

**TESTIMONY of
VICTORIA C. CHRISTIANSEN, DEPUTY CHIEF, STATE AND PRIVATE FORESTRY
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
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ENERGY AND NATURAL RESOURCES COMMITTEE
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Concerning
FEDERAL AND NON-FEDERAL COLLABORATION, INCLUDING THROUGH THE
USE OF TECHNOLOGY, TO REDUCE WILDLAND FIRE RISK TO COMMUNITIES
AND ENHANCE FIREFIGHTING SAFETY AND EFFECTIVENESS**

Madam Chairman and Members of the Committee, thank you for the opportunity to appear before you today to discuss the important role prevention, restoration, community assistance and technology plays in wildland fire management. My testimony today focuses on how wildfire risk can be effectively reduced and mitigated.

Wildland Fire Management programs at U.S. Forest Service and the Department of the Interior seek to achieve both cost-efficient and a technically effective fire management that meets resource and safety objectives. The guiding principles and priorities, as outlined in the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy), are to safely and effectively respond to wildfires, promote fire-adapted communities, and create fire-resilient landscapes through direct program activities and strong Federal, State, tribal and local collaboration. Firefighter and public safety are the primary considerations for all operations.

State Foresters and local fire departments serve as first responders on almost 75 percent of wildfires. Fires on National Forest System lands, on average, represent 11 percent of the wildfires (and 25 percent of the acres) across all jurisdictions each year. The Forest Service provides critical national capacity to ensure that fire management assets, such as large airtankers, helicopters, hot shot crews and smokejumpers are available to support response operations on National Forest System lands, as well as other Federal, State, and private lands. In addition to wildfire response, the agency invests in planning, prevention, education, information technology development and decision support systems.

Fire Budget

While the Forest Service and its firefighting partners are able to suppress or manage 98 percent of fires during initial attack, a few escape initial attack and become catastrophically large fires that are extremely costly to contain. These large conflagrations account for 1 to 2 percent of total fires but result in 30 percent or more of fire expenditures. The ongoing erosion of the agency's non-fire budgets due to the increasing 10-year average cost of fire suppression, causes an ongoing shift in resources from land management to fire management. We are committed to working with Congress to develop a solution that addresses the growth of fire programs as a percent of the agency's budget, and also ends the practice of transferring funds from non-fire programs when suppression funds fall short before the end of the fiscal year.

Wildfire Prevention

Wildfire prevention is a critical element to working collaboratively across land ownership boundaries. The agency uses cooperative fire agreements to further the goals and implementation of the Cohesive Strategy. Nationally, nearly 9 out of 10 wildfires are caused by humans, including some of the most costly wildfires. If we prevent unwanted, human-caused fires from igniting, we can proactively use our resources to create resilient landscapes, improve our response to the other wildfires that need attention, and engage communities to be prepared for and live with wildfire.

The goal of wildfire prevention is to stop unwanted human-caused wildfires before they start and to reduce the negative effects of wildfires. Prevention occurs in three main areas:

- **Education** aimed at changing behavior through awareness and knowledge.
- **Engineering** designed to shield an ignition source or prevent wildfire from impacting something we value. Examples include clearing debris from around a house, installing spark arrestors on equipment, and utilizing well-designed campfire pits.
- **Enforcement** efforts to gain compliance with fire regulations and laws (primarily a State and local role). Elements of enforcement include detection to keep fires small, patrols to increase visibility and public awareness of fire danger, and public compliance with wildfire regulations.

Wildfire prevention education activities can reduce the number of human-caused wildfires and thus fire-related costs. A 2009 study on wildfire prevention education programs in the state of Florida found that the benefit to cost ratio could be as much as 35 to 1. That is, every additional dollar spent would have reduced wildfire related losses (e.g., home and timber losses, etc.) and suppression costs by 35 dollars. A more recent study on Tribal lands found that fire prevention education is highly effective, reducing the number of human-caused fires on one tribal unit by 93 percent.

