# Oregon Air Quality Monitoring Annual Report: 2019

**October 2020**



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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
**Department of Environmental Quality**

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# Glossary of Air Quality Terms used in this report:

AQI – Air Quality Index – standardized EPA method of reporting air quality
BScat – Beta Scattering - a light scattering unit used for visibility
CO – Carbon monoxide – An odorless, colorless gaseous pollutant
CO2 – Carbon dioxide – Primary greenhouse gas
CO2e - Carbon dioxide equivalent – A unit linking GHG to CO2
WF - Wildfire
GHG – Greenhouse Gas
HAPs – Hazardous Air Pollutant as defined in Title III of the Clean Air Act
MMTCO2e - Million metric tons of carbon dioxide equivalent
NAAQS – National Ambient Air Quality Standards – federal air quality standards
NO – Nitrogen oxide
NO2 – Nitrogen dioxide - a reddish-brown gaseous pollutant.
NOx – Nitrogen oxides – reddish brown gaseous pollutant - mainly NO and NO2
O3 – Ozone – a gaseous pollutant and a component of smog at ground level
PM2.5 – Particulate Matter 2.5 micrometers in diameter and smaller
PM10 - Particulate Matter 10 micrometers in diameter and smaller
ppm – Parts per million - air pollutant concentration.
ppb – Parts per billion - air pollutant concentration.
SO2 – Sulfur dioxide - a colorless, pungent gaseous pollutant.
TSP - Total Suspended Particulates
USG – Unhealthy for Sensitive Groups – an AQI air quality category
µg/m3 – Microgram per meters cubed - air pollutant concentration
VOC – Volatile Organic Compounds

Standard Exceedance – Occur when the NAAQS is surpassed.

Standard Violation – The NAAQS provides a cushion which allows for a few exceedances every year. (e.g. the ozone NAAQS is compared to the 4th highest day of the year. So a city can have three exceedances without a violation.)

Non-Attainment - An area is non-attainment if its three year average violates the NAAQS and EPA formally declares it non-attainment.

Published by the Department of Environmental Quality, November, 2020

# Air Quality Annual Report

## DEQ's Mission Statement

The Department of Environmental Quality's (DEQ) mission is to be a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Each year DEQ updates the annual report including the most recent year. The air pollutants of greatest concern in Oregon are:

- Fine particulate matter (mostly from combustion sources) known as **PM2.5** (2.5 micrometers and smaller diameter)
- **Air Toxics -** pollutants that cause or may cause cancer or other serious health effects
- Ground-level **ozone**, a component of smog
- **Greenhouse gas** (GHG) emissions and global climate change are also concerns in Oregon. Oregon state agencies track GHG emissions from a wide variety of products, services, utilities, and fuel providers. These emissions data are available on DEQ's web site under Air Quality/AQ Programs / Greenhouse Gas Reporting Home. http://www.oregon.gov/DEQ/AQ/Pages/Greenhouse-Gas-Inventory-Report

  There is much more information about climate change on the Oregon Global Warming Commission's web page http://www.keeporegoncool.org/

## Oregon's 2019 Ambient Air Quality in Summary:

- **PM2.5**
  PM2.5 from non-wildfire sources was below the federal health standards in 2019 except in Oakridge which was just above the standard. There were a few Wildfire smoke impacts in Southern Oregon in the last week of July.

  **Air toxics**
  Some air toxics such as benzene and acetaldehyde, remain near or above ambient benchmark concentrations. A*mbient benchmark concentrations are levels at which, if exposed over a lifetime, an individual's risk of getting cancer is increased by one in a million, or non-cancer health effects could occur.*
- **ozone** (smog)
  The ozone concentrations had one day above the standard in both Portland and Medford. The rest of the days were below the National Ambient Air Quality Standard in these cities and in the rest of the state.
- **Carbon monoxide, nitrogen dioxide, sulfur dioxide** and **PM10**
  These pollutants are far below the criteria pollutant federal health standard. These pollutants have been trending mostly downward for most locations over the last ten years.



*WF = Wildfire Smoke Impact*
*USG = Unhealthy for Sensitive Groups*

# Air Quality Index

The Air Quality Index (AQI) converts ambient air pollutant concentrations into categories of health concern. The AQI uses index numbers, levels of health risk, and colors to communicate six categories of health concern (Table 1), and identifies air quality levels that range from good to hazardous.

Table 1 Air Quality Index Health Category Descriptors.

| Air Quality | AQI | Health Advisory |
|---|---|---|
| Good | 0-50 | No health impacts expected . |
| Moderate | 51-100 | Unusually sensitive people should consider reducing prolonged or heavy outdoor exertion. |
| Unhealthy for Sensitive Groups | 101-150 | People with heart disease, respiratory disease (such as asthma), older adults, and children should reduce prolonged or heavy exertion. Active healthy adults should also limit prolong outdoor exertion. |
| Unhealthy | 151-200 | People with heart disease, respiratory disease (such as asthma), older adults, and children should avoid prolonged or heavy outdoor exertion. Everyone else should reduce prolonged or heavy outdoor exertion. |
| Very Unhealthy (Alert) | 201-300 | People with heart disease, respiratory disease (such as asthma), older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion. |

## How the AQI is computed

The AQI is computed for PM2.5, PM10, ozone, nitrogen dioxide, sulfur dioxide, and carbon monoxide but the PM2.5 and ozone AQI's are typically the highest in Oregon and usually drive the health category. EPA provides all states with the AQI equation for national uniformity. See EPA's AIRNow web site for more detail about the AQI.

Table 2. Air Quality Index Ranges and Episode Stages for PM2.5 and ozone.

| Air Quality Rating | Air Quality Index (AQI) | $PM_{2.5}$ 24-hour Average ($\mu g/m^3$) | Ozone 8-hour Average (ppm) |
|---|---|---|---|
| GOOD | 0 - 50 | 0.0 - 12.0 | 0.000 - 0.054 |
| MODERATE | 51 - 100 | 12.1 - 35.4 | 0.055 - 0.070 |
| UNHEALTHY FOR SENSITIVE GROUPS | 101 - 150 | 35.5 - 55.4 | 0.071 - 0.085 |
| UNHEALTHY | 151 - 200 | 55.5 - 150.4 | 0.086 - 0.105 |
| VERY UNHEALTHY | 201 - 300 | 150.5 - 250.4 | 0.106 - 0.200 |
| HAZARDOUS | >300 | >250.5 | >0.200 |

*WF = Wildfire Smoke Impact*
*USG = Unhealthy for Sensitive Groups*

# 2019 Oregon Air Quality Index by City

The AQI provides a review of the health levels over the past year. The Figures below display the AQI health levels over the past year for all the areas where DEQ and LRAPA monitor air quality. **Note: A summary of all the AQI days are shown in Appendix G.**

Table 3. Figure Key for 2019 Air Quality Index.

| Figure | City or Area | Figure | City or Area | Figure | City or Area |
|---|---|---|---|---|---|
| 1 | Albany | 16 | Enterprise | 31 | Mt. Hood Wilderness |
| 2 | Applegate Valley | 17 | Eugene/Springfield | 32 | Oakridge |
| 3 | Ashland | 18 | Florence | 33 | Pendleton |
| 4 | Baker City | 19 | Forest Grove | 34 | Portland |
| 5 | Beaverton | 20 | Grants Pass | 35 | Prineville |
| 6 | Bend | 21 | Hermiston | 36 | Roseburg |
| 7 | Burns | 22 | Hillsboro | 37 | Salem |
| 8 | Cave Junction | 23 | John Day | 38 | Sauvie Island |
| 9 | Chiloquin | 24 | Klamath Falls | 39 | Shady Cove |
| 10 | Corvallis | 25 | La Grande | 40 | Silverton |
| 11 | Cottage Grove | 26 | Lakeview | 41 | Sisters |
| 12 | Coos Bay | 27 | Lyons | 42 | Sweet Home |
| 13 | Cove | 28 | Madras | 43 | The Dalles |
| 14 | Crater Lake | 29 | Medford | 44 | Tualatin at I-5 |
| 15 | Detroit Lake | 30 | Mill City | | |

