

**STATEMENT OF
DALE BOSWORTH
CHIEF, USDA FOREST SERVICE
Before the Subcommittee on Forest and Forest Health, Committee on Resources,
House of Representatives**

Fire Threat to Humans

July 31, 2001

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to appear before you today to talk about the implementation of the National Fire Plan. I am Dale Bosworth, Chief of the Forest Service. I am accompanied today by Lyle Laverty, Associate Deputy Chief and National Fire Plan Coordinator of the Forest Service. Also with me today is Dr. Robert Lewis, Deputy Chief for Research and Development and Dr. Kevin Ryan, project leader in fire effects research at Missoula, Montana, who will testify on fire ecology in one of the other panels.

Thirty Mile Fire

First I would like to speak briefly about the Thirty Mile Fire on the Okanogan National Forest in Washington State. Four young firefighters, Tom Craven, Karen FitzPatrick, Jessica Johnson, and Devin Weaver, lost their lives when they were trapped in a narrow canyon on the afternoon of July 10. Their deaths occurred despite the fact they deployed fire shelters. Fortunately, 10 other firefighters and two civilians in the area survived.

Four of the survivors and two civilians were injured. All but one of the injured were treated at local hospitals and later released. One firefighter, Jason Emhoff, received burns over 30% of his body and remains in the Burn Center at Harborview Medical Center in Seattle.

I went out to the fire scene after hearing of this tragedy and met with some of the injured firefighters and visited Jason shortly after the accident. I admire their courage as they recover from their physical and emotional injuries. I also met with other firefighters while I was there and was once again impressed with the professionalism these brave men and women exhibit while dedicating themselves to the fireline – season after season -- protecting life, property, and our country's natural resources.

When something like this happens it really impacts the Forest Service. Not just the friends and colleagues in local offices who suffer a tremendous emotional blow but everyone in the Forest Service family cares deeply and is affected.

As of July 30, the Thirty Mile Fire burned 9300 acres and is 100% contained. Mop-up and monitoring is expected to continue throughout the summer. The fire burned in dense lodgepole pine, sub-alpine and Douglas fir stands that are 80 to 100 years old. Fires in this vegetation type during dry years burn with intense heat and are extremely difficult to suppress once they become

large. When first attacked, and for several hours afterwards, the fire was not perceived as dangerous. It became dangerous suddenly with a change in conditions.

We still do not know all the reasons behind this horrible event. The investigation is not complete. We want the investigation to be in-depth and thorough because it is important for the future safety of our wildland firefighters that we learn all we can from this tragedy. When the investigation is complete, we would be happy to brief you on the results.

National Fire Plan

I would like to now turn to the National Fire Plan. The severe fire season of 2000 captured the attention of the American people on the need to find ways to protect life and property and minimize losses of natural resources. On September 8, 2000, the Secretary of Agriculture and the Secretary of the Interior issued a report entitled “Managing the Impact of Wildfires on Communities and the Environment.” The report, referred to as the National Fire Plan, contains recommendations to reduce the impacts of wildland fires on rural communities, reduce the long-term threat from catastrophic fires, and ensure sufficient firefighting resources in the future.

For the past century we have been very successful at preventing and suppressing unwanted fire. This work was accomplished with the best intentions to protect our growing communities and valuable forest and rangeland resources. In some locations an unintended consequence of this success, however, was the buildup of excessive amounts of dense vegetation, that now, in times of drought and wind, fuels devastating wildfires. These uncharacteristically intense fires threaten homes, communities, watersheds, wildlife habitat, and the lives of firefighters and the public. Each year, more vegetation grows and the problem becomes incrementally worse. There is no short-term solution to this problem. Now, more than ever, we must continue to prevent and suppress unwanted fires and reduce these unnatural fuel conditions. They have the potential to be more destructive to communities and the environment than ever before.

While we continue with our best efforts to protect communities and forestlands from the effects of unwanted fire, we must focus our attention to treating the hazardous buildup of vegetation that fuels these fires. An aggressive fuel treatment program is the only long-term solution if we are to reduce the effects of unwanted wildland fire, restore our forests to ecologically health conditions, and protect our communities on a longer term basis. As we continue to find common ground and work in partnership with other federal agencies, states, tribes, counties, local communities, and Congress, we leverage our resources and skills, increasing our ability to solve this national problem. We are at a turning point. The National Fire Plan is the beginning of the solution.

