

# Responding to Climate-Amplified Extreme Weather Events Series

*Understanding Heat and Smoke\* Vulnerabilities and Cooling Needs in Oregon Households*

Presented by

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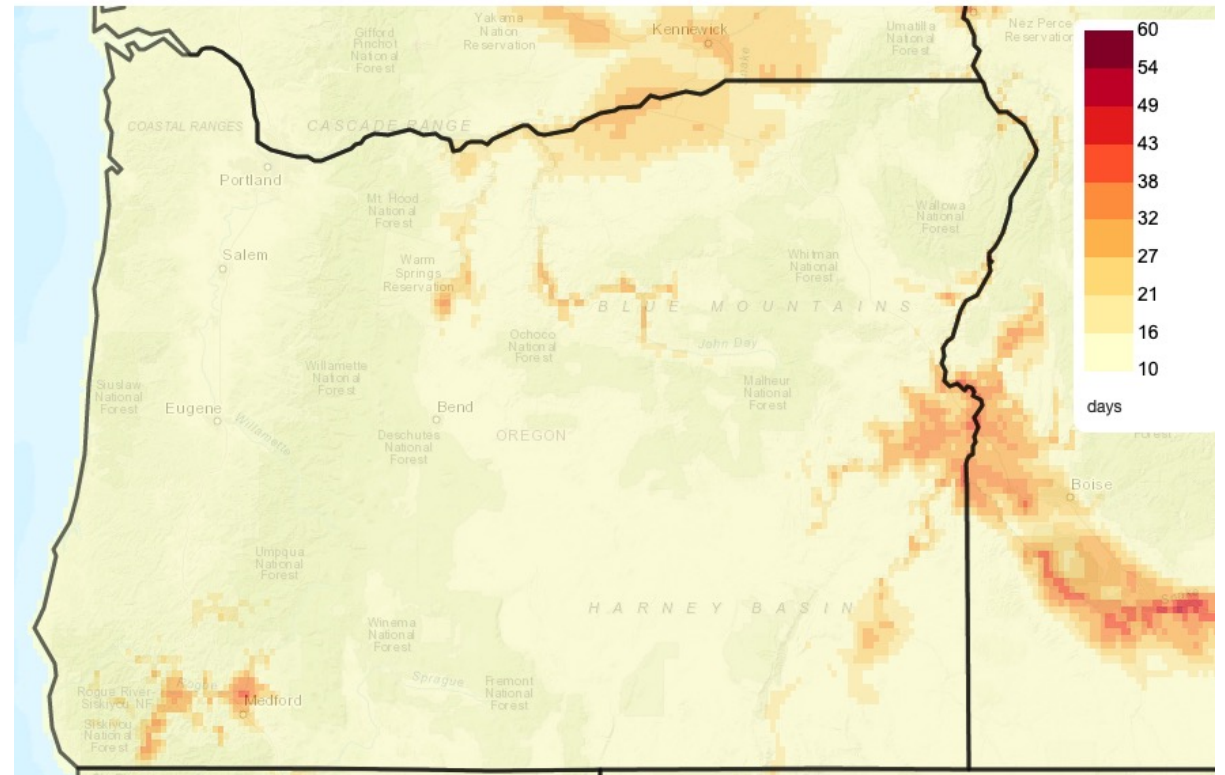
May 17, 2023



# What's "normal" in Oregon, anyways?

- ▶ Historically moderate temperatures = lack of infrastructure or regulations to provide cooling
- ▶ Our infrastructure, economic systems, and social systems have been designed to keep people warm, not cool

Days with Heat Index  $\geq 90^{\circ}\text{F}$   
Historical simulation, 1971-2000 mean  
Multi-model mean derived from 18 downscaled CMIP5 models

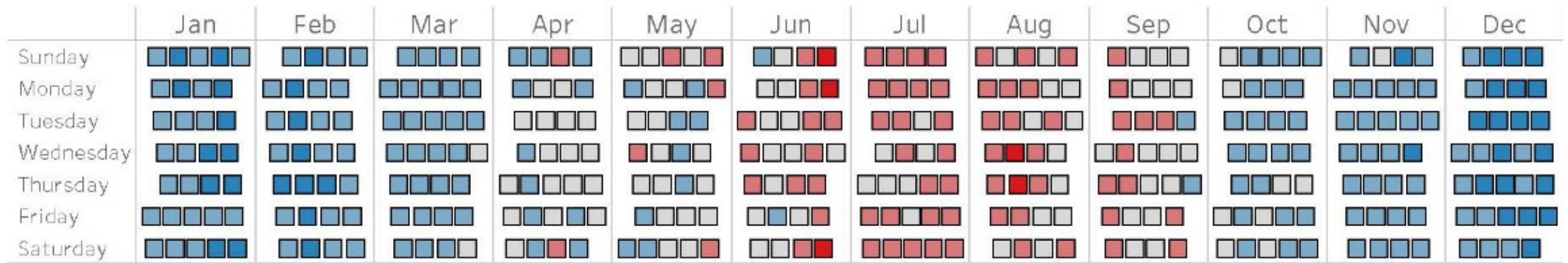


Source: Climate Toolbox Climate Mapper

# The 2021 Heat Dome

## Chart 1. Daily temperature in 2021

Maximum high temperatures recorded at the Portland Airport, 2021



Max temperature  
 30    116

Source: Multnomah County

# Heat Dome: 72 Heat deaths in Multnomah County, OR

**Table 3. Cooling availability among decedents**

Cooling type	Count	Percent (%)
Fan only	36	50%
None	13	18%
AC w/ or w/o fan	10	14%
Unknown	13	18%
<b>TOTAL</b>	<b>72</b>	<b>100%</b>

