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“A Legislative Hearing to Examine S.2736, the Recognizing the Protection of Motorsports Act of 2021; S. 1475, the Livestock Regulatory Protection Act of 2021; S. 2661, Smoke-Ready Communities Act of 2021; and S. 2421, the Smoke Planning and Research Act of 2021.”

Chair Carper, Ranking Member Capito, and Members of the Committee:

Thank you for the opportunity to speak before you today about how we can increase the resilience of vulnerable populations to wildfire smoke in the face of a changing climate and increasing incidence of wildfire in the American West.

I am a research professor and senior policy advisor with the Ecosystem Workforce Program (EWP) at the University of Oregon. The EWP is a joint program of the University of Oregon and Oregon State University. This unique partnership allows Oregon’s two leading research universities to contribute to natural resource governance and rural community development to promote community and landscape resilience. I also am the vice provost for academic operations and strategy at UO. Today, I am speaking in my role as a faculty member rather than as an officer of the university, and UO has no position on the bills discussed in this hearing.

Summary

- The Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) make historic and vital investments in greenhouse gas and hazardous fuels reduction, both of which should help ameliorate wildfire smoke over time. However, given the climate change already underway, the incidence of wildfires will continue to increase in the West for some time.
- Wildfire smoke will continue to be a growing problem in the West, and increasingly nationally, affecting both rural communities and major population centers.
- Building community resilience to wildfire smoke is critical to support public health and economic well-being.
- People with limited economic means, those living or working outdoors, children, the elderly, and people with certain medical conditions are often hit hardest by smoke. Special attention is needed to ensure that these vulnerable populations can limit their exposure to wildfire smoke.
- Recent congressional investments through the IRA Environmental and Climate Justice Block Grants (Sec. 60201) will allow the Environmental Protection Agency (EPA) to support smoke-ready communities, among many other urgent needs. In addition, targeted programs such as those envisioned in S. 2661 and S. 2421 are needed to support community planning and preparation, enable facility upgrades to create indoor clean air

refugia in homes and public buildings, and improve smoke monitoring, forecasting, and information sharing.

- A wide range of interdisciplinary, applied, and action-oriented research and development is needed to support resilience to wildfire smoke, especially for vulnerable populations. Sustained intramural competitive and extramural research and centers of excellence, such as those envisioned in S.2421, would help build interdisciplinary researcher capacity to develop new models, technologies, decision-support tools, and techniques that address wildfire smoke in a socially equitable manner.

Growing Risk of Wildfire and Wildfire Smoke

Much of the American West is comprised of fire adapted landscapes where wildfire is a key ecological process historically driven both by natural ignitions and burning practices of indigenous peoples. Highly effective fire suppression beginning in the 20th century has changed many western ecosystems, creating denser forest stands that are more susceptible to high severity fire. On top of this, hotter and drier weather driven by climate change is increasing the size and severity of wildfires. Nationally, the U.S Forest Service increasingly sees wildfire not as a seasonal, but year around issue.¹ Some call this the era of megafires.² Moreover, as population in the West has grown, humans are increasingly in the path of wildfire and wildfire smoke. Unfortunately, scientific evidence suggests that in many areas of the West, wildfires are expected to continue to increase.³

With the growing size and severity of wildfires, we are also seeing growing negative public health and economic impacts from wildfire smoke. Wildfire smoke not simply a localized issue near active fires. It is increasingly affecting urban population centers that may be hundreds or even thousands of miles away from any given fire.

Wildfire smoke includes fine particulate matter (often called PM_{2.5}) that can create both acute and cumulative health impacts. The exact makeup of wildfire smoke varies, and smoke can become even more dangerous when it includes chemicals from building materials and building contents. Children, the elderly, pregnant women, and people with cardiovascular disease or other health conditions are particularly vulnerable.⁴

In addition, many populations are particularly vulnerable to smoke exposure due to their social or economic circumstances. For example, one key recommendation to reduce smoke exposure is to go indoors into spaces that have lower fine particulate matter than outdoors. However, people have unequal access to this sort of space and some populations are particularly challenged to escape the smoke. Many peoples' livelihoods depend on them working outdoors, including farmers, forest workers, those working in construction and landscaping, recreation and tourism, and wildland fire response. In addition, people who are unhoused may have little to no access to clean air during smoke events. Even for those who can go indoors, many houses, commercial establishments, and public buildings (especially in lower income communities) do not provide indoor air quality that is significantly better than outside, due to lack of filtration systems or poor insulation. Limited access to information and language barriers can further exacerbate risk.⁵

