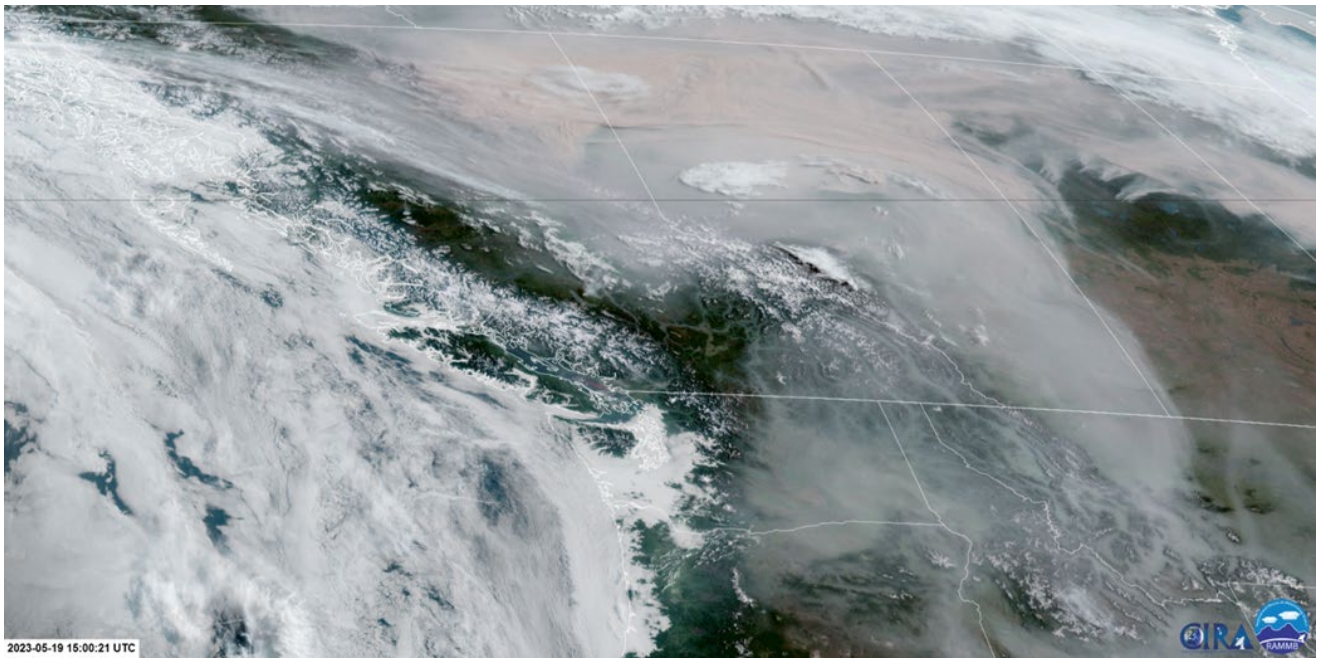
# Spokane Regional Clean Air Agency
# Air Quality Report - May 2023

Smoke from wildfires in western Canada made an incursion into the Inland Northwest on May 18th, 19th, and 20th (Figure 1). The smoke pushed the Air Quality Index (AQI) for $PM_{2.5}$ to 78 (MODERATE air quality) on the 19th and almost certainly caused the AQI for ground-level ozone to rise to 84 (MODERATE) on the 20th – the worst air quality for the month (Figure 2). Although air quality was good on all but five days in May, the $PM_{2.5}$ and ozone readings were the highest so far this year (Tables 1, 2, and 3). A cold front moved into the region from the west on the 21st, bringing storms and strong southwesterly winds. Figures 3, 4, and 5 show the daily concentrations of $PM_{2.5}$, $PM_{10}$, and ground-level ozone across the monitoring network.

**Figure 1: GOES-18 satellite image from May 19th showing smoke from wildfires in Canada infiltrating the U.S. Pacific Northwest (courtesy of the Regional and Mesoscale Meteorology Branch (RAMMB) of NOAA/NESDIS and the Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University).**




The Washington State Department of Ecology operates $PM_{2.5}$ sensors at Greenbluff and Turnbull ozone monitoring stations. $PM_{2.5}$ data for those locations are reported on Spokane Regional Clean Air Agency's Current Air Quality webpage (https://spokanecleanair.org/air-quality/current-air-quality/) and the Washington State Department of Ecology's air quality map (https://enviwa.ecology.wa.gov/home/map). Those data are included in Appendix 3 but not elsewhere in this report because of greater data uncertainty (less accurate, lower quality) with the use of low-cost sensors compared to the Agency's regulatory-grade monitors.

See Appendix 1 of this report for information about federal air quality standards, Appendix 2 for a description of the AQI, or Appendix 3 for a summary of daily $PM_{2.5}$ and $PM_{10}$ mass concentrations and AQIs across the Spokane-area ambient air monitoring network. Current and historical ambient air quality data can also be obtained from the Washington State Department of Ecology's air monitoring data website, https://enviwa.ecology.wa.gov/home/map.

