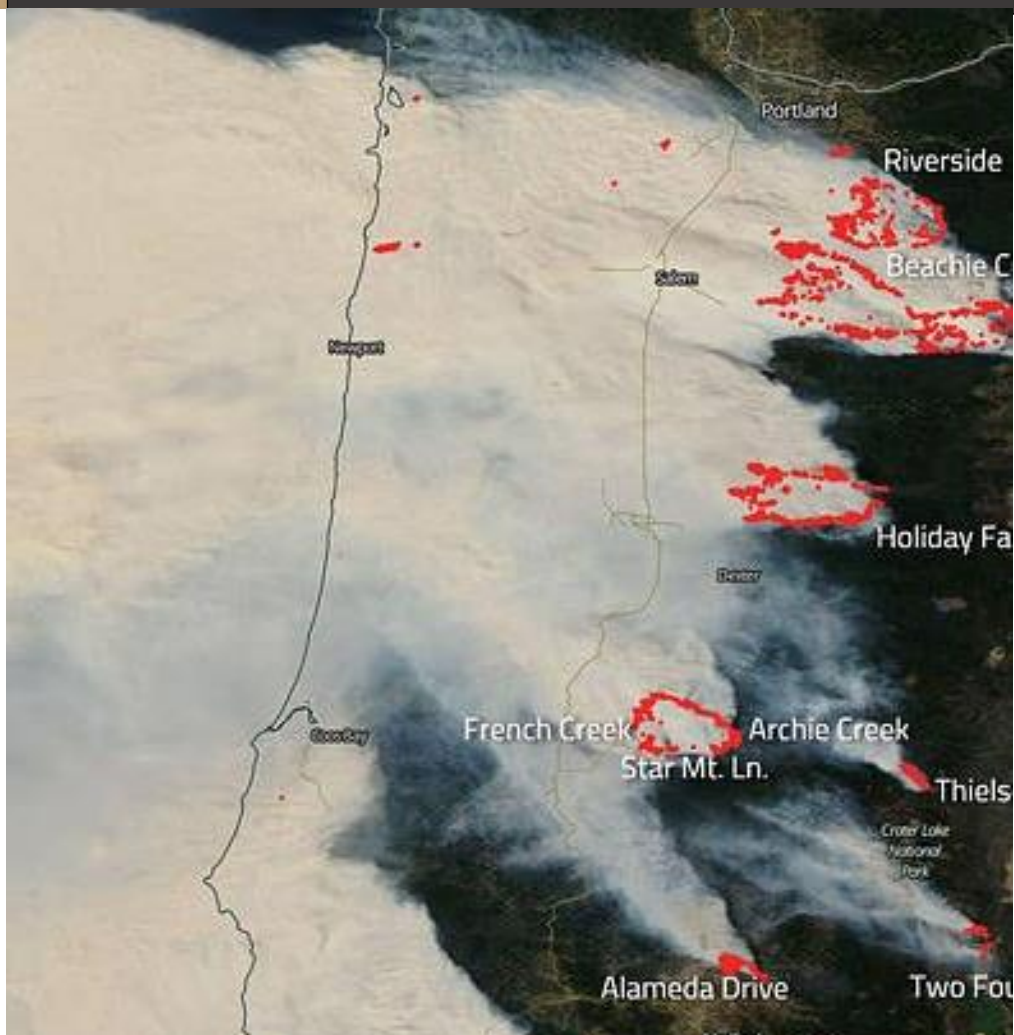
Wildfire Smoke Trends and the Air Quality Index

Data from 2000-2024

July 2025



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DEQ Department of Environmental Quality

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Executive summary

Large wildfires increased across the western United States over the last decade and are expected to become more frequent, according to the National Interagency Fire Center. This report summarizes Oregon DEQ's air quality monitoring for fine particulate matter ($PM_{2.5}$) particulate matter during the 2024 wildfire season (June 1 to Oct. 25), how that information is translated into an Air Quality Index with categories of potential health effects, and how wildfire smoke has influenced AQI trends in Oregon over the past several years."

Across Oregon, wildfire smoke has contributed to an increase in the number of days with AQI levels that are Unhealthy for Sensitive Groups (USG) or worse, with notable examples observed in Eastern, Central, Southern, Northern, and Western Oregon — including the Willamette Valley. While this count focuses on days at or above the USG level, it's important to note that even Moderate AQI levels can affect health in sensitive individuals, as there is no completely "safe" level of exposure to $PM_{2.5}$.

- **Central Oregon (Bend):**
    - In 2024, Bend had 16 days with AQI values that were USG or worse, including 11 USG days and five Unhealthy days. Sisters recorded 5 days at USG levels in 2024.
    - From 1989 to 2012, Bend had only seven days with AQI values that were USG or worse due to wildfire smoke, averaging 0.3 days per year.
    - From 2013 to 2023, Bend experienced a sharp increase, recording 83 days with AQI values that were USG or worse, averaging eight days per year. This marks a 28-fold increase in the number of impacted days per year compared to the previous period. In 2024, Bend had 16 additional days of USG or worse air quality, bringing the total to 99 days from 2013 to 2024.
    - Sisters experienced 88 days of USG or worse air quality between 2012 and 2024. The town recorded four Hazardous days in 2012 (the first on record), three Hazardous days in 2017, and seven Hazardous days in 2020. The 2024 data confirm ongoing smoke impacts with five days of USG, continuing the trend of declining air quality in recent years.
    - From 2017 to 2024, there were 94 days in Bend with AQI values at USG or worse. Sisters recorded 65 days at USG or worse during this same period.

- **Southeastern Oregon (Klamath Falls):**
    - In 2024, Klamath Falls had nine days with AQI values that were USG or worse, with seven USG days and two Unhealthy days.
    - From 2000 to 2012, Klamath Falls had 33 days with AQI values that were USG or worse due to wildfire smoke, or three days per year.
    - From 2013 to 2023, Klamath Falls had 143 days with AQI values at Unhealthy for Sensitive Groups (USG) or worse — averaging 14 days per year. This represents a five-fold increase in the number of days at or above USG compared to the previous ten-year period. In 2024, Klamath Falls experienced 9 additional days of USG or worse air quality, bringing the total to 152 days from 2013 to 2024.
    - In all, there were 137 days with AQI values that were USG or worse from 2017 to 2024.
- **Southwestern Oregon (Medford):**
    - In 2024, Medford had two days with AQI values that were USG or worse, with one USG day and one unhealthy day.
    - From 2000 to 2012, Medford had 22 days with AQI values that were USG or worse due to wildfire smoke, or two days per year.
    - From 2013 to 2023, Medford had 140 days with AQI values that were USG or worse, or 10 per year. That is a 14-fold increase in days impacted per year between the two ten-year periods. In 2024, Medford experienced two additional days of USG or worse air quality, bringing the total to 142 days from 2013 to 2024.
    - In all, there were 122 days with AQI values that were USG or worse from 2017 to 2024.
    - From 2000 to 2024, Medford also experienced seven Hazardous AQI days.
- **Northeastern Oregon (La Grande):**
    - In 2024, La Grande had one USG day with AQI values in the USG level.
    - From 2000 to 2012, La Grande had eight days with AQI values that were USG or worse, or one day per year.
    - From 2013 to 2023, La Grande had 35 days with AQI values that were USG or worse, or 4 days per year. That represents a five-fold increase in the number of days at or above USG per year between the two ten-year periods. In 2024, La Grande had one additional day of USG, bringing the total to 36 days from 2013 to 2024.
    - In all, there were 30 days with AQI values that were USG or worse from 2017 to 2024.

- **Northwestern Oregon (Portland):**
    - In 2024, Portland had no days with AQI values that were USG or worse due to wildfire smoke.
    - Before 2015, Portland had three days with air quality at AQI values that were USG or worse due to wildfire smoke since DEQ air quality monitoring began in 1985.
    - From 2015 to 2023, Portland had 29 days with AQI values that were USG or worse, or four days per year. No additional days were recorded in 2024.
- **Willamette Valley (Eugene, Salem, and Oakridge):**

Over the past few years, wildfire impacts in the northern and central regions of the Willamette Valley were comparatively less severe than impacts observed in Western areas like Oakridge.

- In 2024, Eugene had no USG days and no impact was observed in Salem. Oakridge had 11 days at USG or worse, including seven USG days, 3 Unhealthy days, and 1 Very Unhealthy day.
- From 2000 to 2012, Eugene and Salem areas had no days with AQI values that were USG or worse. From 2000 to 2012, Oakridge had five days with AQI values that were USG or worse from the wildfire smoke, or 0.5 days/year.
- From 2013 to 2023, Eugene and Salem had 64 days with AQI values that were USG or worse, or 6 days per year. That represents a 15-fold increase in the number of days with AQI levels at or above Unhealthy for Sensitive Groups (USG) per year between the two ten-year periods. In 2024, there were no days with AQI levels reaching USG or higher. Eugene and Salem first experienced days with Unhealthy AQI in 2017 and 2020, respectively. In 2017, Eugene recorded two Very Unhealthy days and one Hazardous day. Similarly, Salem experienced six Hazardous days, along with two Very Unhealthy and eight Unhealthy days. In 2022, Eugene had four USG days and three Unhealthy days, while Salem recorded one USG day and two Unhealthy days. From 2013 to 2023, Oakridge had 101 days with AQI values that were USG or worse, or 10 days/yr. That represents a 25-fold increase in the number of days per year with AQI levels at or above Unhealthy for Sensitive Groups (USG) between the two ten-year periods. In 2024, Oakridge experienced 11 additional days of USG or worse air quality, bringing the total to 112 days from 2013 through 2024. In 2017, Oakridge had its first days above the Unhealthy AQI level, with three Very Unhealthy days. In 2020, Oakridge experienced four Very Unhealthy and five Hazardous days. In 2022, Oakridge had 37 days with AQI values that were USG or worse, with 3 USG days, 15 Unhealthy days, nine Very Unhealthy days, and ten Hazardous days.

- In all, there were with 59 days with AQI values of USG or worse from 2017 to 2024 in Eugene and Salem, while Oakridge had 109 days at USG AQI levels or above between 2017 to 2024.

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Introduction

Oregon and adjacent states have abundant temperate rainforests west of the Cascade Mountains and drier ponderosa pine forests east of the Cascades. Fire is a natural part of the ecology of these forests and occasional burning is healthy for forests. Figure 1 demonstrates wildfire trends over the last decade for Oregon, Washington, and Northern California, using the 2024 fire data published by the National Interagency Coordination Center. Fires in these forests have recently become larger, with more acres burned, and a fire season that starts earlier and ends later.

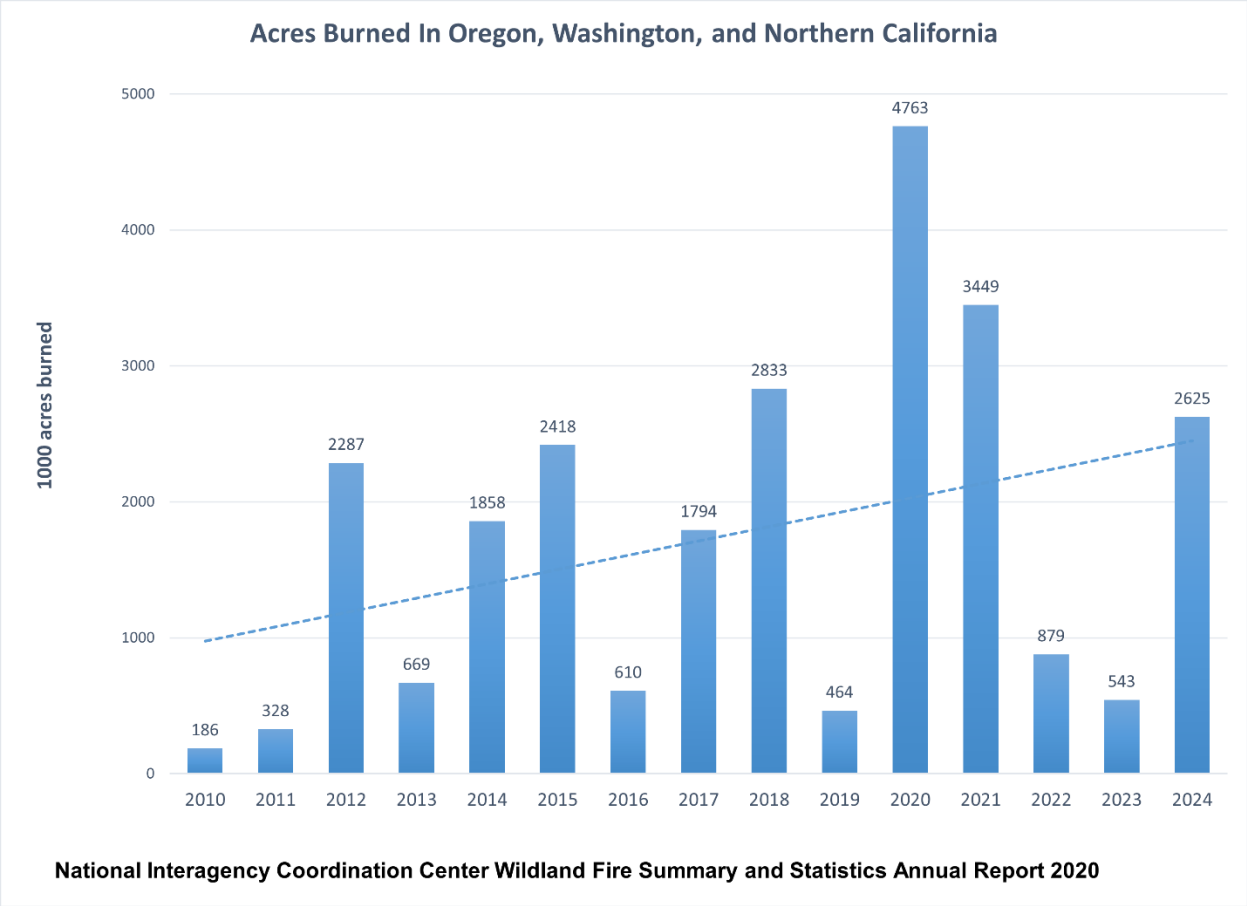


Figure 1. Acreage burned by wildfire in areas impacting the Pacific Northwest.

Wildfire smoke impacts

Wildfire Smoke Impacts Oregon's wildfire season historically started in late July and continued into early September. In the last three years, fires have begun in mid-July and extended into early October. In 2024, wildfires impacted Southern, Central, and Northeastern Oregon, as well as the mountains of Northern California. Some smoke intrusions also originated from British Columbia, Idaho, and Central Washington. In 2020, large fires occurred in the Cascades and along the Oregon coast.

The 2024 wildfire season included numerous fires and complexes across the Cascades and throughout East, Central, North/Northeast, and Southern Oregon. Wildfires in Washington also significantly contributed to smoke transport into Oregon. Figure 2 shows a map of major fire locations.

Columbia Gorge (August 2024)

Wildfires in the Columbia Gorge during August 2024 had localized but minimal air quality impacts. The Whisky Creek Fire (3,239 Acres), Sandstone Fire (702 Acres), and Williams Mine Fire (13,092 Acres) were the primary sources of smoke in the region. West-southwest winds dispersed most smoke, keeping air quality in Hood River, The Dalles, and Stevenson in the Good to Moderate range. However, overnight smoke pooling near Trout Lake and Glenwood resulted in occasional diminished air quality. By late August, increasing containment and scattered rain showers helped reduce fire activity and smoke production, leading to overall Good air quality throughout the region.

East Central Oregon (August–September 2024 and Oct. 2024)

Wildfires in East Central Oregon during August and September 2024 led to moderate to severe smoke impacts, particularly affecting Burns, Dayville, John Day, Prineville, and Seneca. The Rail Ridge Fire (163,622 Acres), Wiley Flat Fire (30,186 Acres), Shoe Fly Fire (26,817 Acres), Firestone (9,462 Acres) and Flat Top Fires (36,362 Acres), and Bachelor Complex (11,741 Acres) were the primary contributors to Unhealthy to Very Unhealthy air quality in several communities. Wildfires in East Central Oregon during August and September 2024 led to moderate smoke impacts, primarily affecting Bend, Sunriver, La Pine, Oakridge, and Crescent Lake. August saw fluctuating smoke levels, with Moderate conditions persisting across the region, but localized Unhealthy for Sensitive Groups (USG) air quality near active fires. As fire activity increased in September, particularly with the expansion of the Rail Ridge and Wiley Flat Fires, air quality worsened, with some locations like Burns and Dayville experiencing Hazardous conditions at times. As of mid-September, air quality had improved in most areas, with only localized and short-term smoke concerns remaining.

A warming trend in early October intensified wildfires in East Central Oregon, increasing smoke accumulation and producing persistent smoke in Bend, Oakridge, Sunriver, La Pine, and Crescent Lake, resulting in USG to Unhealthy AQI levels. Meanwhile, John Day, Prineville, and

Redmond experienced mostly Moderate to Good conditions with occasional USG spikes. However, by mid-October, a cold front brought light rain, reducing fire activity and clearing smoke across the region.