Wildfire Prevention Education Teams are used to deliver messaging targeted to diverse audiences. These Teams have developed messages ranging from sage grouse habitat protection to how to reduce sparks from shooting, dragging chains and equipment, to properly extinguishing campfires and understanding restrictions. These are often interagency teams that help support the local agency's fire protection plan to reduce human-caused wildland fire risks, hazards, and losses through the development, use, and communication of prevention plans.

As Smokey Bear reaches 75 years in 2019, he is still the Ad Council's most successful Public Service Announcement. In fact, 8 out of 10 citizens can identify his face and slogan, and he continues to be loved by millions of people. Smokey's messages are particularly important as more people choose to live in and near the wildland urban interface and recreate in wildlands.

Restoring Forests

Many ecosystems are fire dependent, requiring fire as a critical process for maintaining health and resiliency. Yet, we are experiencing larger and more intense fires along with expanding development within our nation's forests. This scenario increases the negative impacts of wildfire. The Forest Service estimates a total of nearly 480 million acres (of which 94 million are within National Forests) remain at moderate to very high risk from uncharacteristically severe wildfires.

Restoring fire to these fire-dependent landscapes can reduce the frequency and the impact of severe wildfire events.

The agency's hazardous fuels management program continues to focus on wildfire risk through prescribed burns, timber sales and mechanical treatments that reduce the spread and severity of wildfire, and also promote resilient ecosystems. These activities also reduce potential impacts to communities and increase opportunities for wildland firefighters to safely and effectively engage wildfires. More than 3,000 fuel treatments have been assessed since 2006 and evidence suggests that these treatments can be effective in reducing the impacts of wildfire.

Nearly three million acres of hazardous fuel treatments are accomplished on National Forest Systems lands a year. Of these, 700,000 acres are treated mechanically and two million acres are in the Wildland Urban Interface. Timber sales account for 200,000 acres of the mechanically treated acres. So far this year, we have treated more than 1.2 million acres to reduce hazardous fuels and are on track to meet our target of 2.2 million acres. The majority of these treatments are in the wildland urban interface. These accomplishments include naturally-ignited wildfire acres that were assessed and determined to meet land management goals. Managing wildfires in favorable conditions continues to be an important method to reducing risk of catastrophic wildfire.

Wildfire risk reduction requires coordinated efforts across a given landscape by many landowners. Since 2014 we have placed special emphasis on hazardous fuels investment in cross-boundary efforts that engage in reducing landscape level risk and on working with partners to create resilient communities. For instance, the Joint Chiefs' Landscape Restoration Partnership aims to reduce wildfire threats to communities and landowners, protect water quality and supply, and improve wildlife habitat for at-risk species. This multi-year partnership between the Forest Service and the Natural Resources Conservation Service is a landscape-level initiative which directly funds work across all ownerships to improve the health and resiliency of forest ecosystems where public and private lands meet across the nation. The Forest Service is also a partner in the Department of the Interior's Wildland Fire Resilient Landscapes program, which is a landscape-level approach for creating fire-adapted ecosystems through joint fuels management work.

Since 2014, the Joint Chiefs' Landscape Restoration Partnership has carried out hazardous fuels treatments on over 236,000 acres of National Forest System lands. These activities have improved 200,000 acres of wildlife habitat, restored 29,000 acres of watersheds and improved aquatic habitat on 724 stream miles. The Joint Chiefs' Landscape Restoration Partnership has also drafted 2,200 contracts to support private landowners in implementing conservation activities on over 216,000 acres through the Environmental Quality Incentive Program and leveraged over \$14 million from partners to implement restoration projects.

The long-term value of fuel treatments far outweigh their costs. Our studies show that when tested by wildfire, 90 percent of fuel treatments assessed are effective in changing the fire behavior or helping with control of the wildfire. In case studies such as the Mokelumne Watershed Avoided Cost Analysis in the Sierra Nevada, estimates for avoided costs from fuel treatments range from 126 to 224 million dollars based on 68 million dollars of treatments, 2 to 3

times the costs of the hazardous fuel treatments. Avoided costs included structures saved, suppression operations, infrastructure repair and reconstruction and impacts to municipal watersheds.