**Figure 2: Air Quality Index (AQI) values for May 2023. The data represent the maximum AQI values across all monitoring stations within Spokane County.**

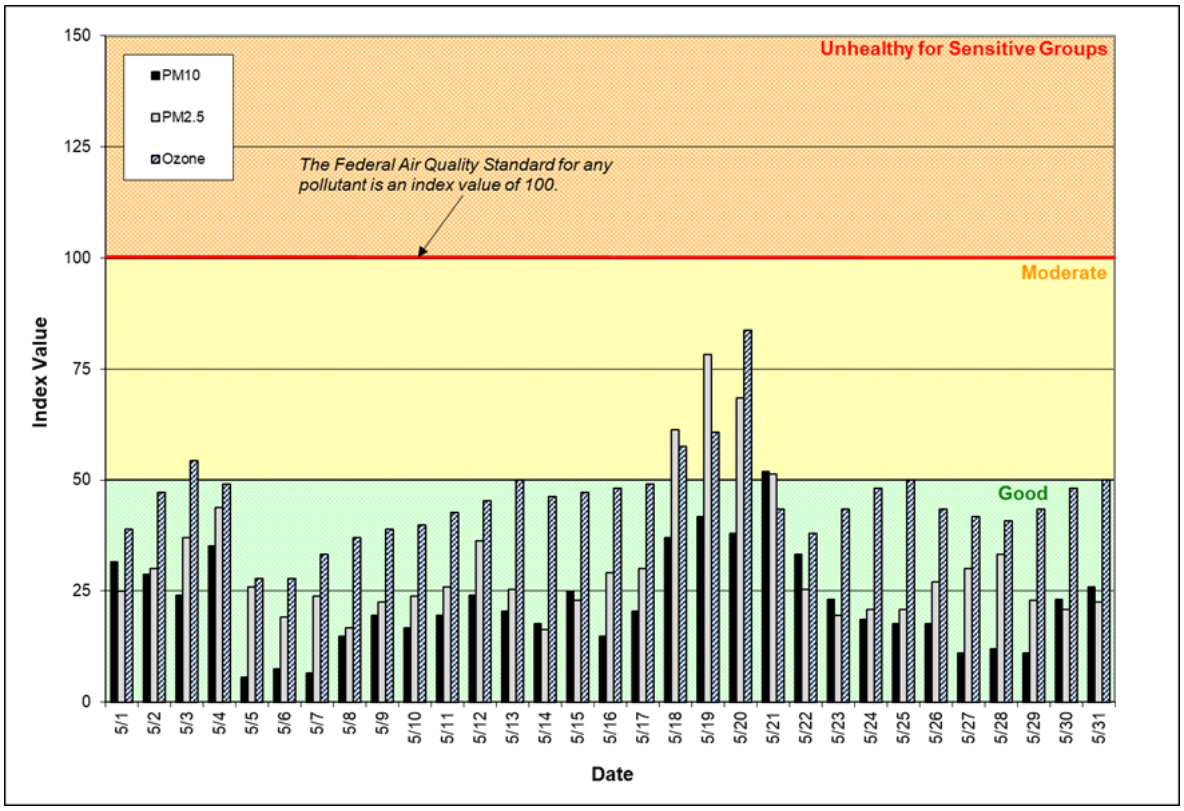



**Figure 3: Multi-station 24-hour average $PM_{2.5}$ for May 2023; Spokane County.**

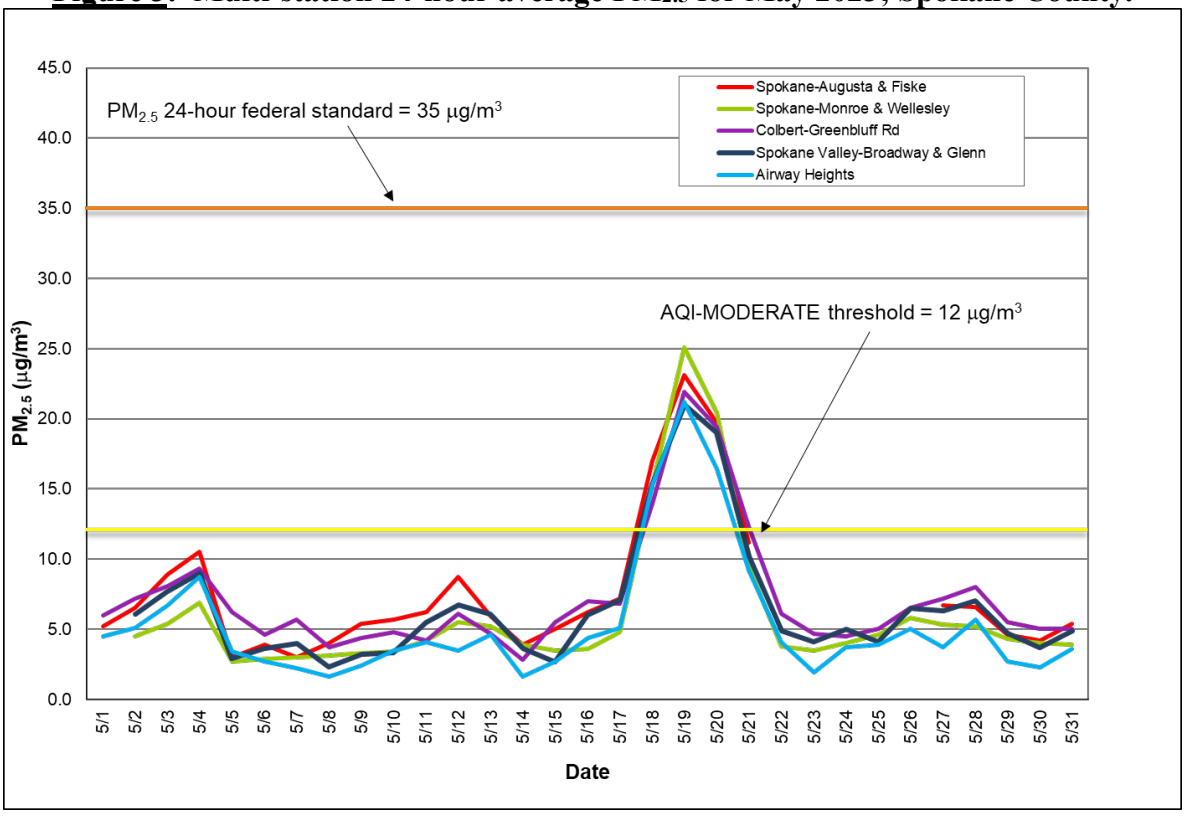


