

Are mega-wildfires our new normal?



WILDFIRE 101:
WHAT IS HAPPENING
AND WHY



LEADING THROUGH
PARTNERSHIP IN
WASHINGTON




ONLY YOU
CAN PREVENT
WILDFIRES



A photograph of a forest floor covered in lush green moss and fallen logs. The scene is dimly lit, with sunlight filtering through the trees in the background. The text is overlaid on the image in white, bold, sans-serif font.

**Are mega-wildfires
our new normal?**

***Not if we all do
our part.***

A photograph of a forest floor. In the foreground, there are several large logs covered in vibrant green moss. The ground is covered with a thick layer of dry pine needles and twigs. In the background, numerous tree trunks of varying heights and thicknesses rise up, creating a dense canopy. The lighting is soft and filtered, typical of a forest interior.

“Historically, Indigenous communities would burn many acres per year; we had more frequent fire, with lower severity, done for ecosystem benefits.

“The result was less fuel accumulation, lower smoke emissions per acre, and resource benefits, in contrast to the resource damage we see with wildfires today.

“The Western United States is a fire-adapted ecosystem— it developed with fire.”

— Cody Desautel, Executive Director and Member of the Commission on Wildland Fire Mitigation and Management; The Confederated Tribes of the Colville Reservation



TABLE OF CONTENTS

KEY TERMS	5
LETTER FROM CHALLENGE SEATTLE CEO	6
ACKNOWLEDGMENTS	7
EXECUTIVE SUMMARY	8
PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY	10
PART II: LEADING THE WAY THROUGH PARTNERSHIP	15
PART III: ONLY YOU CAN PREVENT WILDFIRES	19
CONCLUSION	22
SOURCE INFORMATION	23



KEY TERMS

Wildfire

Unplanned and uncontrolled fire caused by a natural ignition, unintentional human ignition, or arson on a natural landscape.

*For the purposes of this report, we use the term **mega-wildfire** to refer to a large wildfire that has significant and devastating impacts on the environment and/or communities, e.g., record-setting unhealthy air quality.*

Controlled burn

1. An intentionally set fire managed by a team of experts under specified weather conditions; or
2. Unplanned fire allowed to burn to some extent under close supervision and management by experts.

Both types are done for ecological and forest health benefits.

Suppression

Actions taken to extinguish a wildfire, or prevent or modify the movement of an unwanted fire.



“There is something each of us can do to prevent mega-wildfires in our state”



In the last few years, we have experienced devastating wildfires on both sides of the Cascades, had the worst air quality in the world, and begun to associate the start of summer with the fear of wildfire season. While wildfires are not new to our state, we have seen the emergence of mega-wildfires that have uncontrollable dimension, intensity, size, and duration.

Mega-wildfires are harming our health, decimating our small businesses and communities, and putting our first responders at risk.

Challenge Seattle is an alliance of 22 organizations, who represent some of the Seattle region's largest employers; together we are committed to tackling some of the region's most pressing civic challenges. In late 2022, after another long wildfire season, we asked ourselves: Are out of control wildfires inevitable, and if not, what can Washingtonians do?

As I reflect on this work, three major takeaways are on my mind:

1. Mega-wildfires do not have to be inevitable. There is something each of us can do to prevent them in our state. In fact, right now, we the public are a big part of the problem—81% of wildfire ignitions from 2016-2020 were human-caused—and that means we represent a powerful part of the solution.
2. Our knowledge of best practices for wildfire management and creating healthy forests has evolved. We owe this to research across disciplines and to our Indigenous community members' willingness to share the practices they have long known to be effective. In order to protect ourselves and prevent mega-wildfires, we will need to be open-minded, willing to re-think our actions and policies in the context of what we now know, and revisit the question: are we contributing to the problem or helping to solve it?
3. A central tenant of our work at Challenge Seattle is that big problems are solved through partnership; no one sector or organization can alone take on the biggest challenges of the day. For this project, we partnered with Boston Consulting Group (BCG), and we brought together a team of subject matter experts and leaders in our state. In working with them, I believe the experts in our state are leading the way—in Washington and beyond—embracing partnership and leveraging innovation to change our trajectory. From the Governor and the Legislature making historic investments in wildfire prevention, response, and recovery, to cross-sectoral collaboration to make our forests healthier, we should continue to support their leadership and the work.

Every Washingtonian, myself included, has a responsibility to do something to prevent wildfires, mitigate their impacts, and protect ourselves from the worst effects.

It's time to get going, and I hope you'll join us,

Chris Gregoire
CEO, Challenge Seattle
Former Washington State Governor



ACKNOWLEDGMENTS

We thank the team at Boston Consulting Group (BCG) who, as always, brought a high-level of rigor and tireless dedication to this project. We also want to thank the wildfire advisory group, who provided input and guidance throughout this process. Listed below, this group is comprised of exemplary leaders in our state, and we owe a great deal of gratitude for their time on this report and for all they are doing in service of protecting our state and our environment. Finally, we express our thanks to the many other experts consulted by BCG, who lent their time and expertise to this project.

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EXECUTIVE SUMMARY

We, the public, are a big part of the problem—and a powerful part of the solution

Wildfires have been a part of life in Washington State for generations, but in recent years, the nature of wildfires has changed. The fires are bigger, burning hotter, and more devastating:

- **4 of the 5 largest recorded fires in Washington happened in the last eight years.**
- **5 of the last 6 years have had significant smoke exposure across the state**, with multiple parts of the state having the worst air quality in the world for several days in 2022.
- **With the impacts of climate change—hotter temperatures, drier summers—more wildfires are occurring in the historically wetter Western Washington**, putting the state's largest population centers at increasing risk.

From summer activities canceled due to unhealthy air quality to seemingly endless stories of homes and livelihoods destroyed, the impacts of wildfires are all around us, and wildfire season is becoming synonymous with summer in Washington.

Thanks to work happening across sectors, we have made significant advancements in how we stop wildfires and we have more resources to bear. We have cutting-edge technology, which is helping us detect fires faster. We have best practices to manage forests, and innovative partnerships to make them healthier, slowing the spread of and impacts of wildfires. These are all reasons to be hopeful, and they show us that a path other than the inevitability of mega-wildfires is in view.

But, the experts cannot do this alone. While there are a multitude of reasons for the advent of mega-wildfires, a hard truth rises to the surface through this project: **We, the public, are a leading cause of the problem.**

We started over 2/3 of the wildfires from 2016-2020; policies enacted in the last century led our forests to become unhealthy, full of kindling to fuel fires; and, an increase in wildfires is only one manifestation of the climate crisis we now face.