Eastern and Northeastern Oregon (July–August 2024)

In July and early August 2024, multiple wildfires significantly worsened air quality across Eastern and Northeastern Oregon, particularly affecting Harney, Malheur, Grant, Baker, Morrow, Umatilla, and Wheeler counties. The primary fires contributing to smoke production included the Falls Fire (151,680 Acres), Lone Rock Fire (137,222 Acres), Durkee Fire (294,265 Acres), Battle Mountain Complex (183,026 Acres), Telephone Fire (54,034 Acres), Crazy Creek Fire (86,963 Acres), and the Porcupine Fire (6,491 Acres) near Malheur Lake. Persistent hot and dry conditions, along with temperature inversions and light winds, contributed to widespread smoke accumulation and poor air quality.

Between July 19 and August 6, air quality deteriorated in many communities, with Burns, John Day, Monument, Drewsey, and Spray frequently recording Very Unhealthy or Hazardous AQI levels due to their proximity to active fires. Areas such as Ontario, Baker City, and Seneca faced Unhealthy to Unhealthy for Sensitive Groups conditions. A heatwave further exacerbated smoke impacts, and temperature inversions trapped smoke overnight, worsening air quality in valleys and low-lying areas.

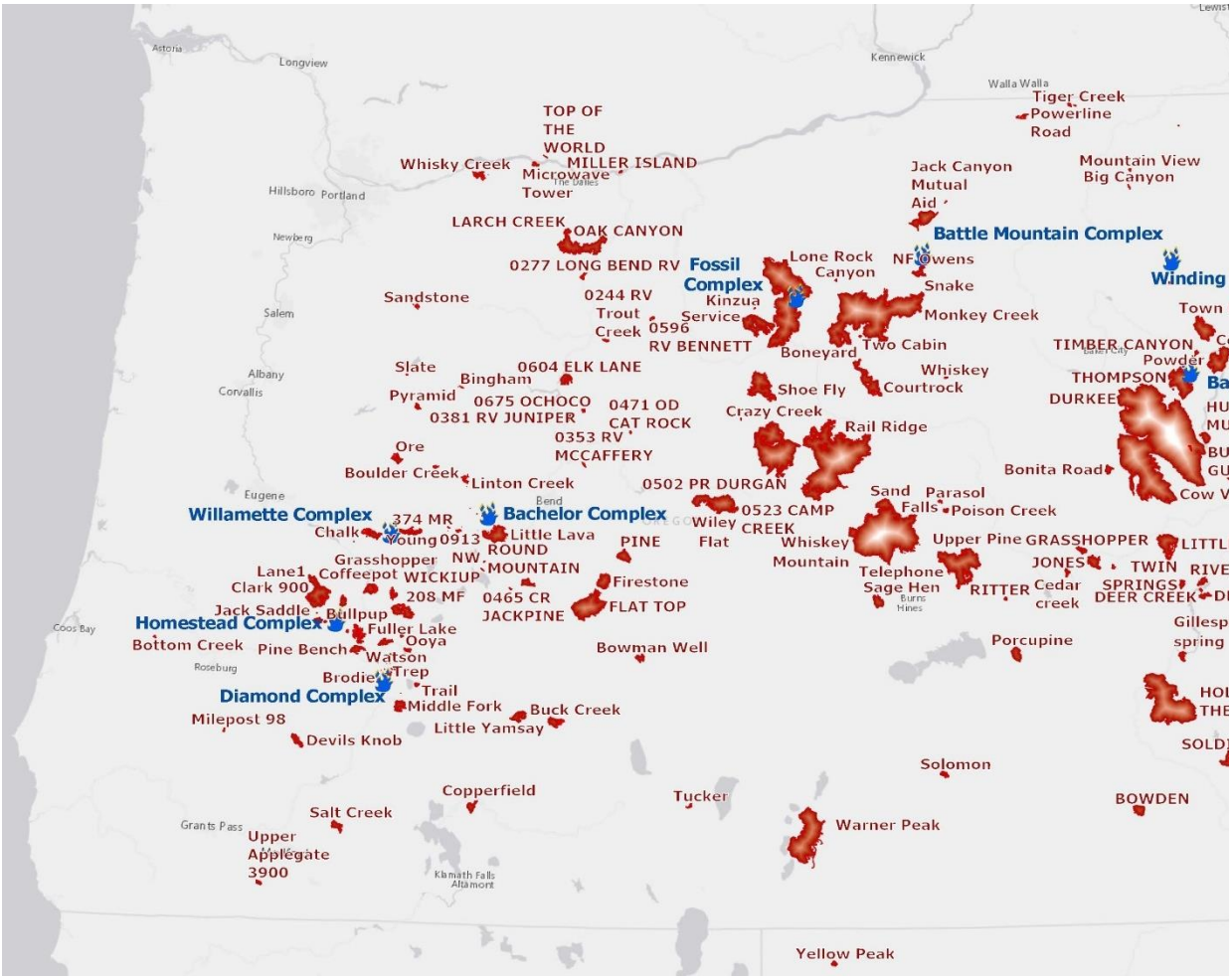
By early August, increased humidity and some precipitation helped reduce smoke production, leading to gradual improvements in air quality. However, active burning and smoke drainage patterns continued to impact areas such as Burns, John Day, and Seneca, which remained in the Unhealthy for Sensitive Groups category.

Northwest Willamette Valley (July–September 2024)

Wildfires in Northwest Willamette Valley during July–September 2024 led to moderate smoke impacts, primarily affecting Oakridge, McKenzie Bridge, Sweet Home, and Detroit Lake. The Willamette Complex South (31,296 Acres), The Coffee Pot Fire (6,203 Acres), Chalk Fire (6,015 Acres), Moss Mountain Fire (2,849), Ore Fire (3,485 Acres), Pyramid Fire (1,312 Acres), Young Grasshopper Fire (5,288 Acres), 208 Fire (11,201 Acres), McKinley Fire (24 Acres), and Slate Fire (91 acres) resulted in Air Quality Index values ranging from Unhealthy for Sensitive Groups to Unhealthy levels. Smoke impacts extended beyond the Willamette Valley into Central Oregon, affecting Redmond, Bend, and Sisters with Moderate to USG air quality. In contrast, Oakridge and La Pine experienced more persistent Unhealthy for Sensitive Groups to Unhealthy air quality, as smoke lingered in the area under stagnant conditions. Meanwhile, the Portland metro area, Springfield, and Sweet Home mostly recorded Good to Moderate air quality with occasional haze. The Willamette Valley's terrain and local wind patterns helped disperse smoke and limit accumulation. A cooling trend in mid-August temporarily improved conditions, though shifting winds continued to bring intermittent smoke across the region.

Southern Oregon (July–August 2024)

Wildfires in Southern Oregon during July–August 2024 caused moderate to significant smoke impacts, primarily affecting Medford, Grants Pass, Klamath Falls, Crater Lake, Diamond Lake, Summer Lake, and Crescent. The Middle Fork Fire (5,286 Acres), the Homestead Complex Fire, and Diamond Complex Fire were the primary contributors to smoke in the region, resulting in Unhealthy to Very Unhealthy air quality east of the Cascades—particularly along Highways 97 and 138. Crater Lake and Diamond Lake experienced persistent smoke, occasionally reaching Very Unhealthy levels. Crescent and Summer Lake saw periods of Hazardous air quality due to heavy smoke accumulation. In contrast, Medford and Grants Pass generally experienced Moderate to USG conditions, with occasional overnight spikes to Unhealthy levels.



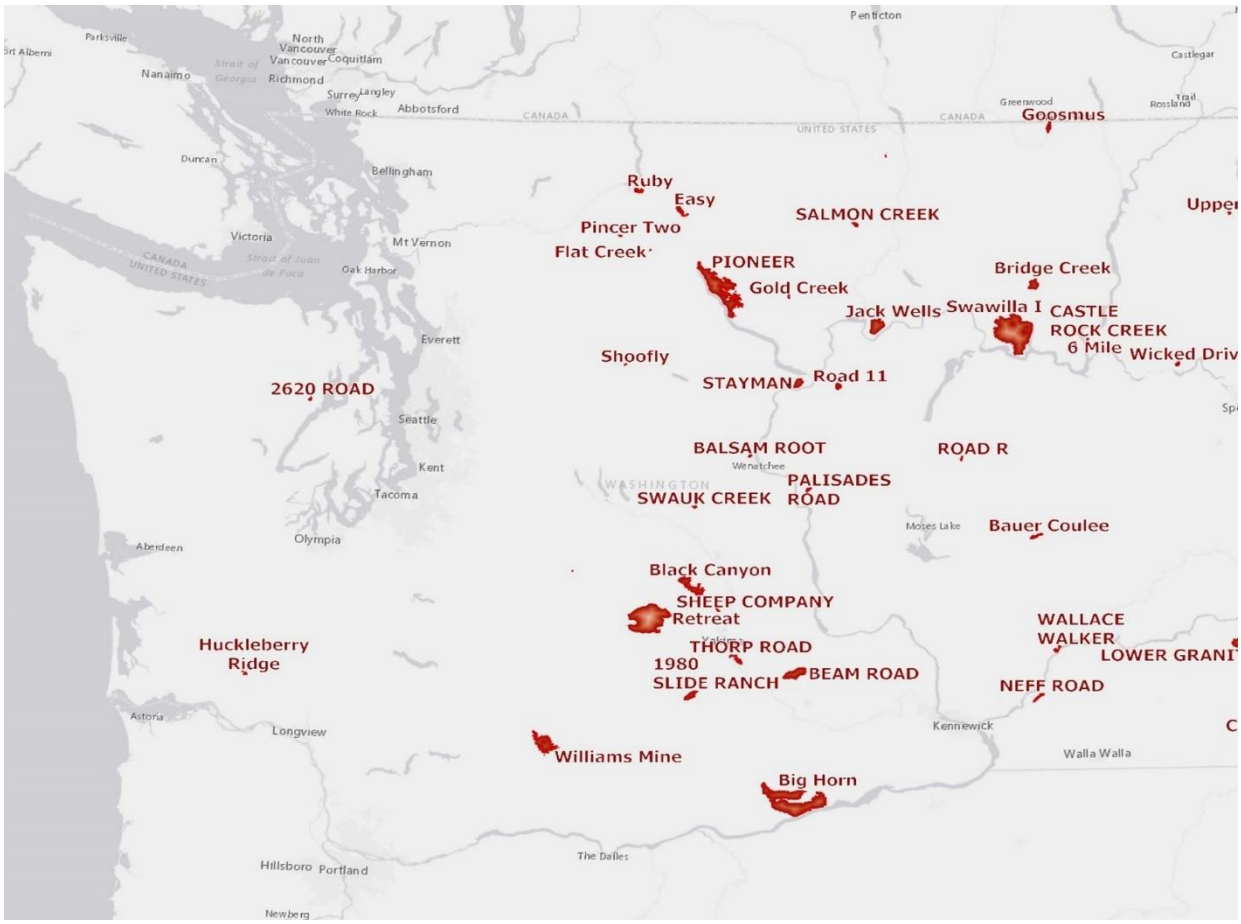


Figure 2. Wildfire perimeters during the 2024 fire season.
(a) Burned areas in Oregon, including major complexes such as Willamette, Homestead, and Diamond.
(b) Burned areas in Washington, with notable fires like Pioneer, Big Horn, and Cougar Creek.
Fire names and perimeters were derived from the NWCC incident reports and mapped using GIS.

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Scope of this report

This report is limited to the presentation of AQI $PM_{2.5}$ trends and associated categories of potential health impacts during wildfire season in Oregon (Jun. 1 to Oct. 25). This report is a useful reference for detailed discussion of the causes, prevalence, and impacts of wildfire smoke.

Calculating AQI trends

Wildfire smoke emits a wide variety of pollutants measured as particulate matter ($PM_{2.5}$ and PM_{10}), black carbon, nitrogen dioxide (NO_2), carbon monoxide (CO), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and metals. According to the Oregon Health Authority's publication, Wildfire Smoke and Your Health, $PM_{2.5}$ may represent the greatest health concern since it can be inhaled deeply into the lungs and may reach the bloodstream. Volatile organic compounds can cause symptoms such as watery eyes, respiratory tract irritation and headaches. Higher levels of ozone (smog) can also be formed from an increase in the precursor pollutants: nitrogen dioxide and VOCs.

The EPA regulates six "criteria pollutants": carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide. To communicate the health risks associated with these pollutants, the EPA developed the color-coded Air Quality Index (AQI), which translates pollutant concentrations into easily understandable health categories. In Oregon, $PM_{2.5}$ and ozone are typically the pollutants with the highest AQI values and are therefore considered the primary drivers of air quality-related health concerns. Ozone levels tend to rise in urban areas during the summer, especially on hot days, often resulting in higher AQI values—unless wildfire smoke is present. During smoke events, $PM_{2.5}$ concentrations typically dominate the AQI. As a result, $PM_{2.5}$ is used to assess trends in wildfire smoke impacts on public health, since it most frequently reaches the highest AQI levels among continuously measured pollutants.

The EPA's "Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI)" is a formal guidance (EPA-454/B-12/001) originally published in September 2012 and updated May 2016. The AQI categories and their associated health impacts are summarized in Table 1 below.

In 2024, the U.S. EPA updated the AQI breakpoints. Notably, the "50" cut-off for Moderate AQI was lowered to 9.0 µg/m³ (previously 12 µg/m³), while intermediate breakpoints of 100 (Unhealthy for Sensitive Groups) and 150 (Unhealthy) remain at 35.4 and 55.4 µg/m³. Higher breakpoint, 200 (Very Unhealthy), 300, and 500, were also decreased to 125.4, 225.4, and 325.4 µg/m³, respectively (Table 2). As part of this report, all AQI values were recalculated based on measured $PM_{2.5}$ concentrations using the updated 2024 breakpoints.

Table 1. The $PM_{2.5}$ Air Quality Index and potential health effects.

Air Quality Index (AQI) Categories and Health Recommendations

AQI Category	Index	Who Needs to be Concerned?	What Should I Do?
Good	(0–50)		It's a great day to be active outside.
Moderate	(51–100)	Some people who may be unusually sensitive to particle pollution.	Unusually sensitive people: Consider making outdoor activities shorter and less intense. Watch for symptoms such as coughing or shortness of breath. These are signs to take it easier. Everyone else: It's a good day to be active outside.
Unhealthy for Sensitive Groups	(101–150)	Sensitive groups include people with heart or lung disease, older adults, children and teenagers, pregnant people, minority populations, and outdoor workers.	Sensitive groups: Make outdoor activities shorter and less intense. It's OK to be active outdoors, but take more breaks. Watch for symptoms such as coughing or shortness of breath. People with asthma: Follow your asthma action plan and keep quick relief medicine handy. People with heart disease: Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider.
Unhealthy	(151–200)	Everyone	Sensitive groups: Avoid long or intense outdoor activities. Consider rescheduling or moving activities indoors.* Everyone else: Reduce long or intense activities. Take more breaks during outdoor activities.
Very Unhealthy	(201–300)	Everyone	Sensitive groups: Avoid all physical activity outdoors. Reschedule to a time when air quality is better or move activities indoors. * Everyone else: Avoid long or intense activities. Consider rescheduling or moving activities indoors. *
Hazardous	(301–500)	Everyone	Everyone: Avoid all physical activity outdoors. Sensitive groups: Remain indoors and keep activity levels low. Follow tips for keeping particle levels low indoors.*

*Note: If you don't have an air conditioner, staying inside with the windows closed may be dangerous in extremely hot weather. If you are hot, go someplace with air conditioning or check with your local government to find out if cooling centers are available in your community.

Table 2. 2024 EPA changes to the $PM_{2.5}$ Air Quality Index breakpoints.

$PM_{2.5}$ Air Quality Index (AQI) Categories – Updated 2024 Breakpoints

AQI Category	Index Values	$PM_{2.5}$ Concentration Range (µg/m³, 24 hour avg)	Description of Air Quality
Good	0–50	0.0 – 9.0	Air quality is satisfactory, air pollution poses little
Moderate	51–100	9.1 – 35.4	Acceptable air quality; some pollutants may pose a concern for sensitive individuals
Unhealthy for Sensitive Groups	101–150	35.5 – 55.4	Sensitive groups may experience health effects; general public is less likely affected
Unhealthy	151–200	55.5 –125.4	Everyone may begin to experience health effects
Very Unhealthy	201–300	125.5 – 225.4	Health alert: risk of health effects is increased for everyone.
Hazardous	301+	225.5+	Health warnings of emergency conditions; general population more likely to be affected.