Source: Multnomah County



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# State of Oregon heat dome response: SB 1536

- ▶ Landlords may not\* prohibit or restrict tenants from installing or using portable cooling device
- ▶ Requires cooling in new dwelling units
- ▶ Updates language for “warming centers” to include cooling and air filtration
- ▶ Creates an Oregon Health Authority program to distribute air conditioners and air filters
- ▶ Oregon Department of Energy
  - \$10 million Ductless Heat Pump Deployment Program
  - \$15 million grant/rebate program for installation of heat pumps by landlords
  - \$2 million grant funding for Community Cooling Center program
  - Conduct a Cooling Needs Study

Non-legislative actions:

- ▶ Portland Emergency Heat Response Program
- ▶ Multnomah County Heat Vulnerability Index

**So, what's on the horizon?**



# Current Climate Change Scenarios

## Lower emissions

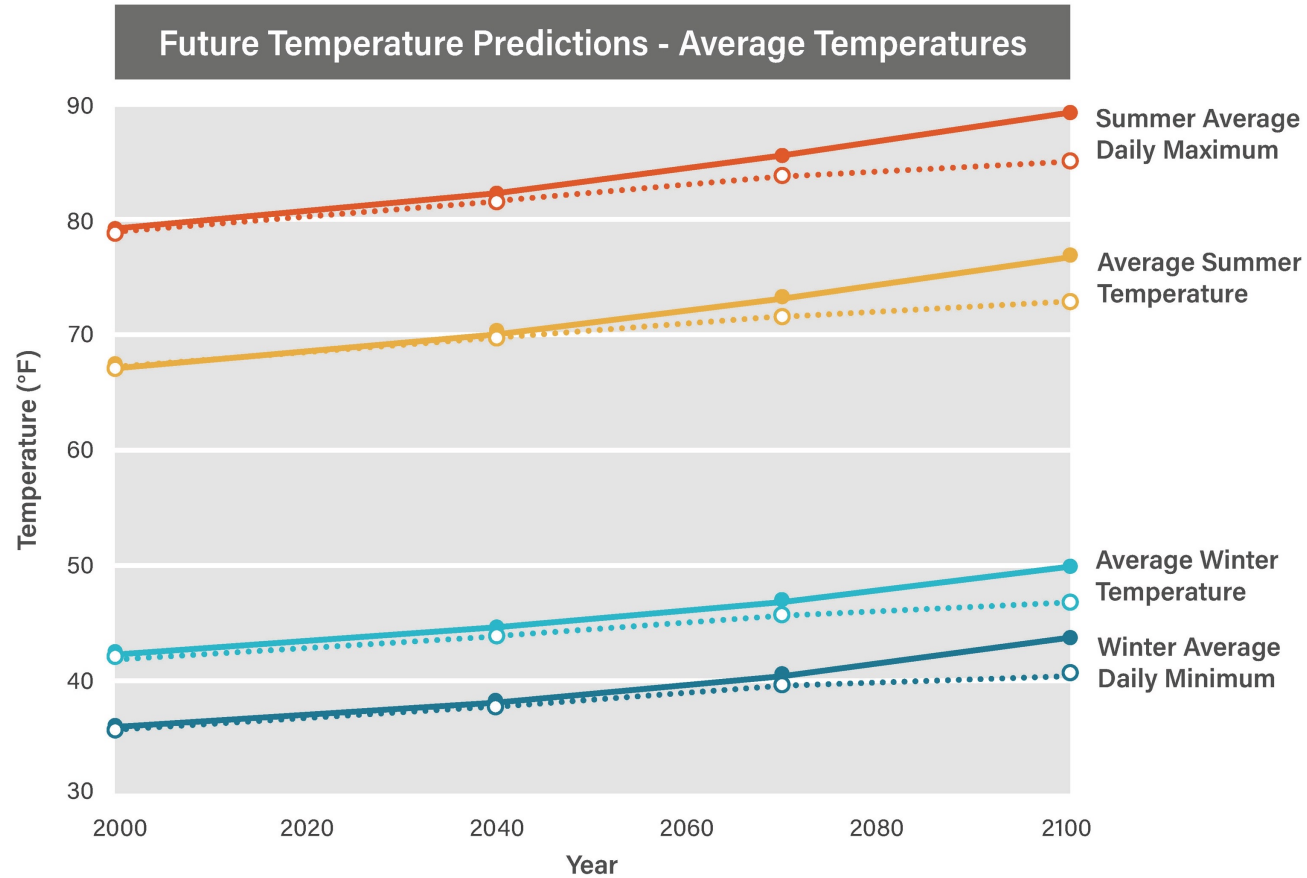
- Average global surface temperature warming of around 3.6°F to 5.4°F (2-3°C)

