United States Senate Committee on Agriculture, Nutrition, and Forestry; Subcommittee on Conservation, Climate, Forestry, and Natural Resources
Forestry in the Farm Bill: The Importance of America's Forests
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Mr. Chairman, Members of the Committee,

Thank you for the invitation to speak about the importance of America's forests. My name is Tony Cheng. I am the director of the Colorado Forest Restoration Institute (CFRI) and a professor in the Department of Forest and Rangeland Stewardship at Colorado State University in Fort Collins, Colorado.

CFRI is part of the Southwest Ecological Restoration Institutes established by Congress in 2004 through the Southwest Forest Health and Wildfire Prevention Act (PL 108-317), along with sister institutes in Arizona and New Mexico. The Institutes were created in response to large and severe forest wildfires that burned throughout the American West during the 2000 and 2002 fire seasons. Our mission is to work collaboratively with fellow researchers, land managers, their interested and affected stakeholders, and partners to co-develop, transfer, and apply locally-relevant science to increase the resilience of forests to wildfire and other stressors. We work across all land ownerships and management jurisdictions in Colorado and have reach across the Interior West through many collaborative partnerships.

To preface my testimony, America's forests are a well-spring of values, services and goods. Forests are essential to the livelihoods and cultural and spiritual traditions of Indigenous peoples who inhabited and stewarded the land for generations. Forests continue to contribute to the well-being of millions of Americans. The hard numbers tell only part of the story:

- Forests comprise 765 million acres or over 31% of the total land surface of the U.S. Of this figure, nonfederal lands (Tribal, state and local government, and private) comprise 69%, with federal lands comprising the remaining 31%.[1]
- Approximately 125.5 million people in the U.S., nearly 39% of the population, receive their surface drinking water from forest lands[2].
- U.S. forests, wood products and urban trees collectively offset annual CO_2 emissions by nearly 15%[3].
- Forests host a rich diversity of species that have co-evolved with forests over millenia that have intrinsic value in and of themselves[4].
- An estimated 3.7 million family forestland owners who collectively own more than 250 million acres of forest lands[5].

- Privately-owned forests support approximately 2.5 million jobs, $99 billion in annual payroll, and $200 billion in annual contribution to Gross Domestic Product. Privately-owned forests are central economic drivers in many rural communities across the country [6].
- Forests are vital to an outdoor recreation economy that accounts for approximately $454 billion annually in Gross Domestic Product and approximately 5 million jobs annually[7], many of which are in rural communities adjacent to federal public lands.

Despite the societal and ecological value of America's forests, public investments into forest conservation and stewardship pale in comparison to their value, especially in light of the threats to forests resiliency due to land use change pressures, the legacy of historic forest and fire management approaches, and increasingly prevalent droughts and warming temperatures that are leading to increases in wildfire, insect outbreaks and other forest mortality agents.

Promoting resilient forests has been a primary goal of the Farm Bill for the past 30 years. I will frame my testimony with an emphasis on the changes in forest resiliency resulting from wildfires in many forests of the Western U.S. Fire is essential to rejuvenating many forest types across the U.S.[8] As such, fire is not necessarily an indicator of an unhealthy forest and is also a critical management tool to sustain forest resilience. However, following a global trend, western U.S. forests are experiencing growing frequency, size and severity of wildfires, the many causes of which have been well-documented, such as: drier and hotter conditions that have extended fire seasons to nearly year-round; large increases in human sources of ignitions that can start a fire in more places and at more times of the year; and more available fuel to burn in the form of forest vegetation as well as built infrastructure[9].

Not only have fires become larger and more severe over the past 20 years, but many states are witnessing a growing proportion of their forests being converted to non-forest conditions following fire. This conversion is due in part to the size and severity of these fires that are eliminating living trees with viable seed sources, but also due to increasingly unfavorable climatic conditions that are inhibiting tree regeneration post-fire – and may not return to forest without investments in tree seeding or planting[10]. The conversion of forests to nonforest condition has cascading effects into everyday life for years to come for people and communities not just within close proximity to the fire, but also those downstream of these fires. This forest conversion is a clear indicator that western forests are facing a resilience debt into the future.