**Figure 4: Multi-station 24-hour average $PM_{10}$ for May 2023; Spokane County.**

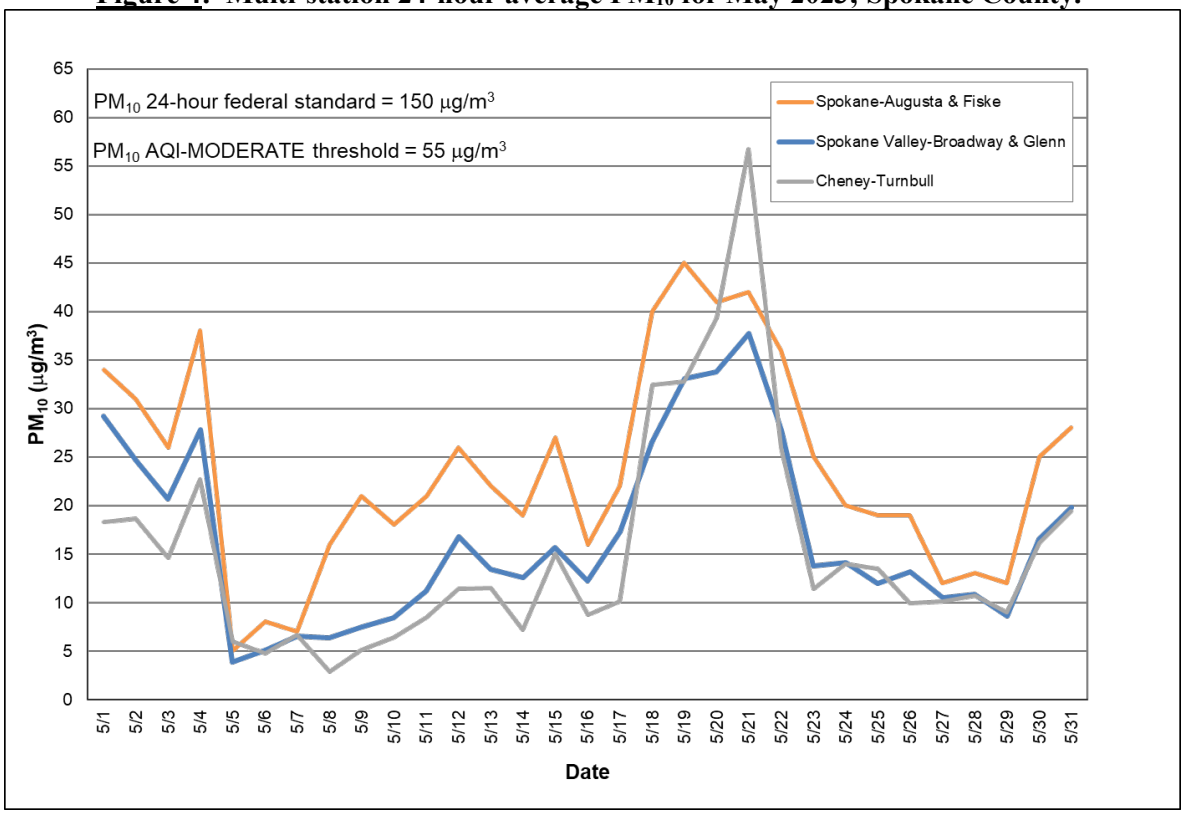



**Figure 5:** Eight-hour maximum ozone concentrations for the Spokane region in May.

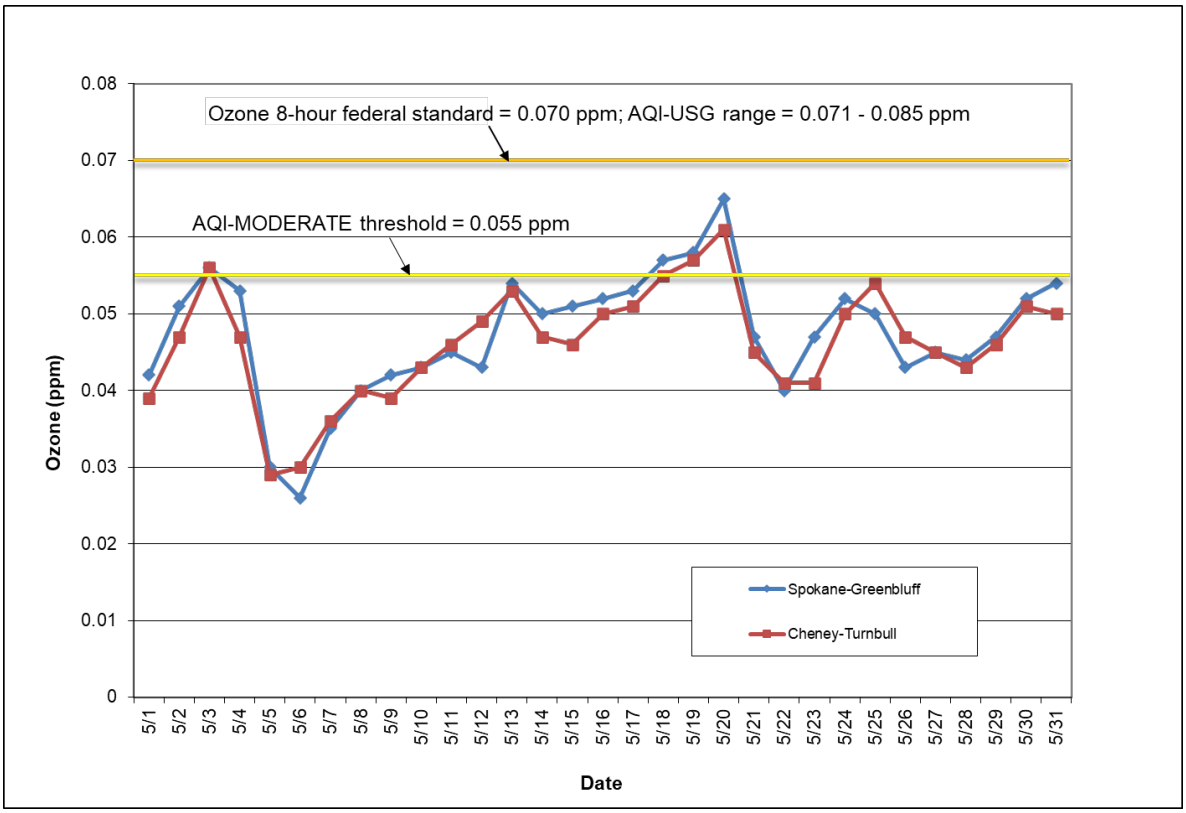


Table 1 summarizes the daily AQIs by category for the month and year-to-date and Tables 2 and 3 contain the maximum AQI values for each pollutant for the month and for the year, respectively.

**Table 1: AQI summary, May 2023**

| Category | Number of days in May | Number of days this year to date |
|---|---|---|
| Good (0-50) | 26 | 133 |
| Moderate (51-100) | 5 | 18 |
| Unhealthy for Sensitive Groups (101-150) | 0 | 0 |
| Unhealthy (151-200) | 0 | 0 |
| Very Unhealthy (201-300) | 0 | 0 |
| Hazardous (>300) | 0 | 0 |