## Higher emissions

- 7.7°F average temperature increases



# Average temperature increases for Portland, Oregon



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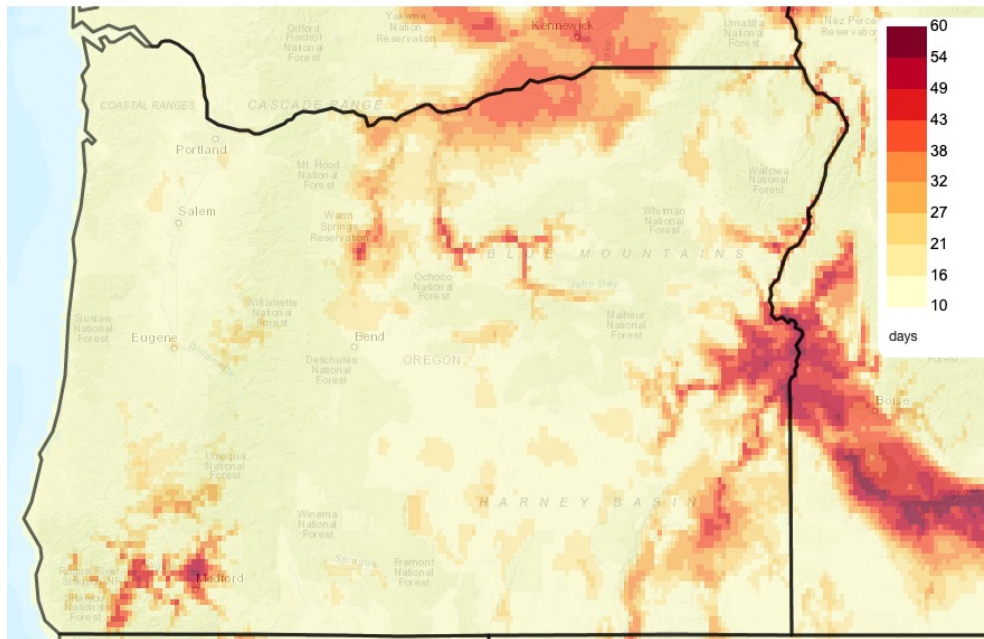
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# Mid- to late-century statewide temperature increases

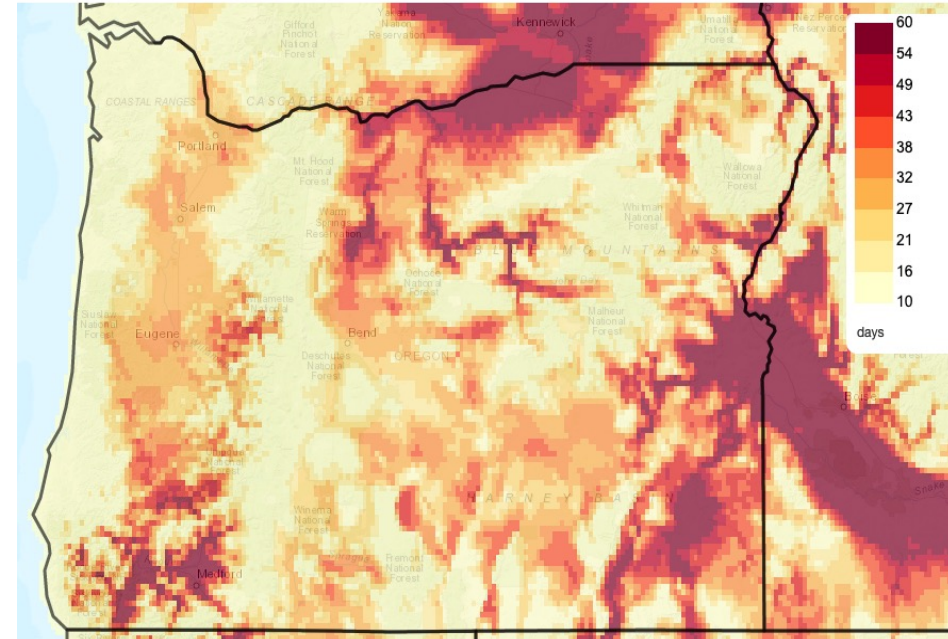
Optimistic (lower emissions) through 2050

Days with Heat Index  $\geq 90^{\circ}\text{F}$   
Lower Emissions (RCP 4.5), 2010-2039 mean  
Multi-model mean derived from 18 downscaled CMIP5 models



Optimistic (lower emissions) through 2100

Days with Heat Index  $\geq 90^{\circ}\text{F}$   
Lower Emissions (RCP 4.5), 2070-2099 mean  
Multi-model mean derived from 18 downscaled CMIP5 models