Wildfire smoke can also have negative economic impacts in areas with significant outdoor tourism economies, as is common in the American West. Tourists cancel vacations during smoke events or decide to visit less smokey regions all together. Major sporting events,

such as intercollegiate football⁶, and outdoor concerts and plays that bring revenue to communities, can be canceled. For example, the Ashland (Oregon) Shakespeare Festival,⁷ with its outdoor Elizabethan theater, has faced multiple cancellations due to smoke in recent years. Wildfire smoke can also affect the flavor of grapes and resulting wines.⁸ Finally, institutions such as universities or high-tech commercial facilities can face substantial costs driven by smoke intrusions into HVAC systems and the need to protect sensitive research equipment.

Increasing Resilience to Wildfire and Wildfire Smoke

One key component to wildfire smoke resilience is *addressing the underlying drivers of increasing wildfire smoke* by reducing greenhouse gas emissions and through hazardous fuels reduction in places where treatments are likely to change fire behavior. Greatly expanded mechanical thinning and prescribed fire that are strategically placed are needed to make an appreciable impact on fire behavior. While the effects of these actions will take decades to substantially change the trajectory of wildfire on a continental scale, project implementation today can improve wildfire local conditions in the short term and are vital to making progress long term.

A second key to smoke resilience is *high quality information* about health impacts and practical steps that people can take to reduce health risk. This information needs to be provided before and during smoke events and be delivered by trusted sources in languages and modalities applicable to a diversity of populations, especially to those who are most vulnerable.⁹

A third key component is *community planning and preparation*. We know from two decades of community wildfire protection and fire-adapted community preparation that multi-stakeholder collaboration is critical to support household and community readiness for natural hazards. While, in many communities, forest and wildfire collaboratives can (and in some cases are) expanding to include smoke, successful smoke preparation and planning requires bringing together new networks. For example, local agencies that address public health and air quality as well as social service delivery organizations that support vulnerable populations are central, along with those who understand wildfire risk. Moreover, wildfire smoke can affect communities that may otherwise have more limited wildfire risk and therefore may not have any history of engaging in this type of work. Given the likelihood that low-capacity communities also have high numbers of vulnerable residents, financial support for planning and implementation processes will be important to the success in these places.

A fourth key component is *investments in home and public building upgrades and portable filtration* to increase the ability of households and communities to seek refuge from smoke and for individuals to don personal protective equipment when needed. Investments in home insulation and air purification can help reduce PM_{2.5} indoors. It is also important to understand the indoor air quality of public buildings and take steps to have at least some of these buildings available to act as clean air shelters for vulnerable populations. Investing in school building retrofits to limit educational disruption due to poor air quality is especially important in areas where the wildfire season overlaps with the school year.

A fifth key component is *improved air quality monitoring¹⁰ and smoke forecasting*, clear communication of current conditions and forecasts to allow emergency managers and the public to better anticipate smoke events and take appropriate action, as well as avoid costly actions when smoke events are unlikely. A high-density monitoring network is particularly important in

the mountainous West, where numerous microclimates and complex airflow can make smoke conditions variable even across relatively small geographies. Continuing to improve forecasting could also increase the safety and the amount of prescribed fire that can be accomplished, which is a critical to reducing wildfire and smoke risk over time.¹¹

A sixth key component is *research and development*, which is needed to develop new techniques, models, and strategies to increase resilience to wildfire smoke and climate change more broadly. Given the multifaceted nature of increasing smoke resilience, much of this work will need to be interdisciplinary and progress will require sustained investment in collaborative, applied research. In addition to new forecast models referenced above, we need, for example, better techniques for engaging and empowering vulnerable populations, decision-support tools for emergency managers, new personal protective equipment for wildland firefighters and other outdoor workers, better approaches to addressing competing indoor air quality needs, improved understanding of the chemistry and toxicology of smoke, clearer understanding of the public health impacts of climate change, and much more.

Promising Investments, Programs, and Projects

Promising programs and projects are emerging to support the development of smoke-ready communities. These range from critical congressional investments to federal agencies' actions and community initiatives to prepare for future smoke events. Below are a few examples among many of these efforts.