**Table 2: Maximum AQI values and pollutant concentrations for this reporting period.**

| Pollutant | AQI | | Location | Date |
|---|---|---|---|---|
| **Ozone** | **84 (conc. = 0.065 ppm)** | **Moderate** | **Greenbluff** | **5/20** |
| **$PM_{10}$** | **52 (mass conc. = 57 µg/m$^3$)** | **Moderate** | **Turnbull National Wildlife Refuge** | **5/21** |
| **$PM_{2.5}$** | **78 (mass conc. = 25.1 µg/m$^3$)** | **Moderate** | **Spokane – Monroe & Wellesley** | **5/19** |

**Table 3: Maximum AQI values and pollutant concentrations this year.**

| Pollutant | AQI | | Location | Date |
|---|---|---|---|---|
| **Ozone** | **84 (conc. = 0.065 ppm)** | **Moderate** | **Greenbluff** | **5/20** |
| **$PM_{10}$** | **53 (mass conc. = 58 µg/m$^3$)** | **Moderate** | **Turnbull National Wildlife Refuge** | **2/20** |
| **$PM_{2.5}$** | **78 (mass conc. = 25.1 µg/m$^3$)** | **Moderate** | **Spokane – Monroe & Wellesley** | **5/19** |

# Appendix 1 – National Ambient Air Quality Standards

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, carbon monoxide (CO), lead (Pb), nitrogen dioxide ($NO_2$), particulate matter ($PM_{10}$ and $PM_{2.5}$), ground-level ozone ($O_3$) and sulfur dioxide ($SO_2$; Table A-1). These are known as "criteria" pollutants because the US EPA established regulatory limits to concentrations in ambient air using human health or environmentally based criteria. Carbon monoxide, particulate matter and ozone are monitored in Spokane County by the Spokane Regional Clean Air Agency (SRCAA) and the Washington State Department of Ecology (Ecology).

**Table A-1: National Ambient Air Quality Standards**

| Pollutant [links to historical tables of NAAQS reviews] | | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|---|
| Carbon Monoxide (CO) | | primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | | 1 hour | 35 ppm | |
| Lead (Pb) | | primary and secondary | Rolling 3 month period | 0.15 µg/m$^3$ (1) | Not to be exceeded |
| Nitrogen Dioxide ($NO_2$) | | primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | primary and secondary | 1 year | 53 ppb (2) | Annual Mean |
| Ozone ($O_3$) | | primary and secondary | 8 hours | 0.070 ppm (3) | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particle Pollution (PM) | $PM_{2.5}$ | primary | 1 year | 12.0 µg/m$^3$ | annual mean, averaged over 3 years |
| | | secondary | 1 year | 15.0 µg/m$^3$ | annual mean, averaged over 3 years |
| | | primary and secondary | 24 hours | 35 µg/m$^3$ | 98th percentile, averaged over 3 years |
| | $PM_{10}$ | primary and secondary | 24 hours | 150 µg/m$^3$ | Not to be exceeded more than once per year on average over 3 years |
| Sulfur Dioxide ($SO_2$) | | primary | 1 hour | 75 ppb (4) | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m$^3$ as a calendar quarter average) also remain in effect.

(2) The level of the annual $NO_2$ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) $O_3$ standards additionally remain in effect in some areas. Revocation of the previous (2008) $O_3$ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous $SO_2$ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous $SO_2$ standards or is not meeting the requirements of a SIP call under the previous $SO_2$ standards (40 CFR 50.4(3)), A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

# Appendix 2 – Air Quality Index

The Air Quality Index (AQI) is EPA's color-coded tool for communicating daily air quality to the public and can be calculated for any of the criteria pollutants except lead, provided monitoring data are available. An index value above 100 indicates that the concentration of a criteria pollutant exceeded the limit established in the NAAQS. Categories of the AQI are "Good" (green, 0-50), "Moderate" (yellow, 51-100), "Unhealthy for Sensitive Groups" (USG; orange, 101-150), "Unhealthy" (red, 151-200), "Very Unhealthy" (purple, 201-300) and "Hazardous" (maroon, 301-500; Table A-2).

**Table A-2: Air pollutant breakpoints for the Air Quality Index.**

| Air Quality Index Levels of Health Concern | Color Code | Index Numerical Value | Breakpoints | | | | Health Effects |
|---|---|---|---|---|---|---|---|
| | | | $O_3$ (ppm) 8-hour | $PM_{2.5}$ ($\mu g/m^3$) 24-hour | $PM_{10}$ ($\mu g/m^3$) 24-hour | CO (ppm) 8-hour | |
| **Good** | Green | 0-50 | 0.000-0.054 | 0.0-12.0 | 0-54 | 0.0-4.4 | Air quality is considered satisfactory and air pollution poses little or no risk. |
| **Moderate** | Yellow | 51-100 | 0.055-0.070 | 12.1-35.4 | 55-154 | 4.5-9.4 | Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution. |
| **Unhealthy for Sensitive Groups** | Orange | 101-150 | 0.071-0.085 | 35.5-55.4 | 155-254 | 9.5-12.4 | People especially sensitive to air pollution may experience health effects. The general public is not likely to be affected. An AQI in this category or above indicates that air pollution exceeds levels acceptable under federal air quality standards. |
| **Unhealthy** | Red | 151-200 | 0.086-0.105 | 55.5-150.4 | 255-354 | 12.5-15.4 | Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects. |
| **Very Unhealthy** | Purple | 201-300 | 0.106-0.200 | 150.5-250.4 | 355-424 | 15.5-30.4 | Health alert: everyone may experience more serious health effects. |
| **Hazardous** | Maroon | >300 | 0.201 to the Significant Harm Level* (0.600 ppm, 2 hour average) | 250.5+ | 425+ | 30.5+ | Health warnings of emergency conditions. The entire population is more likely to be affected. |