Five Impactful Actions Every Washingtonian Can Take Today

- ✓ *Responsibly start, manage, and extinguish any planned fire, including campfires and landscape debris burns*
- ✓ *Safely use and maintain landscaping equipment and vehicles to avoid starting a fire*
- ✓ *Check for and comply with burn bans before doing anything that could spark a fire*
- ✓ *Strengthen your home's resiliency to fire by removing flammable items within five feet of your home, clearing gutters of dry leaves and pine needles, putting screens on exterior vents, and identifying a water source and hose that can reach any area of your property*
- ✓ *Create smoke readiness and evacuation plans*

That also means we represent a powerful and essential part of the solution. In many cases, the actions themselves are small, but the impact is big, especially when we all commit.

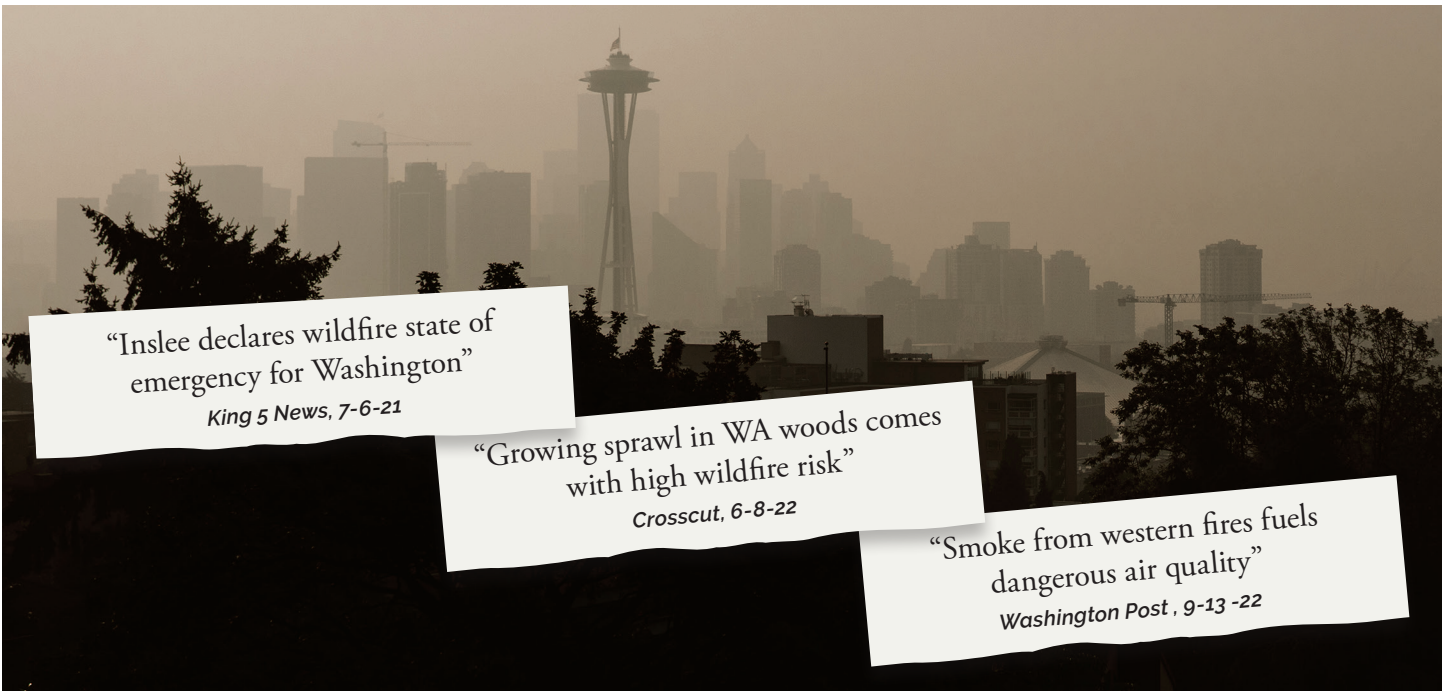
The biggest challenges we face cannot be solved by any one person or organization. The era of mega-wildfires is one of those challenges. The government, businesses, Indigenous communities, and non-profits are already at the table, doing the work to build a healthy environment and resilient, protected communities. It's time to take our seat and get to work.



EXECUTIVE SUMMARY



Okanogan Complex Fire: Trees, brush, and property burn throughout the night during the largest, most destructive wildfire in Washington State history



“Inslee declares wildfire state of emergency for Washington”
King 5 News, 7-6-21

“Growing sprawl in WA woods comes with high wildfire risk”
Crosscut, 6-8-22

“Smoke from western fires fuels dangerous air quality”
Washington Post, 9-13-22

From unhealthy air to homes and livelihoods destroyed, the impact of wildfires is all around us



PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY

How do mega-wildfires start and become so devastating?

To answer the question “are mega-wildfires in Washington inevitable?” we need to understand what is happening and why. But first, there is a key misconception to address: Fire is not inherently bad—in fact, it is an essential, natural, and restorative part of our ecosystem.



For centuries, healthy Eastern PNW ecosystems had a fire burn in the same place about every ~15 years.

Within Washington forests, there are:

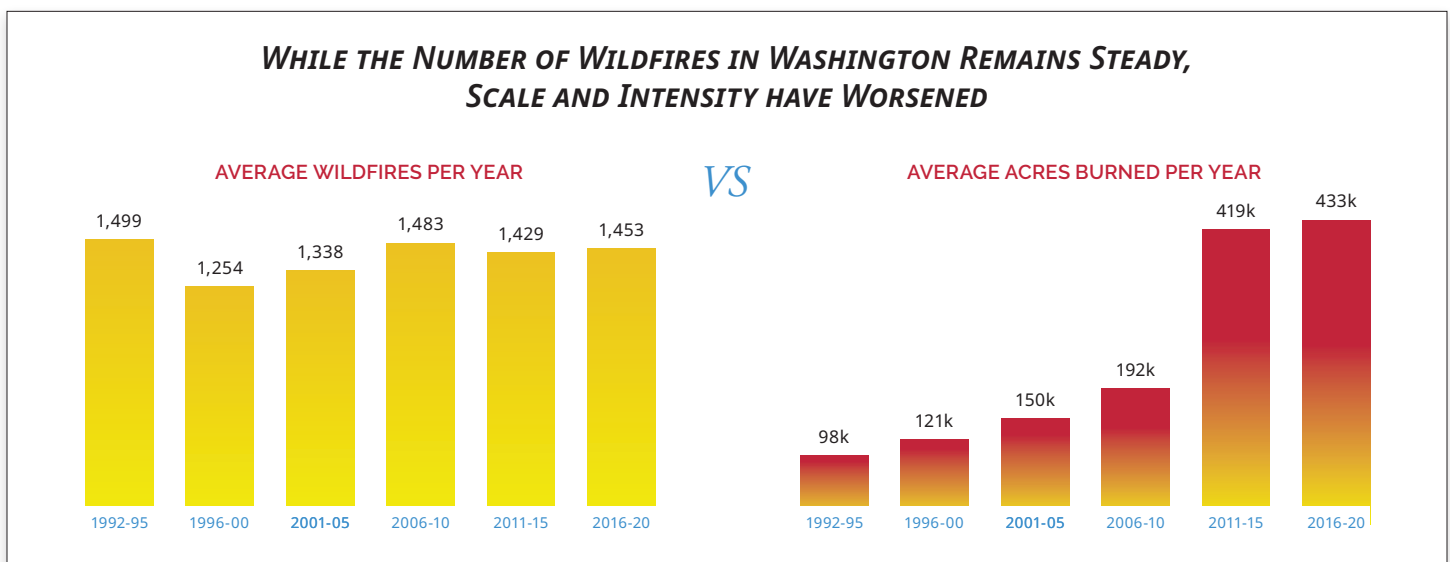
- *Wildfire species that depend on fire*, like the black-backed and Lewis's woodpeckers that flourish in burned trees
- *Native plant species that need or are resilient to fire*, including mature ponderosa pine, fireweed, and bear grass
- *Habitats that require fire*, including wetland meadows that moose rely on, which must be clear of trees to stay wet