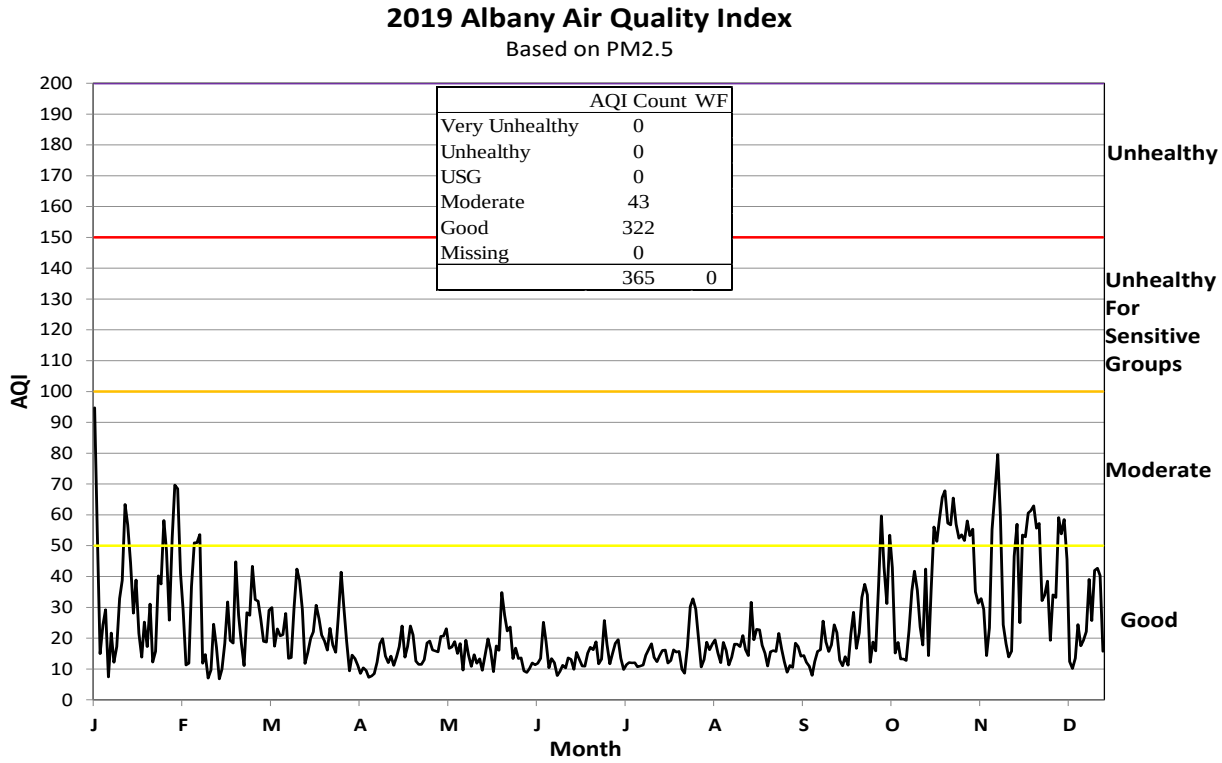



Figure 1. 2019 Albany Air Quality Index Summary.

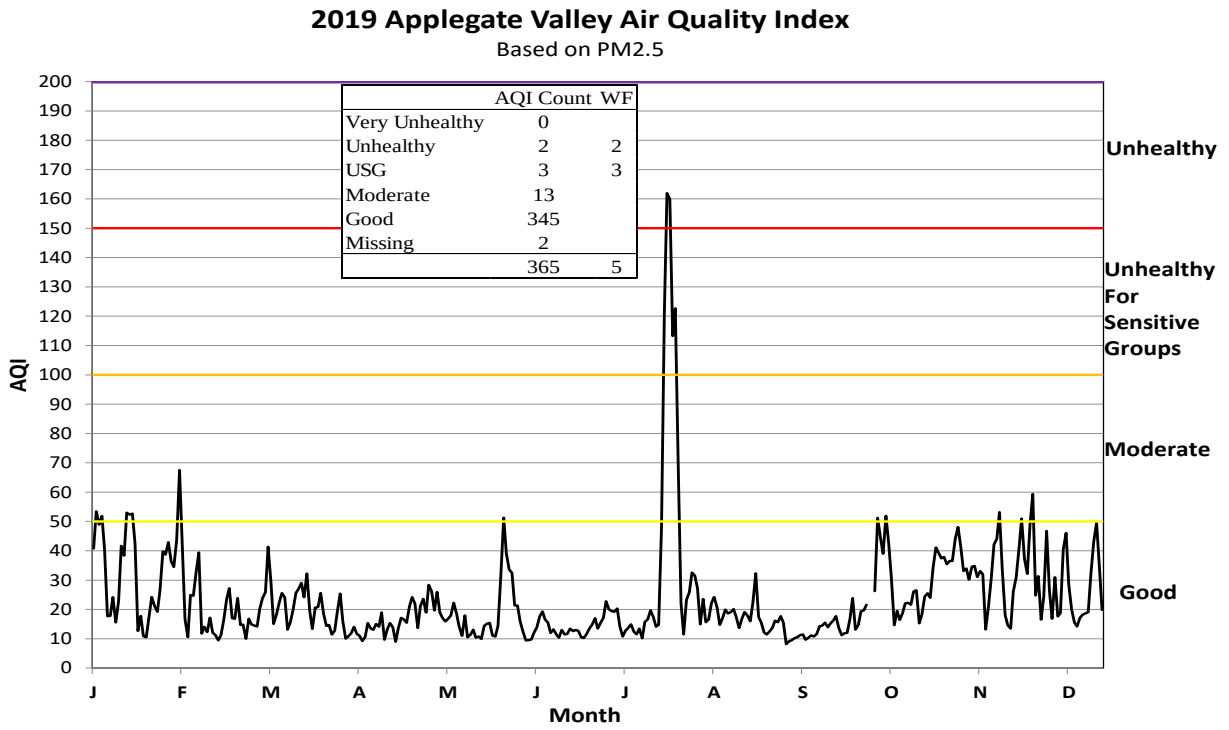



Figure 2. 2019 Applegate Valley Air Quality Summary.

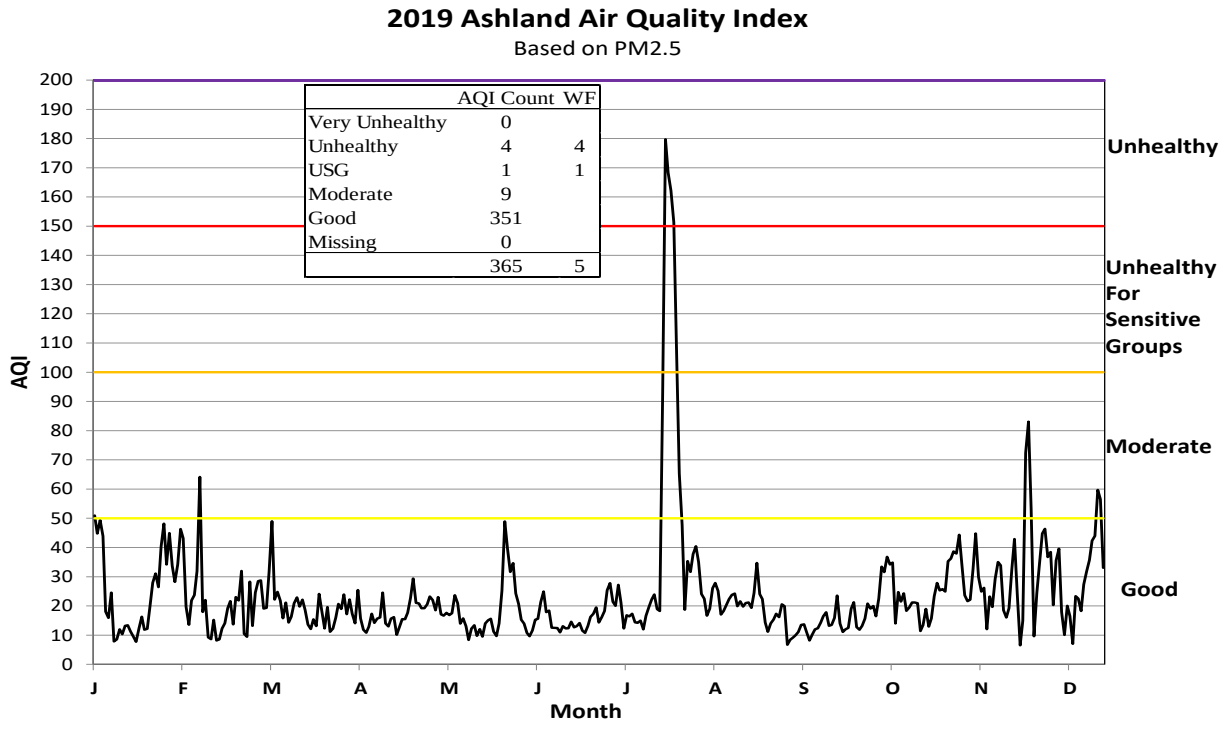



Figure 3. 2019 Ashland Air Quality Index Summary.