Historically, DEQ measured $PM_{2.5}$ using Federal Reference Method (FRM) filter samplers at selected locations. These samplers collect air over a 24-hour period beginning at midnight, typically following a one-in-three, one-in-six, or one-in-twelve day sampling schedule. FRM data are used to meet regulatory requirements and serve as the foundation for long-term trend assessments. In recent years, DEQ and the Lane Regional Air Protection Agency (LRAPA) have upgraded the $PM_{2.5}$ monitoring network by replacing FRM filter samplers with Federal Equivalent Method (FEM) monitors. FEM instruments operate continuously and collect hourly data using beta attenuation methods. DEQ is currently updating nephelometer calibrations by correlating them with FEM data to ensure continuity and accuracy in real-time $PM_{2.5}$ estimates. Many FRM sites are co-located with nephelometers, which provide continuous, real-time measurements of light scattering related to particulate matter concentrations. DEQ established site-specific linear regression equations to correlate nephelometer readings with FRM data, allowing conversion of nephelometer output into estimated $PM_{2.5}$ concentrations for real-time air quality reporting and public health advisories.

For this report, 24-hour average $PM_{2.5}$ values are used to calculate the daily AQI and summarize smoke-related trends. The first level of data used in the wildfire smoke trend

summaries comes from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors because these are EPA-approved regulatory-grade instruments. They are considered the most accurate and consistent for air quality assessments and are used to determine compliance with the National Ambient Air Quality Standards (NAAQS). In contrast, nephelometers and low-cost sensors (e.g., SensOR or PurpleAir) provide valuable supplemental data, especially in areas without FRM/FEM coverage or where instruments were offline or shut down (e.g., due to clogging during heavy smoke), DEQ relied on a tiered approach to fill data gaps. This included using nephelometers first, followed by SensOR, and finally PurpleAir sensors, in that order. For this trend report, when no data were available from a regulatory monitor or nephelometer, DEQ used a nearby SensOR monitor followed by a PurpleAir sensor if needed and correlated their data each with the nearest DEQ monitor when both were operational. This correlation was then used to estimate $PM_{2.5}$ concentrations during periods when the DEQ monitor was offline or otherwise failed to collect valid data.

These data sources were primarily used to support narrative summaries rather than inclusion in the official trend figures. This tiered approach ensures that trend analysis remains scientifically robust while provided important context for describing smoke impacts in regions where regulatory monitors are not present. Resource limitations make operating FRM/FEM monitors across the entire state impractical, necessitating the use of non-regulatory monitors.

In some regions, including Corvallis, Eugene, Portland, and Roseburg, multiple monitors of different types (e.g., FRM, FEM, nephelometers, and sensors) are present. In these areas, we combined site-level data and reported the maximum daily $PM_{2.5}$ concentration regardless of monitor type to better reflect regional exposure.

Wildfire Smoke and Statewide AQI Trends in Oregon (2017–2024)

From 2017 to 2024, wildfire smoke contributed to an increasing number of days with Air Quality Index (AQI) values at or above the “Unhealthy for Sensitive Groups” (USG) level across Oregon. Southern and Southwestern Oregon were consistently the most impacted, with especially severe smoke events in 2018 and 2020. Central Oregon saw more variable but still significant impacts, particularly in 2021 and again in 2024. The Willamette Valley and Portland Metro areas also experienced a rise in USG or worse days, although local terrain and marine air influence at times helped disperse smoke and prevent prolonged accumulation. In 2024, Southwestern Oregon again recorded the highest number of days ≥ USG, while Central Oregon—including Bend, Sisters, and Redmond—saw elevated AQI levels due to regional smoke transport. Conversely, Northeastern and Southeastern Oregon experienced fewer smoke-impacted days in 2024 compared to peak years like 2020 and 2021. However, Southeastern Oregon still recorded notable AQI elevations in 2024, largely due to smoke transported from multiple large fires burning in Northeast Oregon (Figure 3).

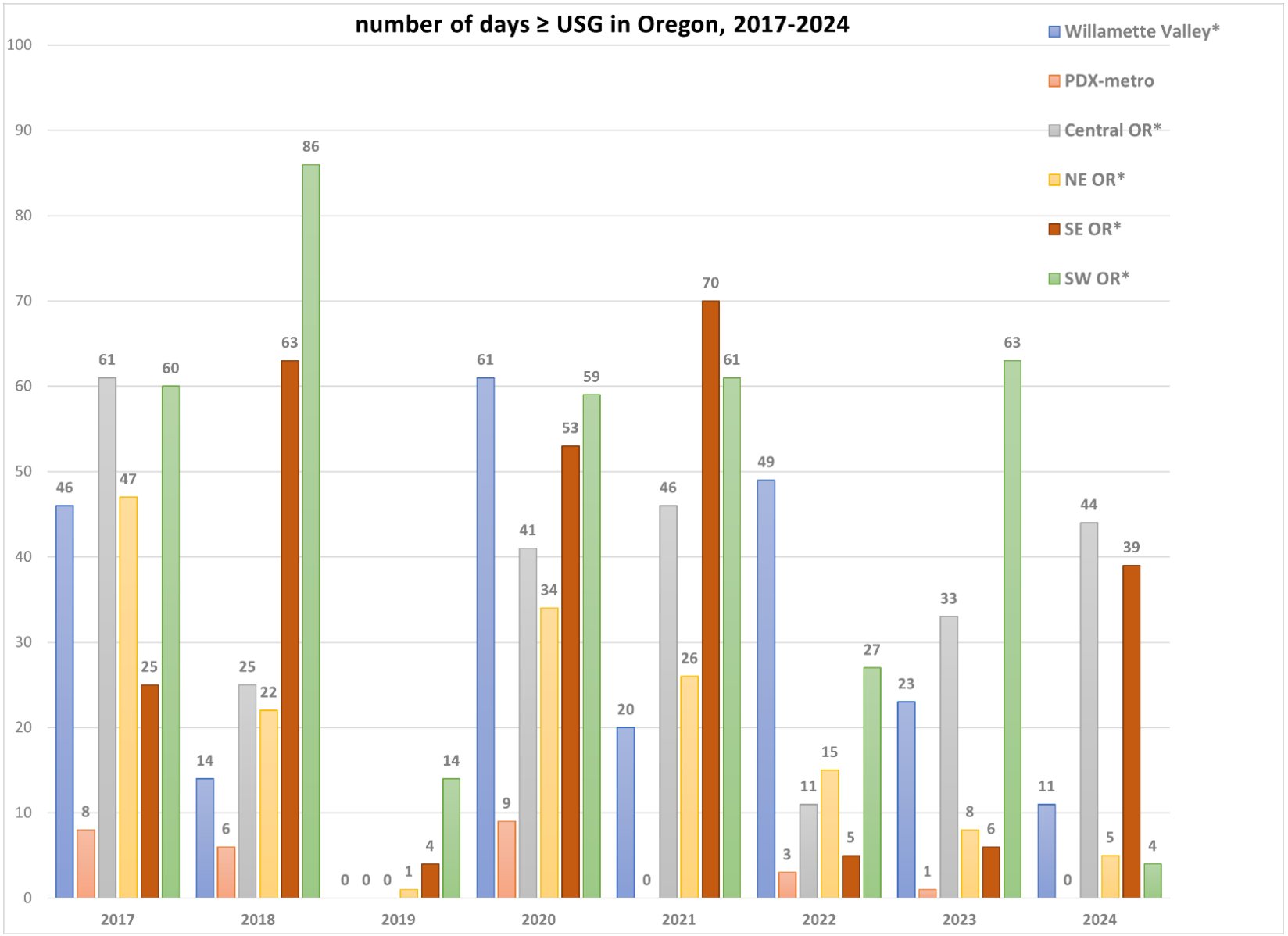

Figure 3. number of AQI days at USG or worse from wildfire smoke in Oregon from 2017 to 2024.

Willamette Valley*: Albany, Corvallis, Cottage Grove, Oakridge, Salem, Sweet Home, Eugene, Roseburg. Central OR*: Bend, Sisters, John Day, Prineville. NE OR*: La Grande, Pendleton, Enterprise, The Dalles, Baker City. SE OR*: Lakeview, Burns, Klamath Falls. SW OR*: Cave junction, Grants Pass, Medford, Roseburg.

Smoke Impacts on AQI Trends

DEQ compiled the wildfire AQI trends for “Unhealthy for Sensitive Groups,” “Unhealthy,” “Very Unhealthy” and “Hazardous” categories of the AQI. Collectively these categories are known as Unhealthy for Sensitive Groups or worse, or ≥USG for short. In Oregon, wildfire smoke occurs during the summer; this report includes values from June 1 to October 25. July 4 was removed from the trends because of outliers due to fireworks. DEQ evaluated summer AQI trends DEQ evaluated summer AQI trends from 2005 to 2024 for 24 communities in Oregon. A map of wildfire-related AQI trends for various cities around the state is shown in Figure 4. The charts on the map show the number of days with AQI values at or above the “Unhealthy for Sensitive Groups” (USG) level, grouped into five color-coded ranges: ≤3, ≤5, ≤8, ≤10, and ≤14.6 days. As part of this report, all AQI values were recalculated using measured $PM_{2.5}$ concentrations and the updated 2024 AQI breakpoints.

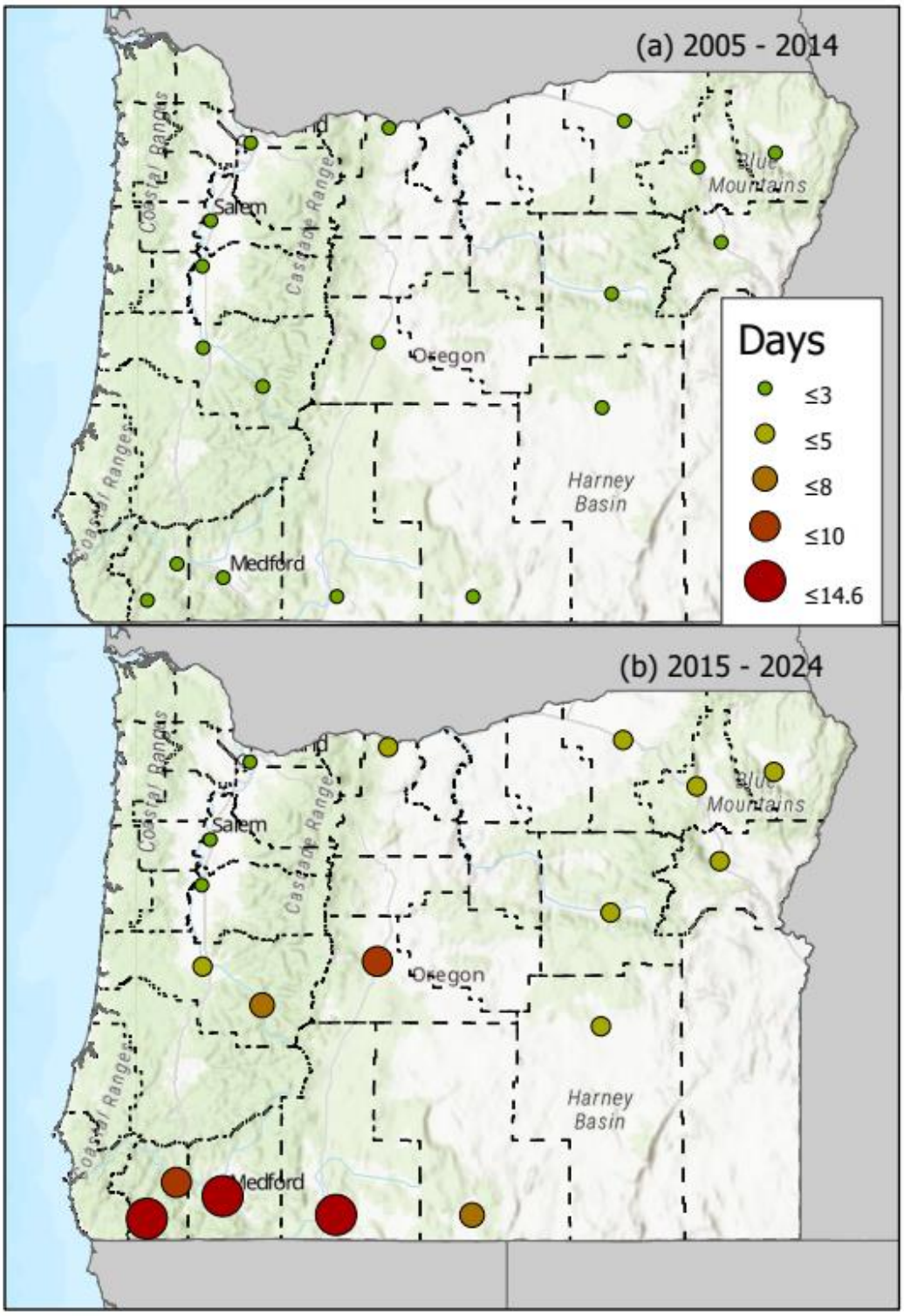

Figure 4. Average number of AQI days at USG or above from wildfire smoke, 2005 to 2024.

To simplify the discussion in this report, only four of the cities from across the state are provided in the main body. They are Bend, Klamath Falls, Medford, and Portland. The trends for the number of days ≥USG for these cities is provided in Figure 5 through Figure 8. The graphs for the remaining cities are shown in the appendix.

The 2024 AQI data has been compiled into the following trends summaries.

- **Bend**
  Between 2000 and 2012, Bend had 6 USG days caused by wildfire smoke. Between 2013 and 2024, Bend experienced 98 days ≥ USG, including 31 Unhealthy days, 10 Very Unhealthy days, and 8 Hazardous days. Of those, 94 days ≥ USG occurred from 2017 to 2024. In 2024 alone, Bend had 11 USG days, 4 Unhealthy days, and no Very Unhealthy or Hazardous days.

- **Klamath Falls**
  From 2000 to 2012, Klamath Falls recorded 33 days ≥ USG, with 16 Unhealthy days and 2 Very Unhealthy days. Between 2013 and 2024, the area experienced 152 days ≥ USG, with 12 Very Unhealthy days and 2 Hazardous days. Of these, 137 days ≥ USG occurred between 2017 and 2024. Notably, Klamath Falls had 2 Very Unhealthy days before 2013, 12 between 2013 and 2024, and its first Hazardous day in 2020. In 2024, it had 9 days ≥ USG; of which 7 were USG days and 2 were Unhealthy days.

- **Medford**
  Between 2000 and 2012, Medford had 22 days ≥ USG, including 5 Unhealthy days and no Very Unhealthy or Hazardous days. From 2013 to 2024, it experienced 142 days ≥ USG, including 68 Unhealthy days, 24 Very Unhealthy days, and 7 Hazardous days. Of these, 122 days ≥ USG occurred between 2017 and 2024, with 59 Unhealthy days, 20 Very Unhealthy days, and 7 Hazardous days. Medford had 1 Hazardous day in 2017 and 5 in 2020. In 2024, it recorded 2 days ≥ USG; 1 USG and 1 Unhealthy day.

- **Portland:**
  Between 2000 and 2012, Portland had 2 days ≥ USG from wildfire smoke. From 2013 to 2024, it experienced 29 days ≥ USG, with 27 of those occurring between 2017 and 2024. During this period, Portland had 7 Unhealthy days, 2 Very Unhealthy days, and 6 Hazardous days, all Very Unhealthy and Hazardous days occurred in 2020. There were no days ≥ USG in 2024.

- **Eugene and Salem (Northern Willamette Valley):**
  There were no days ≥ USG in Eugene and Salem before 2012. Between 2013 and 2024, the region experienced 64 days ≥ USG, including 17 Unhealthy days, 4 Very Unhealthy days, and 15 Hazardous days. From 2017 to 2024, there were 59 days ≥ USG: Eugene recorded 9 Unhealthy, 4 Very Unhealthy, and 9 Hazardous days; Salem had 4 Unhealthy and 6 Hazardous days. Neither city experienced any days ≥ USG in 2024.

- **Oakridge (Eastern Willamette Valley):**
  Between 2000 and 2012, Oakridge had 5 days ≥ USG, with no Very Unhealthy or Hazardous days. From 2013 to 2024, Oakridge experienced 112 days ≥ USG, including 40 Unhealthy, 19 Very

Unhealthy, and 15 Hazardous days. Of those, 109 occurred between 2017 and 2024. In 2024, Oakridge had 11 days ≥ USG: 7 USG days, 3 Unhealthy days, and 1 Very Unhealthy day.

- **La Grande (Northeastern Oregon):**
  Between 2000 and 2012, La Grande had 8 days ≥ USG from wildfire smoke. From 2013 to 2024, it experienced 36 days ≥ USG, including 11 Unhealthy, 4 Very Unhealthy, and 1 Hazardous day. Of these, 30 occurred between 2017 and 2024, with the first Unhealthy day recorded in 2017 and the first Hazardous day in 2020. In 2024, La Grande had 1 USG day.