Less than nine months have passed since the Forest Service, Department of Interior, and our State partners undertook the giant task of implementing the National Fire Plan. It is a monumental task. In that brief time, we’ve learned many lessons, and we realize we have many areas in which we can improve. We are dedicated to developing processes to expedite collaboration, providing common performance measures and budget planning models, and analyzing and managing interagency landscape scale projects.

While we recognize shortcomings, we should not lose sight of the extraordinary achievements that have occurred on the ground in the last nine months. Today, national forest resources and nearby communities are protected by an optimum level of firefighters and equipment. That was not the case 9 months ago. During a recent firefighting readiness review in California, fire managers on the Sequoia National Forest described how the new firefighting assets, provided by the National Fire Plan, have helped control wildfires in one day that historically have taken 3-5 days to control. In Utah, we have spoken with people who have said that without the additional firefighters, many of the fires occurring there this year would have grown to a large size.

The rehabilitation and restoration efforts in Montana's Bitterroot Valley are a testament to community and agency partnerships. Research and feasibility studies in bio-energy and biomass production are underway in Colorado, California, and the Pacific Northwest, as we look for alternative ways to improve utilization and reduce hazardous fuels. Contracting Officers are working on a national contract to provide engines and crews from the private sector to assist us with wildland fire suppression and fuel treatment projects. Today, there are unprecedented examples of interagency and governmental cooperation occurring to meet these goals; this, from a program only nine months old.

The list of accomplishments is long, and I am proud of the progress we have made in such a short time.

In discussing the National Fire Plan, I would like to focus on 5 key points:

- Ø **Firefighting**
- Ø **Rehabilitation and Restoration**
- Ø **Hazardous Fuel Reduction**
- Ø **Community Assistance**
- Ø **Accountability.**

The status of our actions in these five key areas include the following:

Firefighting Readiness The National Fire Plan made funds available to increase initial attack capability, increase extended attack support, and provide more resources during large fire episodes. These additional firefighting resources will control more fires during initial attack, thereby reducing wildland fire threats to communities at risk. We have promoted over 980 permanent employees to fill important supervisory positions. Lastly, we have hired 453 people targeted to offset fire leadership retirements anticipated over the next five years. The cornerstone of the Forest Service fire safety program is the training provided to every individual involved in these programs.

The Forest Service adheres to the National Wildfire Coordinating Group fire qualification standards. This training is reinforced with daily, weekly and monthly safety meetings and annual fire safety refresher training. In addition, Safety Briefings are given at the beginning of each shift on an incident.

To enhance our readiness and attack capabilities, our scientists are conducting research to improve monitoring of fuel conditions, enhancing fire risk assessments, improve fire weather and behavior predictions, and increase the accuracy of long term fire severity, fire weather, and climatic conditions. Twenty-two research and development projects related to these improvements have been funded using the Joint Fire Sciences and National Fire Plan programs.

While these efforts will help reduce threats to communities at risk, large wildland fires will not be eliminated. Long term and comprehensive programs in fire prevention, fire suppression, and fuel treatment, involving the States, tribes, communities, and other federal agencies, will be necessary before the current fire environment is changed to one that is less destructive and costly. To this end, we are currently working on improvements to wildland fire planning systems, working with the Congress to expand authorities for the use of federal dollars on State and private lands, focusing fuel treatment in areas where communities are at risk, working with other State and federal agencies to plan interagency landscape level fuel treatment programs, and expanding fire prevention programs.

Rehabilitation and Restoration Healthy, diverse ecosystems are resilient and less likely to produce uncharacteristically intense fires when they burn. In FY 2001, we have focused on treatment of some of the areas most seriously damaged by fire during the 2000 fire season. In FY2001, 437 restoration projects are underway to treat 300,000 acres. Watershed restoration is planned for 840,000 acres. Road and trail work will address more than 3,000 linear miles. Habitat restoration will be carried out on 500,000 acres, and forest health projects to treat invasive plants and suppress insects and diseases will cover 280,000 acres. In FY 2001, nine research projects are funded through the Fire Plan in support of rehabilitation.

