



AWC 2025 PRESENTATION – Wenatchee, WA
WILDFIRE PREPAREDNESS & RESPONSE

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MICHAEL CHIU

PNW Wildfire Fuel Mitigation Coordinator

1982 - 1986 University of Washington
College of Forest Resources, Forest Resource Mgt

1982 - 1990 USFS (Wenatchee NF, Chelan Ranger District)
US NPS (Mt Rainier, North Cascades, Olympic NP)
Seattle Water Department – Cedar River Watershed

1990 - 2016 Bellevue Police Department
Patrol / Field Operations
Investigations
Community Services
Administration

2020 - 2024 Team Rubicon - Greyshirt and Volunteer Leader
Primary Duty - Planning, Command & General Staff
Training Cadre - Chainsaw Operations
Core Operations (Muck Out)



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OBJECTIVES

- Utilizing Team Rubicon "Before and After the Flames"
- Re-envisioning a more nuanced Wildland Urban Interface
- Wildland fire trends
- Building Codes, official WUI designation/mapping, insurance
- Current WUI Research to guide public policy discussions

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TEAM RUBICON KNOWS

DEFENSIBLE SPACE



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FUEL LADDERS



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Team Rubicon Knows

HOME IGNITION ZONE



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FUEL MITIGATION



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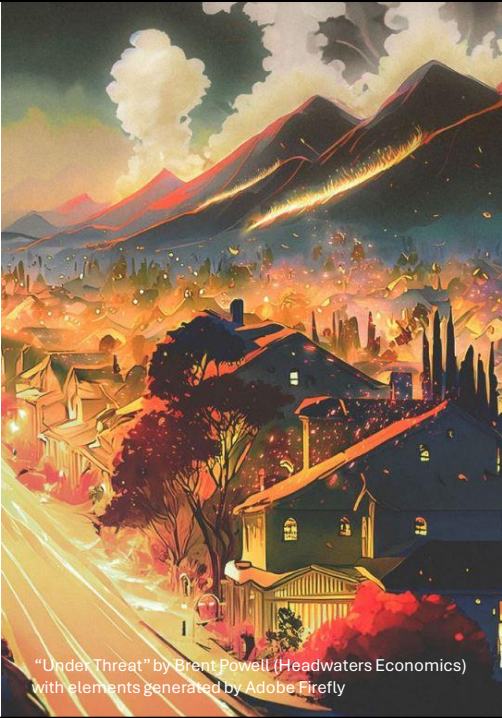
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RECOVERY



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“Under Threat” by Brent Powell (Headwaters Economics)
with elements generated by Adobe Firefly

WILDLAND URBAN INTERFACE

EMBER STORMS and EXTREME FIRE PROPAGATION

COMMUNITY WILDFIRE PROTECTION PLANS (CWPP)

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WILDLAND URBAN INTERFACE • TRENDING

- Community Wildfire Protection Plan – 15 of 39 counties submitted CWPP (Avg submission 2017)
- WUI acreage has grown 24% (2001 – 2020) and WUI fires now account for 9% of all fires (David Hosansky, April 16, 2024)
- Area burned by WUI fires (2005-2020) increased 35% as a fraction of all burned areas. (Hosansky, 2024)
- WUI fires emit far more toxins than traditional fires (burning of manufactured materials)
- “Fire season” has stretched by an average of **78 days** since the 1970s (USFS, 2024)
- National Crisis: Annual total economic burden of wildfires between **\$394 - \$893 billion**, equivalent to roughly **3%** of the entire U.S. GDP. (National Bureau of Economic Research, 2024)
- Approximately **85%** of all wildfire originate from human activities (National Interagency Fire Center, 2024)

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Affecting change – Insurance Underwriters

Rank	Event	Year	State	Insured Loss
*	Palisades / Eaton	2025	California	\$35-45 billion (CoreLogic 2025)
1	Camp Fire	2018	California	\$12.5 billion
2	Tubbs Fire	2017	California	\$11.1 billion
3	Woolsey Fire	2018	California	\$5.3 billion
4	Maui Wildfire	2023	Hawaii	\$4.4 billion
5	Oakland Fire	1991	California	\$3.9 billion
10	Marshall Fire	2021	Colorado	\$2.8 billion

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WILDLAND URBAN INTERFACE • TRENDING

- Rapidly evolving Building Codes
- Rapidly premium escalation, or cancellation, of homeowners insurance
- Official designation by state, or county, or municipality of “WUI”
- Frequency of catastrophic conflagrations is increasing

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2018 International Wildland Urban Interface Code

(IWUIC updated every three years: 2021, 2024)

- WUI Area Designation and Requirements
- Building Construction Regulations
- Fire Protection Requirements
- Washington State **Senate Bill 6120** (2024)
"Wildland Urban Interface Code"



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Summary of SENATE BILL REPORT ESB 6120

(Feb. 2024)

- Stipulates which portions of the International Wildland Urban Interface Code the State Building Code Council may adopt.
- Requires the Department of Natural Resources to **develop and maintain a statewide wildfire hazard map and a base-level wildfire risk map** in coordination with the state fire marshal.
- **Permits cities, counties and towns to complete their own maps of areas at greatest risk from wildfire** for use in applying the International Wildland Urban Interface Code.