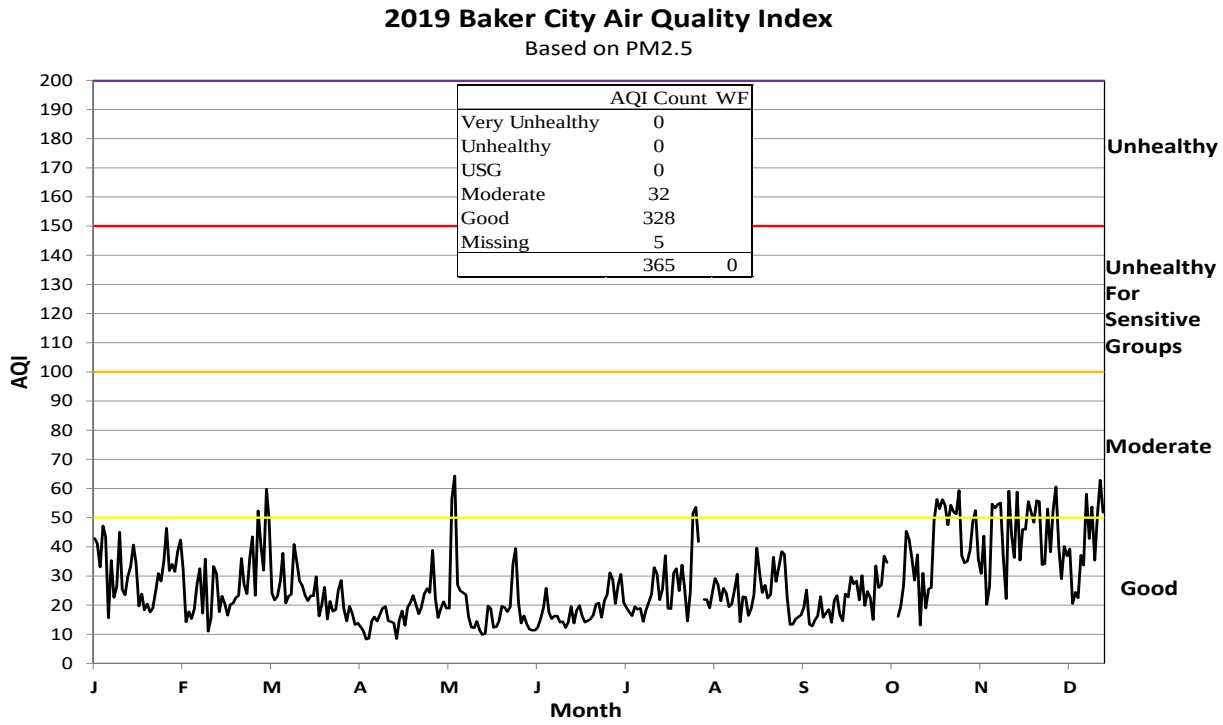



Figure 4. 2019 Baker City Air Quality Index Summary.

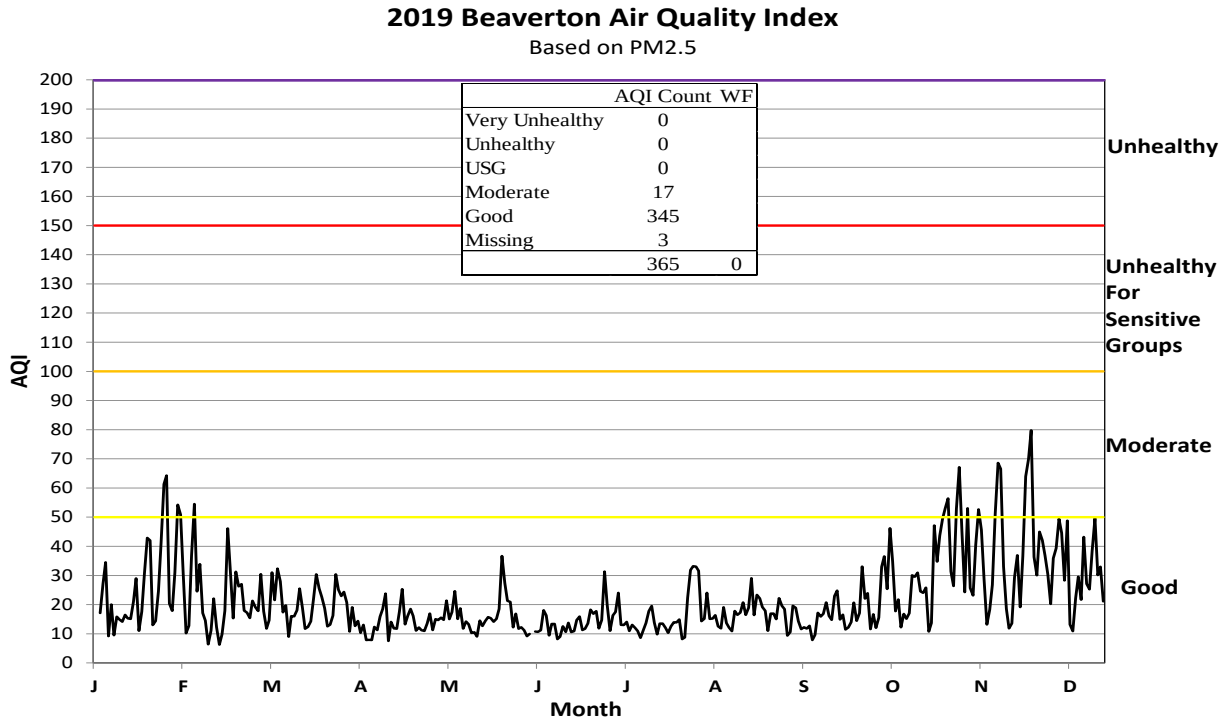



Figure 5. 2019 Beaverton Air Quality Index Summary.

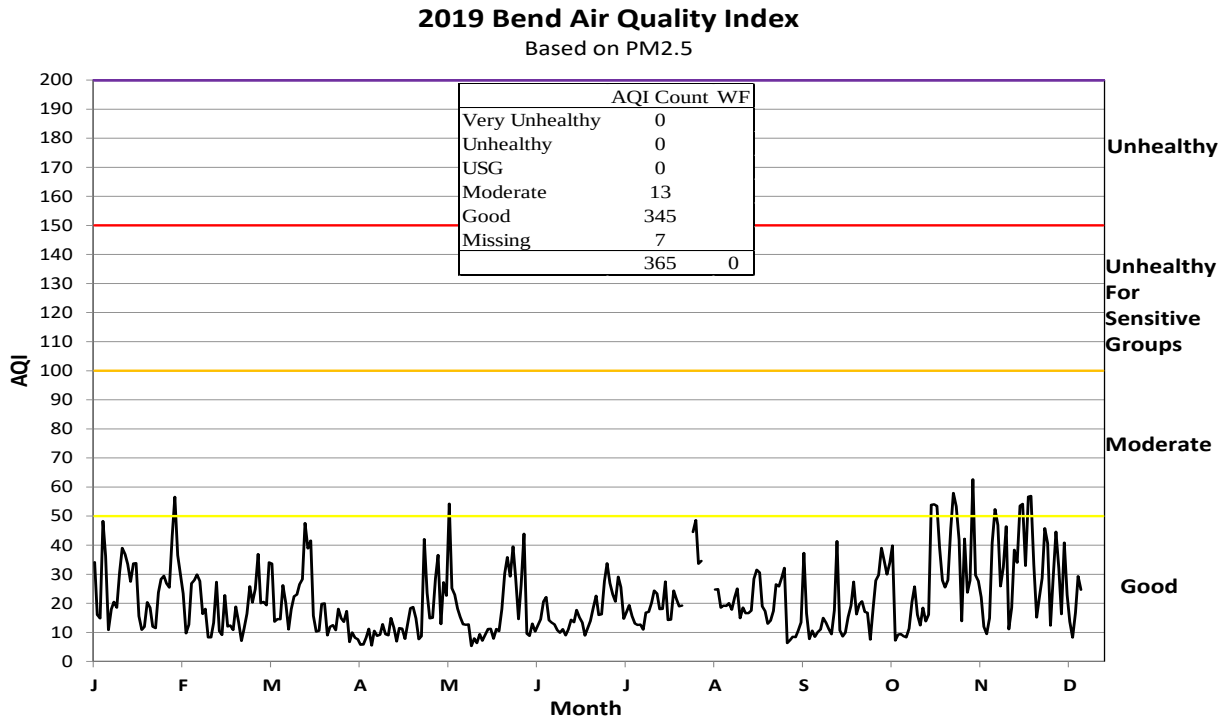



Figure 6. 2019 Bend Air Quality Index Summary.

