2004, I presented testimony on this subject in Senator Crapo's Rural Development Field Hearing in Cascade, Idaho. I totally agree with Senator Crapo's in seeing on-the-ground efforts related to implementation of HFRA, while at the same time, continuing to address concerns about the research and university involvement in the future. But as of now it seems to me to be somewhat backwards. Considerable research and development activities have occurred since passage of HFRA, both in the public and private sectors. Many of the private research efforts have been funded by USDA/USFS/SBIR Grants for innovation. However, it seems that while these products get considerable scientific attention, they never actually get put on the ground. This is in part because the Forest Service has been a willing seller of timber from thinning projects, but not a willing active buyer of these indigenous, biodegradable, invasive noxious weed free products to complete the watershed cycle. The Forest Products Lab in Madison supports significant grant dollars, and also conducts internal research, but do not have contracting authority to actually partner with the private sector companies to produce products in commercially useable quantities. Likewise, our company engages in numerous research projects (Wood Straw, Flow Check, Project Poles) under USDA/SBIR Grants that develop, not only new products, but also commercialization plans to take them to the market place.

Without a new public/private partnership attitude and initiative between the agencies and private sector companies, I believe this small diameter/biomass utilization problem will continue to remain sluggish. The problem is not just about more research, albeit, that remains a necessary element of the long-term solution. But the immediate problem is getting the agencies to buy these engineered products, which they helped pay to be developed, to be placed on the landscape for which they were designed. For example,

our company developed Wood Straw under a grant and tested extensively in conjunction with the USFS Rocky Mountain Research Lab in Moscow. It was designed to provide an invasive weed free restoration solution to agricultural straw. It was also designed to be produced in rural communities to stimulate local economic development and job creation in areas that have been disseminated by mill closures (ie.,Cascade). The BAER Teams believe in the product but cannot obtain it in a timely manner because it is not available in inventory to accommodate their accelerated timeframes. The USFS, DOI, BLM and NIFC agree that it is an effective, innovative solution. But because of currently established purchasing practices, they have not developed the logistics to create partnerships and procure suitable inventories to draw upon during fire emergencies. On a recent fire at Idaho City in the Boise National Forest the BAER Team Leader specified 200 ton of Wood Straw. We could not deliver within his five-day timeframe. On the Valley Road fire in the SNRA at Stanley, the same Team Leader told me he would have considered Wood Straw but knew he could not get it on short notice – instead they bought 1,900 tons of "certified weed free" agricultural straw, which of course is subsidized under the farm program and a totally different "certification" issue. NIFC inventories fire trucks, hoses, shovels, etc. "in case" there is a fire. There should also be inventories of state of the art restoration materials established, because as history teaches us, there will always be fires until forest health is improved through the intent and implementation of HFRA. We need to "complete the watershed cycle" by reducing fire fuel materials from the landscape, adding value through rural economic development and returning these indigenous materials to the landscape as a preferred restoration solutions.

Recently, I met with USFS Chief Dale Bosworth to discuss this matter. He referred me to Jack Troyer of Region 4 and also Deputy Forest Operations Chief Joel Holtrop, both of whom I spoke with yesterday. They are putting together a task force with their staff to help resolve this issue. Additionally, Tim Murphy, Deputy Director of NIFC in Boise, is working diligently with BLM and BAER Team Coordinators to cooperate in resolving the issue. I am also to meet with DOI and BLM officials shortly to discuss this matter. I believe everyone agrees this is not a technological issue, but a purchasing, logistics and bureaucratic issue that can be cooperatively resolved for the sake of the health of the landscape and also economic development and job creation in rural communities.
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There is common ground here. Research is still an equally important factor. But moving on to actually produce products on the ground is equally important. I am honored to present this perspective, from the viewpoint of numerous small diameter companies that daily participate in this issue for their very existence and future in the marketplace.