Capacity constraints due to the present approach to budgeting for wildfire continue to be the greatest impediment to further improving the health and resiliency of the nation's forests. Today, the agency spends over half of its budget in fire-management activities and has seen a corresponding decline in non-fire staffing of 39 percent since 1998. This has enormous implications for how the agency carries out its mission, including shifting resources from the very programs that help reduce the risk of catastrophic fire in the first place.

Protecting Homes and Helping Communities Adapt to Wildfire

During an average year, more than 73,000 wildfires burn about 7 million acres of Federal, Tribal, State, and private land and more than 2,600 structures. Growth, development and sprawl of homes and communities into America's wildland continues in or near wildlands. Wildfires also pose risk to utility infrastructure, municipal watersheds and recreation and wildlife values. The National Association of State Foresters has identified more than 70,000 communities at risk from wildfire. Approximately 11 percent of these communities are at reduced risk as a result of enacting mitigation and fire prevention ordinances, being recognized as a Firewise community, or reduction of high priority hazardous fuels identified in a Community Wildfire Protection Plan. Nationally, more than 20 percent of communities at risk have a Community Wildfire Protection Plan, while more than 80 percent of communities at risk in the west, where wildfire risk is highest, have such a Plan. The Forest Service works together with our Federal, State, local and NGO partners to help communities be prepared for wildfire.

State Fire Assistance Program

The State Fire Assistance program provides financial assistance through partnership agreements with State Foresters to support hazardous fuel mitigation projects, create defensible space near communities, plan and prepare for wildfire, , and obtain equipment to respond to and mitigate fire impact. This program maximizes cross-jurisdictional partnerships to help homeowners and communities in fire-prone areas take responsibility for fire protection. In 2016, program funding assisted nearly 14,000 communities, providing personnel, training, firefighting equipment, education programs and hazardous fuels treatments. State and local firefighting resources are important for community protection and often provide the quickest response to wildfires in the wildland urban interface.

Volunteer Fire Assistance Program

The Volunteer Fire Assistance program is focused on rural fire departments in communities of less than 10,000 people. This program supports local fire preparedness and suppression efforts and provides funding for equipment, training, and expansion of volunteer fire departments where little or no fire protection is available. There are over 26,000 rural and predominantly volunteer fire departments nationwide. In fiscal year 2016, Volunteer Fire Assistance funding assisted over 14,000 volunteer fire departments.

Fire Adapted Communities Coalition and Firewise

Working with other Federal agencies and professional and non-profit organizations, the Fire Adapted Communities Coalition is a partnership helping communities in the wildland urban interface adapt to living with wildfire and increase their resilience against wildfire damage. The National Fire Protection Association's Firewise program, a key component of Fire Adapted Communities, encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes to withstand the risk of wildfire. Home ignitability during wildland fires depends on the characteristics of the home and its immediate surroundings. The placement and configuration of factors such as construction material, decks, firewood, rain gutters, wooden shingles, outdoor furniture, landscaping and vegetation can significantly affect the defensibility of a home or related structure. Firewise helps communities and home owners in the wildland urban interface understand their vulnerability and maintain defensible space around their homes.

Community Mitigation Assistance Teams

The Forest Service has used Community Mitigation Assistance Teams to collaborate with local communities on mitigation efforts soon after incidents occur. These Teams integrate the community fire adaptation and resilient landscapes concepts outlined in the National Cohesive Wildfire Management Strategy, and focus on building local capacity for sustainable mitigation programs to reduce risk.

Use of New Technologies in Fire Management Activities

The Forest Service is committed to working with the wildland fire community and the Committee to identify areas where we might adapt to keep pace with the increasing complexity in the wildland fire system. The following includes areas where the agency has invested in development of technologies to use in fire management activities.

Unmanned Aircraft Systems

The interagency wildfire community has made a commitment to using Unmanned Aircraft Systems technology in wildfire suppression operations. An interagency Fire Unmanned Aircraft Systems working group has been chartered to help identify procedures, assess risk and develop policy to safely integrate unmanned aircraft systems in wildfire suppression.