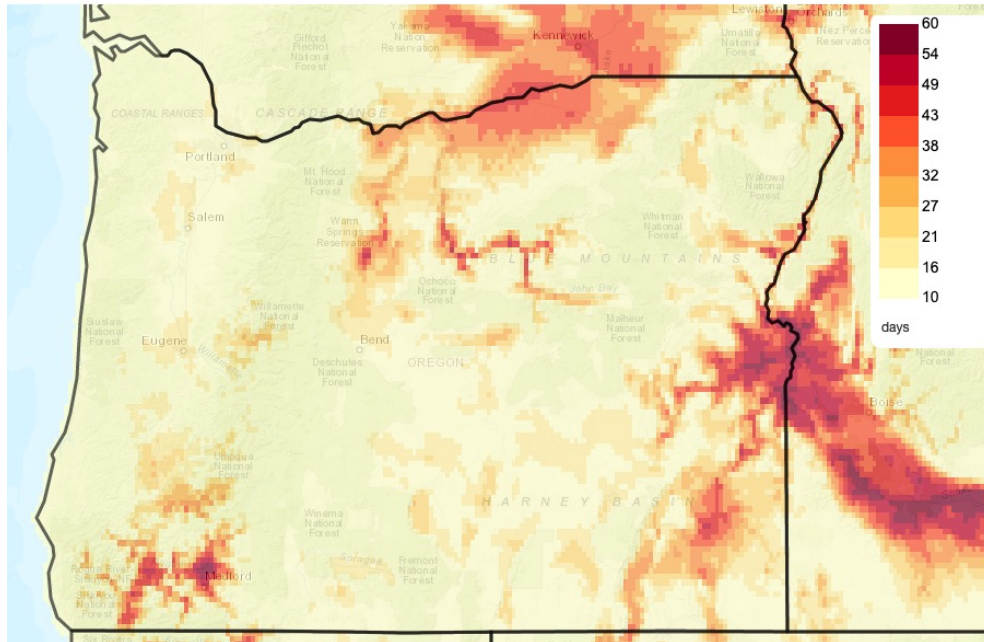


Source: Climate Toolbox

# Mid- to late-century statewide heat increases

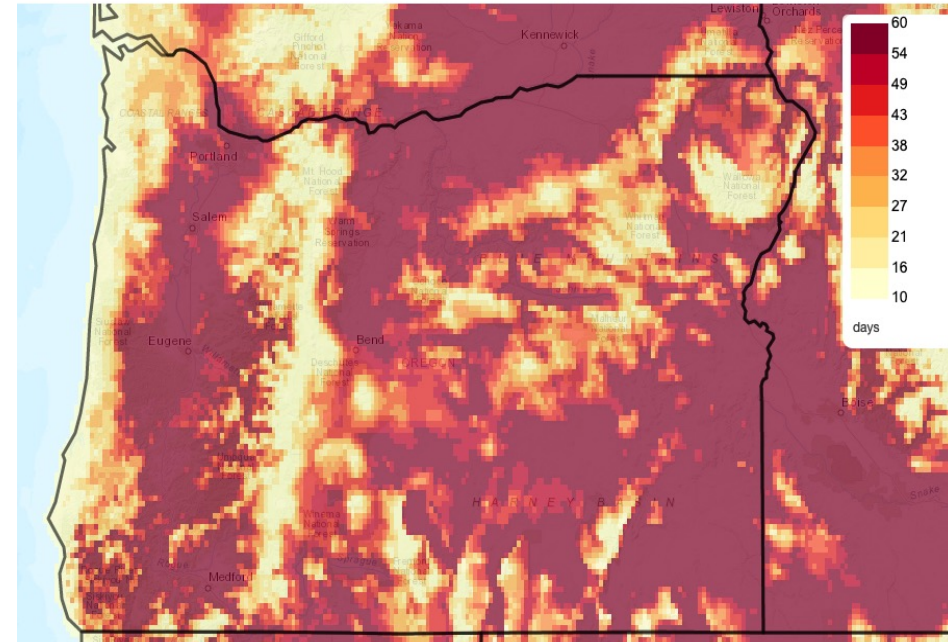
Pessimistic (higher emissions) through 2050

Days with Heat Index  $\geq 90^{\circ}\text{F}$   
Higher Emissions (RCP 8.5), 2010-2039 mean  
Multi-model mean derived from 18 downscaled CMIP5 models



Pessimistic (higher emissions) through 2100

Days with Heat Index  $\geq 90^{\circ}\text{F}$   
Higher Emissions (RCP 8.5), 2070-2099 mean  
Multi-model mean derived from 18 downscaled CMIP5 models