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"EMBER STORMS"

AN OUTSIZED IMPACT ON LIVES & PROPERTY LOST

Chinook, Foehn, Santa Ana, Diablo, Katabatic...

- Spring and Fall wind events coinciding with anomalous dry fuels
- High velocity sustained winds caused by large pressure gradients, often down mountain ranges

13% of total number of fires and only 12% of acreage burned (1992-2020)

- **60% of structures lost**
- **52% of human lives lost**

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DOWNSLOPE WIND DRIVEN FIRES



Marshall Fire, December 2021 – Colorado (Patrick Cullis)

• 2023 Hawaii Fires (August - Lahaina, HI)	102 / 2,207	Power lines
• 2021 Marshall Fire (December – Superior/Louisville, CO)	2 / 1,084	Power lines + old embers
• 2020 Labor Day Fire (September, Western OR)	11 / >3,000	Mostly Human
• 2020 East Troublesome Fire (October, Grant/Larimer Co, CO)	2 / 555	Human
• 2018 Camp Fire (November - Paradise, CA)	85 / 18,804	Power lines
• 2017 Tubbs Fire (October – Santa Rosa, CA)	22 / 5,600	Power lines
• 2016 Chimney Tops 2 (November – Gaitlinburg, TN)	14 / 2,400	Human
• 2014 Carlton Complex Fire (July - Methow Valley, WA)	2 / 353	Lightning
• 2009 Black Saturday Bushfire (February - Victoria, Australia)	173 / 2,029	Power line, human, lightning

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OUTSIZED DIRECT IMPACT OF DOWNSLOPE WIND DRIVEN FIRES

13% of total number of fires

12% of acreage burned (1992-2020)

60% of structures lost

52% of human lives lost

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Downslope wind-driven fires in the western United States

John T. Abatzoglou, Crystal A. Kolden, A. Park Williams, Mojtaba Sadegh, Jennifer Balch, Alex Hall. 2023

- <https://doi.org/10.1029/2022EF003471>
- Downslope mountain winds bring dry air toward human settlements. Fires associated with downslope winds, primarily ignited by humans, had geographic hotspots in the front range of the Rockies, SW California, and the eastern slope of the Washington Cascades. Downslope wind events allow fires to rapidly spread downhill. **Fires pushed by downslope winds accounted for most of the deaths and loss of structures during 1999–2020.**

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Redefining the urban wildfire problem in the West

Dr. Kimiko Barrett, Dr. David Calkin, Dr. Mark Finney, Dr. Jack Cohen, Dr. Stephen Pyne, Dr. Stephen Quarles (2024).

- <https://headwaterseconomics.org/natural-hazards/redefining-the-urban-wildfire-problem-in-the-west/>

- The modern wildfire problem. The problem was initially defined by the wildland fire community as a **fire control problem complicated by encroaching houses**. It would be more effective to define the situation as **fire-prone and firerequiring landscapes complicated by an ever-expanding urban scene**.

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Fire risk to structures in California's Wildland-Urban Interface

*Zamania laei, M., San Martin, D., Theodori, M. et al.
Nature Communication 16, 8041 (2025).*

- <https://doi.org/10.1038/s41467-025-63386-2>

- Structure survivability **can be predicted to 82% accuracy**. Results highlight the **effectiveness of hardening and defensible space, with a hypothetical 52% reduction in losses**. Findings emphasize the need for community-level mitigation to reduce structure loss in future WUI fires.

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Compounding effects of climate change and WUI expansion quadruple the likelihood of extreme-impact wildfires in California

Kumar, M., AghaKouchak, A., Abatzoglou, J.T. et al. Natural Hazards 2, 17 (2025).

- <https://doi.org/10.1038/s44304-025-00067-6>

- More than three-quarters of extreme-impact wildfires originated within 1 km from the wildland-urban interface. The deadliest and most destructive wildfires, 90% of which were human-caused, primarily occurred in the fall, while the largest wildfires (56% of which were human-caused) mostly took place in the summer. By integrating human activity and climate change impacts, we provide a **holistic understanding of human-centric wildfire risk, crucial for policy development.**

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QUESTIONS?

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