These ecosystems rely on a regular cadence of fire to thrive; but that is not the same as mega-wildfires which cause devastation and long-term damage. **Because our landscape requires fire, our goal cannot and should not be to eliminate it. In fact, as we will see later, decisions to stop all fires have contributed to the mega-wildfires challenge we now face.**

Through this report, we focus on stopping **mega-wildfires**, while paving way for a return to the natural order of fires that benefit our ecosystem, reduce the amount of flammable material on the forest floor, and do not have long-term negative effects on soil and vegetation. It will not always be an easy or perfect balance to strike, but what is clear is “no fire” is not the right option.

To define the problem we face, let's start with the numbers. Comparing the graphs below, one can see that the number of wildfires in Washington has remained consistent over the last 30 years, but there has been a dramatic increase in the number of acres burned each year. In tandem, as shown in the graphs at the top of the next page, we have seen an increase in smoke across the state—more communities impacted and more smoke days in total.

The change is not in the number of fires, but in their impact—why?





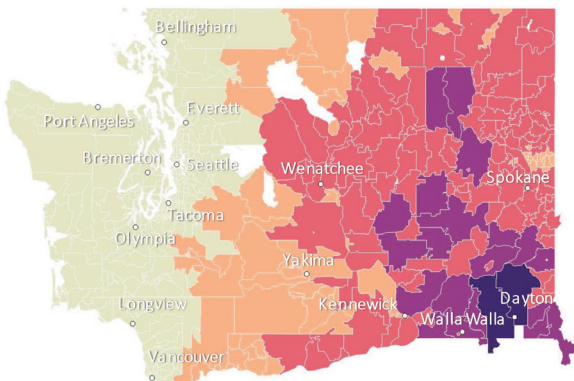
PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY

SMOKE EXPOSURE HAS BEEN WORSENING AND EXPANDING ACROSS THE STATE

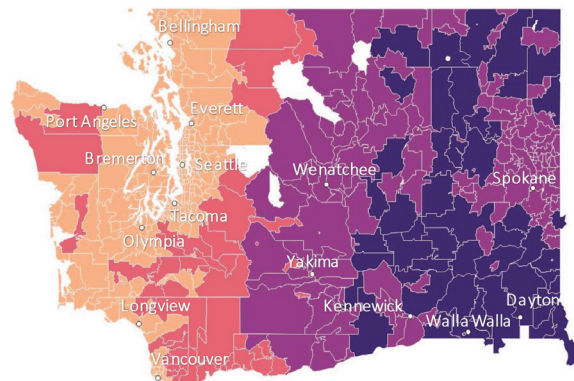
2009-2014

VS

2015-2020



AVERAGE NUMBER OF SMOKE DAYS



AVERAGE NUMBER OF SMOKE DAYS

How a fire actually works

To understand why we are experiencing more mega-wildfires, we will look at how a fire actually works: an initial ignition, the fuel that feeds it, and how it spreads.

At each stage, we will layer on important context, including the impacts of human behavior, historical forest management practices, and climate change.

Each exacerbates the challenge we face and in sum creates the mega-wildfire conditions we experience today.

AN IGNITION: HOW A FIRE STARTS



The combination of an ignition (a spark) and fuel creates an initial fire.

Historically, ignitions were naturally occurring—as from a lightning strike—or set purposefully by Indigenous communities who used sophisticated and effective burning practices for specific benefits, like supporting native ecosystems.

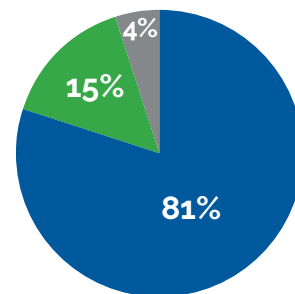
Today, more than 2/3 of wildfire ignitions are caused by humans. Many are accidental and not caused by individuals with expertise in fire management.

The problem we face: Though not every ignition starts a big fire, every ignition could become one.

WILDFIRES CAN BE IGNITED IN MANY WAYS, BUT IN WASHINGTON MOST FIRES ARE STARTED BY HUMAN ACTIONS

CAUSES OF THE 1,453
FIRES FROM 2016-2020:

- Human = 81%
- Natural = 15%
- Undetermined = 4%



Types of human-caused ignition

- Debris & open burning
- Recreation & ceremony, fireworks
- Arson/incendiarism
- Equipment & vehicle use
- Power generation, transmission & distribution
- Smoking
- Misuse of fire by a minor



PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY

FUEL & SPREAD: HOW A FIRE GROWS

Abundant fuel and the right conditions for spread cause a wildfire to grow bigger.

What is fuel?



Fuel is anything that can burn, including grasses, trees, shrubs, dead leaves, and fallen pine needles.

How does fire grow and spread?



For spread to occur, the fuel must be dry enough to ignite. If the fuel is not already dry, heat from burning trees dries neighboring trees via evaporation. Once dry, heat from the fire raises the temperature of neighboring trees to the point of ignition. Where and how fire spreads is also determined by weather (e.g., high winds combined with lots of fuel can increase the speed a wildfire travels), and the topography (e.g., fires burn faster uphill).

Why have the conditions for fire growth and spread become so much worse?