*The significant harm level (SHL) is set at a level that represents imminent and substantial endangerment to public health.

# Appendix 3

**Table A-3: May summary air quality data for air monitoring stations in Spokane County.** Particulate matter mass concentration is reported as 24-hour averages in micrograms per cubic meter of air (μg/m$^3$). See Appendix 2 for an explanation of the Air Quality Index. Turnbull and Greenbluff $PM_{2.5}$ sensor data are reported here but not elsewhere in the report because of greater data uncertainty with use of low-cost sensors. The $PM_{2.5}$ monitor at Spokane Valley – Broadway & Glenn was offline on the 1st for conclusion of annual maintenance. The $PM_{2.5}$ monitor at Spokane – Augusta & Fiske was offline for annual maintenance on the 22nd through the 25th. The $PM_{2.5}$ monitor at Spokane – Monroe & Wellesley was offline on the 1st, the $PM_{2.5}$ sensor at Turnbull was offline on the 10th and 11th, and the $PM_{2.5}$ sensor at Greenbluff was offline on the 10th, 16th, and 17th for unknown reasons.

| Pollutant Concentration | | | | | | | | | | | | | Air Quality Index (AQI) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ozone (ppm) Max 8-Hour Avg | | $PM_{2.5}$ (μg/m$^3$) 24-Hour Avg | | | | | | | $PM_{10}$ (μg/m$^3$) 24-Hour Avg | | | | Ozone | | $PM_{2.5}$ | | | | | | | $PM_{10}$ | | | |
| Date | Ozone - Turnbull NWR | Ozone - Greenbluff | $PM_{2.5}$ - Airway Heights, 12th & Lawson | $PM_{2.5}$ - Colbert, E Greenbluff Rd | $PM_{2.5}$ - Spokane, Augusta & Fiske | $PM_{2.5}$ - Spokane Valley, Broadway & Glenn | $PM_{2.5}$ - Spokane, Monroe & Wellesley | $PM_{2.5}$ - Turnbull NWR (temporary sensor) | $PM_{2.5}$ - Greenbluff (temporary sensor) | $PM_{10}$ - Spokane, Augusta & Fiske | $PM_{10}$ - Spokane Valley, Broadway & Glenn | $PM_{10}$ - Turnbull NWR | Date | Ozone - Turnbull NWR | Ozone - Greenbluff | $PM_{2.5}$ - Airway Heights, 12th & Lawson | $PM_{2.5}$ - Colbert, E Greenbluff Rd | $PM_{2.5}$ - Spokane - Augusta & Fiske | $PM_{2.5}$ - Spokane Valley, Broadway & Glenn | $PM_{2.5}$ - Spokane, Monroe & Wellesley | $PM_{2.5}$ - Turnbull NWR (temporary sensor) | $PM_{2.5}$ - Greenbluff (temporary sensor) | $PM_{10}$ - Spokane, Augusta & Fiske | $PM_{10}$ - Spokane Valley, Broadway & Glenn | $PM_{10}$ - Turnbull NWR | MAXIMUM |
| 5/1 | 0.039 | 0.042 | 4.5 | 6.0 | 5.2 | | | 1.1 | 1.7 | 34 | 29 | 18 | 5/1 | 36 | 39 | 19 | 25 | 22 | | | 5 | 7 | 31 | 27 | 17 | 39 |