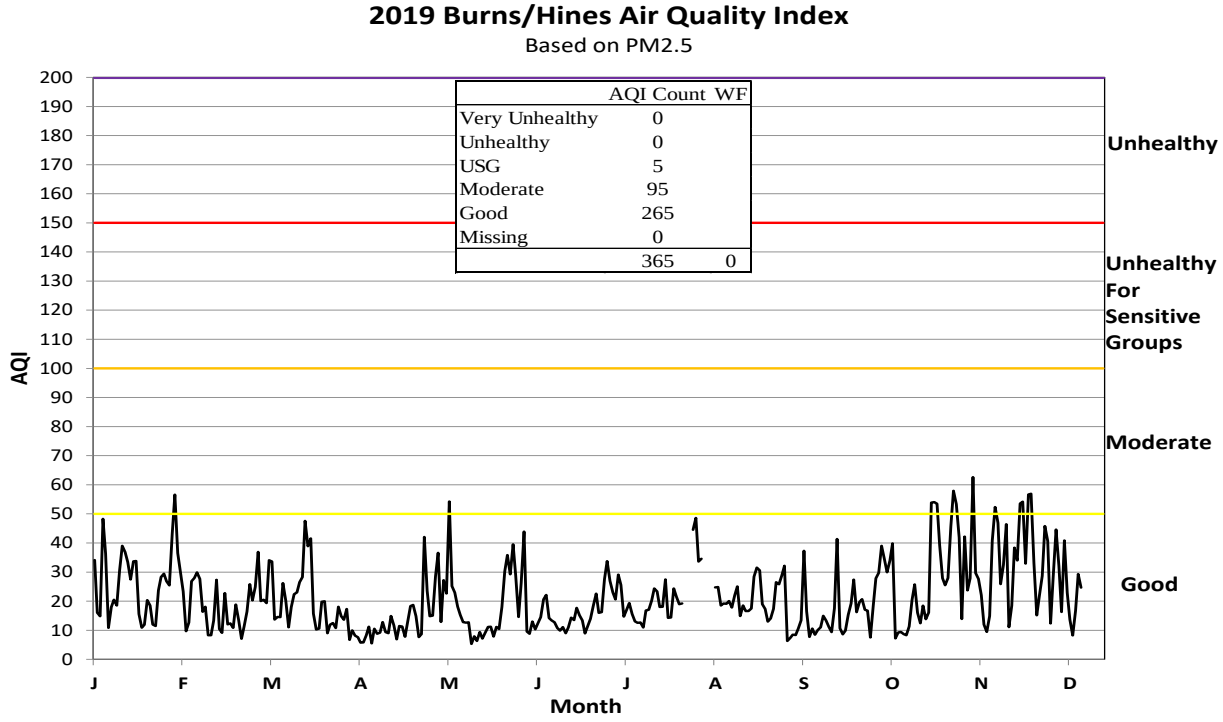



Figure 7. 2019 Burns/Hines Air Quality Index Summary.

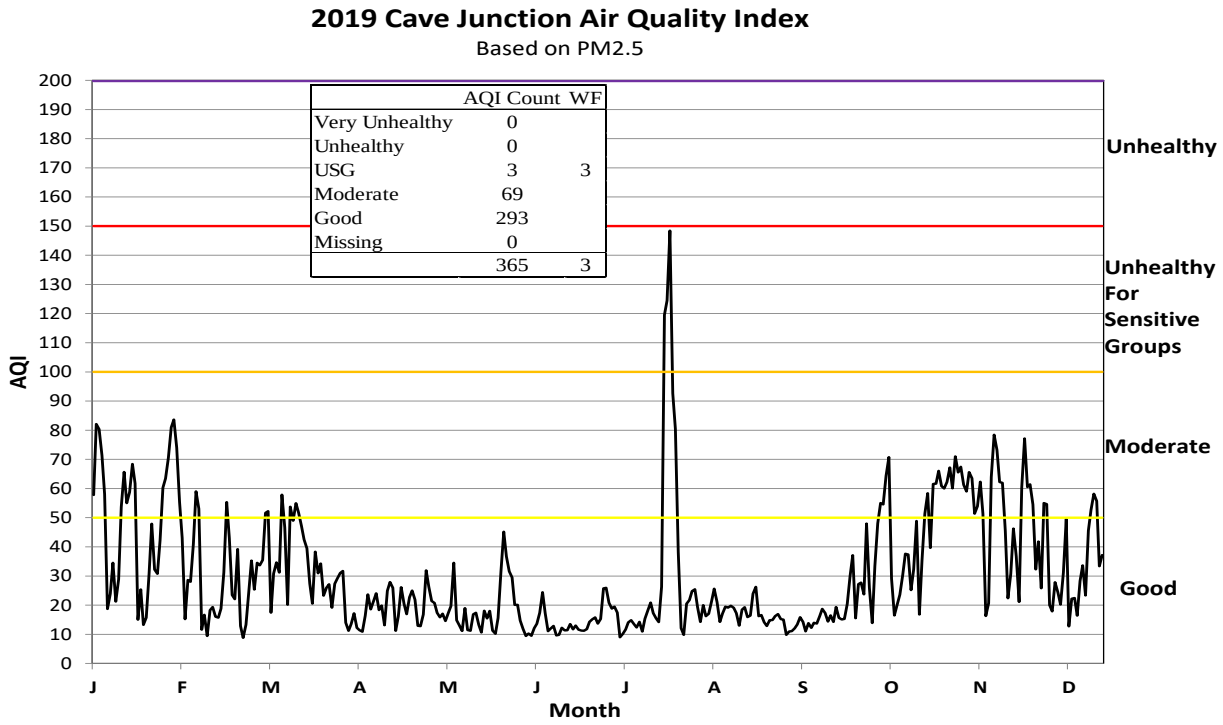



Figure 8. 2019 Cave Junction Air Quality Index Summary.

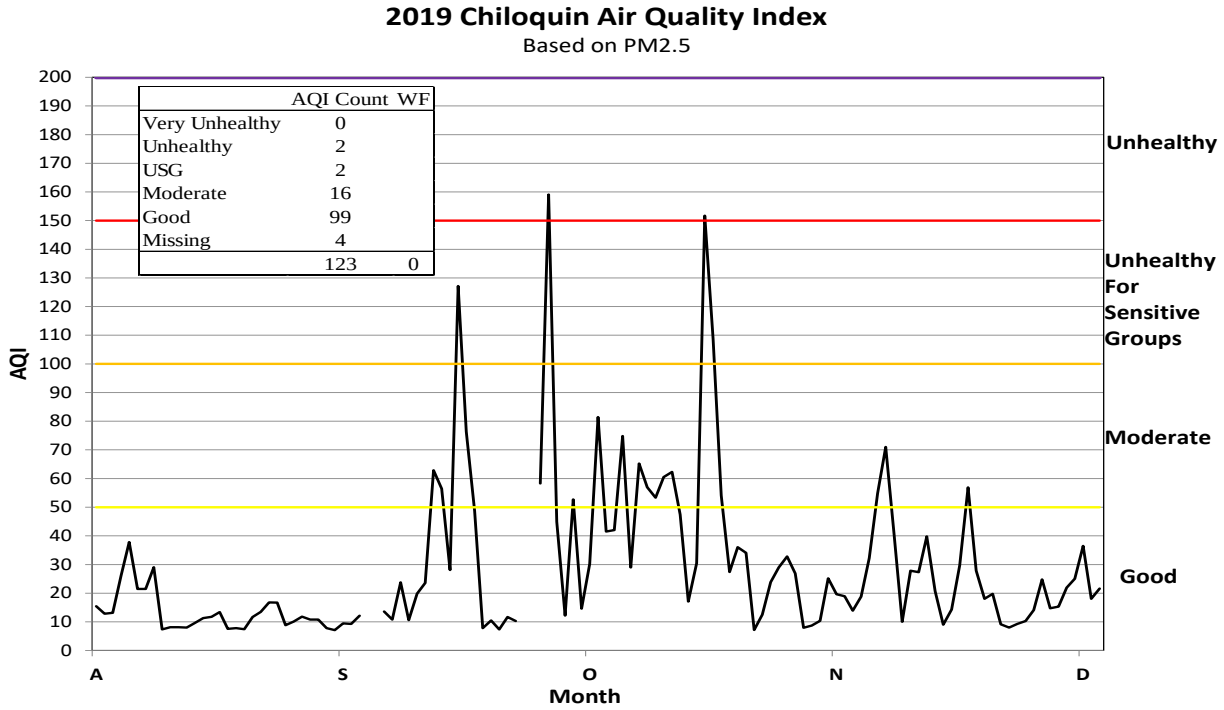



Figure 9. 2019 Chiloquin Air Quality Index Summary.
*Monitoring started on August 31th, 2019*