For hundreds of years, the combination of naturally occurring, more frequent, smaller fires and Indigenous land stewardship created healthy forests. However, as a result of policy change in the 1900s, our forests experienced a dramatic reduction in fires. For example, in response to the “Big Burn of 1910,” which remains one of the largest fires in American history, the U.S. enacted the “10 am Policy,” meaning all fires were to be controlled by 10:00 am the morning after they started. After 100+ years of fire suppression policy, our forests are denser with large build ups of fuel on the forest floor.



In addition to an increase fuel load on forest floors, extreme weather due to climate change—including droughts, high temps, and high winds—have dried out the abundant fuel and provide the “perfect” conditions for a fire to spread.

The problem we face: With denser forests, drier fuel, and more enabling conditions for spread, wildfires are burning hotter, further, and faster.



Forests cover nearly half of our state, and they represent a powerful resource in combating climate change by capturing and storing carbon.

Wildfires damage and destroy this resource, and in the process release more emissions into the air—offsetting our efforts to reduce greenhouse gases (GHGs)

- *Some years, Washington’s wildfire carbon emissions account for up to ~20% of our state’s total carbon emissions*
- *By 2050, climate change is projected to increase extreme fires globally by 30%*

“Fire was turned off as though turning off water from a spigot right around the year 1900.”

Dr. James Johnston, Oregon State University



PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY

WASHINGTONIANS ARE PAYING A HEAVY PRICE

The combination of historical policies, human behavior, and climate change has led to wildfires becoming bigger and burning hotter than our ecosystems can withstand. As a result, our forests and natural areas are at risk—elements of our state that are core to our identity—and the toll on Washingtonians is increasing. Wildfires compromise our health, damage our homes and livelihoods, and lead to a multitude of other costs and impacts,

Here are two examples—one looking ahead to future devastating impacts, and one that underscores the human and financial costs we have already assumed:

- **There are 1.1 million homes at high-risk in wildland-urban interface (WUI) zones.** In recent years, the area where forest and other unoccupied natural lands meet human infrastructure— also known as the wildland-urban interface or WUI zone—has become increasingly developed. These still-growing WUI zones are at increased risk for wildfire impact given their proximity to forested and other vulnerable lands.
- **Between 2014-2018, there were \$4.5 million in asthma-related medical issues related to wildfire smoke.** The smoke from wildfires leads to poor air quality, which can result in adverse health impacts, particularly for children and people with chronic illnesses. While there is much to learn about the long-term impacts of wildfire smoke on human health, we are seeing worrying immediate impacts. A recent study found that when the air quality is categorized as “unhealthy” as a result of wildfire smoke, emergency room visits increased by 12% and asthma-related claims by 24% in the state.



At a Glance: One Fire's Impact

In 2020, Washington had one of the worst fires in recent history: the Cold Springs/Pearl Hill fire. In September of that year, two large fires burned a total of 413,000 acres in ten days across Okanogan & Douglas counties.



413k
acres burned



2.6M
acres of wheat
crops destroyed



\$6.7M
in fire suppression
costs



190k
acres of apple
crops destroyed



11 days
of “unhealthy” smoke



2 days
of “very unhealthy”
smoke

MORE RISK FROM WILDFIRES MEANS WASHINGTONIANS ARE PAYING THE PRICE BOTH DIRECTLY (VIA COSTS OF DAMAGE AND REHABILITATION) AND INDIRECTLY (VIA LOSSES)

DIRECT COSTS (INCLUDING REHABILITATION)



Suppression (e.g., aviation, engines, firefighting crews, agency personnel)



Property losses (insured and uninsured)



Aid to evacuated residents, sheltering, donations



Closures and damage to recreation facilities and public lands



Soil erosion, loss of timber resources



Infrastructure damage/rehabilitation, including utility lines, water reservoirs, transportation

INDIRECT COSTS (INCLUDING LOSSES)



Physical and mental health



Supply chain disruption



Lost recreation value



Tax revenues lost



Economic/Business revenues lost (including in agriculture)



Decrease in home values, increased insurance premiums (or loss of insurance)



Extensive loss of ecosystem services (aesthetic, wildlife, etc. value)



PART I: WILDFIRE 101—WHAT IS HAPPENING AND WHY

A CRISIS FELT BY ALL AND DISPROPORTIONATELY BY MANY

All Washingtonians are impacted by wildfires and are assuming the costs of these devastating events—and we know there are members of our community that are disproportionately affected. Examples include:

- Rural communities
- The agricultural industry
- Indigenous communities
- Those without access to smoke-free, clean air spaces (e.g., unhoused individuals)
- Those who work outside (e.g., construction workers, masons, roofers)
- Communities that have barriers to evacuation (e.g., households with limited English proficiency and the elderly).

AN “ALL HANDS, ALL LANDS” APPROACH

This is a crisis with impacts felt by all and disproportionately by many in our state. The good news is many are already leading the charge, with cutting-edge approaches and best practices, and an “all hands, all lands” collaborative approach to the problem we face.

So, no, we do not need to accept the inevitability of out-of-control wildfire seasons.

And, yes, there is a lot we can and must do to prevent wildfires in our state and protect ourselves from the worst impacts in the near term.

In the next section, we highlight the work on-going across sectors, and the places where experts in our state are focused next; but they cannot do this alone. The final section highlights the vital ways we all must commit to being part of the solution, not the problem.

“How Do You Say ‘Evacuate’ In Tagalog? In A Disaster, English Isn’t Always Enough”

KUOW, 4-20-18

“Washington state winery cancels its 2020 vintage as industry worries about wildfire smoke”

Seattle Times, 6-20-21

“Heat and smoke protections for WA farmworkers may fall short”

Crosscut, 8-13-22

“Wildfires In The West Are Putting Parched Tribal Lands In Growing Danger”

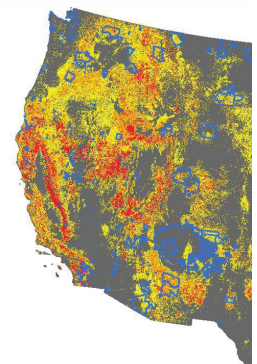
NPR, 7-14-21

INDIGENOUS COMMUNITIES ARE 50% MORE VULNERABLE TO NEGATIVE EFFECTS OF WILDFIRES

Census data shows that Indigenous communities experience greater vulnerability to wildfire—measured by higher exposure (e.g., living/working in places at heightened risk of wildfire) and lower adaptive capability (e.g., various resources to mitigate risk and adapt/recover after a crisis).