Wildfire suppression has used smaller aircraft systems available to ground crews for tactical decision making and fire managers for strategic planning. Recent unmanned aircraft systems deployments include:

North Fire: In 2016, the Forest Service utilized small unmanned aircraft systems to gather aerial imagery helpful in managing the North Fire on the Cibola National Forest in New Mexico. Two platforms were used. A fixed-wing platform gathered data used for strategic planning. A small quadcopter was also used by ground crews to gather real time situational awareness information to help guide their actions. These activities were done in coordination with the Department of the Interior.

National Aerial Supervision Training Academy: In early 2017, unmanned aircraft systems technology was used as part of a training event to introduce aerial firefighters to this technology, demonstrate and test launch procedures, test unmanned aircraft systems and visibility, and evaluate draft protocols and procedures for integration of this technology into suppression operations.

Boundary Fire: The Forest Service recently used unmanned aircraft systems to document pre-fire and post-fire effects in key biological areas of the Boundary Fire on the Kaibab National Forest in Arizona. This information will be used to develop a rehabilitation and reforestation plan as part of the post fire restoration work. These activities were done in coordination with the Department of the Interior.

The agency will continue to look for opportunities to use unmanned aircraft systems in wildfire management to enhance fire fighter safety both on the ground and in the air.

Wildfire and Asset Monitoring Applications

A wildfire monitoring application prototype that provides real-time incident information to users is being tested. Similar to current weather forecasting and monitoring applications in use today, *Wildfires Near Me* monitors the landscape for wildfires and notifies the user if a wildfire is reported within the user's specified notification distance. Once the user begins "monitoring" a specific incident for information, the application alerts the user of any incident changes that occur via browser, emails and text-messages. This provides users of the application with an early warning system to raise awareness of fire activity, potential risks, and general information about management activities.

The agency recently deployed the *Automated Flight* following application which tracks, in real time, where all aviation assets are located across the nation. The application is web-based and enables managers to track aviation assets and provide real time situational awareness.

Mapping technologies

New technologies such as the Incident Management Team Collector can create, collect and share map information in near real time to support decision making. Firefighters and field personnel can relay incident data to the Incident Management Teams such as structural locations, hazards, and fire line location, etc. The decreased time in obtaining decision support information helps plan for operations and reduces redundant data collection efforts.

Early warning systems

To explore new opportunities in early warning systems, fire management staff have reviewed tweets about wildfires from Twitter with the goal of developing an early warning system for new and emerging wildfires. Utilizing the existing structure and concept of the *Threat News Explorer*, fire management staff are building a web app called *TwitterFire*. Every 15 minutes *TwitterFire* relies on a custom built search algorithm to examine an average of 5,250,000 tweets and narrow the data set down to only those likely to be talking about a wildfire in the United States. The tweets are then used to drive a notification system which sends emails and/or text messages to registered users when a threshold is met for a specific geographic location. The concept relies on the millions of Twitter users to spot wildfires and tweet about them; the results appear to be promising. The science of social media data mining is growing rapidly, and our ability to extract meaningful value from social media posts has improved greatly over the course of this project.

Automated telemetry units

The Forest Service is deploying automated telemetry units on all large airtankers that are utilized on fire operations to monitor the effectiveness of fire retardant. The information will help the agency better understand the conditions where retardant will best support firefighting objectives.

Research

Forest Service Research and Development is working to decrease the impacts of uncharacteristically high intensity wildland fires that damage natural resources, decrease ecosystem productivity, cause erosion and create high risk for flooding. Forest Service scientists are working on fuel assessments and treatments and other preparedness activities. They are also studying societal attitudes and developing decision-making processes for reducing risk and potential impacts to life and property.

We continue to work on developing risk-based methods for deciding the best strategies to mitigate the adverse impacts of fires in forest ecosystems and decrease the risk for communities. This research has directly supported the development of two major fire management decision support systems. The models estimate the probability of impact of an ongoing large fire. The agency is also conducting research related to fire spread and applications of fire behavior models for fire management decision support and actuarial risk assessment.

I would be happy to answer any questions the Committee may have.