Thank you for your consideration,

Steven L. Thorson
Steven L Thorson

QUESTIONS AND ANSWERS

OCTOBER 27, 2005

Senator Mike Crapo
Subcommittee on Forestry, Conservation,
and Rural Revitalization
Forest and Rangeland Research
Program Oversight Hearing
October 27, 2005

David Canavera, Manager, Ecosystems Project, MeadWestvaco Corporation

1. In your testimony you outlined several areas that demand greater attention for research. As end users of this desired research, are you satisfied with current methods of technology transfer? If not, what would be your suggested changes?

2. In light of the relatively flat funding allocated over the past few years to the Forest Service's R&D program decline in funding and capacity. Do you have any suggestions to improve this program to make better use of limited resources? How would you improve the current programs?

Question: In your testimony you outlined several areas that demand greater attention for research. As end users of this desired research, are you satisfied with current methods of technology transfer? If not, what would be your suggested changes?

Response: Technology transfer of Forest Service research to end users is satisfactory. However, I urge the Forest Service to stay abreast of the digital world and make its findings, programs and tools available to end users via the internet. This is especially true for the forest products industry which does most of its work digitally. I would even suggest that the Forest Service needs to establish a business relationship with a company such as Google to deliver its products to the public.

Question: In light of the relatively flat funding allocated over the past few years to the Forest Service's R&D program decline in funding and capacity. Do you have any suggestions to improve this program to make better use of limited resources? How would you improve the current programs?

Response: Although the FY 2006 Forest Service research budget of $480 million budget is considered to be a flat budget, this amount still represents a tremendous expenditure for forest research. I suspect it far exceeds the budget of any other country in the world spent on forest research, yet our industry is in serious economic turmoil – we continue to lose jobs to international competition. Land ownership patterns are shifting drastically which I fear will lead to further degradation of the integrity of America's forests. To combat these trends and the fact that federal funds for research will likely decrease in coming decades, I suggest the Forest Service consider the following:

- Evaluate all existing programs on a regular basis for their merit. Only the best programs stay, shut down the others. Critical to this process would be the development of evaluation criteria. Economic assessment should be one component of these criteria.
- Focus on the future, what issues and major technologies will be important? How do you fit these future programs into an existing budget? What programs will have to be closed to make room for the future?
- The Forest Service should better leverage its funds through cooperative research agreements with other organizations and government agencies.
- A radical thought - Operate Forest Service Research as a separate business on a pay-as-you-go basis. I believe this would quickly bring focus to the less productive programs.
- Consider organizational changes – to me there seems to be too much administrative overhead within the current research structure and not enough direct report relationship. I feel all Forest Service Research should report to one person. The Station Directors should report to the Deputy Chief for Research.
- Finally, I always ask myself this question: "When was the last time we called someone in Forest Service Research for advice or counsel on a critical issue?" If we can't provide multiple instances, I suggest that many of the research programs are not relevant.

Senator Mike Crapo
Subcommittee on Forestry, Conservation,
And Rural Revitalization
Forest and Rangeland Research
Program Oversight Hearing
October 27, 2005

Robert Daniels, Extension Professor, Mississippi State University, Representing the Society of American Foresters.

1. You highlighted in your testimony your work in response to the timber damage caused by Hurricane Katrina. Are there other examples of where research has been translated directly into helping landowners and practitioners?

Yes, there are many examples that I can readily cite. First is the body of timber tax law and practical interpretation of IRS regulations regarding timber, done by the Forest Service and selected Extension specialists at universities. In the aftermath of Hurricane Katrina, Dr. Deborah Gaddis has done excellent work teaching Mississippi landowners about timber casualty loss and other tax provisions that will help them minimize financial losses. Attached are some of her materials.