WILDFIRE HAZARD POTENTIAL (WHP)

- Moderate
- High
- Very High
- Federal Indian Reservations





Partnership at all levels makes Washington a national leader in wildfire response

To end the era of mega-wildfires, leaders across sectors are stepping up to do the hard and necessary work to put us on a better course. They are acting along the spectrum of wildfire prevention to post-fire recovery, and taking measures to improve the health of our forests in the process. They are bringing more resources to bear through new policies and funding at local, state, and federal levels, doing more together through partnership, and deploying innovative technologies to make wildfire responses more efficient and effective. Below are several examples of how this work is taking shape. Far from exhaustive, these examples are intended to highlight the breadth of the work ongoing and the ways in which Washington is a national leader in the wildfire response.

WHAT'S HAPPENING TODAY

Recent Legislation Powering Progress

- **Federal:** The 2022 Infrastructure Investment and Jobs Act includes dedicated wildfire resources for Washington State, including \$39 million over five years for wildfire mitigation. Other funds within the bill may reach the state as well, including \$5 billion for fuel management and \$600 million nationally for firefighter pay and mental health supports.
- **State:** The 2021 Washington State House Bill 1168 allocated \$500 million over eight years (\$125 million per biennium) for wildfire prevention, preparation, and restoration. This is the most funding for non-firefighting activities in response to the wildfire crisis in state history.

Cross-Sector Collaboration

The Central Washington Initiative: A partnership to reduce wildfire risk in 2.45M acres of the Okanogan-Wenatchee National Forest and surrounding lands by 2032

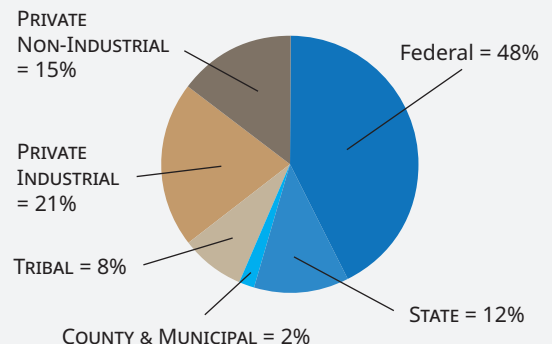
Started in 2022, the Central Washington Initiative is bringing the "all hands, all lands" approach to life. Led by the U.S. Forest Service, this project represents a unique cross-sector collaboration, bringing together Indigenous tribes, Washington State agencies, local government, non-profits, industry partners, and trade associations. By working together, the partners can more quickly reduce wildfire risk at scale in large, unhealthy forests (e.g., those with lots of excess fuel that can increase a wildfire's intensity) by reducing fuels, conducting controlled burns, and focusing on aquatic restoration.

Full list of Central Washington Initiative partners: *U.S. Forest Service; Confederated Tribes of the Yakama Nation; Confederated Tribes of the Colville Reservation; Washington State Department of Natural Resources; Washington Department of Fish and Wildlife; North Central Washington Forest Health Collaborative; Tapash Collaborative; Blue Forest Conservation; Okanogan, Yakima, Kittitas, and Chelan counties; The Nature Conservancy, The Wilderness Society; and the American Forest Resource Council.*



The Need for Landowner Cooperation

One of the biggest potential barriers to wildfire prevention and restoring forest health (e.g., reducing the fuel on the forest floor) is the level of coordination required among landowners. From national parks to private working forests, there are many types of forest landowners in the state. Wildfires do not stop at the boundary of one landowner to the next, so addressing wildfires and preventing them in the first place requires a collaborative approach.



Washington forest land ownership



PART II: LEADING THE WAY THROUGH PARTNERSHIP



The aftermath of the 2021 Bootleg Fire in Southern Oregon demonstrated the benefits of fuel management. In this example, areas that were treated with a combination of fuel management methods (controlled burns and thinning) were most resilient to wildfire, especially when compared to forests that did not have any kind of fuel management. Any fuel management technique used alone, as seen in the area that was thinned only is beneficial, especially in comparison to unmanaged forests.

Fuel Management: What it is and why it matters

Fuel management is one of the key strategies in the Central Washington Initiative plan—and crucial to forest health initiatives across the state.

Decades of fire suppression policies, vegetation growth, and the drying effects of climate change have caused fuel to build up in Washington’s forests. This high load of fuel presents a significant risk, as the excess fuel increases the intensity of wildfires. A key step in wildfire prevention and mitigation is reducing the amount of fuel in forests to more natural-occurring levels, which in turn will slow and decrease the intensity of a wildfire and promote restoration of forest health.

Fuel management can take many forms, including controlled burns—a practice Indigenous communities used effectively for forest health for centuries—and thinning dense strands of trees. As seen above, fuel management can make a difference in the impact of wildfires, particularly when treatment methods are combined. Importantly, fuel management will vary by landscape and ecosystem. An approach that is highly effective in the high deserts of Eastern Washington could have an adverse impact in the temperate rainforests of Western Washington.



PART II: LEADING THE WAY THROUGH PARTNERSHIP

WHAT'S HAPPENING TODAY *(continued)*

Cutting-Edge Technology

PANO AI: Bringing machine learning technology to wildfire detection

The sooner a fire is detected, the higher the likelihood it can be suppressed. Start-up PANO AI offers an early detection tool that combines the power of AI and cloud-based software, and leverages cameras, satellites, and other data feeds to identify smoke and fire immediately, pinpoint latitude and longitude, and automatically alert fire-monitoring professionals. Through a 2023 pilot with the Washington State Department of Natural Resources, PANO AI is installing 21 revolving high-definition cameras on top of mountains across Washington.

While new to Washington, PANO AI has been operating since 2019 with early success. In 2021, PANO AI identified, confirmed, and notified customers of more than 100 fires across four U.S. States and Australia.

Data-Powered Decision-Making

RADRFIRE: Using remote sensing data to map and analyze wildfire behavior, inform fire management decisions, and predict future damage

Developed by the Pacific Northwest National Laboratory (PNNL), RADRFIRE—or Rapid Analytics for Disaster Response for Wildfires—is currently being used in Washington by the U.S. Forest Service, the National Interagency Fire Center, utility operators, and key decision makers for wildfire response and recovery.

By retrieving data from satellites and using AI and cloud computing to analyze the images, RADRFIRE can predict the direction and speed of wildfires and pinpoint hardest-hit areas, providing valuable real-time data to evaluate risk and predict future impact.

Additionally, RADRFIRE can highlight hot spots to inform where fire retardant should be dropped, project what interventions might be best suited to suppress the fire in the moment based on past fires experiences, determine the carbon loss from trees damaged or killed in fires, and suggest emergency exit routes. For recovery, the RADRFIRE tool has the capacity to predict areas vulnerable to landslide and flooding in the wake of a fire, enabling preventive measures to be taken.

The RADRFIRE tool is funded by the U.S. Department of Energy and the U.S. Forest Service.