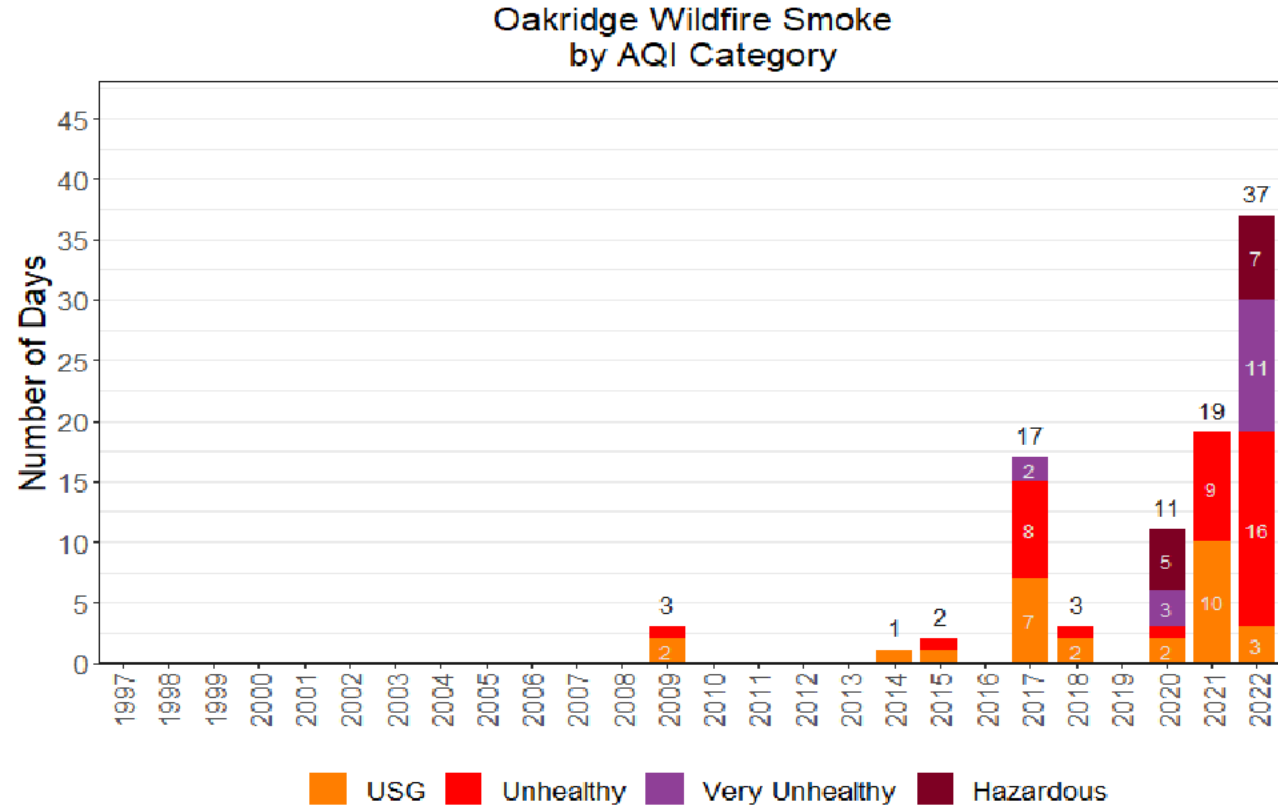
Source: Climate Toolbox

# Why we've got to talk about smoke



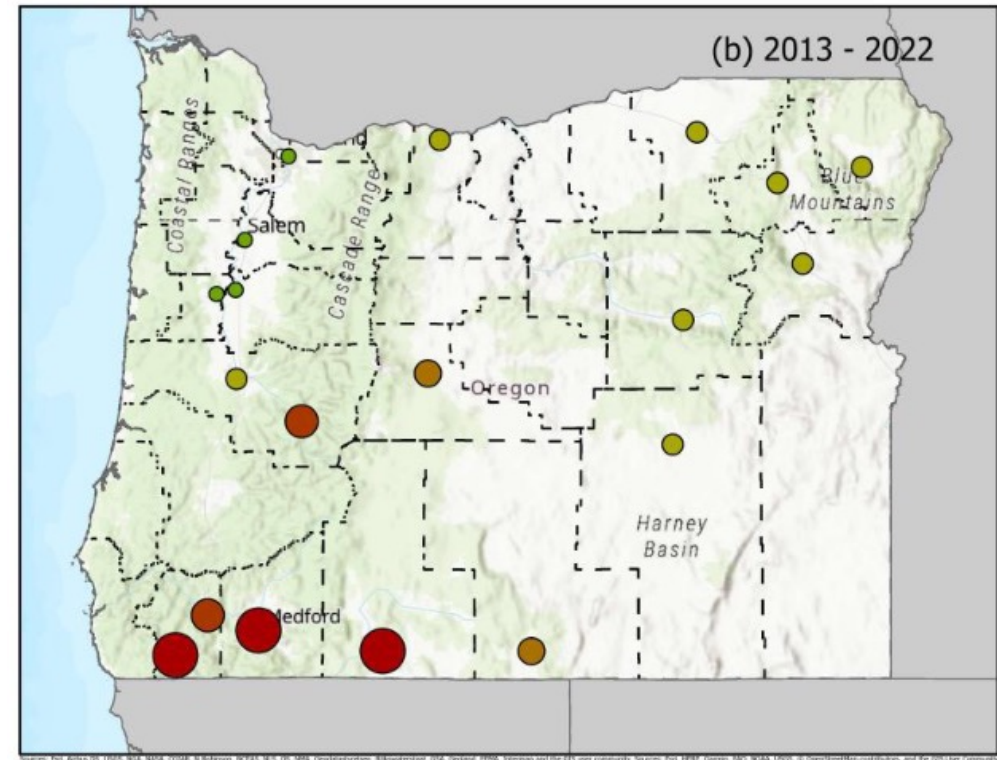
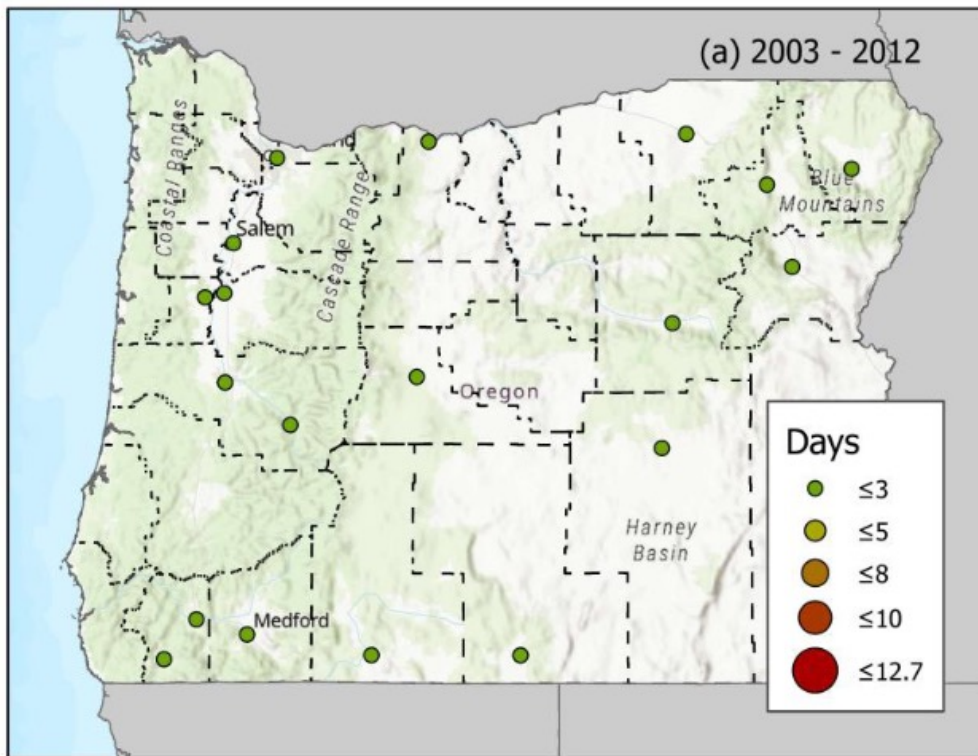
*Photo from Oakridge, Oregon during the 2022 Cedar Creek Fire*