For example, in Colorado, the headwaters of three major river systems – the Colorado, Platte and Rio Grande – originate from national forest lands. Early indications suggest snow falling on recently burnt forests at risk of converting to nonforest are now melting earlier and more rapidly[11,12], impacting the reliability and sustainability of water being delivered to downstream communities and agricultural producers. In the semi-arid West, this situation magnifies ongoing stressors placed on these river systems. Further, summer rains that were previously absorbed by forested hillslopes have potential to generate large debris flows from burned areas, oftentimes many years after the fire and with catastrophic consequences to people and high repair or replace costs to infrastructure, like roads and bridges, that are borne by local

governments and communities for many years after the fire[13,14]. Municipal water providers such as Denver Water continue to spend funds to clear out water intake facilities from sediment produced by forest wildfires that burned over 20 years ago, but have not regrown.

Investments in and updates to forest management programs and activities to mitigate potential forest loss from fire have not kept pace with changes in fire regimes and the changing vulnerability of forest conditions. As one GAO report from 2015 noted, on-the-ground managers expenditure of limited funds tends to result in so-called "random acts of mitigation" that are not always strategically located or not completed due to funding shortfalls and are, therefore, not impactful on altering wildfire outcomes. Some research studies show that incomplete forest fuel reduction projects can make fires worse due to the untreated woody biomass left after the tree thinning component of projects are complete. Furthermore, forest density reduction and woody biomass removal projects are not always connected to wildfire response or with post-fire forest recovery. Fuel reduction, wildfire response and post-fire authorities, programs, and funding evolved independently over time and in response to environmental and socio-economic conditions from the 20th century – some dating back to the 1920's. The result is that programs that need to work together to foster resilient forests and corresponding communities oftentimes operate in silos. A case can be made that these programs and their corresponding investments need updating and brought into closer alignment.

Drawing upon the ongoing applied work CFRI and the other SWERIs are engaged in and upon research examining the effectiveness of forest and wildland fire policy from colleagues such as Dr. Courtney Schultz and the Public Lands Policy Group at Colorado State University[15], I offer four areas where programs could benefit from closer alignment and increased investment.

First, there is a need and opportunity for plan and execute forest mitigation actions that are explicitly connected to, and reinforce, fire response and post-fire recovery actions. Presently, these program areas are not always clearly connected at the planning or execution stages. Direction, investments, and incentives are lacking for managers – alongside their interested and affected stakeholders, and community-connected partners (i.e., local fire protection districts, municipal and agricultural water supply entities, non-profit watershed councils, etc.) – to collaboratively plan and enact these connected actions across jurisdictions and landownerships as an integrated system for forest wildfire resilience.

More recent authorities, programs and funding streams provide a ready foundation to promote this integrated system, an example being the Collaborative Forest Landscape Restoration Program (CFLRP) and the Joint Chiefs Landscape Restoration Program. While these programs primarily emphasize wildfire mitigation through forest density and woody biomass reduction actions, there is potential to more explicitly connect these actions to wildfire response and post-fire recovery priority areas and actions. These can be accomplished through the application and integration of geospatial analytical and planning tools, such as the Potential Operational Delineations and Quantitative Wildfire Risk Assessment developed by Forest Service R&D's Rocky Mountain Research Station and deployed by CFRI and other entities.