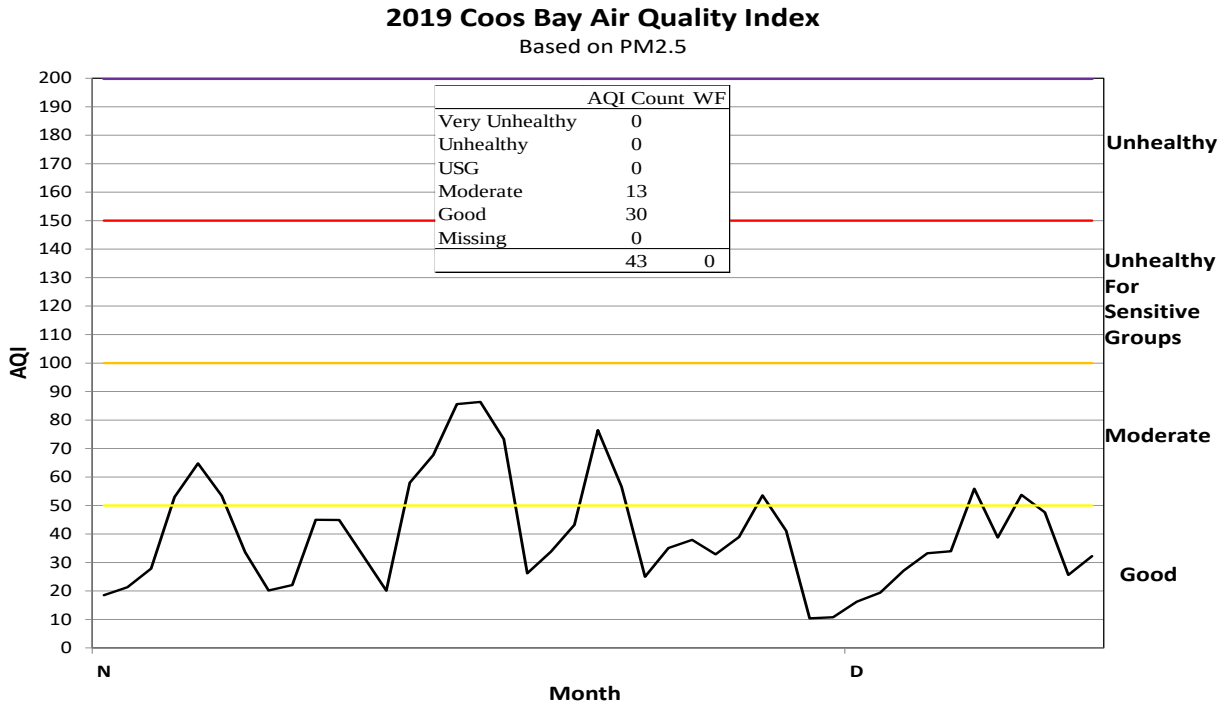



Figure 10. 2019 Coos Bay Air Quality Index Summary.
*Monitoring started on November 18th, 2019*

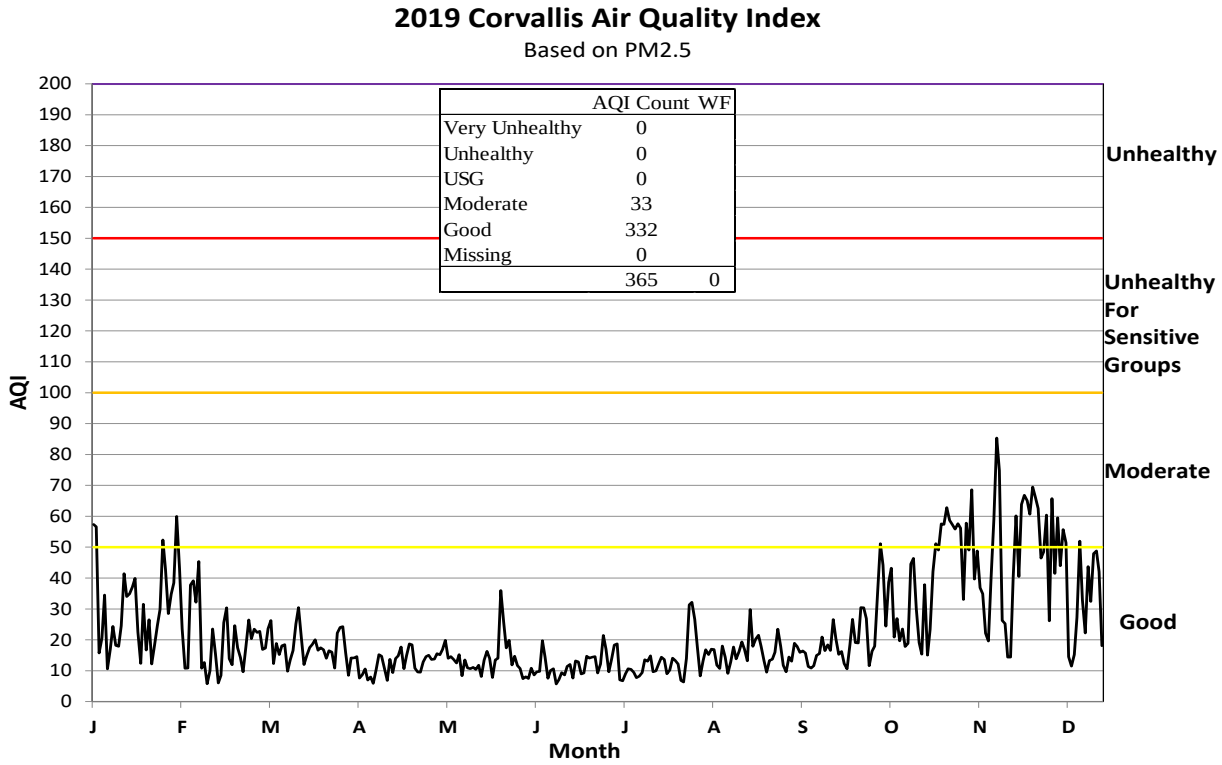



Figure 11. 2019 Corvallis Air Quality Index Summary.