Hazardous Fuel Reduction We are investing to reduce fire risk in communities, municipal watersheds, and other areas where conditions favor uncharacteristically intense fires. As of June 30th, treatment projects have been completed on more than 859,000 acres. About 80 % of these acres are treated with prescribed fire. The remaining 20% are treated either mechanically or by hand labor. Estimates of accomplishments projected through the end of the year continue to vary due to unseasonably dry conditions in many regions. In Florida, the state with the largest program, a third year of drought cancelled most planned prescribed burning activities. A lower than normal snow pack in the interior West has also left much of that part of the country at high fire danger earlier in the season than normal. Currently, national program managers anticipate that actual hazardous fuels accomplishment will total more than 1 million acres but less than the 1.8 million acres target.

The most important aspect of hazardous fuels reduction is reducing the threat to local communities. When it comes to reducing threat, we need to protect communities and help the communities to help themselves through changing the landscape from high risk to low risk. We'll accomplish that by working closely with communities on major projects. We will be concentrating on projects that will reduce risk.

One dimension of the FY 2001 program of work is the planning effort to prepare for fuel reduction treatments in fiscal years 2002 and beyond. The increased focus on wildland-urban interface areas presents additional challenges in planning, including increased community

participation, and increased use of hand treatments and equipment. Nearly 1 of every 8 dollars appropriated for hazardous fuels reduction in FY 2001 is focused on planning activities.

Our work on the ground this year is based on planning done in previous years when there was less emphasis on mechanical treatment and the wildland-urban interface. Planning underway this year and in the future reflects our emphasis on the interface and ecosystem restoration.

Forest Service, US Fish and Wildlife Service and National Marine Fisheries Service are working together at national, regional and local levels to accomplish consultation under the Endangered Species Act of 1973, thanks to swift Congressional action to clarify the Department of Agriculture's authorities.

Our scientists are conducting research in ranking areas for fuel reduction efforts, determining impacts of these treatments on wildlife, fish and riparian areas, and developing new uses and systems for harvesting forest undergrowth and small diameter trees. Through the National Fire Plan, 24 research projects in support of Hazardous Fuels reduction are funded in 2001.

Community Assistance

We are just completing a successful interagency effort with the States and tribes to better define the communities in the wildland urban interface across the United States. Using State Fire Assistance funds, we have helped states increase firefighting capability, and establish a significant new hazard mitigation program. Over 290 mitigation projects have received grants in 2001, and over 128,000 homeowners in the Western U.S. will receive benefits from treatments. The Cooperative Fire Program has also funded 10 national FIREWISE workshops; educating 870 community leaders from 450 communities in 41 states about methods to increase protection for their communities. Volunteer Fire Assistance funds, to date in the amount of 13.2 million dollars, are being delivered through grants to rural Volunteer Fire Departments providing training and equipment for small fire departments that are often the first line of defense in the interface. The Economic Action Programs are in the final stages of awarding grants for biomass energy systems, small diameter market development, and community economic development and fire planning.

Here are some examples:

- 1) Bastrop County, Texas has received a \$205,000 federal grant for The Texas Wildfire Protection Plan: Lost Pines Project. The grant will provide funding for projects that encompass education, land stewardship, fuel reduction, residential planning and multi-agency partnerships. State and local resources will add an additional \$221,000 in match for the projects.
- 2) Many Southern states have joined together to use National Fire Plan grant dollars to fund an extensive assessment to evaluate the areas of the states that have the highest wildfire risk combined with the value of homes and improved property. The project will fund GIS mapping to display the most at-risk communities. The assessment will serve as a tool for growth planning, determination of fire resource allocations, as well as for educating community leaders and the general public.

3) The Concerned Resource Environmental Workers received a \$161,000 National Fire plan grant to construct approximately 25 miles of fire breaks throughout the foothills of Ojai, CA, over eighteen months. At-risk youth and other kids will be the workers on the project to protect the community. Plans are to employ as many 45 youth this summer.