# Oakridge, Oregon wildfire smoke trends



Source: Oregon Department of Environmental Quality (DEQ)

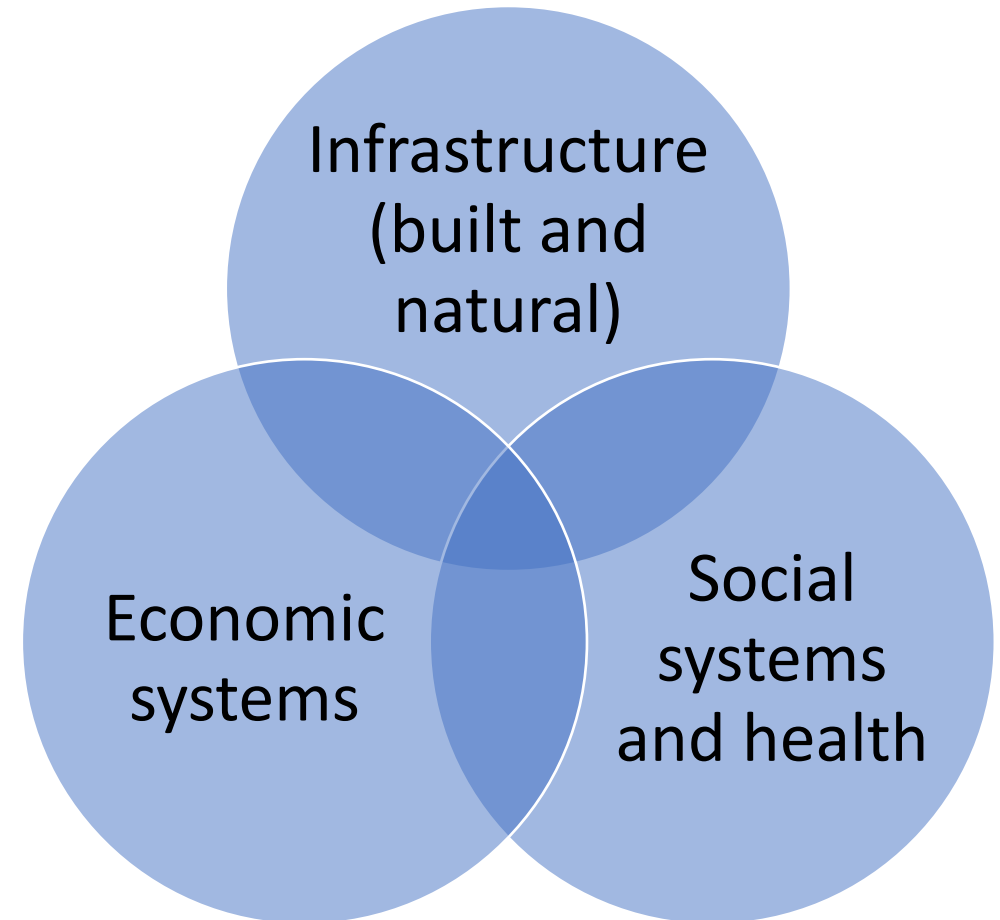
# Average number of AQI days at unsafe for sensitive groups or above from wildfire smoke, 2003 to 2022