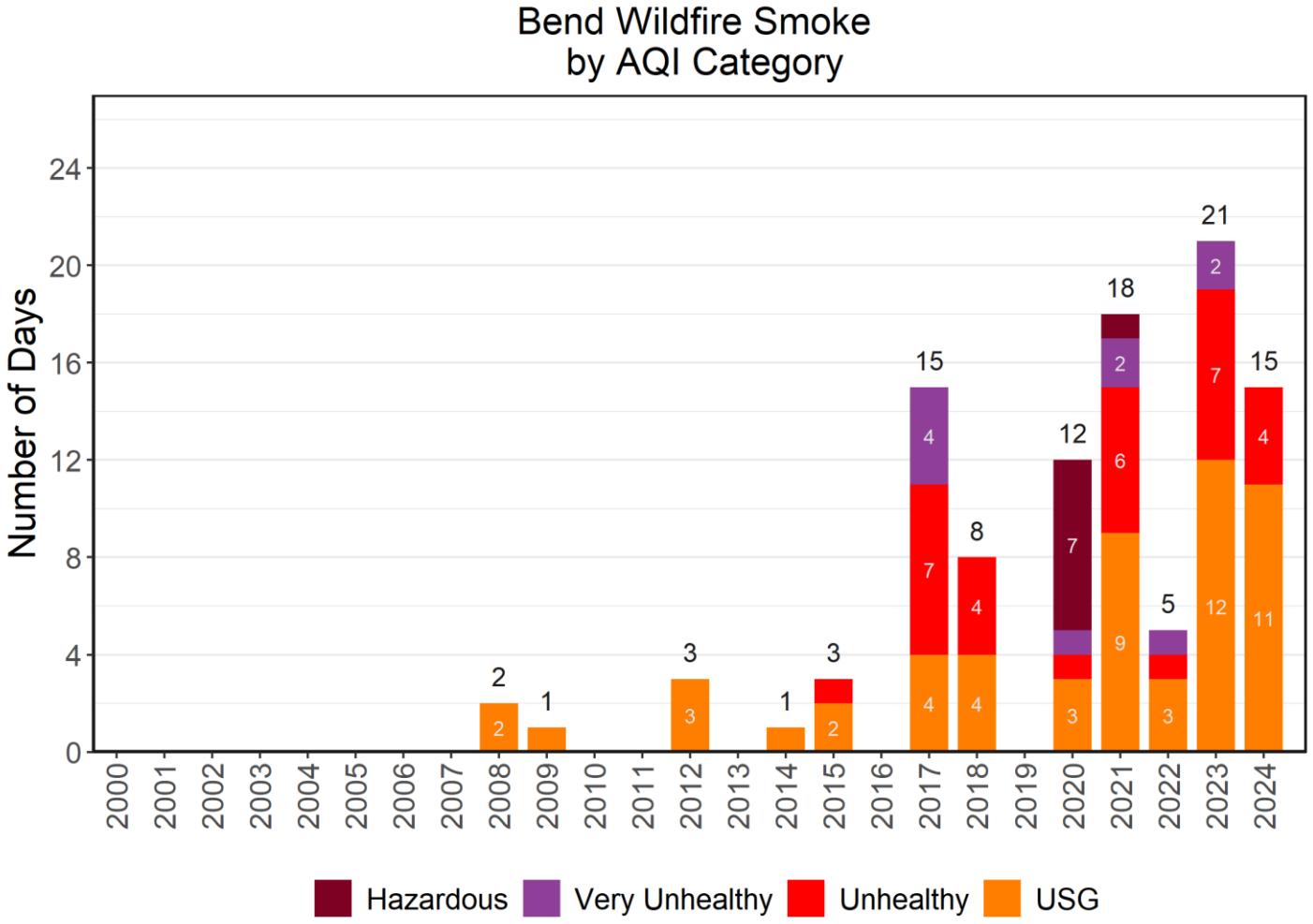

Figure 5. Bend ≥ USG AQI wildfire smoke trends.

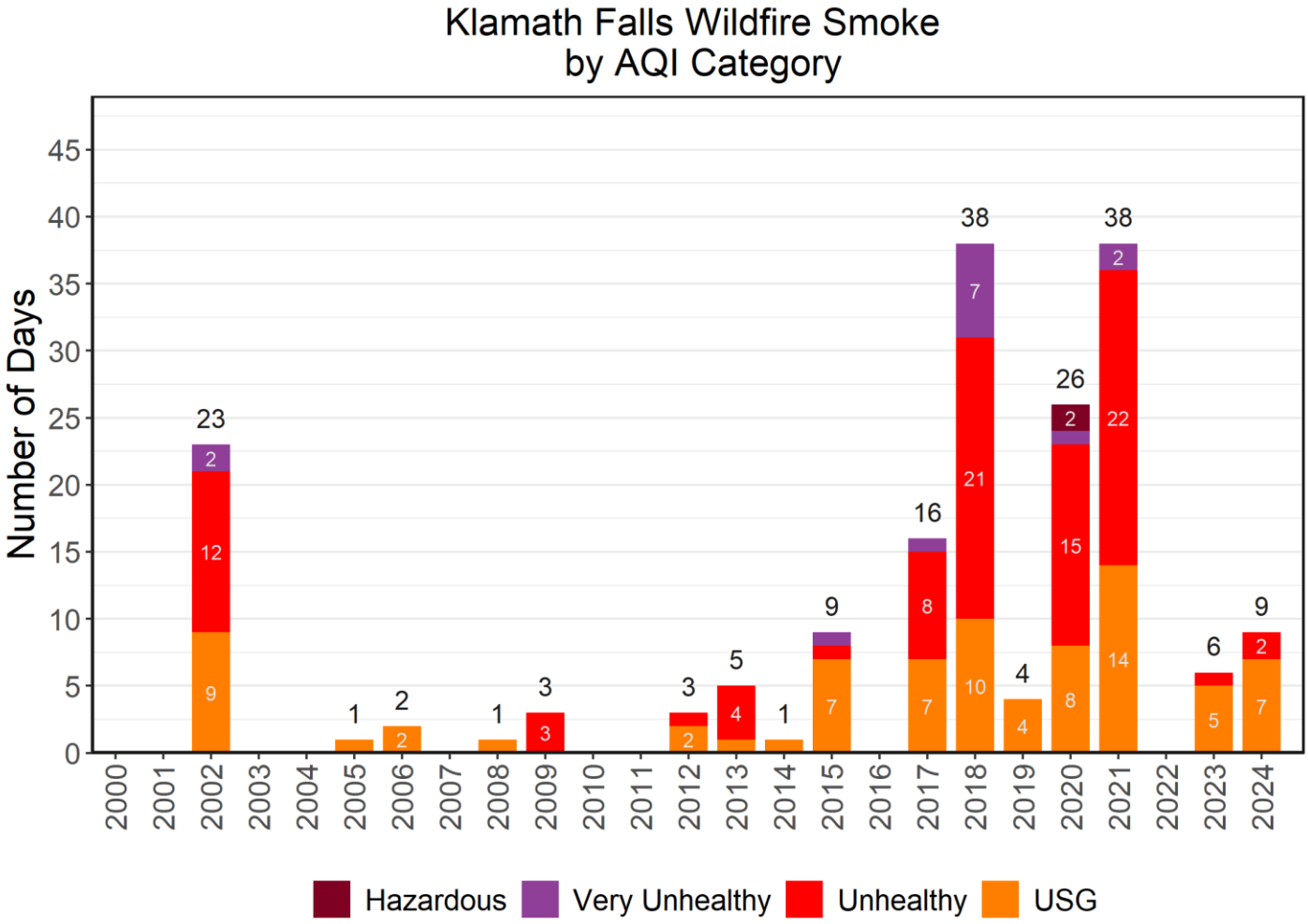

Figure 6. Klamath Falls ≥ USG AQI wildfire smoke trends.

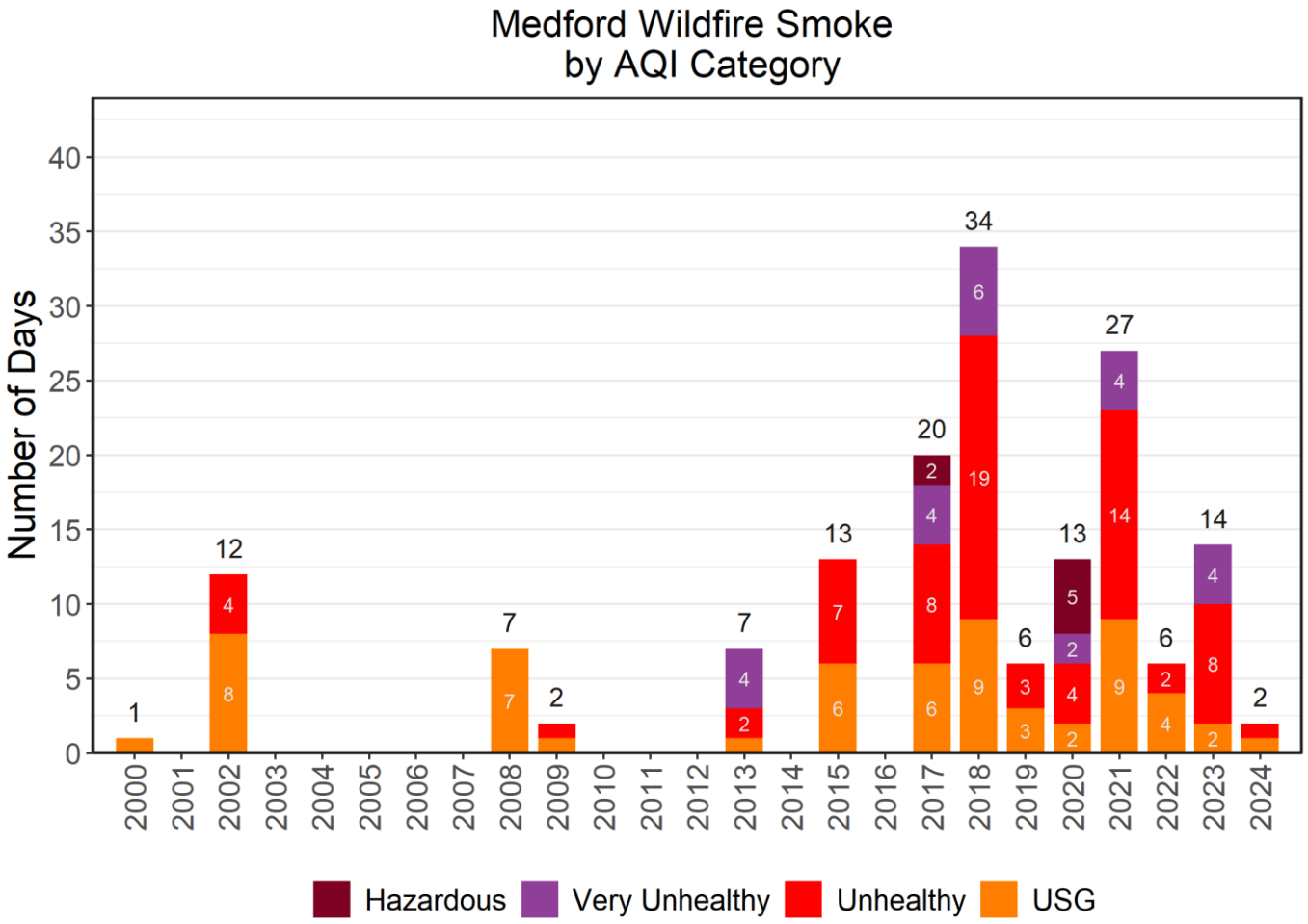

Figure 7. Medford ≥ USG AQI wildfire smoke trends.

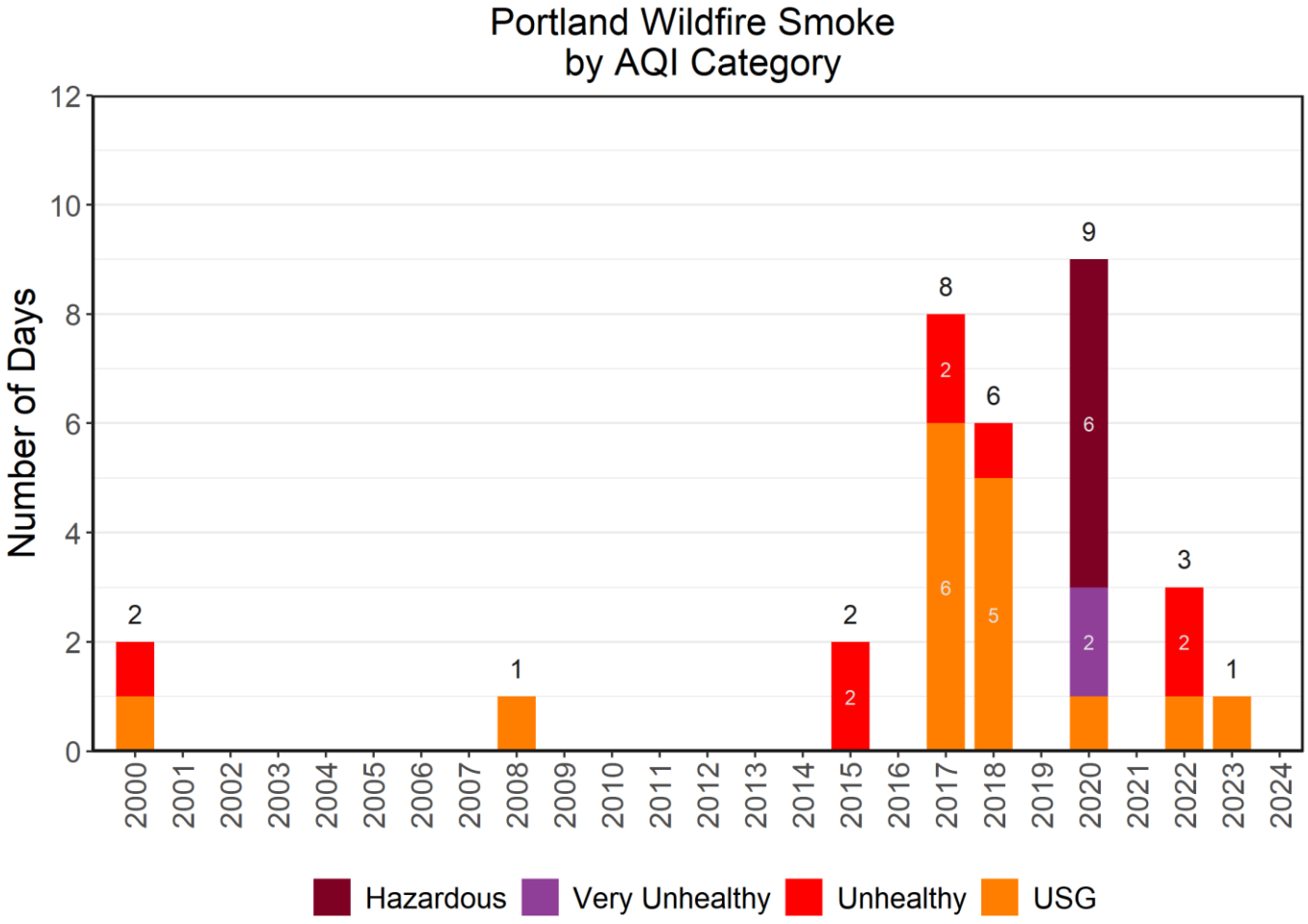

Figure 8. Portland ≥ USG AQI wildfire smoke trends.

Conclusion

The data show an increasing number of days with AQI values at or above the "Unhealthy for Sensitive Groups" (USG) level across Oregon, particularly since 2017. While Southern and Southwestern Oregon have experienced the most significant impacts, other areas such as the Willamette Valley and Portland Metro are also seeing more frequent smoke events. If these trends continue, Oregon is likely to face more days with elevated AQI levels during the summer, affecting areas that have historically seen less smoke.

References

EPA's Wildland Fire Publications, Fact Sheets and Other Resources

AQI – A Guide to Air Quality and Your Health

Track current air quality on DEQ's online Air Quality Index or the free Oregon Air app.

During wildfire season, you can also track air quality at OregonSmoke.org.

Wildfire Smoke and Your Health, Public Health Division, Oregon Health Authority.

U.S. Environmental Protection Agency. *Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI).* EPA-454/B-12/001. Research Triangle Park, NC: Office of Air Quality Planning and Standards; September 2012 (updated May 2016).

Appendix

Wildfire trends for individual communities

The graphs below show the number of days with an AQI ≥USG for 20 communities with monitoring data. The horizontal axis (or date) varies for each chart depending on when monitoring was started.