4) Governor Kenny Guinn of Nevada has announced two new public service announcements for radio and television, to recruit volunteer firefighters and seek support for volunteer fire departments in Nevada. Governor Guinn noted support of volunteer fire departments and enlistment of new members is essential to successful fire protection efforts in the small communities of the state. Through a grant from the National Fire Plan, two new public service announcements have been developed. Firefighters representing nine volunteer fire departments in Nevada were used for filming on location at the scene of last summer's Arrow Creek fire in Reno, and in Virginia City.

Accountability Oversight, coordination, program development and monitoring for performance are critical for the National Fire Plan. We are conducting a series of regional reviews to assess progress. We are working with Governors, the Department of the Interior and other stakeholders to finish a 10-year Comprehensive Strategy for implementation of the National Fire Plan. We have been directed by the Secretaries to fully integrate all of our efforts.

We are committed to demonstrating sound accountability for the funds provided by Congress in support of the National Fire Plan. We have implemented a new financial management system that better tracks federal funding and expenditures. We continue to use existing and new information systems to track program performance and we will soon complete a Third Quarter Status Report on our accomplishments. The agency is using a new system to pilot an automated accomplishment reporting system for fuels, rehabilitation and restoration, and community assistance functions. Reporting under this system is enabling prompt assessment of output accomplishments. If deemed successful, this reporting system will be expanded for agency-wide use as early as fiscal year 2003. The output measures reported under the National Fire Plan are a key aspect of the broader agency performance measure accomplishment now being incorporated in the Annual Performance Planning process.

The Department of the Interior, National Association of State Foresters and the Forest Service have jointly established an interagency website for the National Fire Plan where people can find out more about National Fire Plan Implementation and ways they can participate in making their homes safer from wildfire. Additionally the Forest Service and Department of the Interior have cooperated in development of the Action and Financial Plans required by Congress. We will continue such cooperative efforts in preparation of the fiscal year 2003 program that will improve the consistency of information.

Fire Management Plans, Land Management Plans and the National Fire Plan

Ninety one percent of the national forests have fire management plans that guide fire suppression actions on initial attack fires and larger fires that escape initial attack. Many of these fire management plans are being updated to meet the guidelines in the 1995 Federal Wildland Fire Policy; however, they currently contain adequate direction for tactical fire suppression initial attack and fuel treatment.

By December 2003, all National Forests will have a fire management plan that meets guidelines established in the 1995 Federal Wildland Fire Management Policy.

Interagency Coordination

Successful implementation of the National Fire Plan requires a commitment among the federal partners to integrate their programs, to the maximum extent practicable, to ensure that implementation proceeds in a standard, consistent, and cost-effective manner across agencies. This we are doing. For example, we should have integrated priorities, accomplishment timeframes, performance measures, and reporting procedures. Our agencies are working to identify and quickly resolve implementation issues as they arise.

Although we have made progress in some of these areas, Secretary Veneman and Secretary Norton have discussed the need for much more thorough integration of program activities between the two agencies and have tasked their respective Deputy Secretaries to ensure that this is accomplished. The findings and recommendations of the Comptroller General will be a useful tool in this effort.

Summary

Mr. Chairman, while we continue with our best efforts to protect communities and forestlands from the effects of unwanted fire, we must now focus our attention to treating the hazardous buildup of vegetation that fuels these fires. The National Fire Plan is the beginning of the solution. We have come a long way and we recognize there are many areas in which we can improve. My staff and I will continue to work closely with the Department of the Interior team and the State Foresters and communities to restore and maintain healthy ecosystems and to minimize the losses from future wildfires. We are hiring and training personnel to improve future fire management capabilities. We are stabilizing and rehabilitating many of the sites damaged during the fires in 2000. The reduction of hazardous fuels reflects an expanded scale of action with extensive planning underway for 2002 and 2003. In cooperation with the States, the list of communities at risk has been revised, and will be an important tool to plan future projects.

This concludes my statement; we would be happy to answer any questions you or Members of the Subcommittee might have.