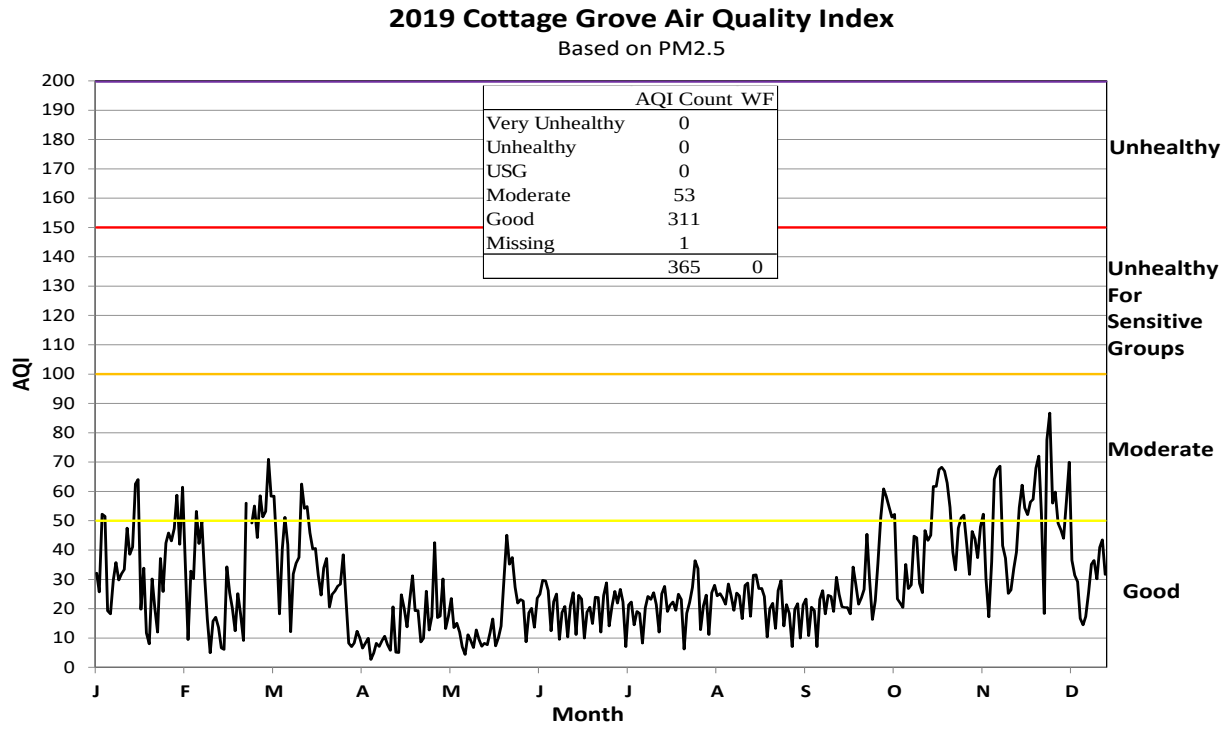



Figure 12. 2019 Cottage Grove Air Quality Index Summary.

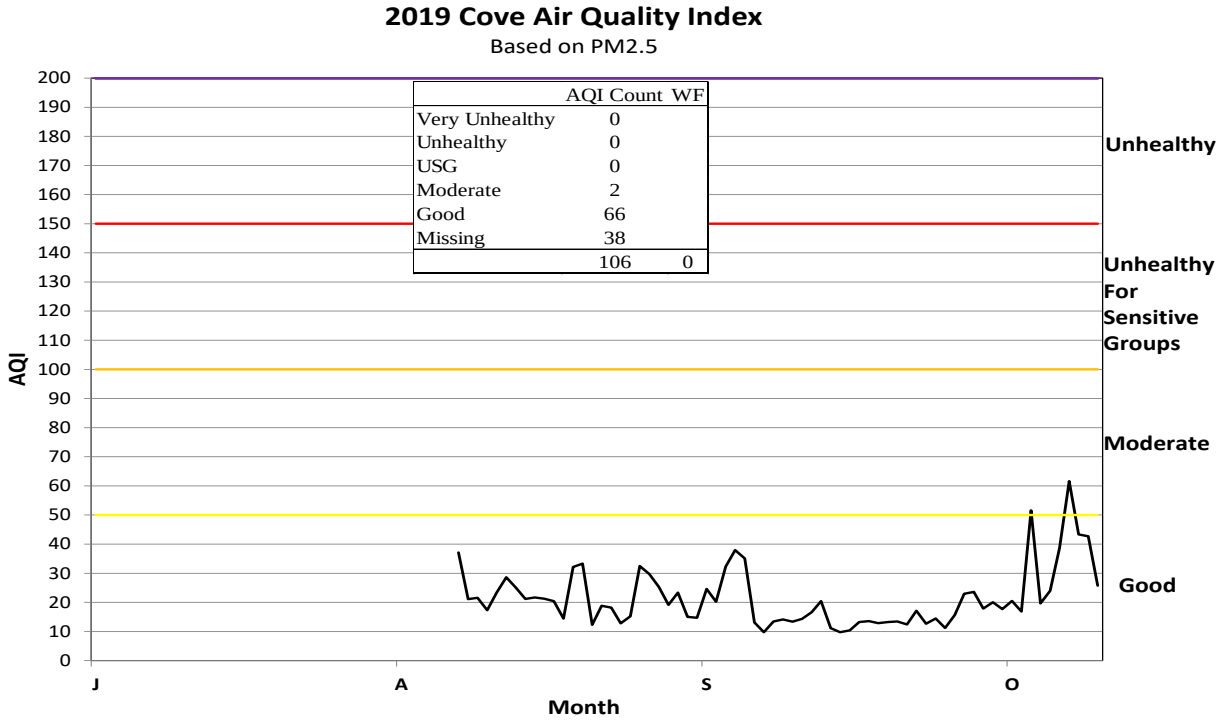



Figure 13. 2019 Cove Air Quality Index Summer Summary
*Monitoring from August 8th to October 14th.*

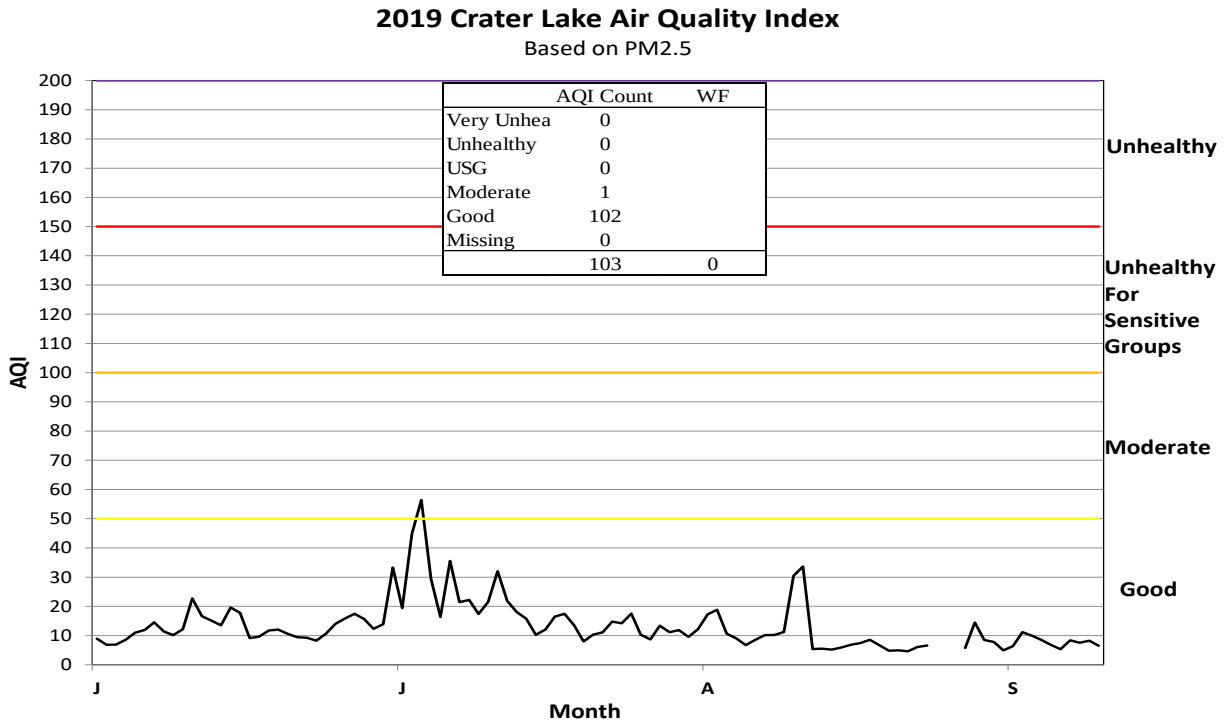



Figure 14. 2019 Crater Lake Summer Air Quality Index Summary.
*Monitoring from June 25th to October 8th.*