Broadening and increasing investment into these programs to incentivize strategic, coordinated planning and implementation linking mitigation, response and recovery actions would represent a more holistic, integrated systems approach to the forest wildfire problem in the western US. Furthermore, expanding the geographic coverage and modifying eligibility requirements of these programs could expand the reach of CFLRP, Joint Chiefs Landscape Restoration Partnership, and similar competitive funding programs supporting collaborative natural resource stewardship to under-served and rural areas, beyond landscapes with high densities of high property values occurring at the wildland-urban interface. Many of these under-served, rural areas rely on forests that are vulnerable to fire for domestic and agricultural water supplies, and employment, income, and subsistence opportunities associated with forest resources.

Second, in order to achieve the goals from the first recommendation, investments are necessary to develop and sustain collaborative capacity and resilience. Local collaborative initiatives involving a range of forest and fire managers from across jurisdictions, interested and affected stakeholders, and community-connected partners require their own organizing resources and capacity[14]. They are often poorly funded and lack necessary staffing, and yet carry the burden of recruiting and keeping a diversity of people and organizations at the table, and making progress[15]. Establishing and sustaining stand-alone funding for collaborative capacity and community-based stewardship engagement would help overcome these challenges. Especially important would be to structure funding programs that acknowledge the different "stages of readiness" across collaborative groups. Current funding programs tend to be biased towards groups already at an advanced stage of readiness and have been successful at procuring and administering funds, coming up with the funds necessary to meet match requirements, and handling complex federal grant accounting and reporting requirements. Scaling funding programs and associated requirements to different stages of readiness could help build a pipeline of local community-based collaboratives gradually increasing in capability to produce meaningful outcomes on the ground and in their communities.

Third, one of the more effective linkages between forest density and woody biomass reduction, fire response, and reducing post-fire impacts is through the application of prescribed fire. A substantial body of research assessing the effectiveness of forest density and fuel reduction on mitigating fire behavior and outcomes has evolved in the past 20 years. While many details and nuances conspire to defy sweeping generalizations about forest fuel treatment effectiveness, findings from on-the-ground empirical studies demonstrates that when forest density reduction is followed closely by prescribed fire to remove woody biomass, fire intensity and growth are significantly reduced. While prescribed fire is admittedly controversial, it remains an essential method to alter wildfire outcomes. There is a need for increased investment to develop and sustain a full-time prescribed fire workforce adequately staffed and well-distributed across the country, and trained in strategic planning, social dimensions and community engagement, and safe and effective tactical operations of prescribed fire. In addition to hiring more people into this workforce, there is a need to expand existing training and education infrastructure, technology, and human resources in all aspects of prescribed fire so the workforce is professionalized and retain people from initial hiring to retirement. The training and education

resources should not be just for federal agencies and Tribal entities, but should also be available to state, local and non-governmental, community-based entities that function as critical partners in promoting forest wildfire resilience.

The fourth, but certainly not least, area for consideration is the substantial shortfall in investments to address post-fire recovery and restoration. This includes both recovery and restoration of infrastructure critical to the functioning of communities impacted by fire, and the recovery and restoration of watershed and forest resources. There are many facets of federal programs and funding for post-fire recovery that many communities are unfortunately learning about and struggling with that are worthy of further study and problem-solving to better align programs and funding with the growing post-fire recovery needs faced by communities. In particular, in keeping with the theme of keeping forests as forest, the pipeline needed to replant trees in areas that experienced large, severe fire is in need of investment. This includes the human, technological, and physical infrastructure needed to collect seeds, cultivate seedlings in nurseries, and transport, plant, tend to, and monitor seedlings across large areas across the western U.S. There is also a need to conduct both basic and applied research about potential long-term consequences and likelihood of success of planting tree species adapted to drier, hotter climatic conditions in locations where they are not currently present. If there is societal demand for forests to remain forest in the face of a changing climate, answering these unknowns requires investment.

In sum, there is a need and opportunity to update and align disparate programs for forest wildfire mitigation, wildfire response and post-fire recovery – and increase overall investments into these connected, reinforcing actions – to reduce the potential for forest loss from the compounding effects of wildfire and a drying and warming climate. Thank you again for providing me the opportunity to speak at this hearing.

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