# Examples and lessons from our work

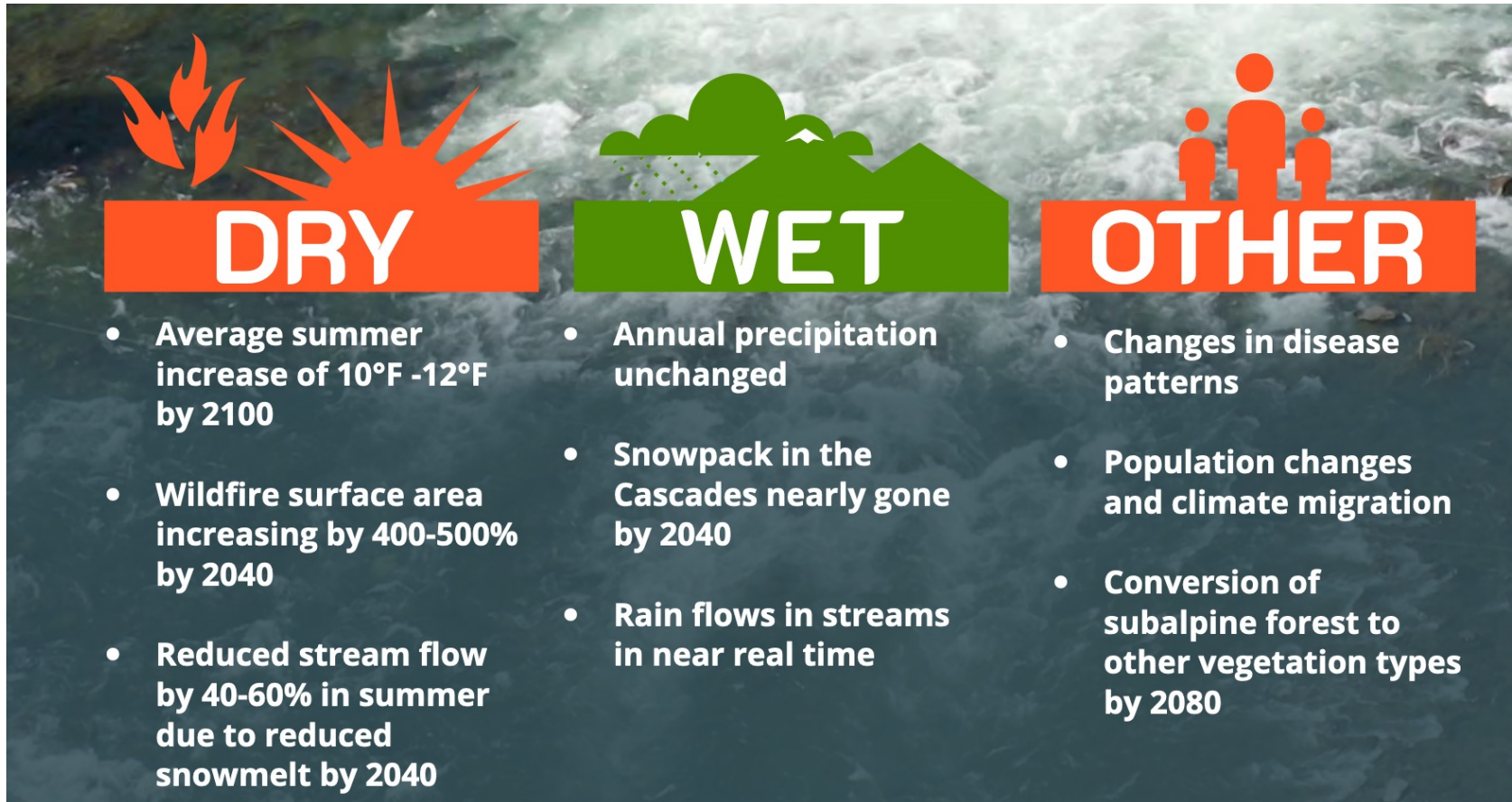
- ▶ Community Climate Action Plans (CAPs)
- ▶ Oakridge Targeted Airshed Grants
- ▶ City of Eugene Decarbonization
- ▶ Oregon Cooling Needs Study

... All roads lead to housing!



# Example 1: Climate Action Plans (CAPs)

## Helping communities prepare for the baseline to change



The infographic is set against a background of turbulent water. It is divided into three vertical columns. The first column, labeled 'DRY' in white text on an orange background, features a sun and flame icon. The second column, labeled 'WET' in white text on a green background, features a house and rain cloud icon. The third column, labeled 'OTHER' in white text on an orange background, features a family silhouette icon. Each column contains a bulleted list of projected climate impacts.