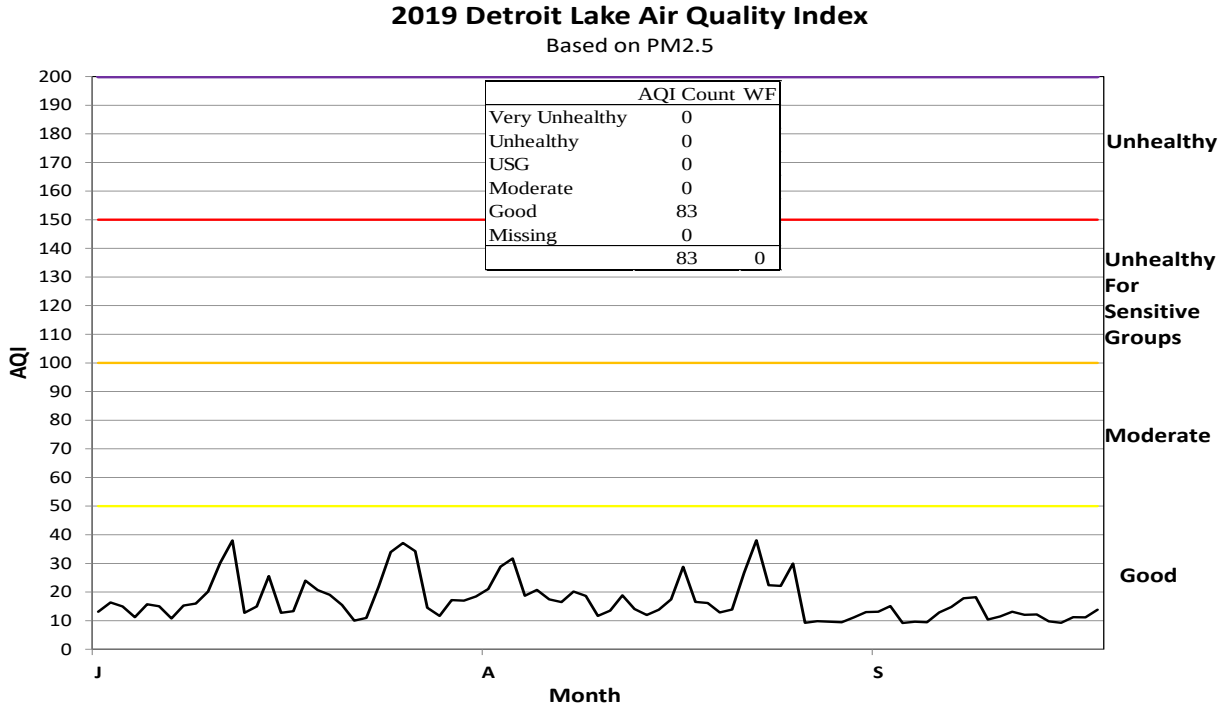



Figure 15. 2019 Detroit Lake Summer Air Quality Index Summary.
*Monitoring from July 12th to October 2nd.*

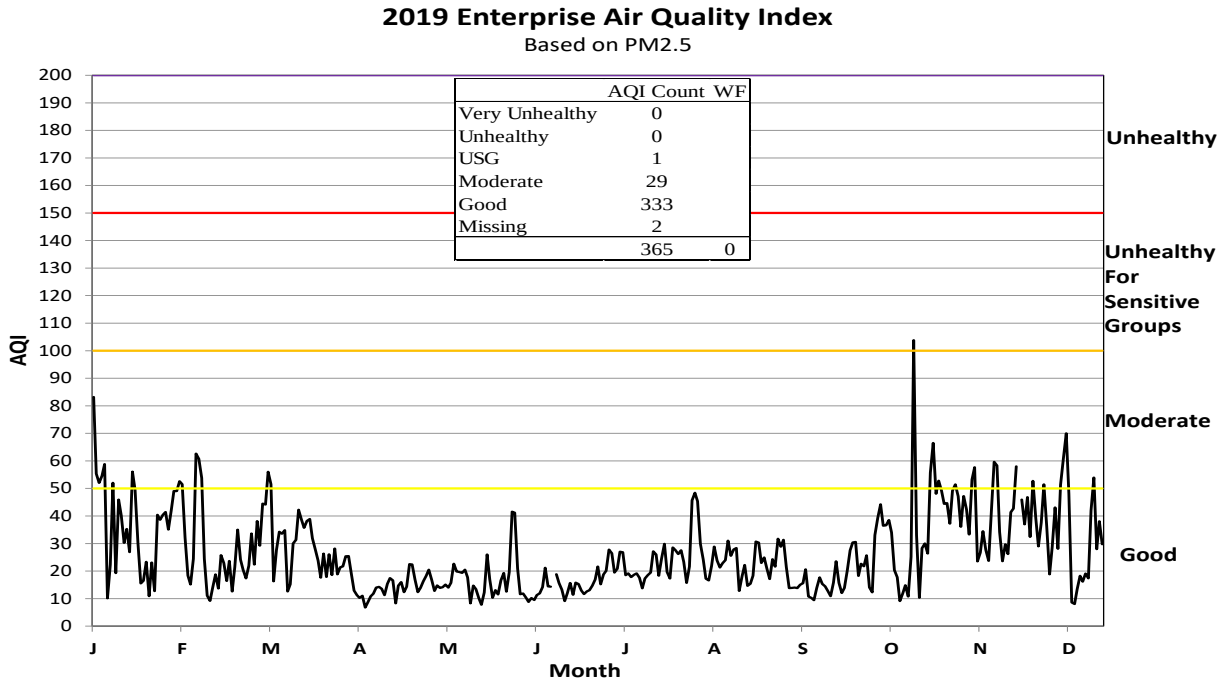



Figure 16. 2019 Enterprise Air Quality Index Summary.

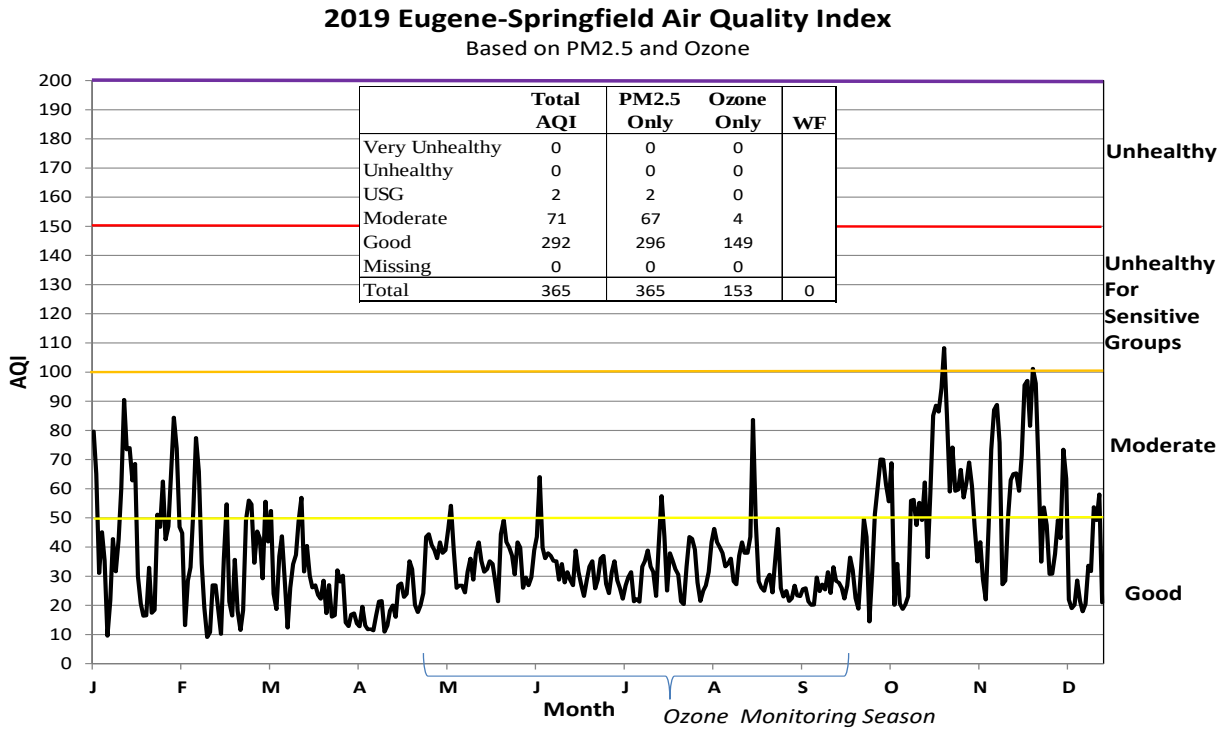



Figure 17. 2019 Eugene/Springfield Air Quality Index Summary.
*Note: only the maximum ozone AQI or PM2.5 AQI is reported each day during ozone season.*