Climate change and wildfire mitigation

- Significant investment in hazardous fuels reduction and greenhouse gas emissions reductions funded in the IIA and IRA should contribute to reducing the rate of increase in wildfire fire severity over time and thereby limiting increases in smoke health impacts. These investments will need to be sustained and potentially even increased over time.

Planning, preparation, and support

- As part of the IRA, the Environmental and Climate Justice Block Grants allow for investment in a broad set of climate resilience activities, and these funds could be used in communities planning to mitigate smoke risks from wildfires.
- The EPA, in partnership with the U.S. Forest Service and other state and federal agencies, has created a wildfire smoke toolbox to provide resources to support community wildfire smoke response.¹²
- Similarly, the Fire Adapted Communities Network (FACNET) has integrated information about smoke readiness into their resources and support of fire adapted communities planning and preparation.¹³
- Communities such as Ashland¹⁴ and Bend¹⁵ in Oregon have increased public communications to help residents take action to protect themselves when air quality may be reduced due to unplanned and prescribed fire.
- With support from the EPA, community leaders in Garfield County, Colorado, and Silver Bow County, Montana, are creating collaborative smoke response and communication plans by creating new networks of local partners.¹⁶

Infrastructure improvements

- The Environmental and Climate Justice Block Grants of the IRA also funds a broad set of monitoring and pollution remediation activities that could include infrastructure investments to increase wildfire smoke readiness.
- Partners in Oakridge, Oregon are using EPA funding historically focused on reducing wood smoke to, among other activities, improve indoor air quality in schools and the local library in part to provide clean air space during wildfire smoke events in a community where many homes lack HVAC systems that can provide air filtration.

Research and development

- In 2021, the EPA funded approximately \$9 million in extramural research “that will address behavioral, technical and practical aspects of interventions and communication strategies to reduce exposures and health risks of wildland fire smoke.”¹⁷
- The EPA Pacific Ecological Systems Division is working with agency, community, and university partners to improve wildfire smoke detection capabilities.
- The EPA Center Public Health and Environmental Assessment is conducting action research projects focused on identifying effective collaborative smoke-ready planning strategies in partnership with rural communities.¹⁸
- The University of Oregon is launching a Center for Wildfire Smoke Research and Practice with initial funding from the EPA via congressionally directed spending. The goal of this center is to work with practitioners and researchers to help increase community resilience to wildfire smoke through practice-oriented research, outreach, and engagement. This center may serve as proof-of-concept for the centers of excellence contemplated in S. 2421.
- The Department of Homeland Security Science and Technology Directorate, along with a number of other state and federal partners, have invested in the development of a wildland fire respirator. The respirator could significantly reduce the smoke impacts for wildland firefighters who cannot use the Self-Contained Breathing Apparatus that structural firefighters use.¹⁹
- The Confederated Tribes of the Colville Reservation, the Okanogan River Airshed Partnership, and the University of Washington recently collaborated on research to identify effective communication strategies of smoke information to rural and tribal communities.²⁰
- A collaboration of university researchers and federal scientists from NOAA and NASA have been evaluating high-resolution smoke forecasting models using data from recent large wildfires.²¹

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- ⁵ United Way of Columbia-Willamette, *Preparing Oregon's Communities of Color for Disasters: Where We Are and Where We Need to Go* (August 2022). <https://www.unitedway-pdx.org/sites/default/files/2022-08/UWCW%20Preparing%20OR%27s%20Communities%20of%20Color%20FINAL%20082622.pdf>
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- ⁹ United Way of Columbia-Willamette, *Preparing Oregon's Communities of Color for Disasters*.
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- ¹¹ Hill et al. *Can Prescribed Fire Mitigate Health Harm?*
- ¹² EPA, *Smoke Ready Toolbox for Wildfires*. <https://www.epa.gov/smoke-ready-toolbox-wildfires>
- ¹³ Emily Troisi, *Being Fire Ready Means Being Smoke Ready* (June 3, 2021). <https://fireadaptednetwork.org/fire-adapted-means-being-smoke-ready/>.
- ¹⁴ City of Ashland, *City of Ashland Community Response Plan for Smoke*. [https://www.ashland.or.us/SIB/files/Smokewise%20Documents/Ashland_CRP_January_2021_Signed\(1\).pdf](https://www.ashland.or.us/SIB/files/Smokewise%20Documents/Ashland_CRP_January_2021_Signed(1).pdf)
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