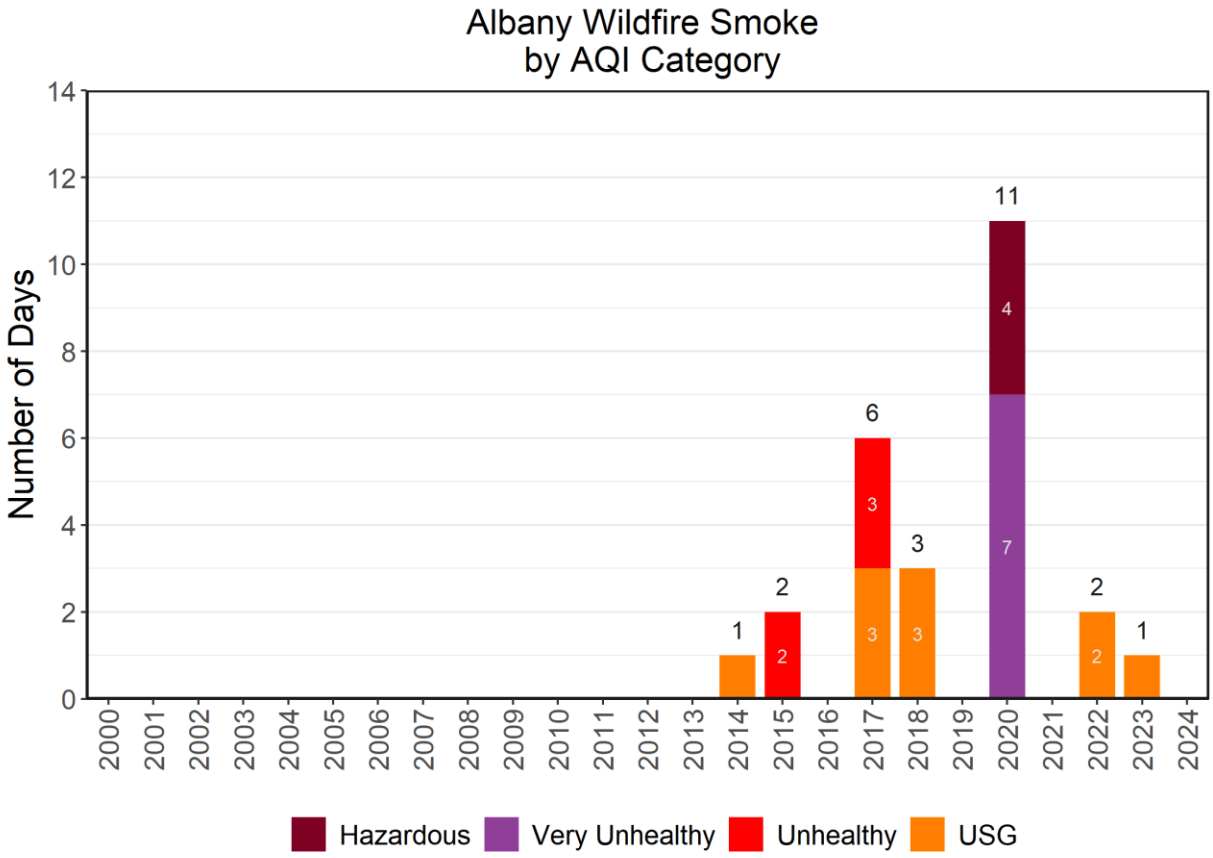

Figure 9. Albany wildfire ≥ USG AQI wildfire smoke trends.

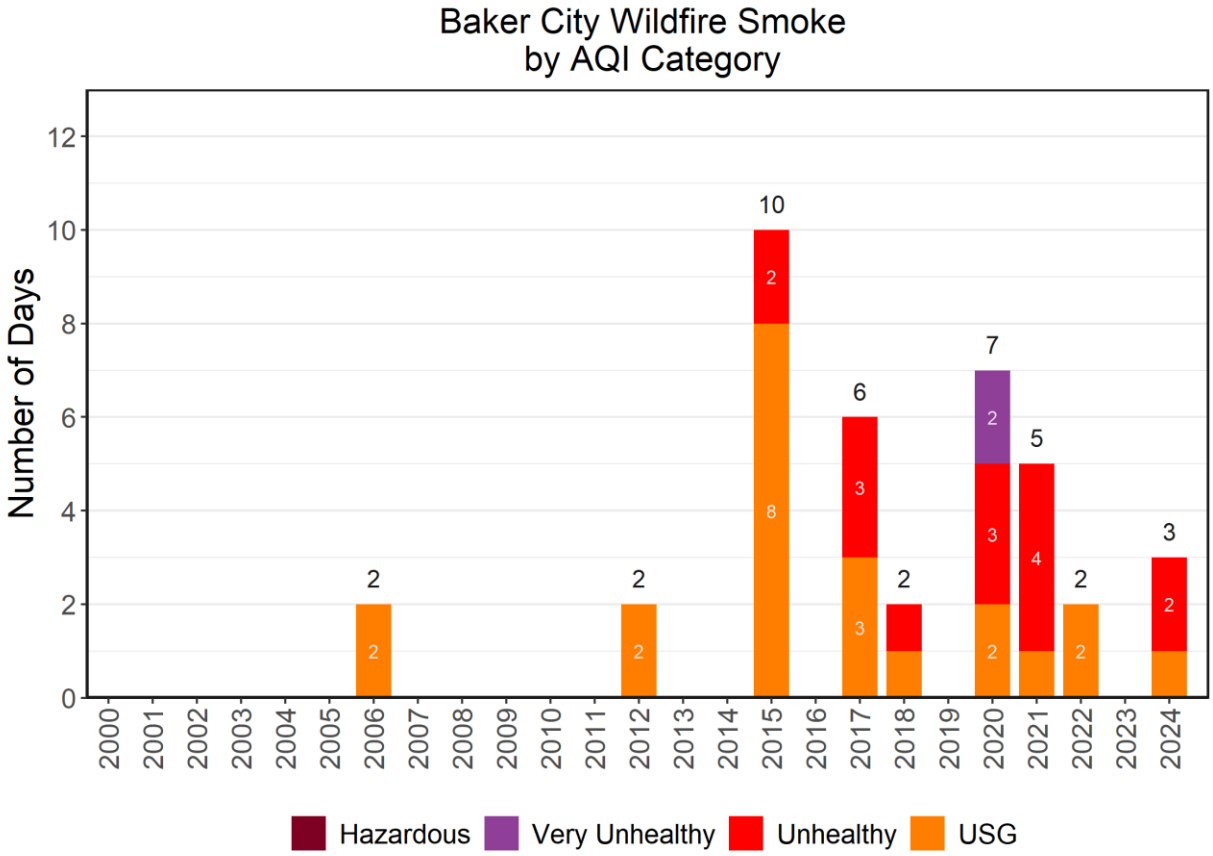

Figure 10. Baker City wildfire ≥ USG AQI wildfire smoke trends.

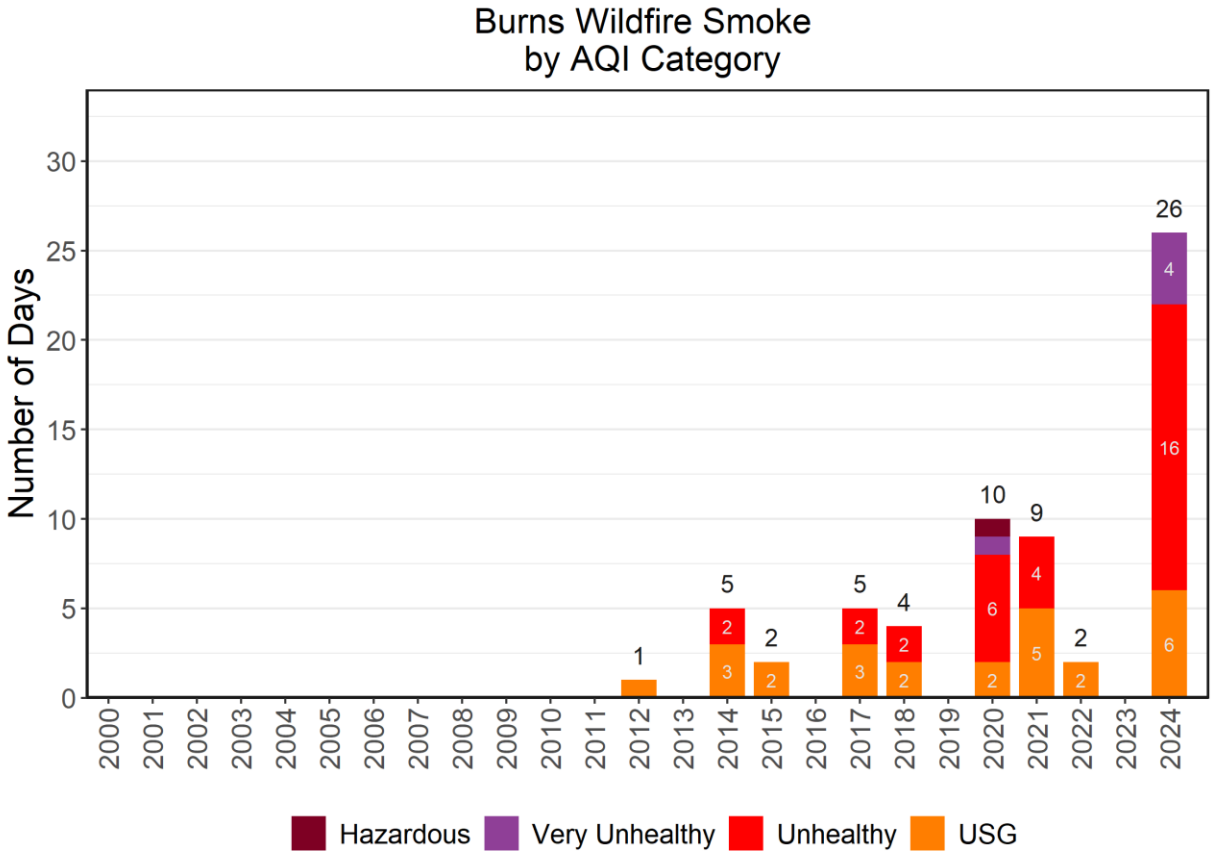

Figure 11. Burns wildfire ≥ USG AQI wildfire smoke trends.

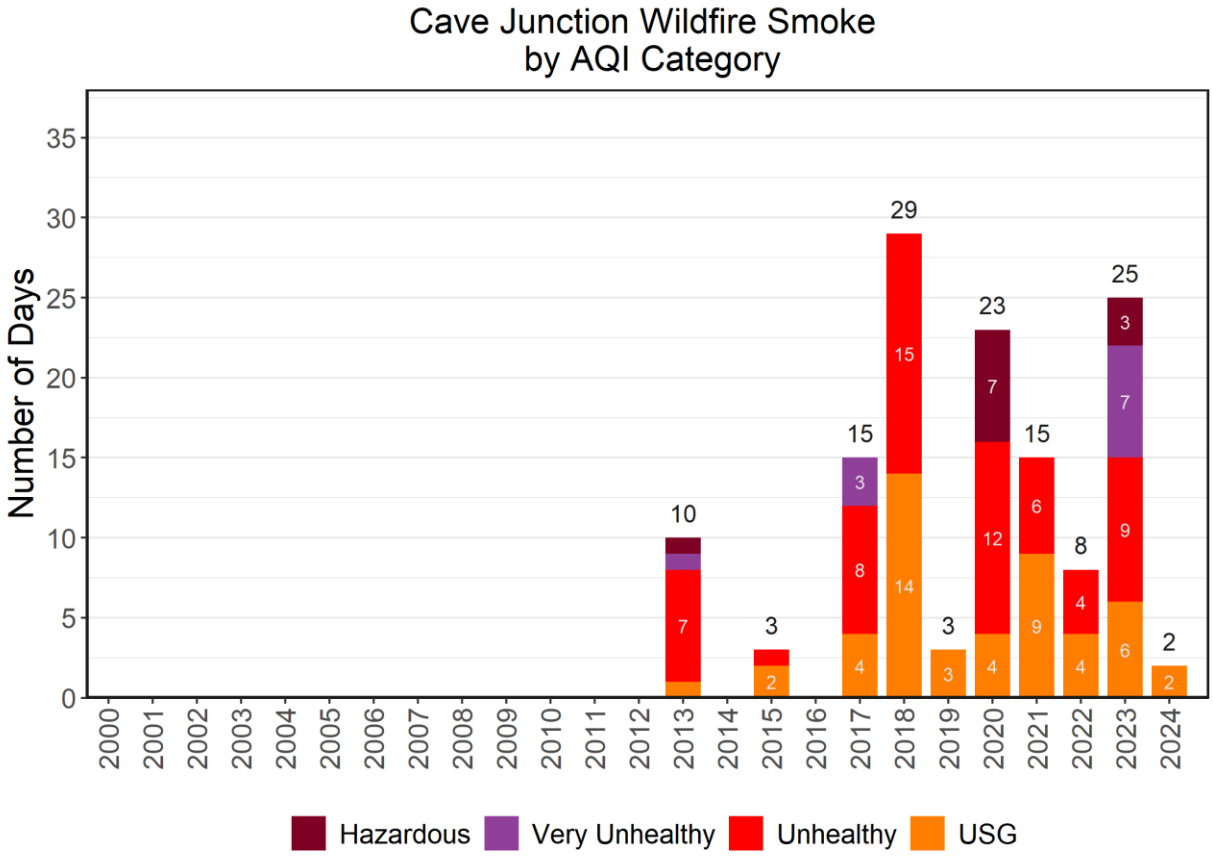

Figure 12. Cave Junction wildfire ≥ USG AQI wildfire smoke trends.

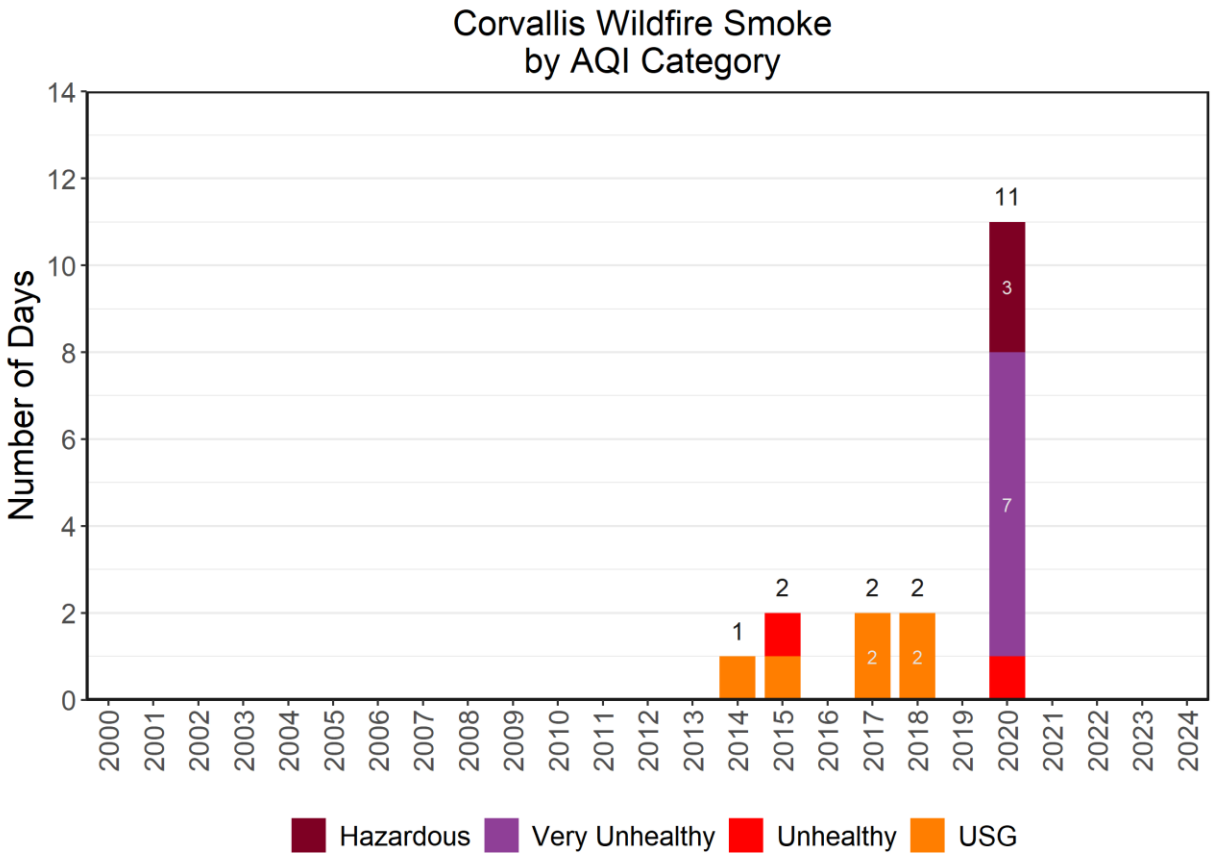

Figure 13. Corvallis wildfire ≥ USG AQI wildfire smoke trends.