Pano Station deployment

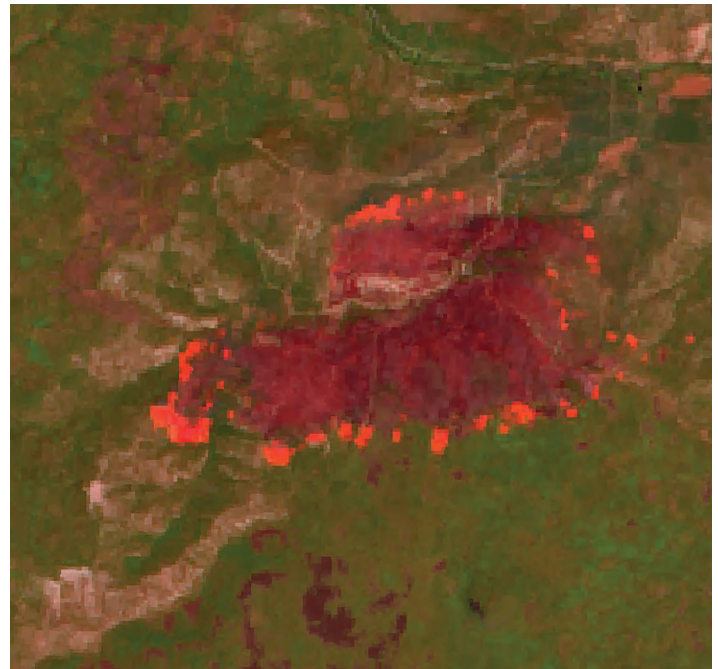


Image assessed by RADRFIRE from the Mammoth Fire south of Panguitch, UT. The bright red areas indicate active fire fronts while violet indicates smoldering areas



PART II: LEADING THE WAY THROUGH PARTNERSHIP

WHAT'S HAPPENING TODAY *(continued)*

Forward-Looking Research

University of Washington's Healthy Air, Healthy Schools Project: Understanding the impacts of and improving poor air quality in schools

Children are one of the more vulnerable groups to the health impacts of wildfire smoke. To keep children protected indoors, a team at the University of Washington is examining the impact of ultra-fine pollution particles, including those from wildfire smoke, in urban and rural Washington classrooms. Their hope is the research can be used to inform schools, districts, and the state legislature of the current risks and options to ensure schools provide healthy environments for students. Through Phase 1 of the project, the researchers found that HEPA filters effectively remove all outdoor air pollutants, including wildfire particles. In Phase 2, the team is measuring the impact of HEPA filters and other interventions (e.g., building retrofits) in 10 elementary schools for improving air quality during wildfires. This research is funded by the University of Washington and the U.S. Environmental Protection Agency.

LOOKING AHEAD

Experts across sectors are leading the way—and they know we cannot slow down, more must be

done. Below is a list of the highest priority places our advisory group highlighted for public, private, non-profit, and other sectors and groups involved in wildfire work to bridge the gap between our current state and our future vision of healthy ecosystems and protected communities. Across the opportunities, two key needs emerge: **public education and workforce development**. While efforts are happening in both—and progress has been made in 2023 already—the leaders in this field need more resources and support to tackle these two big needs head on.

The experts are taking action—that is clear—and looking at the data, we see encouraging trends. In 2021 and 2022, fewer acres burned in Washington than in 2020, and the majority of fires are being suppressed quickly and before they reach 100 acres. But, there are still a small number of fires that spread to be large and complex, typically under the worst burning conditions and in the most difficult terrain, making suppression difficult. In 2021, these kinds of fires (45 out of ~1800) were responsible for 97% of total acres burned.

Progress is happening, but the leaders across sectors cannot make progress alone. There is a big impediment in their way: us. With 2/3 of wildfires caused by humans in our state, we, the public, have a responsibility and the power to reduce the risk of wildfire.

WHERE WASHINGTON WILDFIRE EXPERTS ARE FOCUSED

To bridge the gap between the current state and our future vision of healthy ecosystems and protected communities, this project's wildfire advisory group highlighted the places for action across sectors.

The Big Needs

Specific areas of focus

1
Public education

2
Building and retaining the workforce we need to prevent, respond, and recover from wildfires

- ✓ Enhance public education campaigns on fire safety and the health risks of smoke
- ✓ Optimize fuel management, with varied approaches by landscape, through collaboration, and with on-going monitoring
- ✓ Scale up controlled burning, including by revisiting regulations and investing in public education
- ✓ Ensure evacuation plans and emergency communications reach all at-risk communities
- ✓ Support resiliency efforts, like home preparations in wildland-urban interfaces (WUI)—areas where forest and other unoccupied natural lands meet human infrastructure
- ✓ Prepare communities for smoke, including through public education and investments in retrofits to create clean air spaces
- ✓ Strengthen real-time fire and smoke detection capabilities
- ✓ Prioritize landscapes for post-fire risk management (e.g., those at risk of landslides and flooding as a result of a wildfire)
- ✓ Scale up workforce and training for fuel management, firefighting, and reforestation



To solve the wildfire crisis, we need all Washingtonians to pitch in

We know why fires are getting worse, and we know government, industry, Indigenous, and community leaders are doing something about it. But their work will only go so far without each and every one of us playing a role.

We are an essential part of the answer to preventing wildfires.

We can limit the damage wildfires cause.

We can support the work of emergency professionals by knowing how to protect ourselves during fire and smoke.

We can be educated on the role of fire in supporting our ecosystems, so we can advocate for the best measures for our state and environment.

The wildfire crisis requires an “all hands, all lands” approach—and we need all Washingtonians to pitch in. Following are the state-wide resources we can all use to part of the solution, which cover how we can each prevent wildfires, reduce our wildfire risk at home, and be prepared for a smoke or fire emergency.

There are small and big actions alike that we each can and must do—and for all Washingtonians, here are the five most impactful actions everyone can take to prevent, protect, and prepare:

- 1. Responsibly start, manage, and extinguish any planned fire, including campfires and landscape debris burns**
- 2. Safely use and maintain landscaping equipment and vehicles to avoid starting a fire**
- 3. Check for and comply with burn bans before doing anything that could spark a fire**
- 4. Strengthen your home's resiliency to fire by removing flammable items within five feet of your home, clearing gutters of dry leaves and pine needles, putting screens on exterior vents, and identifying a water source and hose that can reach any area of your property**
- 5. Create smoke readiness and evacuation plans**

YOU CAN PREVENT WILDFIRES

Over two thirds of the time, the spark that lights a Washington mega-wildfire is ignited by a person. Under the right conditions—a windy day, a dry hot summer afternoon—any ignition has the potential to become a wildfire. The answer is not eliminating fire—from campfires to cultural ceremonies, fire has an important place in our lives—but being thoughtful to prevent unplanned ignitions and to responsibly start and manage fires that are intentionally set.