Another example of useful research is USDA Forest Service, General Technical Report SRS-5 titled "Hurricane Hugo: South Carolina Forest Land Research and Management Related to the Storm," published in September 1996. This 540-page document is a collection of reports and research findings related to Hurricane Hugo on topics from damage assessment and salvage organization, to forest restoration and evaluation of recovery programs. This work is a very practical and useful tool as we prepare for forest recovery after Hurricane Katrina. The information contained therein will give very valuable guidance to recovery efforts and proves the necessity of research in a very tangible way. Funding a comprehensive research and Extension effort to document the effects and recovery from Katrina, would prove valuable information for future hurricane recovery.

A third example is remote sensing research at Mississippi State University, by Dr. David Evans. His work, in cooperation with the Forest Service, using satellite imagery in forest inventory, has been pivotal to quickly locate and estimate hurricane damage to forests. This information is critical to damage assessment and recovery planning.

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2. You are from a region that was hard hit by Hurricane Katrina. I understand that there is a substantial amount of biomass waste generated by Katrina. Is there anything additional that the research community could be doing now to assist in the disposal of this material?

To say that there is a substantial amount of biomass waste generated by Katrina is an understatement. Let me try to illustrate how much material is likely to be wasted when the salvage effort is concluded next summer.

The Mississippi Forestry Commission estimated that the volume of commercial timber damaged by Hurricane Katrina was 14.6 million cords of pulpwood and 3.2 billion board feet of saw-timber, valued at $1.3 billion. After Hurricanes Hugo in 1998 and Ivan in 2004, it was estimated that 37% and 25% of the volume, respectively, was salvaged. The remainder was lost or wasted. It is expected that following Katrina, the priority for salvage logging will be pine saw-timber since it is the highest value product. I've heard foresters say, "forget the pulpwood." If that proves to be true and say 50% of all saw-timber is salvaged and perhaps 20% of pulpwood is recovered, then 11.6 million cords of pulpwood and 1.6 billion board feet of saw-timber will be wasted. Such a volume of waste biomass would fill 533,000 trucks with sawlogs and 1,933,000 trucks with pulpwood. That is 2.46 million 18-wheelers of forest biomass. That line of trucks parked bumper-to-bumper would stretch 23,295 miles long or nearly seven times from Miami, Florida to Seattle, Washington. Given the huge volume of this material, its use would have to be a large bulk use such as burning in power plants to supplement coal burning. Research to study the efficiency of combining forest biomass with conventional power generation fuels, the economics of collecting and transporting this fuel, and other aspects of biomass use would be helpful.

Questions from Sen. Norm Coleman
From 10/27/2005 Subcommittee Hearing

David Canavera, Manager, Research & Development, Ecosystems Project, MeadWestvaco Corporation:

Question: Mr. Canavera, it is my understanding that the Department of Energy will offer a solicitation early next year providing over $160 million for projects that demonstrate integrated biorefineries at an industrial scale, with intention of enabling widespread commercialization in the U.S. What role could forest-based feedstocks play regarding integrated biorefineries, and will your company, or others in your industry, participate in this solicitation?

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Answer: Forest-based feedstocks are expected to provide the majority of the feedstock that will go into integrated forest biorefineries. Although there are many configurations for biorefineries, I am referring to the instance of a forest biorefinery. In this case, hemicelluloses are first extracted from wood chips prior to pulping and then other chemicals, including transportation fuels, are extracted from the pulping liquors. As responsible land stewards, it is the role of forestry to provide a high quality, renewable and sustainable supply of wood to this overall process.

I understand that Potlach in Arkansas, and possibly other companies, will participate in the solicitation. I know there is intense interest in forest-based biorefineries in the states of New York, Maine and Wisconsin.

QUESTION FROM SENATOR NORM COLEMAN (R-MN):

The U of M's Extension Service connects academia to rural landowners who are finding innovative ways to earn income from their land, and I think this local connection is an important one for the Forest Service to have. How can the Forest Service fully utilize universities' outreach and extension resources in order to do more with Forest Service funds?