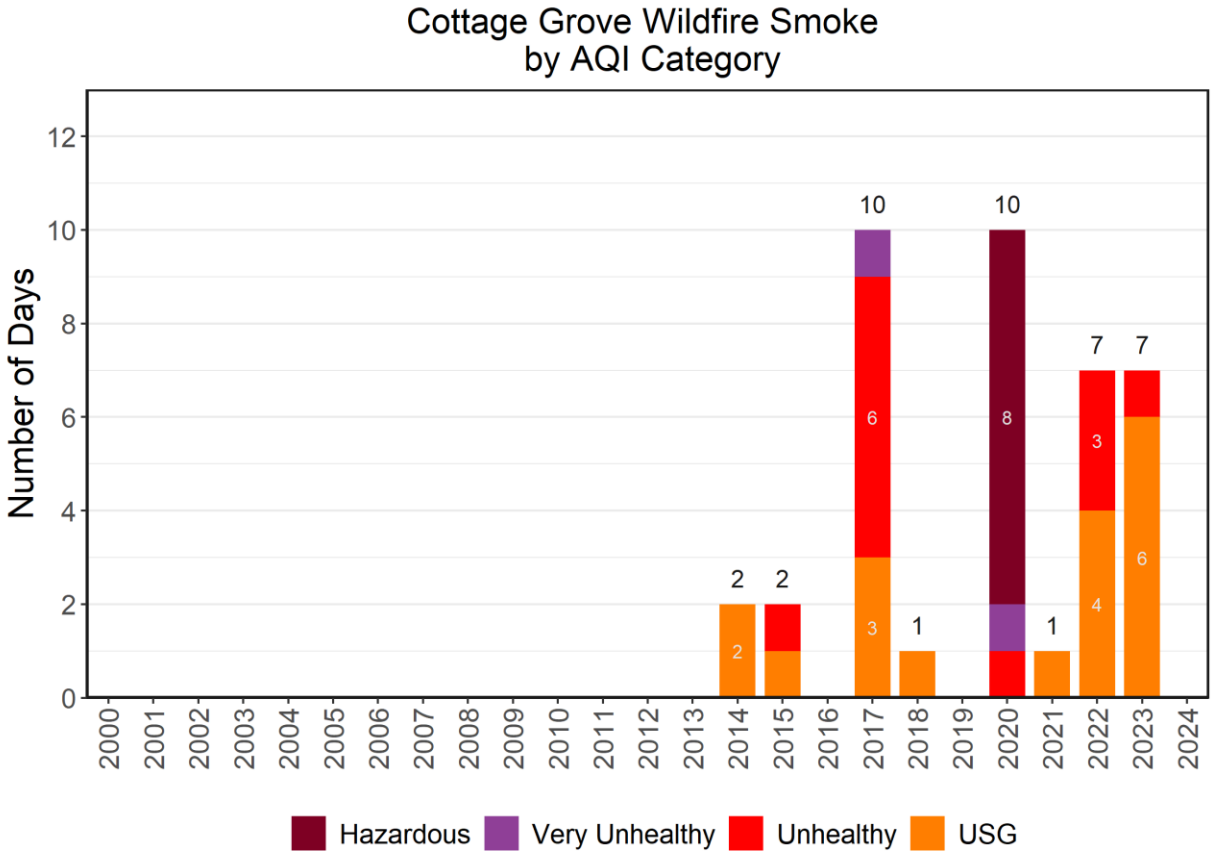

Figure 14. Cottage Grove wildfire ≥ USG AQI wildfire smoke trends.

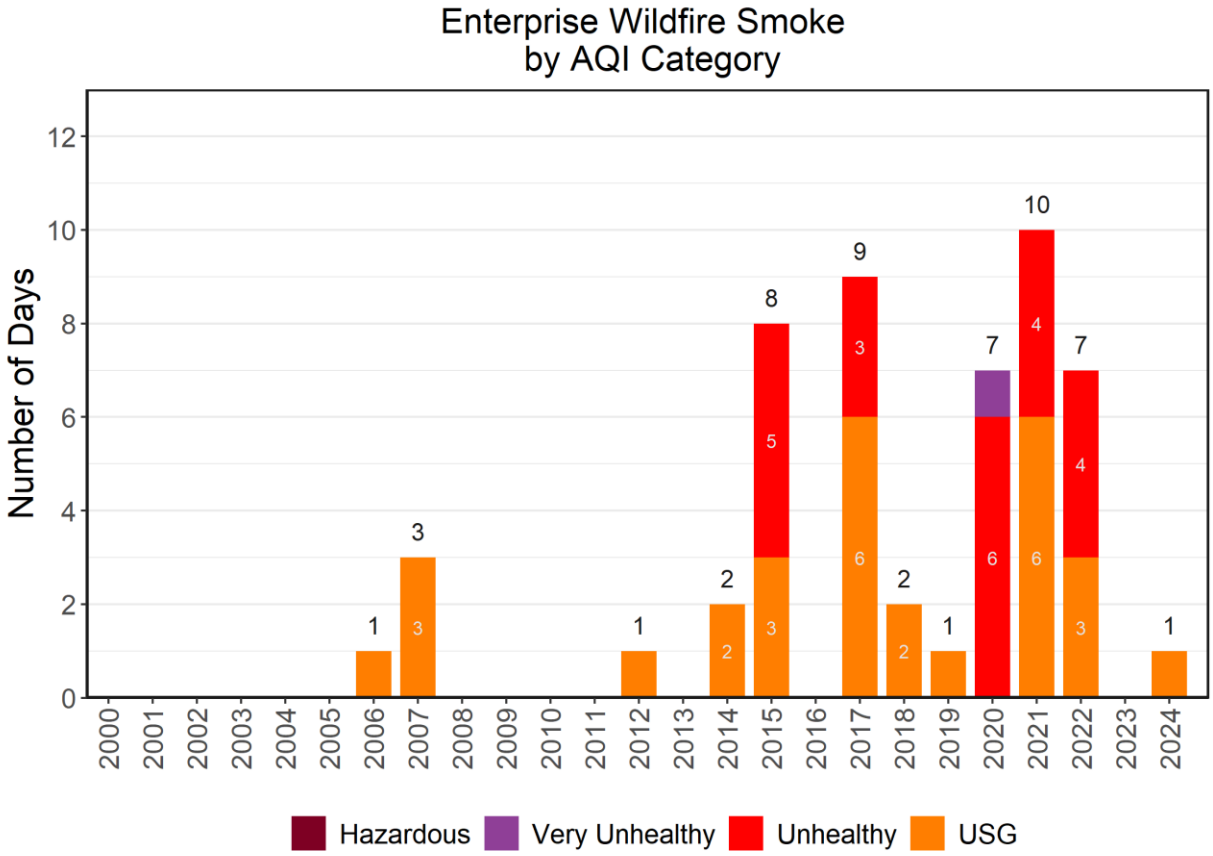

Figure 15. Enterprise wildfire ≥ USG AQI wildfire smoke trends.

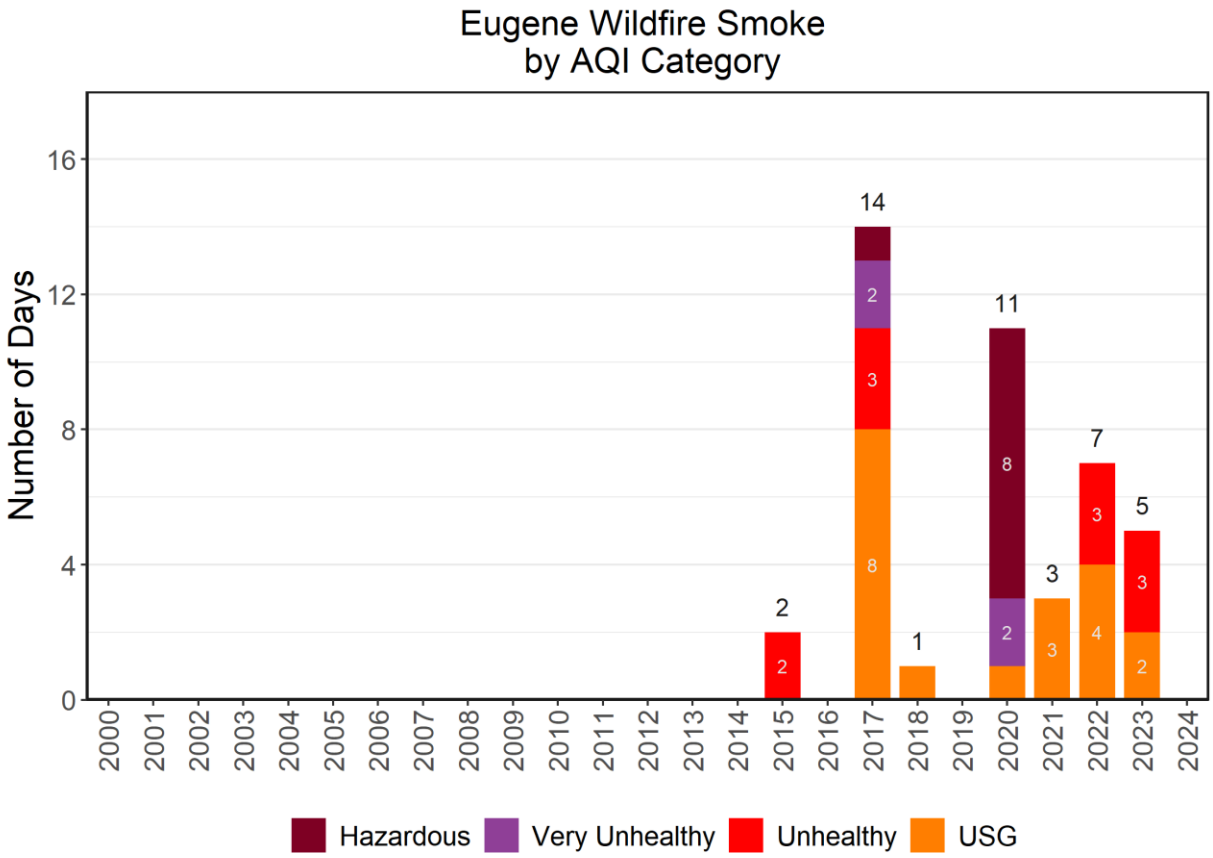

Figure 16. Eugene/Springfield wildfire ≥ USG AQI wildfire smoke trends.

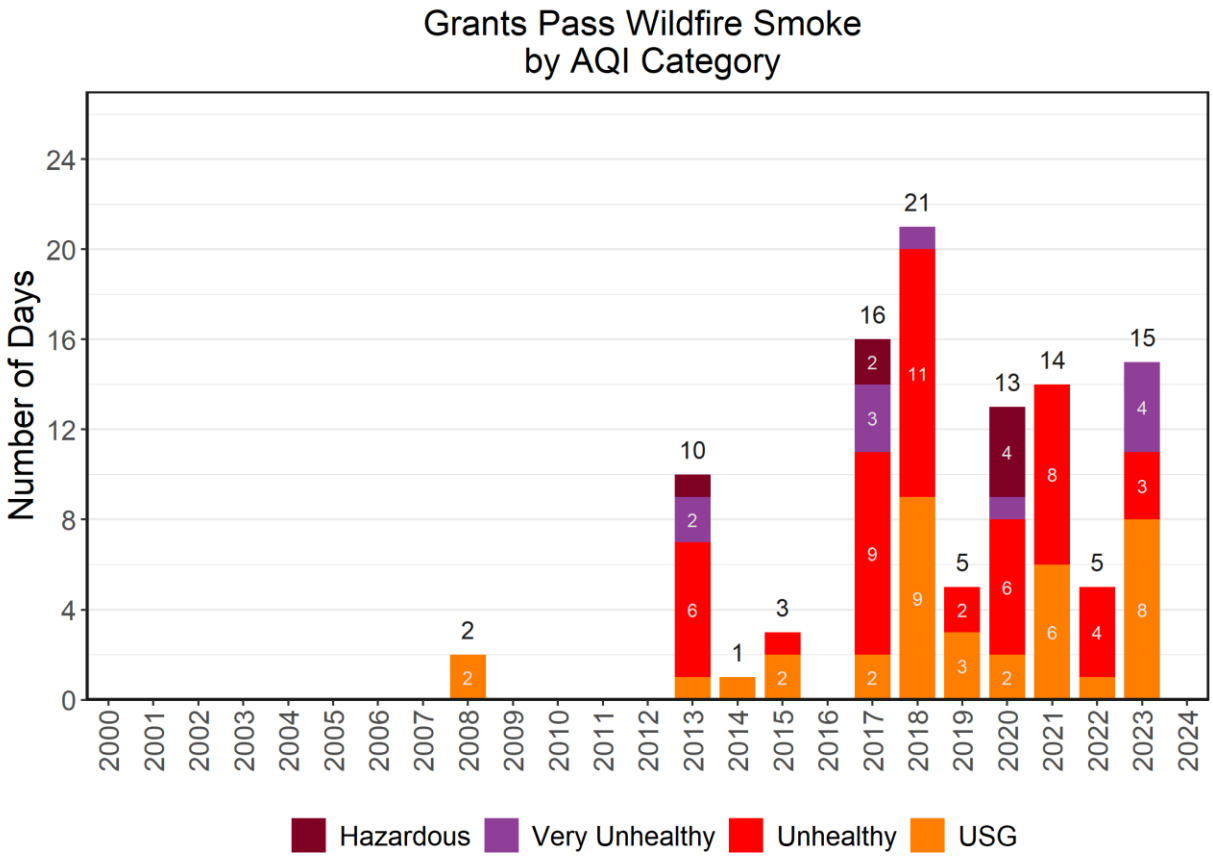

Figure 17. Grants Pass wildfire ≥ USG AQI wildfire smoke trends.

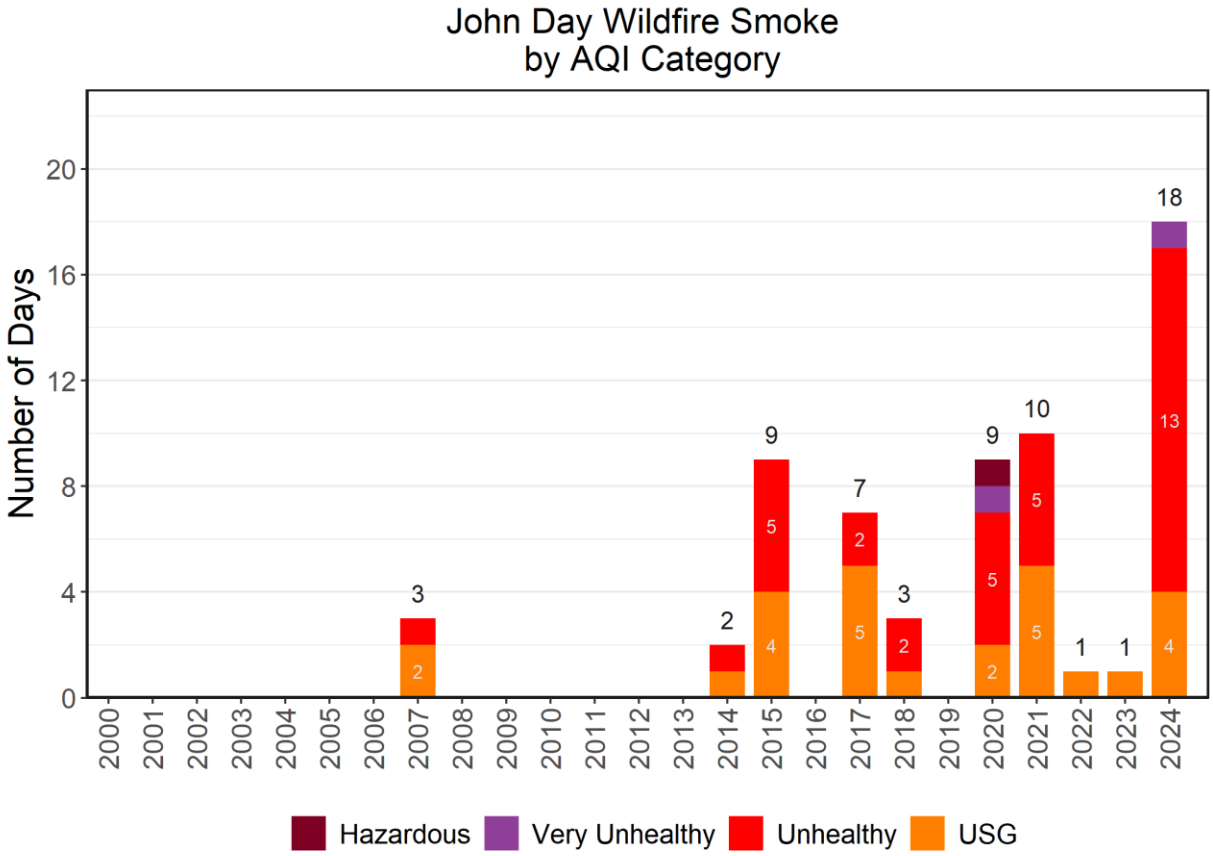

Figure 18. John Day wildfire ≥ USG AQI wildfire smoke trends.