**STATEMENT OF
Dr. ROBERT LEWIS
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USDA FOREST SERVICE
Before the
Subcommittee on Forest and Forest Health, Committee on Resources
U.S. House of Representatives**

**Fire Threat to Humans - Science in the National Fire Plan
Ecological Basis for Fire Management Strategies**

July 31, 2001

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to appear before you to talk about fire ecology and science and the National Fire Plan. I am Dr. Robert Lewis, Deputy Chief for Research and Development. With me today is one of our preeminent fire ecologists, Kevin Ryan, project leader in fire effects research at the Missoula Fire Laboratory of the Rocky Mountain Research Station. Dr. Ryan is available to discuss the scientific principles that govern fire-adapted systems.

I would first like to introduce the scientific basis for managing fire-adapted ecosystems and then describe the role of science and research in the National Fire Plan.

Fire Ecology and the Scientific Basis for Managing Fire-Adapted Ecosystems

Fire is a major force in shaping ecosystems. But fires can inflict great damage and suffering when they occur in environments heavily inhabited by humans and their structures. This inherent duality - ecological agent and destructive force - creates many dilemmas in fire policy formulation and management. These dilemmas have been exacerbated in recent years by the explosive population growth in the wildland urban interface and the rapid accumulation of vegetation.

To better inform policy and fire management debates and better prepare citizens to live in fire-adapted ecosystems, the science community provides knowledge and analytical judgment and asks hard questions about the consequences of management and policy alternatives. Science can describe the connections of integrated human/biophysical systems, more reliably forecast the occurrence of damaging fire events, and characterize the possible outcomes of policy and management options. Scientists can help managers interpret what they are seeing on the ground and can help design management programs as experiments to better understand how ecological systems operate and alert managers to changes that might be needed in management strategies.

Compared with preindustrial times, wildland fire incidence from 1930 through the 1970s decreased in response to aggressive fire suppression and land use changes. The unintended consequences of

these changes have been a significant change in vegetation composition and structure - especially in ecosystems in the Interior West that are tuned to periodic fires at relatively short return intervals. This reduction in wildland fire has destabilized many forested ecosystems that depended on these periodic fires to keep stands thinned of competing underbrush and trees. Understory vegetation has become so dense that wild fires that do occur are larger and more severe than the historical fires. For some fire-adapted ecosystems, the frequency of severe fires has become abnormal, or as we scientists say, outside the range of historical variation.

The severity of these extreme fires poses threats to species persistence, watershed integrity, aesthetics, air quality, and community resilience. Extreme fire behavior can result in loss in soil productivity and site stability, increase sedimentation in streams and water supplies, degrade or destroy critical habitat for fish, wildlife, and plant species, including those at risk of extinction, and increase the spread of invasive weeds or non-native plants. Such fires also emit millions of tons of gases and particulate matter into the air, with negative consequences for human health, carbon balances, and the global climate.

The ecologically sound prescription for this situation is to return fire, on proper terms, to these fire-adapted ecosystems. But it is not simply a matter of letting wildfires burn, because many of these systems are already primed for severe and destructive fire behavior and are festooned with human structures and other values at risk. Frequent, controlled fires - prescribed burning - can be an antidote for sporadic, catastrophic fires. However, many of these systems have missed so many natural fire intervals and have become so encumbered with vegetative fuels that mechanical thinning may be necessary to safely restart natural fire processes. In some of the most overgrown conditions, prescribed burning without thinning could lead to catastrophic escape fires, illustrated vividly in the unfortunate case of the Cerro Grande prescribed fire escape last summer. Fire managers implementing the National Fire Plan are rapidly increasing the use of prescribed fire and thinning in scientifically based prescriptions to reduce fuel and protect multiple resources. These practices pose their own risks and controversies but when applied in scientifically designed fuels programs, they can be used effectively and safely. The alternative, that is no active management, involves all the resource and human losses associated with high intensity fires and the exorbitant costs of trying to suppress them.

Many policy questions surround the fire problem. These policy questions are heated, confusing, and often come disguised as science questions. We must remember that these questions are not solely scientific questions and that many non-scientific considerations – e.g., policy, law, and economics – must be part of the answer to these policy questions. While science can provide a more solid foundation for management decisions, science alone cannot answer these questions.