Let us all commit to:

✓ **Learn more about how wildfires are started**

Where to turn for information:

- Look to the [Washington State Department of Natural Resources](#) (DNR) and [Smokey Bear websites](#) to learn what activities are wildfire ignition risks and how to keep planned fire (e.g., campfires) safe and small.

✓ **Check if there is a burn ban where you are or where you are going**

There are two reasons a burn ban would be instated: if the air quality is already bad and smoke from outdoor burns would make it worse, or if the wildfire risk is high. It is important to check resources related to both before starting a fire. Do not start a fire if a burn ban is in place, and seek permits if required.

Where to turn for information:

- Air quality bans can be found through the [Washington State Department of Ecology's website](#), which links to the clean air agencies in each county.
- Burn bans due to wildfire risk are included on this [interactive map](#) by county, this [list](#) for our national forests, and [here](#) for tribal lands. Pay attention to local government and firefighting authorities as well, as they may have more contextualized information for your area.



PART III: ONLY YOU CAN PREVENT WILDFIRES

LEARN BEFORE YOU BURN

- Check local regulations.** A permit may be required in your area.
- Check conditions.** Don't burn if it's windy.
- Do not burn** garbage or any materials that emit dense smoke or create offensive odors.

■ Keep a shovel and water hose nearby.

■ Your burn site should be surrounded by gravel or soil at least 10 ft. in all directions.

COMPLETELY EXTINGUISH THE FIRE BEFORE YOU LEAVE

DON'T LEAVE

OK TO LEAVE

Attend the campfire at all times

KEEP THE FIRE SMALL

10 FT. OR MORE

3 FT. MAX

YOU CAN REDUCE YOUR WILDFIRE RISK AT HOME

There are preventative measures you can take that can reduce a wildfire's impact on your home and your community. The steps are simple, but the impact can be significant.

Where to turn for information

- [Ready.gov](#) and the [National Fire Protection Agency](#) have repositories of videos, fact sheets, and reference guides on how to reduce risk and prepare for wildfires at home. Tips include having a hose that can reach all areas of your property and selecting fire-resistant materials for home retrofits and additions.
- DNR's [Wildfire Ready Neighbors](#) program is building the resilience of communities in wildfire-prone areas across the state. In priority counties, residents can [complete this survey](#) to receive customized resources, connections to local experts, and, importantly, an action plan designed to be achievable and relevant. The Department is in the process of expanding the program to other communities, and those outside of their areas of focus can receive a list of generally helpful actions to take now.

CREATE A DEFENSIBLE SPACE

EXTENDED ZONE
30-200 FEET AWAY FROM BUILDINGS, DECKS, AND YOUR HOME'S EDGES.

INTERMEDIATE ZONE
5-30 FEET AWAY FROM BUILDINGS, DECKS, AND YOUR HOME'S EDGES.

IMMEDIATE ZONE
0-5 FEET AWAY FROM DECKS AND YOUR HOME'S EDGES.

THE MAJORITY OF HOMES LOST TO WILDFIRE ARE LOST DUE TO EMBERS

[Click here to view a full-size downloadable PDF of this graphic](#)



PART III: ONLY YOU CAN PREVENT WILDFIRES

YOU CAN PREPARE FOR WILDFIRE AND SMOKE EMERGENCIES

Knowing how to protect ourselves during a wildfire or smoke event remains essential, and planning ahead is paramount. As we deploy best-in-class wildfire response tactics, some wildfires may escape our control due to severe, fire-enabling weather conditions.

Also, we have been and will be impacted by fire and smoke from nearby states, and, as we carry out controlled burns to return our forests to their natural, healthy state, we will continue to experience some smoke (though less severe and often anticipated so it can be planned for, unlike wildfire smoke).

✓ Plan ahead

- Use the resources at [Ready.gov](https://www.ready.gov) to build a wildfire emergency evacuation plan.
- Leverage the resources through the [Washington State Fire Adapted Communities Learning Network](#) to plan for your household, and support your neighborhood and community's wildfire preparedness and planning.
- Learn how to protect yourself during a smoke event from the [Washington State Department of Health](#), and procure the resources you will need to do so (e.g., filters to bring clean air inside, masks). If you do not have access to or cannot create a space with clean air, [contact 211](#) to find a clean air facility near you.

✓ Know your current risk

- Remain aware of wildfires across the state and in your area with [DNR's Wildfire Intel Dashboard](#).
- To know when to enact your smoke safety plans, pull up the [Washington Smoke Blog](#), which has real-time information on areas impacted by wildfire smoke.
- Follow [DNR Wildfires](#) and the [Northwest Interagency Coordination Center](#) on social media for up-to-date wildfire information. Also, follow other social media accounts and alert systems used by your community during a wildfire (e.g., the U.S. Forest Service uses their [Facebook page for the Okanogan-Wenatchee Forest](#) to communicate about new and evolving wildfires in the area).
- Know before you go. For a look across the nation, [InciWeb](#) is the go-to source for reporting on large-scale fires, and [Airnow.gov](#) has a real-time fire and smoke map covering North America.

ADDITIONAL RESOURCES

While these resources are general and apply to all of Washington, we encourage connecting to additional wildfire resources provided by your town, city, or county, and seeking out additional resources to answer any specific questions you have. For example, do you need wildfire insurance? Or if you are a small forest landowner, how you can keep your forest healthy? DNR's [wildfire pages](#), [Ready.gov](#), and [Washington State Fire Adapted Communities Learning Network](#) are great places to start for these questions and more.

WILDFIRE SMOKE AND AIR QUALITY

The Air Quality Index (AQI) reports the level of air quality and health concerns across the following six categories. When in the presence of wildfire smoke, check your local weather for the current AQI.

AIR QUALITY INDEX		WHAT YOU SHOULD DO	
Good	0-50		It's a great day to be active outside and a good time to make a plan if worse air quality is in the forecast.
Moderate	51-100		Some people are especially sensitive to lower levels of particle pollution and should reduce exposure. For example, limit time outside and avoid strenuous outdoor activity. All sensitive groups should watch for symptoms.
Unhealthy for Sensitive Groups	101-150		Sensitive groups should take steps to reduce exposure. Limit time outside, avoid strenuous outdoor activity, and follow tips for cleaner indoor air. Everyone should watch for symptoms as a sign to reduce exposure.
Unhealthy	151-200		Everyone should reduce exposure. Limit time outside, avoid strenuous outdoor activity, and follow tips for cleaner indoor air.
Very Unhealthy	201-300		Everyone should reduce exposure. Stay inside and filter indoor air to keep it cleaner. Go elsewhere for cleaner air, if needed.
Hazardous	300+		Everyone should reduce exposure. Stay inside and filter indoor air to keep it cleaner. Go elsewhere for cleaner air, if needed.