| 5/2 | 0.047 | 0.051 | 5.1 | 7.2 | 6.5 | 6.1 | 4.5 | 1.8 | 2.2 | 31 | 25 | 19 | 5/2 | 44 | 47 | 21 | 30 | 27 | 25 | 19 | 7 | 9 | 29 | 23 | 17 | 47 |
| 5/3 | 0.056 | 0.056 | 6.7 | 8.1 | 8.9 | 7.7 | 5.4 | 2.0 | 2.0 | 26 | 21 | 15 | 5/3 | 54 | 54 | 28 | 34 | 37 | 32 | 23 | 8 | 8 | 24 | 19 | 14 | 54 |
| 5/4 | 0.047 | 0.053 | 8.7 | 9.3 | 10.5 | 9.0 | 6.9 | 2.7 | 3.2 | 38 | 28 | 23 | 5/4 | 44 | 49 | 36 | 39 | 44 | 38 | 29 | 11 | 13 | 35 | 26 | 21 | 49 |
| 5/5 | 0.029 | 0.030 | 3.4 | 6.2 | 3.0 | 2.9 | 2.7 | 0.9 | 1.8 | 5 | 3.9 | 6 | 5/5 | 27 | 28 | 14 | 26 | 13 | 12 | 11 | 4 | 8 | 5 | 4 | 6 | 28 |
| 5/6 | 0.030 | 0.026 | 2.7 | 4.6 | 3.9 | 3.6 | 2.9 | 0.9 | 2.3 | 8 | 5.1 | 5 | 5/6 | 28 | 24 | 11 | 19 | 16 | 15 | 12 | 4 | 10 | 7 | 5 | 4 | 28 |
| 5/7 | 0.036 | 0.035 | 2.2 | 5.7 | 3.0 | 4.0 | 3.0 | 0.5 | 1.0 | 7 | 6.5 | 7 | 5/7 | 33 | 32 | 9 | 24 | 13 | 17 | 13 | 2 | 4 | 6 | 6 | 6 | 33 |
| 5/8 | 0.040 | 0.040 | 1.6 | 3.7 | 4.0 | 2.3 | 3.1 | 0.5 | 0.6 | 16 | 6.4 | 3 | 5/8 | 37 | 37 | 7 | 15 | 17 | 10 | 13 | 2 | 3 | 15 | 6 | 3 | 37 |
| 5/9 | 0.039 | 0.042 | 2.4 | 4.4 | 5.4 | 3.2 | 3.3 | 0.9 | 1.5 | 21 | 7.5 | 5 | 5/9 | 36 | 39 | 10 | 18 | 23 | 13 | 14 | 4 | 6 | 19 | 7 | 5 | 39 |
| 5/10 | 0.043 | 0.043 | 3.5 | 4.8 | 5.7 | 3.3 | 3.4 | | | 18 | 8.4 | 6 | 5/10 | 40 | 40 | 15 | 20 | 24 | 14 | 14 | | | 17 | 8 | 6 | 40 |
| 5/11 | 0.046 | 0.045 | 4.1 | 4.2 | 6.2 | 5.5 | 4.2 | | 1.3 | 21 | 11 | 9 | 5/11 | 43 | 42 | 17 | 18 | 26 | 23 | 18 | | 5 | 19 | 10 | 8 | 43 |
| 5/12 | 0.049 | 0.043 | 3.5 | 6.1 | 8.7 | 6.7 | 5.5 | 1.6 | 1.4 | 26 | 17 | 11 | 5/12 | 45 | 40 | 15 | 25 | 36 | 28 | 23 | 7 | 6 | 24 | 16 | 11 | 45 |
| 5/13 | 0.053 | 0.054 | 4.6 | 4.7 | 5.9 | 6.1 | 5.2 | 2.4 | 2.0 | 22 | 13 | 12 | 5/13 | 49 | 50 | 19 | 20 | 25 | 25 | 22 | 10 | 8 | 20 | 12 | 11 | 50 |
| 5/14 | 0.047 | 0.050 | 1.6 | 2.8 | 3.9 | 3.6 | 3.9 | 1.8 | 1.7 | 19 | 13 | 7 | 5/14 | 44 | 46 | 7 | 12 | 16 | 15 | 16 | 7 | 7 | 18 | 12 | 7 | 46 |
| 5/15 | 0.046 | 0.051 | 2.7 | 5.5 | 5.0 | 2.7 | 3.5 | 1.3 | 0.9 | 27 | 16 | 15 | 5/15 | 43 | 47 | 11 | 23 | 21 | 11 | 15 | 5 | 4 | 25 | 15 | 14 | 47 |
| 5/16 | 0.050 | 0.052 | 4.4 | 7.0 | 6.2 | 6.0 | 3.6 | 1.2 | | 16 | 12 | 9 | 5/16 | 46 | 48 | 18 | 29 | 26 | 25 | 15 | 5 | | 15 | 11 | 8 | 48 |
| 5/17 | 0.051 | 0.053 | 5.1 | 6.8 | 7.2 | 7.1 | 4.8 | 2.6 | | 22 | 17 | 10 | 5/17 | 47 | 49 | 21 | 28 | 30 | 30 | 20 | 11 | | 20 | 16 | 9 | 49 |