However, we realize that not everyone agrees that active management is warranted to reduce wildfire risk. In the context of debate about fire management and policy options, scientific understanding is sometimes misrepresented, oversimplified and taken out of context. This practice

is unfortunate and detracts not only from the quality of the deliberation about fire and land management strategies but also severely hampers the ability of agencies to build public confidence and trust needed to implement positive changes. We feel it is important to base policy and management choices on the body of knowledge, not statements or snippets lifted from reports to justify a point. It is the duty of the scientific community to be as clear as possible about what is known and not known about a body of science to put statements in their proper context, and to correct distortions and misrepresentations. This is extremely important in the field of fire ecology, the source of knowledge for strategies for fire-adapted ecosystems.

We acknowledge that we much to learn – or, as I will discuss later, -- important knowledge gaps that we must attack. Some of these knowledge gaps relate to areas of identified misperception. Some, but certainly not all, of the more common misperceptions are:

- A. *That the incidence of high intensity fire is not unusual and is not indicative of systems that are uncharacteristically stressed.* Records clearly show that the acreage burned is substantially higher in the last 10 years than in the previous seven decades. The number and intensity of extremely large fires has increased due to a combination of factors including fuels condition changes, climatic variation, initial attack, and suppression capability.
- B. *That harvesting trees exacerbates fire risk.* In the early part of the last century when more logging slash was left than is left today, this was true. Modern harvesting operations, based on scientifically sound silvicultural prescriptions, use material more efficiently and follow up rapidly with burning or mechanical reduction of residues, the risk of fire is minimal. Thinning trees in conjunction with subsequent prescribed burning is an effective strategy for reducing fire risk.
- C. *That fires should be left to burn because fire is a natural part of the ecosystem.* Forest Service and other agencies have wilderness and other areas where planning has deemed that fires can burn naturally and benefit the ecological and other objectives of the area. However, in much of the West, fuels have accumulated so much that fires left to burn can quickly become extreme events with a range of devastating consequences. We have initiated new research that will sharpen our ability to determine where relaxed suppression is appropriate and how wildland fires and prescribed burning can be used to achieve ecological and other objectives at the landscape level.
- D. *That mechanical removal of fuel is unnecessary and that prescribed burning alone can effectively reduce fuels.* The Cohesive Strategy, based on a scientific analysis of the vegetative condition of the western forests, recommends that the most overgrown systems, having missed several fire cycles, will require mechanical thinning before any prescribed burning can be done safely. This strategy is the fuels management core of the National Fire Plan and is based on returning fire in its natural role to fire-adapted ecosystems. To build an even stronger scientific basis for strategy, we are researching ways to make fuels management prescriptions economically feasible and environmentally sensitive.
- E. *That we don't have to treat vegetation at the landscape or watershed level since we can protect homes through firesafe construction and home landscaping practices in the immediate*

interface. Our research has shown that fire safe practices are effective. However, this research did not negate the ecological and economic rationale for correcting problems at the landscape level. There are many reasons to minimize the frequency and impact of uncharacteristically intense fires including ecological values, aesthetic conditions, business and infrastructure, human health, quality of life and efficient use of taxpayer's dollars. Home protection and landscape health should fit together in an integrated protection strategy supported by scientific advances on all fronts.

Science and the National Fire Plan

Science plays a key role in the National Fire Plan. Each of the key points of the National Fire Plan have a science basis that has helped shape what is possible and what is sound. Forest Service Research and Development has sustained an active program of wildland fire research since the 1920's. It remains the world's premier organization in wildland fire science. We collaborate closely with research agencies, universities, and the private sector and work closely with fire management operations to refine research needs and ensure technology adoption. For example, firefighting procedures are based on findings from years of past and ongoing work in the fire behavior, meteorology, economics, operations research and engineering development. Rehabilitation and recovery methods are becoming more effective and efficient thanks to rigorous testing and environmental evaluation. Fuels reduction strategies have been developed and are being refined by scientific investigations at various scales to quantify the effects of removal and burning regimes on potential fire behavior and a suite of ecological values and processes. These ongoing studies, in close collaboration with managers, are helping us understand how to plan fuels and vegetation treatment and enlighten us about the consequences of not taking active measures to manage fuels. They are showing us how to remove and use fuels materials we might otherwise burn and add to air quality problems. A growing body of social science shows us how to work with the public and the new fire science of structural ignition is showing us how to effectively protect homes in the interface.