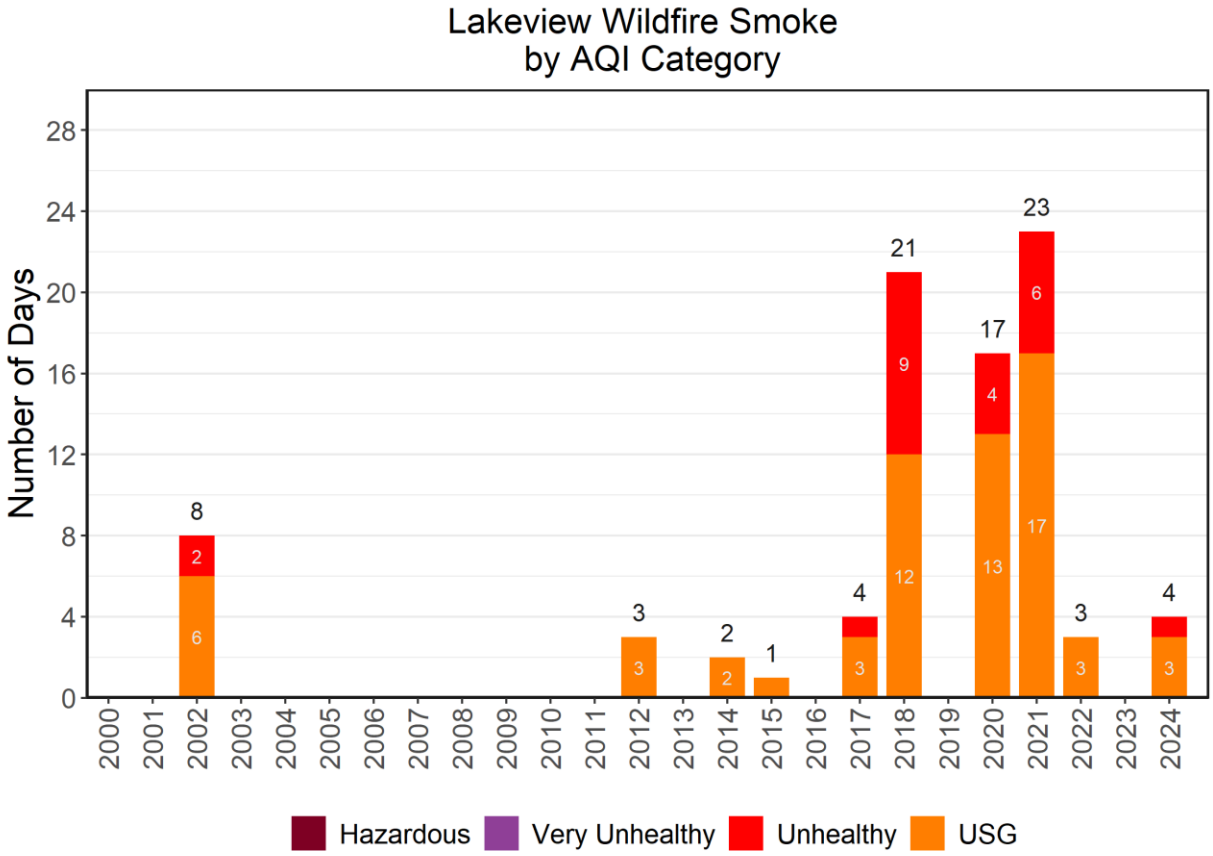

Figure 19. Lakeview wildfire ≥ USG AQI wildfire smoke trends.

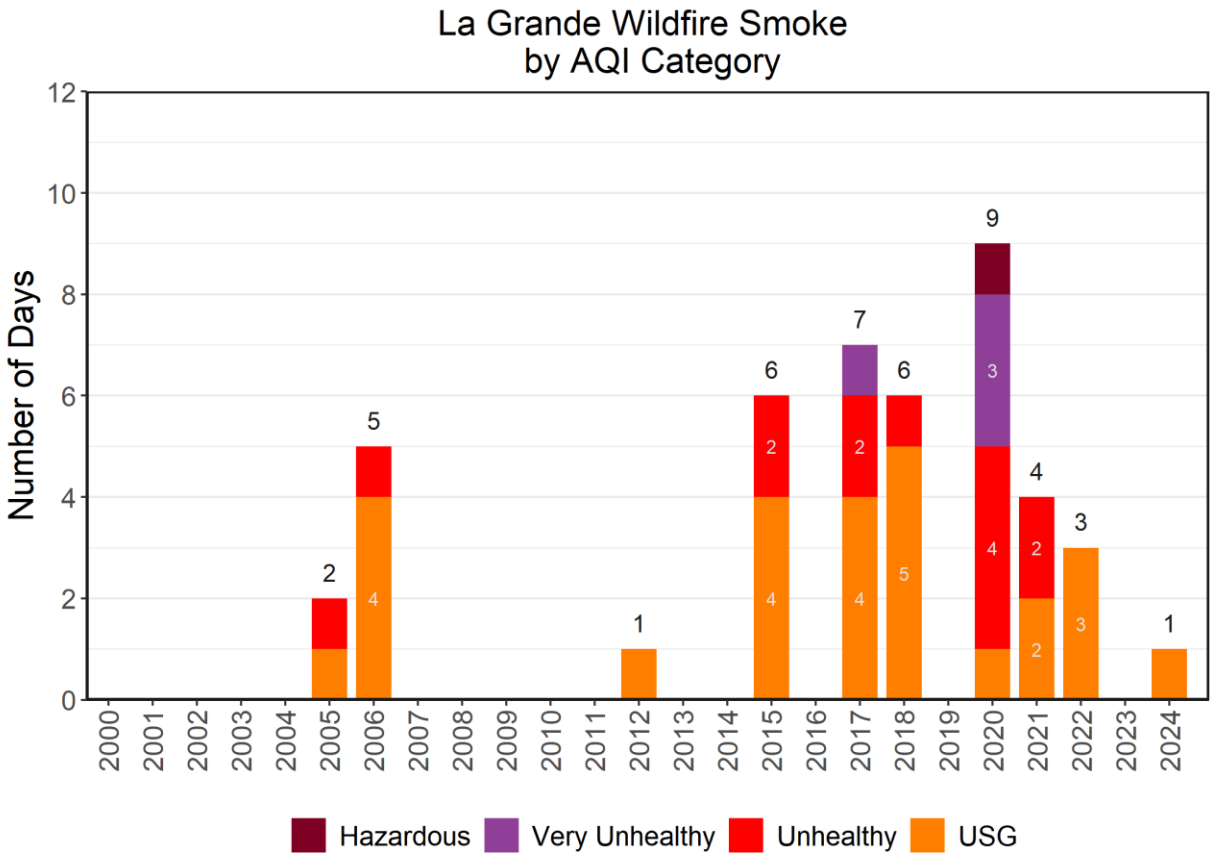

Figure 20. La Grande wildfire ≥ USG AQI wildfire smoke trends.

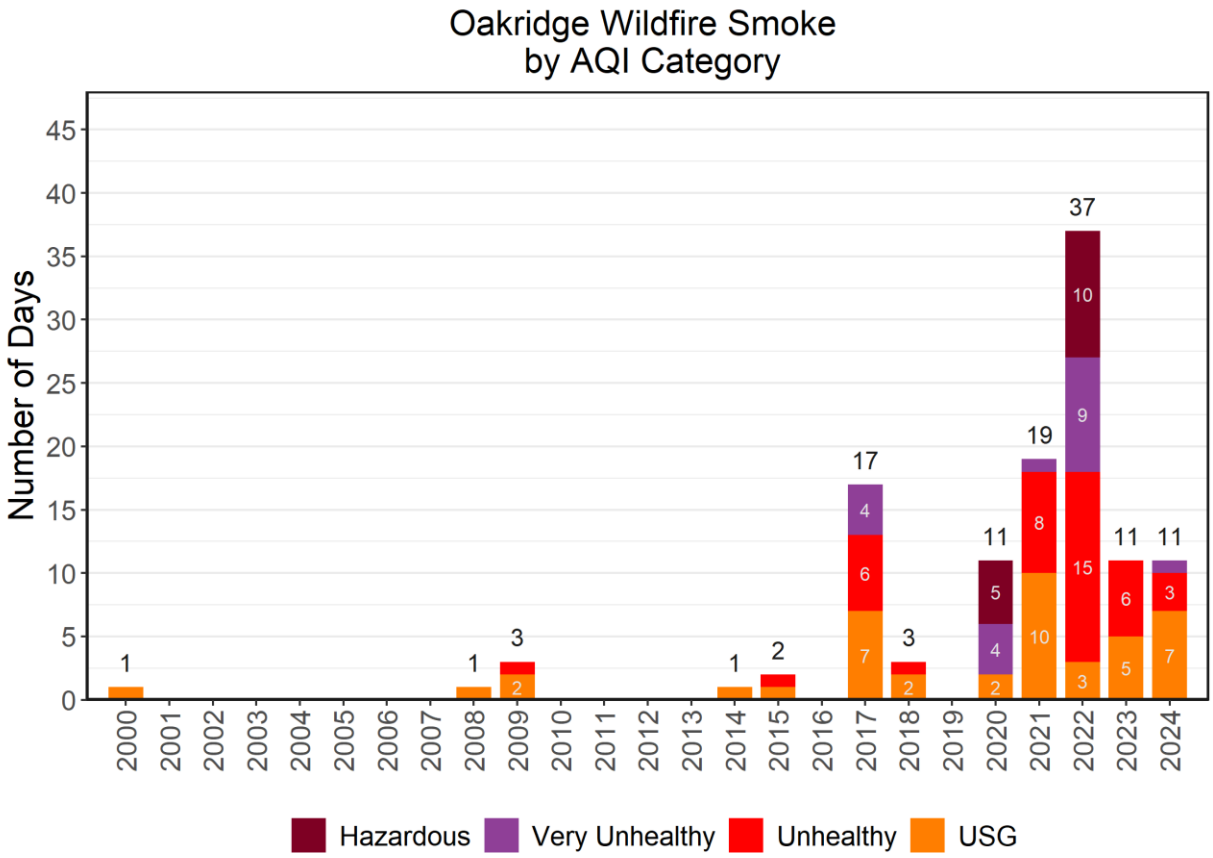

Figure 21. Oakridge wildfire ≥ USG AQI wildfire smoke trends.

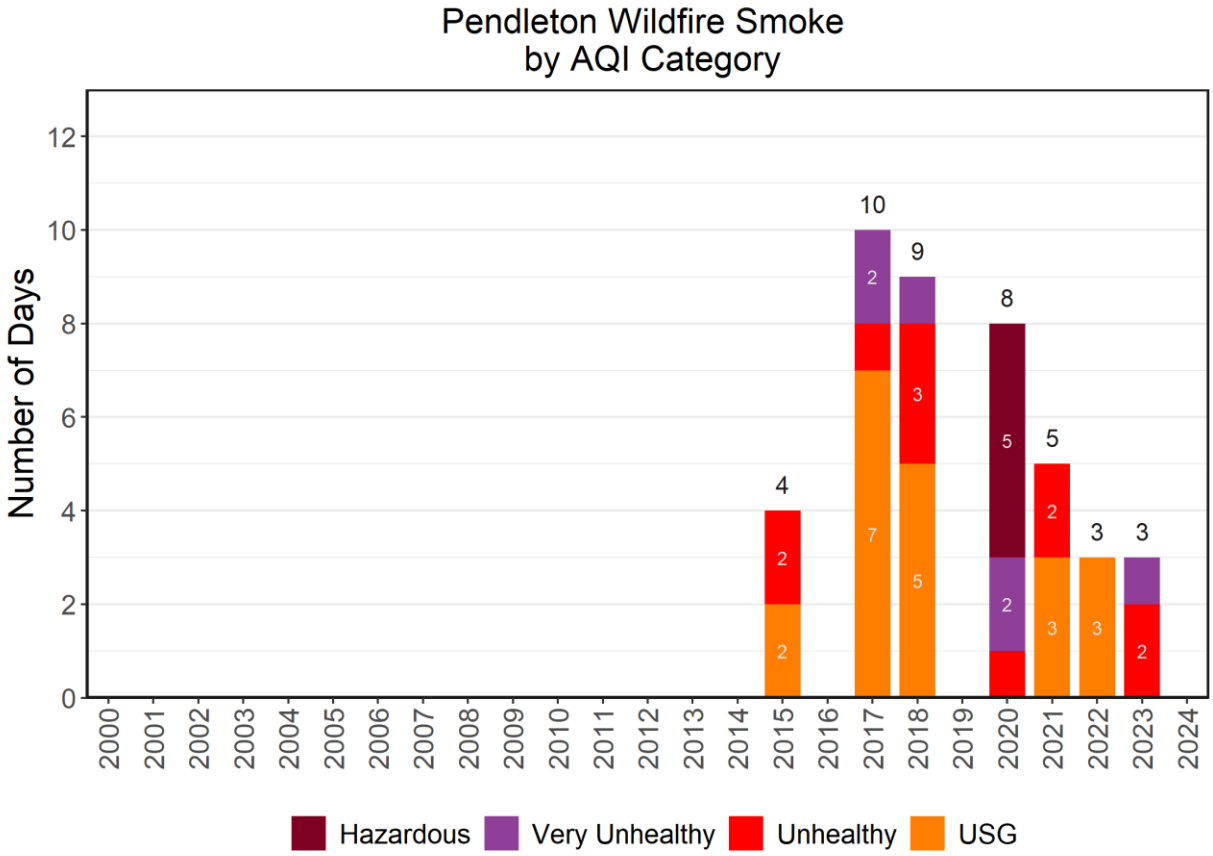

Figure 22. Pendleton wildfire ≥ USG AQI wildfire smoke trends.

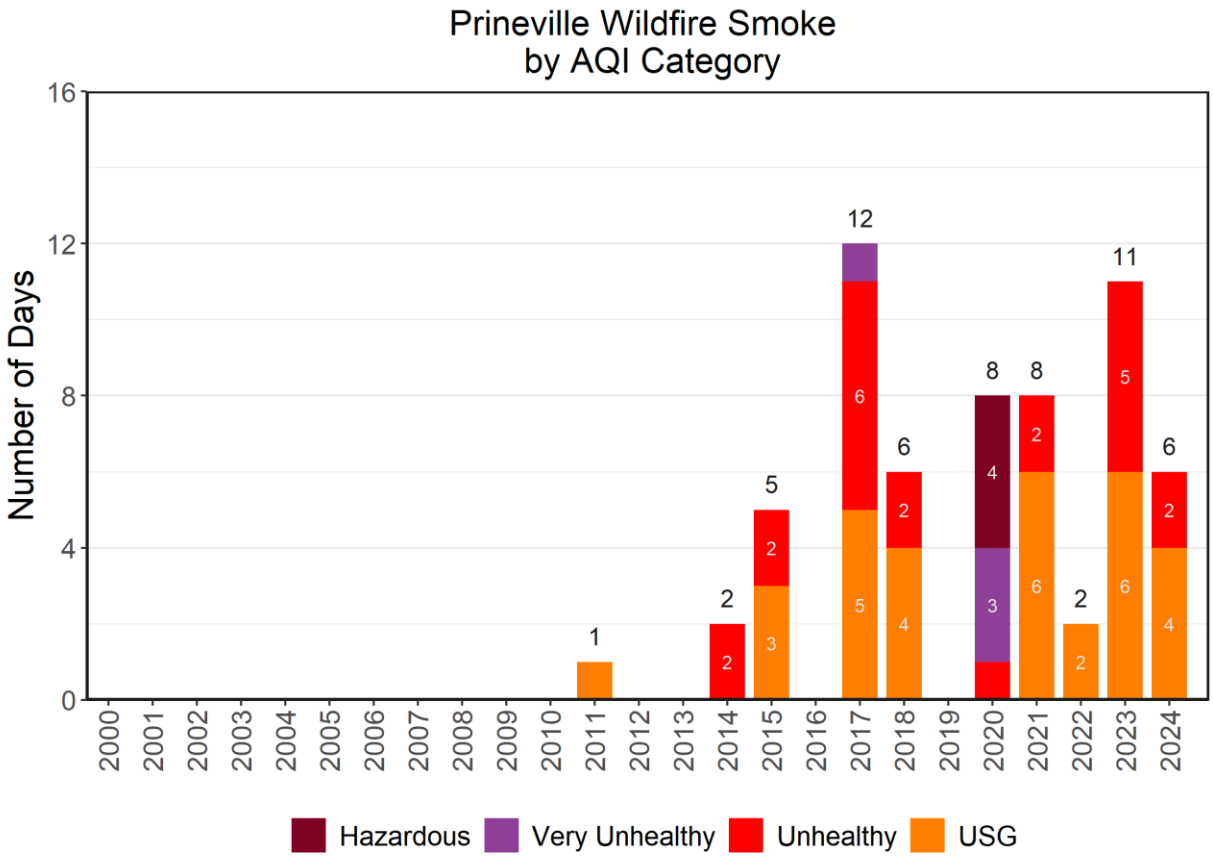

Figure 23. Prineville wildfire ≥ USG AQI wildfire smoke trends.