CONCLUSION



Let's all be part of the solution

Our ecosystem needs fire—it was created with it and is healthiest when it exists. What we cannot and should not tolerate is the continued trend of mega-wildfires.

We can be on a path other than the inevitability of mega-fires and return to the natural order of fires that our landscape was built with and upon.

We can have a future where fires are controlled, providing benefits to our ecosystem instead of destroying it.

We can get to a place where the smoke we experience is from preventative measures like controlled burns, and we can prepare accordingly.

Right now, we, the public, stand in the way of that reality. Today, our actions are the problem—we are accountable for most of the ignitions and are contributors to climate change—but tomorrow we could be the solution. We are equipped with the best practices to protect ourselves, our environment, and our communities, and have a strong foundation of Washington leadership in wildfire response and prevention to build upon. It will require us to stay engaged, keep learning, and remain vigilant, returning to the resources we have at a regular cadence to make sure we all remain prepared, informed, and part of the answer to the crisis we face.

A regular cadence of mega-wildfires is not inevitable. The future is ours to create—let's get to work.



SOURCE INFORMATION

Page 10

Graphic: "While the Number of Wildfires in Washington Remains Steady, Scale and Intensity have Worsened." Source: [Short, Karen C. 2022. Spatial wildfire occurrence data for the United States, 1992-2020. Forest Service Research Data Archive](#). Note: U.S. Forest Service data set begins in 1992, therefore first period only covers 4 years.

Page 11

Graphic: "Smoke Exposure Has Been Worsening and Expanding Across the State." Source: [KCRW, Alison Saldanha, "Dangerous Air: We mapped the rise in wildfire smoke across America. Here's how we did it"; Stanford Environmental Change and Human Outcomes Lab](#). Graphic design by BCG.

Graphic: "Wildfires Can be Ignited in Many Ways, but in Washington State Most Fires Are Started by Humans." Source: [USDA](#).

Page 12

Info box statement: "Some years, Washington's wildfire carbon emissions account for up to ~20% of our state's total carbon emissions." Total gross emission: 84.8 Million tons CO₂e; wildfire emission: 15.3 Million tons CO₂e; EPA; ([link](#)).

Info box statement: "By 2050, climate change is projected to increase extreme fires globally by 30%." Source: UN Environment Programme, "Spreading like Wildfire: The Rising Threat of Extraordinary Landscape Fires"; ([link](#)).

Page 13

Info box: "At a Glance: One Fire's Impact." Source: USDA; US EPA; WA DNR. Graphic design by BCG.

Graphic: "More Risk from Wildfires Means Washingtonians Are Paying the Price both Directly (via Costs of Damage and Rehabilitation) and Indirectly (via Losses)." Sources: "The True Costs of Wildfires in the Western U.S.," Western Forestry Leadership Coalition, Oct 2022; "Community Costs of Wildfire" (Headwaters Economics); "The Costs and Losses of Wildfires: A Literature Survey," D. Thomas, 2017. Graphic design by BCG.

Statement: "There are 1.1 million homes at high-risk in wildland-urban interface (WUI) zones": Housing unit growth in the WA WUI from 1990-2020: ~621K (1990) to ~1.1M(2020); Sources: USDA ([link](#)); Headwaters Economics "As Wildland Urban Interface (WUI) develops, firefighting costs will soar" ([link](#)); BCG analysis.

Statement: "Between 2014-2018, there were \$4.5 million in asthma-related medical issues related to wildfire smoke." Source: This study considers immediate health increase care for people with asthma within two weeks of a smoke event in WA between 2014-2018 ([link](#)).

Statement: "A recent study found that when the air quality is categorized as 'unhealthy' as a result of wildfire smoke, emergency room visits increased by 12% and asthma-related claims by 24% in the state." Source: McDermot, Kaldec, Washington State Health Services Research Project ([link](#)).

Page 14

Graphic and data: "Indigenous Communities Are 50% More Vulnerable to Negative Effects of Wildfires." Source: [Ian P. Davies, et.al. "The unequal vulnerability of communities of color to wildfire."](#)

Page 15

Graphic: "The Need for Landowner Cooperation." Source: [2006 USFS data, per the WFPA](#).

The Central Washington Initiative: [Central Washington Initiative, Department of Natural Resources Partners with USDA Forest Service on Central Washington Initiative, Major Forest Restoration Project Underway in Washington](#).

Page 16

Graphic: 2021 Bootleg Fire showing the benefits of fuel management. Source: [Jonathan Wood and Morgan Varner, "BURN BACK BETTER: How Western States Can Encourage Prescribed Fire on Private Lands," January 2023](#).

Page 17

PANO AI: [Pano AI, Commissioner Franz Announces New AI Wildfire Fighting Technology Pilot Partnership](#). Image: [Pano.ai](#).

RADRFIRE: [RADRFIRE Combines Artificial Intelligence With Satellite Imagery For Wildfire Detection, How A.I. Is Working With Satellites To Corral Wildfires, From Space](#); PNNL experts. Image: Pacific Northwest National Laboratory.

Page 18

UW source: [UW Healthy Air, Healthy School Project](#).

Statement: "In 2021 and 2022, fewer acres burned in Washington than in 2020..." Source: 2022 NWCC Annual Fire Report ([link](#)).

Statement: "In 2021, these kinds of fires (45 out of ~1800) were responsible for 97% of total acres burned": In 2021, WA suppressed 98% of fires before they could grow large (defined as > 100 acres). Sources: NWCC Annual Fire Report ([link](#)); DNR Legislative Report – 2021 Wildfire Suppression ([link](#)); NICC Wildland Fire Summary and Statistics ([link](#)); HB 1168; RCW 19.27; BCG analysis"

Page 20

Graphics: "Learn Before You Burn" and " Completely Extinguish the Fire Before Your Burn." Source: [WA DNR](#).

Graphic: "Create a Defensible Space." Source: [WA DNR](#).

Page 21

Graphic: "Wildfire Smoke and Air Quality." Source: [WA DOH](#).

NOTE FOR THOSE READING THE PRINTED VERSION OF THIS DOCUMENT: To access the hyperlinks used above and in the preceding pages, please go to challengeseattle.com to view and/or download a PDF of this report.



“Every Washingtonian, myself included, has a responsibility to do something to prevent wildfires, mitigate their impacts, and protect ourselves from the worst effects. It’s time to get going.”

Christine Gregoire, CEO, Challenge Seattle,
Former Washington State Governor