RESPONSE FROM STEVEN DALEY-LAURSEN
Dean, College of Natural Resources, University of Idaho
Formerly Associate Dean and Extension Leader
College of Natural Resources, University of Minnesota

Thank you for this important question, Senator Coleman. I understand your concern. I served as the statewide program leader for the forestry and natural resources Extension program at the University of Minnesota from 1988 through 2002. I have served in similar roles at two other institutions.

The Extension mission is to build a bridge between university science and society. Forestry and natural resources extension is uniquely positioned to make research relevant to the needs of forest landowners and their communities so they can achieve their goals for land stewardship and economic development. However, the capacity of universities to carry out this natural resource Extension mission is severely limited by inadequate funding at the federal level. The Renewable Resources Extension (RREA) program was established in 1978 to dedicate a certain amount of federal funding to forestry and natural resources extension programs across the nation, but this act has never been funded at anywhere near its authorized level of appropriation.

Universities are good environments for supporting educational programs for landowners. We can make contacts with individual landowners directly, via workshops, demonstrations, publications, and the internet/web. We also log these contacts to develop an understanding of the issues and how well our contact mechanisms are working. On the research side, Extension also tries to stay in touch with the leading researchers. The results of these efforts are typically very positive for landowners and communities, but we will need to build our capacity to make a major difference for society given fast moving issues such as invasive species, wildfires, urbanization, and global economic and ecological change.

To accomplish more education to the advantage of landowners we will need to build our capacity to accomplish this. We also need to further integrate our extension and technology transfer programs with our research programs and have identified this as a priority for enhancement in the next several years.

There are several things we can do to increase the US Forest Service's "local connection" to the needs and issues of landowners and communities.

1. Create improved mechanisms for increasing local and regional coordination and cooperation between (1) the Forest Service - State and Private Forestry (S&PF) and (2) University-based Extension and Outreach. Currently, there is no formal mechanism (including funding) that links S&PF to University Forestry Programs. However, our organization (NAUFRP) did offer such language several years ago.

We believe such specification is necessary to make more connections and results happen. Alan Ek at the University of Minnesota can provide more background on our language.

2. Create mechanisms for increasing coordination and cooperation between (1) Forest Service - Research and Development (R&D) and (2) University-based research. Encouragement and reward for integration of research with technical assistance, landowner education and technology transfer should be a goal of such mechanisms. There should also be encouragement for cooperation at the local and regional levels on programs with relevance to the needs of landowners and local policy makers.

   Beyond various cooperative agreements, there is no formal mechanism that directs the agency to work with University based research programs. The agency also lacks a designated liaison office for working with forestry programs at Universities. NAUFRP has suggested formalizing the USFS R&D and University linkages including the development of forestry- focused competitive grant program which would foster the integration suggested.

3. Increase federal funding for the Renewable Resources Extension Act (RREA) to the authorized appropriation level, thereby building the capacity of Universities and their partner organizations to offer more landowner and logger education, professional education for natural resource managers, education for local policy makers, and other forms of forestry outreach education.

4. Maintain and/or increase base funding for forestry and related natural resources research programs at Universities. A noteworthy example would be building of the McIntire-Stennis Cooperative Forestry Research Program.

5. Increase pools of competitive funding that encourage and reward research, technical assistance and education partnerships between University research and outreach, Forest Service R&D and S&PF, and other partner organizations. A noteworthy example would be increasing the forestry component of the National Research Initiative Competitive Grant Program (NRICGP) in USDA CSREES, or creating an entirely new and highly targeted forestry competitive grants research program, perhaps within Forest Service R&D.

It was a privilege for me to accept Senator Crapo's invitation to testify to the committee and to field the questions from committee members. Thank you for the opportunity to reply to your concerns. Please contact me or Dr. Alan Ek at the University of Minnesota if you have further questions.

(Steven B. Daley-Laursen, University of Idaho, Moscow, ID 83843. 208.885.6442, stevendl@uidaho.edu).