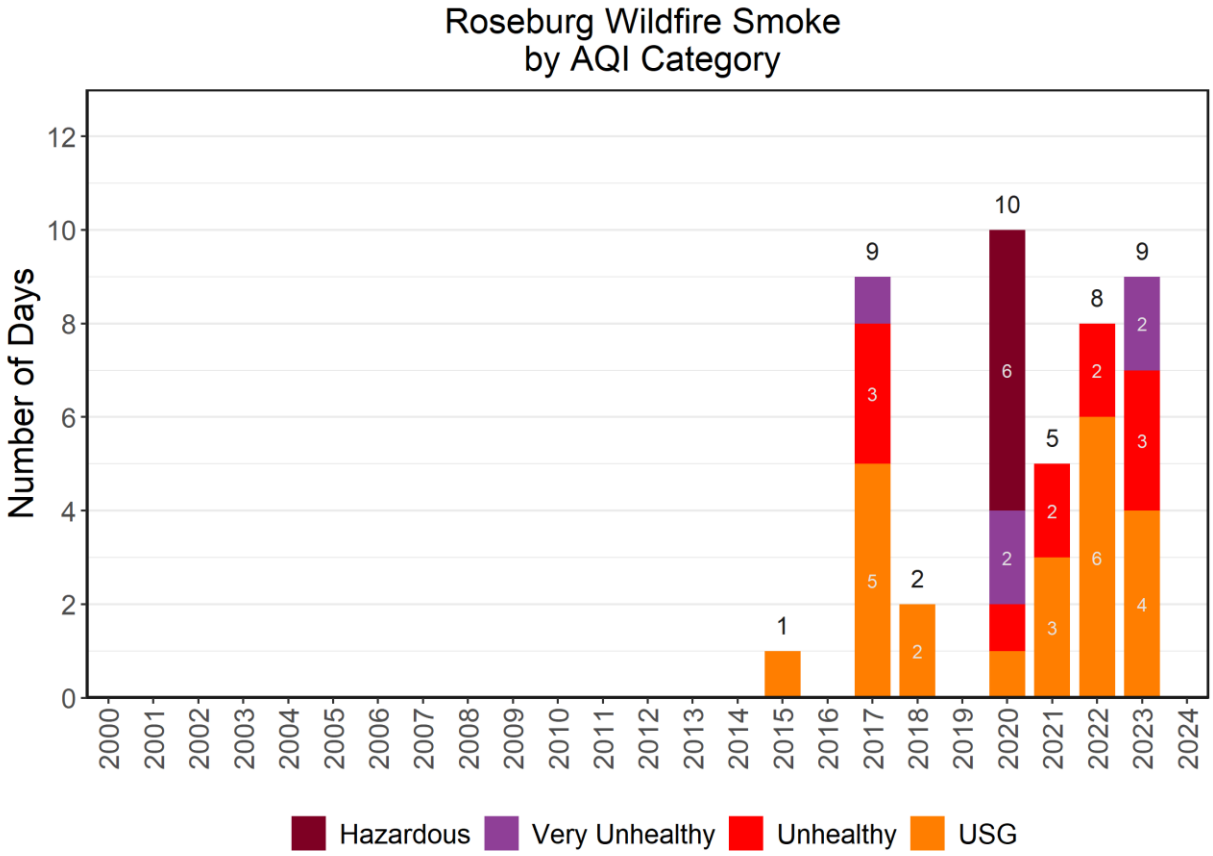

Figure 24. Roseburg wildfire ≥ USG AQI wildfire smoke trends.

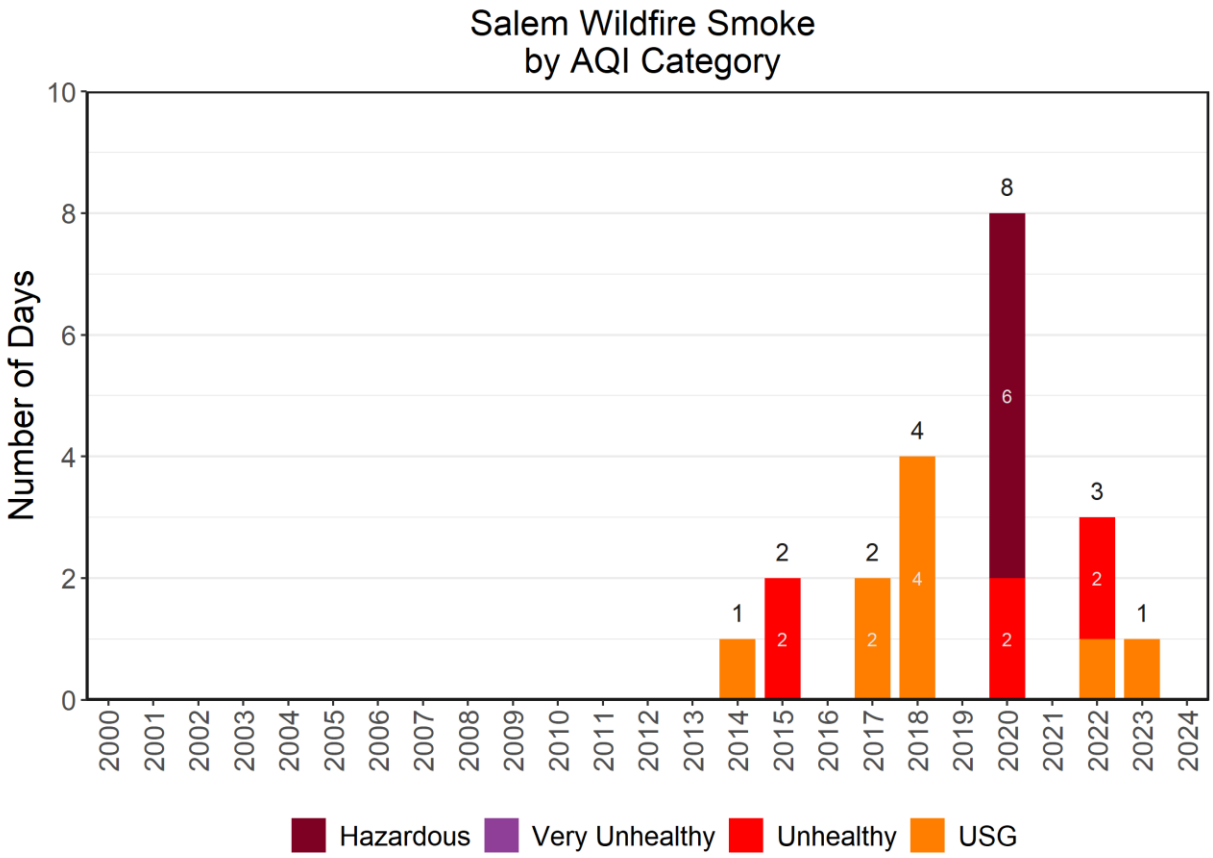

Figure 25. Salem wildfire ≥ USG AQI wildfire smoke trends.

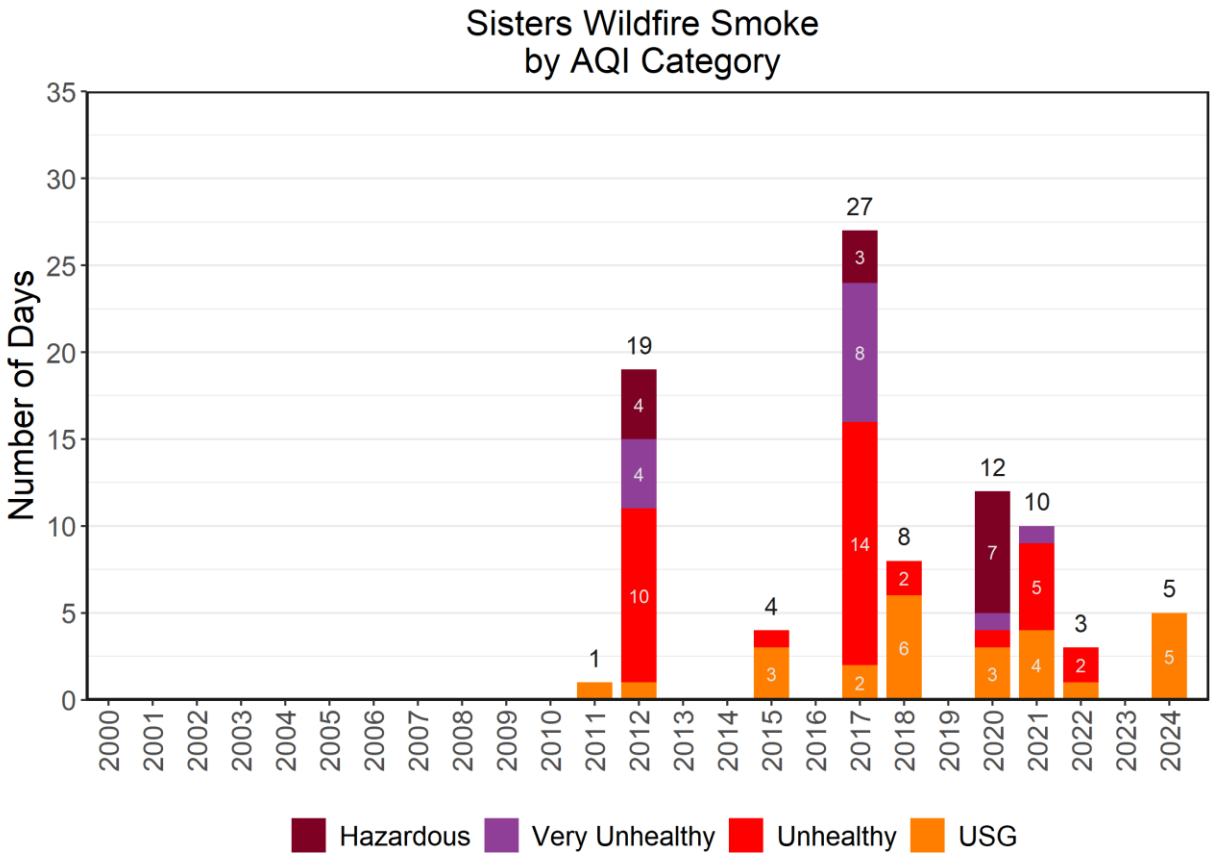

Figure 26. Sisters wildfire ≥ USG AQI wildfire smoke trends.

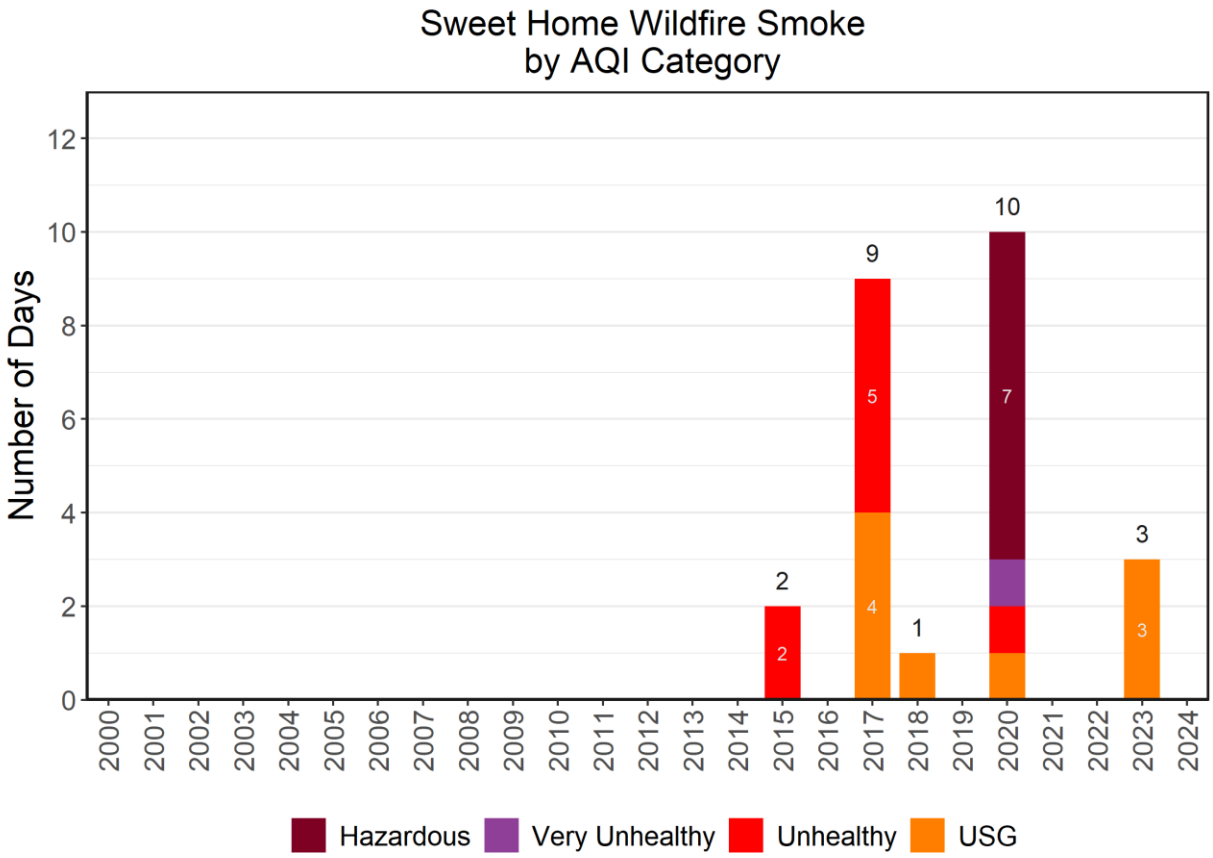

Figure 27. Sweet Home wildfire ≥ USG AQI wildfire smoke trends.

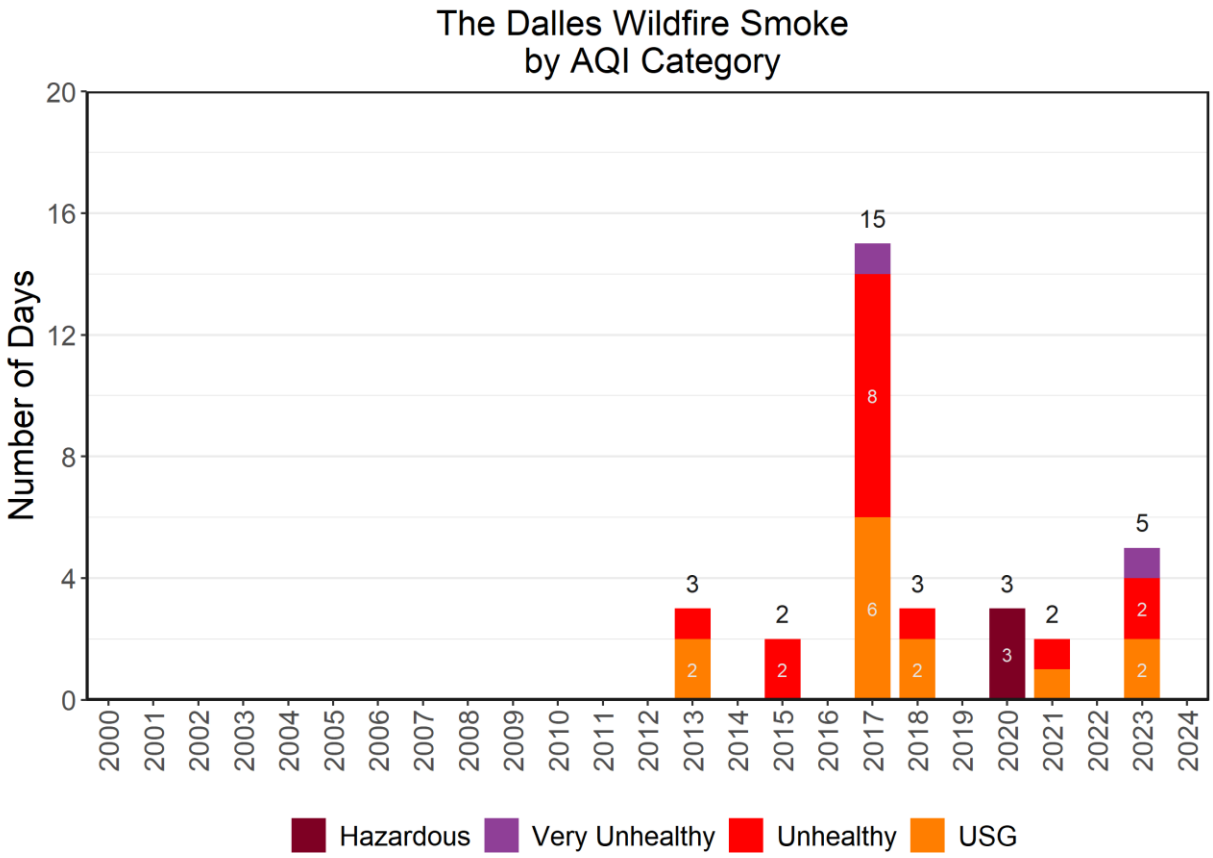

Figure 28. The Dalles wildfire ≥ USG AQI wildfire smoke trends.