| 5/18 | 0.055 | 0.057 | 15.3 | 14.0 | 17.0 | 15.3 | 15.3 | 24.3 | 8.4 | 40 | 27 | 32 | 5/18 | 51 | 58 | 58 | 55 | 61 | 58 | 58 | 77 | 35 | 37 | 25 | 30 | 77 |
| 5/19 | 0.057 | 0.058 | 21.2 | 21.9 | 23.1 | 21.0 | 25.1 | 24.3 | 16.7 | 45 | 33 | 33 | 5/19 | 58 | 61 | 70 | 72 | 74 | 70 | 78 | 77 | 61 | 42 | 31 | 30 | 78 |
| 5/20 | 0.061 | 0.065 | 16.4 | 19.4 | 19.7 | 19.0 | 20.4 | 16.6 | 14.2 | 41 | 34 | 39 | 5/20 | 71 | 84 | 60 | 66 | 67 | 66 | 68 | 60 | 55 | 38 | 31 | 36 | 84 |
| 5/21 | 0.045 | 0.047 | 9.2 | 12.3 | 11.2 | 10.2 | 9.5 | 4.6 | 5.6 | 42 | 38 | 57 | 5/21 | 42 | 44 | 38 | 51 | 47 | 43 | 40 | 19 | 23 | 39 | 35 | 52 | 52 |
| 5/22 | 0.041 | 0.040 | 4.1 | 6.1 | | 4.9 | 3.8 | 1.5 | 1.3 | 36 | 28 | 26 | 5/22 | 38 | 37 | 17 | 25 | | 20 | 16 | 6 | 5 | 33 | 26 | 24 | 38 |
| 5/23 | 0.041 | 0.047 | 1.9 | 4.7 | | 4.1 | 3.5 | 1.2 | 1.1 | 25 | 14 | 11 | 5/23 | 38 | 44 | 8 | 20 | | 17 | 15 | 5 | 5 | 23 | 13 | 11 | 44 |
| 5/24 | 0.050 | 0.052 | 3.7 | 4.5 | | 5.0 | 4.0 | 1.5 | 1.4 | 20 | 14 | 14 | 5/24 | 46 | 48 | 15 | 19 | | 21 | 17 | 6 | 6 | 19 | 13 | 13 | 48 |
| 5/25 | 0.054 | 0.050 | 3.9 | 5.0 | | 4.1 | 4.6 | 1.9 | 1.3 | 19 | 12 | 14 | 5/25 | 50 | 46 | 16 | 21 | | 17 | 19 | 8 | 5 | 18 | 11 | 13 | 50 |
| 5/26 | 0.047 | 0.043 | 5.0 | 6.5 | | 6.5 | 5.8 | 2.5 | 3.0 | 19 | 13 | 10 | 5/26 | 44 | 40 | 21 | 27 | | 27 | 24 | 10 | 12 | 18 | 12 | 9 | 44 |
| 5/27 | 0.045 | 0.045 | 3.7 | 7.2 | 6.7 | 6.3 | 5.3 | 2.9 | 3.1 | 12 | 11 | 10 | 5/27 | 42 | 42 | 15 | 30 | 28 | 26 | 22 | 12 | 13 | 11 | 10 | 9 | 42 |
| 5/28 | 0.043 | 0.044 | 5.7 | 8.0 | 6.6 | 7.0 | 5.2 | 3.0 | 2.6 | 13 | 11 | 11 | 5/28 | 40 | 41 | 24 | 33 | 28 | 29 | 22 | 12 | 11 | 12 | 10 | 10 | 41 |
| 5/29 | 0.046 | 0.047 | 2.7 | 5.5 | 4.6 | 4.7 | 4.3 | 1.9 | 2.1 | 12 | 8.6 | 9 | 5/29 | 43 | 44 | 11 | 23 | 19 | 20 | 18 | 8 | 9 | 11 | 8 | 8 | 44 |
| 5/30 | 0.051 | 0.052 | 2.3 | 5.0 | 4.2 | 3.7 | 4.0 | 1.5 | 1.4 | 25 | 17 | 16 | 5/30 | 47 | 48 | 10 | 21 | 18 | 15 | 17 | 6 | 6 | 23 | 15 | 15 | 48 |
| 5/31 | 0.050 | 0.054 | 3.6 | 5.0 | 5.4 | 4.9 | 3.9 | 1.5 | 1.4 | 28 | 20 | 19 | 5/31 | 46 | 50 | 15 | 21 | 23 | 20 | 16 | 6 | 6 | 26 | 18 | 18 | 50 |
| AVG | 0.046 | 0.047 | 5.3 | 7.2 | 7.6 | 6.6 | 6.0 | 3.8 | 3.1 | 24 | 17 | 15 | AVG | 44 | 45 | 21 | 29 | 30 | 26 | 23 | 14 | 12 | 22 | 15 | 14 | 45 |
| MAX | 0.061 | 0.065 | 21.2 | 21.9 | 23 | 21 | 6.9 | 24.3 | 16.7 | 45 | 38 | 57 | MAX | 71 | 84 | 70 | 72 | 74 | 70 | 78 | 77 | 61 | 42 | 35 | 52 | 84 |