It is a long-standing responsibility of Forest Service research to build the science base to protect forest ecosystems and to restore at risk systems to healthy conditions. We know that the science basis for some key questions is more complete than for others. We are working to fill these knowledge gaps and to help managers and the public think through problems with the best technical assistance and expertise. We know, for example, that many managers in recent fire seasons have observed dramatic reductions in fire spread and intensity as fires entered stands that have been thinned or previously burned. Scientific validation of these landscape scale phenomena is complex and involved, but we are working with managers closely to establish parameters for interpreting these events and setting up landscape scale experiments to help establish guidelines for future management.

We have many examples of successful collaboration between users and research that have resulted in science-based tools in common use such as:

- National Fire Danger Rating System
- Fire retardant technologies
- Fire Effects Prediction Systems
- Smoke Management Systems

- Fire Behavior Prediction Systems
- Fire Hazard Mapping and Fuel Models
- Fire Management Planning and Economic Analysis Systems
- Fire safety and health guidelines

We have parlayed this successful relationship into an intensified program of research and development made possible by the National Fire Plan funding. In FY 2001, increased fire-related research and development in the Forest Service (including the Joint Fire Science Program) has been invested in 63 research and development work units. These units are already turning out useful products to support goals in each of the first four key points of the National Fire Plan.

In addition, the Joint Fire Science program, established by Congress in 1998, also supports the development of information and tools for fuels management. This interagency research and development program was funded at \$ 16 million each with equal \$8 million contributions from the Departments of Interior and Agriculture. The National Fire Plan doubled the size of the Joint Fire Science program in FY2001. There is an important complementary relationship between the Joint Fire Science program and the Forest Service research and development programs. The Joint Fire Science program does not employ scientists or manage other elements of scientific capability such as facilities, equipment, and support staff. The program focuses on applied research on issues that relate to fuels management, while the Forest Service research program provides scientific capability and focuses on long-term issues and fundamental science related to forest health, fire hazard, and the social and economic consequence of fire and other disturbances.

For FY 2002 and beyond, the science base for The National Fire Plan and the Cohesive Strategy will attack important knowledge gaps. Top priority areas for research and development are:

Firefighting

- Tools to assist the integration of fire management with land management planning
- **Improved predictions of fire behavior and fire season severity.**
- **Improved organizational effectiveness and safety practices**

Rehabilitation and Recovery

- **Improved effectiveness of rehabilitation (Emergency Stabilization and Rehabilitation) treatments**
- **Understanding of the effects of post fire treatments on wildlife**
- **Methods for reestablishing native species and excluding invasive exotic plants.**

Hazardous fuels reduction

- Techniques for assessing and managing fire risk at landscape scales.
- Integrated silvicultural, processing, and marketing systems to economically reduce fire hazards.
- Testing the effectiveness and the environmental effects of different fuel treatments

Community assistance

- Better understanding of public knowledge, beliefs, and attitudes about fire and fire management.

- Strategies for integrating fire and fuels management with sustainable community development.
- Strategies for reducing the vulnerability of homes and communities.

Summary

In summary, Mr. Chairman, the science community provides knowledge and analytical judgment to better inform policy and fire management debates and to better prepare citizens to live in fire-adapted ecosystems. In the context of debate about fire management and policy options, scientific understanding is sometimes misrepresented or oversimplified. It is the duty of the scientific community to be as clear as possible about what is known and not known about a body of science, to put statements in their proper context and to correct distortions and misrepresentations. Science plays a key role in the National Fire Plan. Each key point of the National Fire Plan has a science basis that has helped shape what is possible and what is sound. We are working to expand knowledge and to help managers and the public think through the problems with the best technical assistance and expertise.

This concludes my statement. Dr. Ryan and I would be happy to answer any questions you or members of the Subcommittee might have.