Category	Impacts
<b>DRY</b>	<ul style="list-style-type: none"><li>• Average summer increase of 10°F -12°F by 2100</li><li>• Wildfire surface area increasing by 400-500% by 2040</li><li>• Reduced stream flow by 40-60% in summer due to reduced snowmelt by 2040</li></ul>
<b>WET</b>	<ul style="list-style-type: none"><li>• Annual precipitation unchanged</li><li>• Snowpack in the Cascades nearly gone by 2040</li><li>• Rain flows in streams in near real time</li></ul>
<b>OTHER</b>	<ul style="list-style-type: none"><li>• Changes in disease patterns</li><li>• Population changes and climate migration</li><li>• Conversion of subalpine forest to other vegetation types by 2080</li></ul>

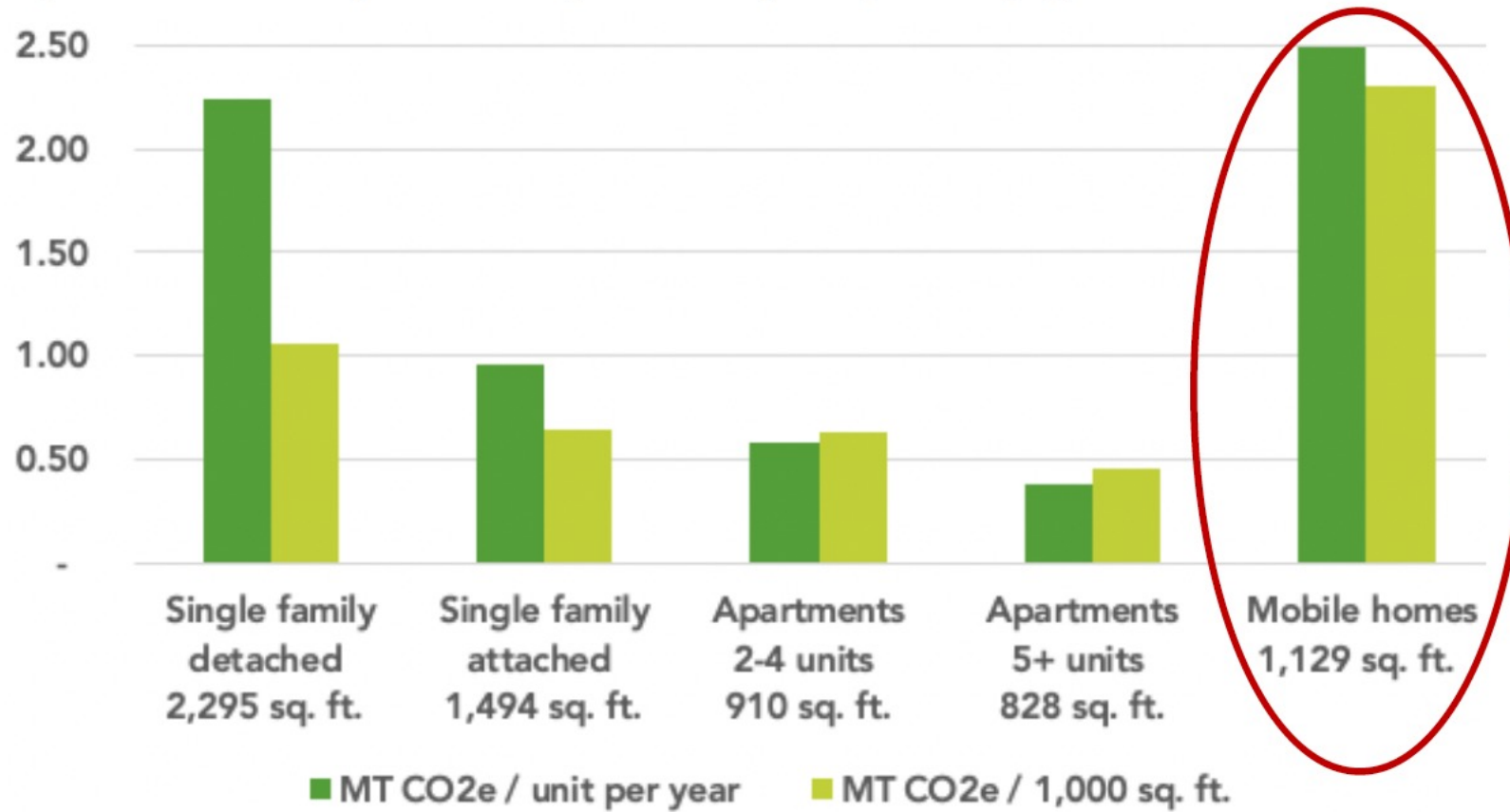
# Example 2: Oakridge, Oregon Targeted Airshed Grants





# Example 3: City of Eugene Decarbonization

Figure 29: Emissions per unit and per 1000 sq. ft. by housing type



## Working on behalf of ODOE

- ▶ Assessing cooling needs and barriers in publicly supported multifamily housing, manufactured dwelling parks, and recreational vehicles (RVs) being used as housing
- ▶ We are using two main approaches for the study:
  - 1) Identify and consolidate all existing data and technical information
  - 2) Perform outreach to understand the social conditions and behaviors surrounding heat and how people seek relief
    - Outreach is built on a foundation of partnerships with Community-Based Organizations

- ▶ We need learn from communities in warmer climates
- ▶ Emergency responses such as portable air conditioners and cooling shelters are important, but we are ultimately aiming for every home to have permanent cooling
- ▶ We need to know more than the weather forecast
- ▶ For housing, there are different responses needed for urban and rural environments
- ▶ For air filtration, portable air filters seem like the current best option

# Thank you!

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