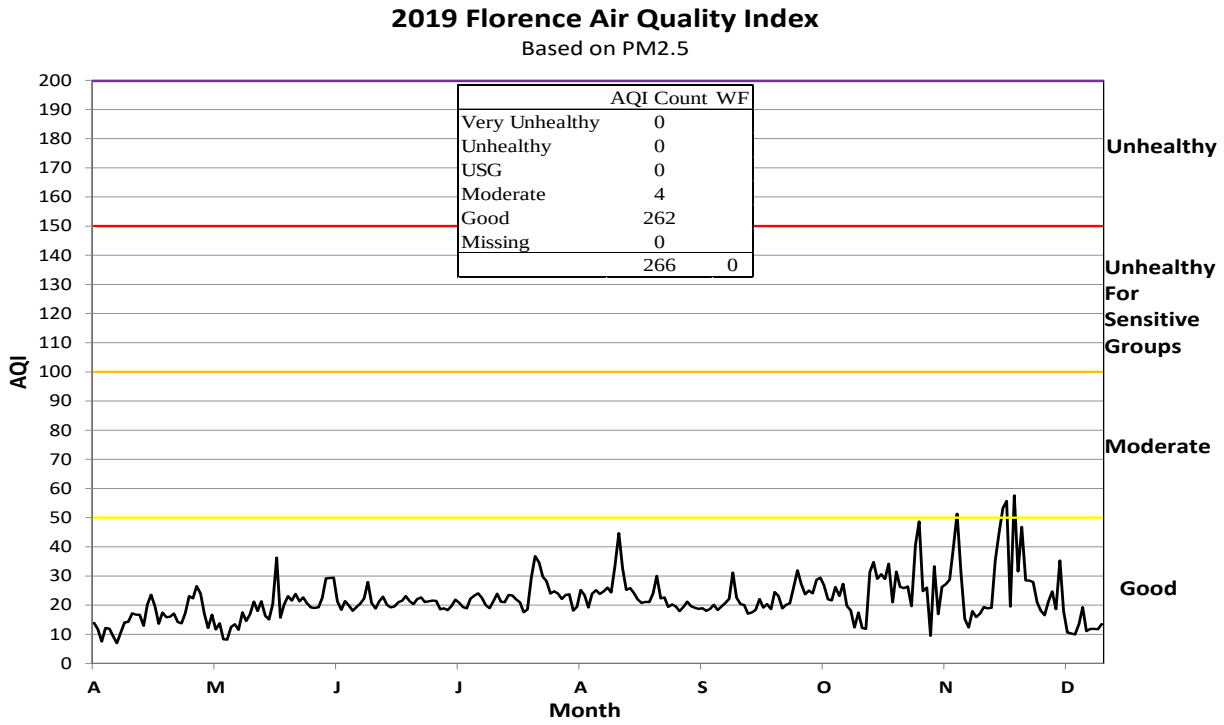



Figure 18. 2019 Florence Air Quality Index Summary.
*Monitoring started on April 10th, 2019.*

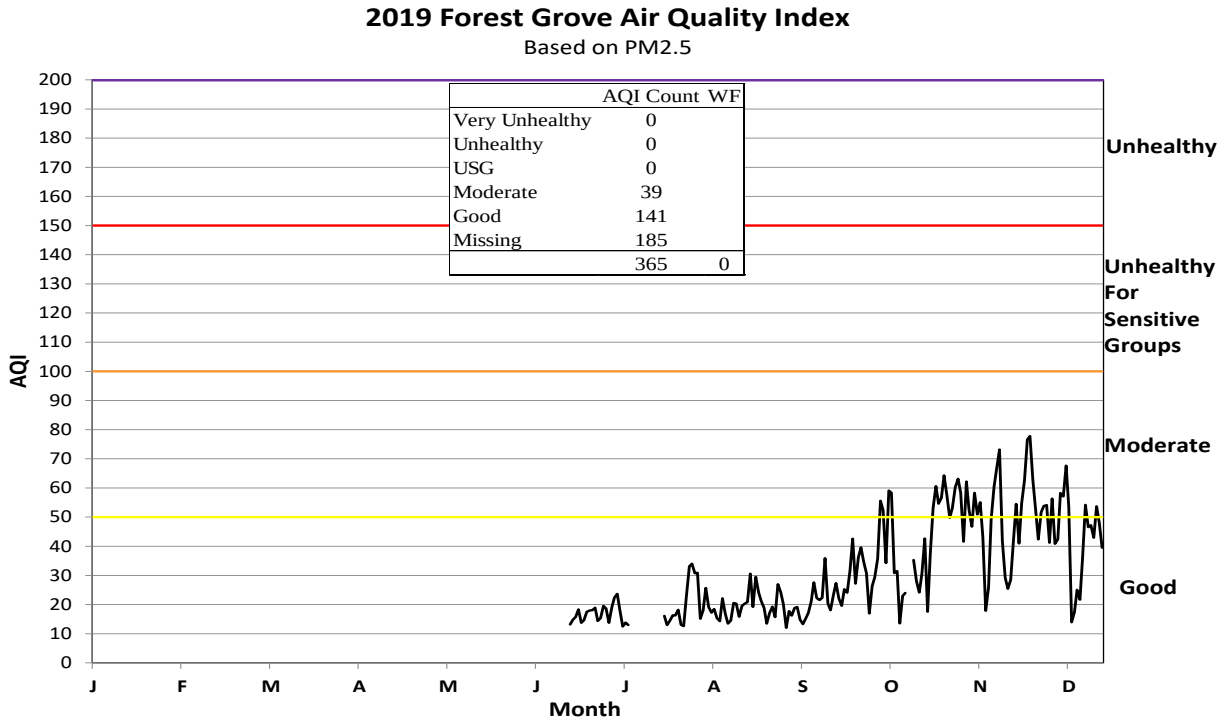



Figure 19. 2019 Forest Grove Air Quality Index Summary.
*Monitoring started on, July 5th, 2019.*

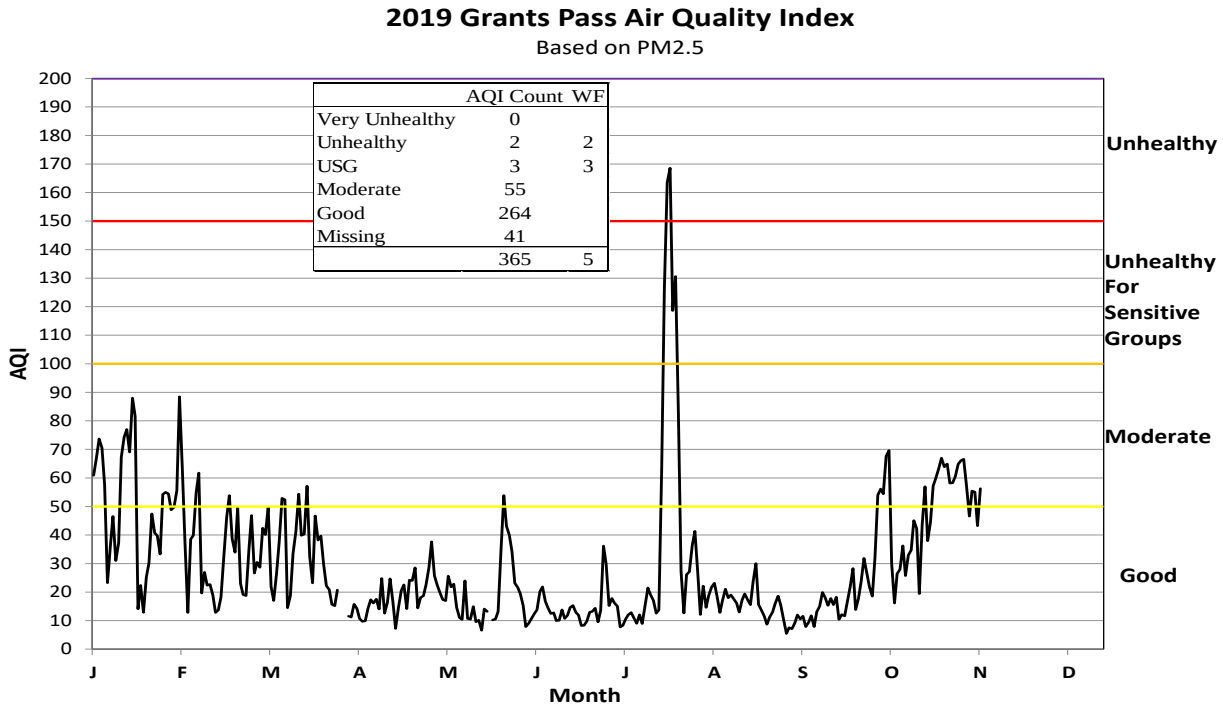



Figure 20. 2019 Grants Pass Air Quality Index Summary.

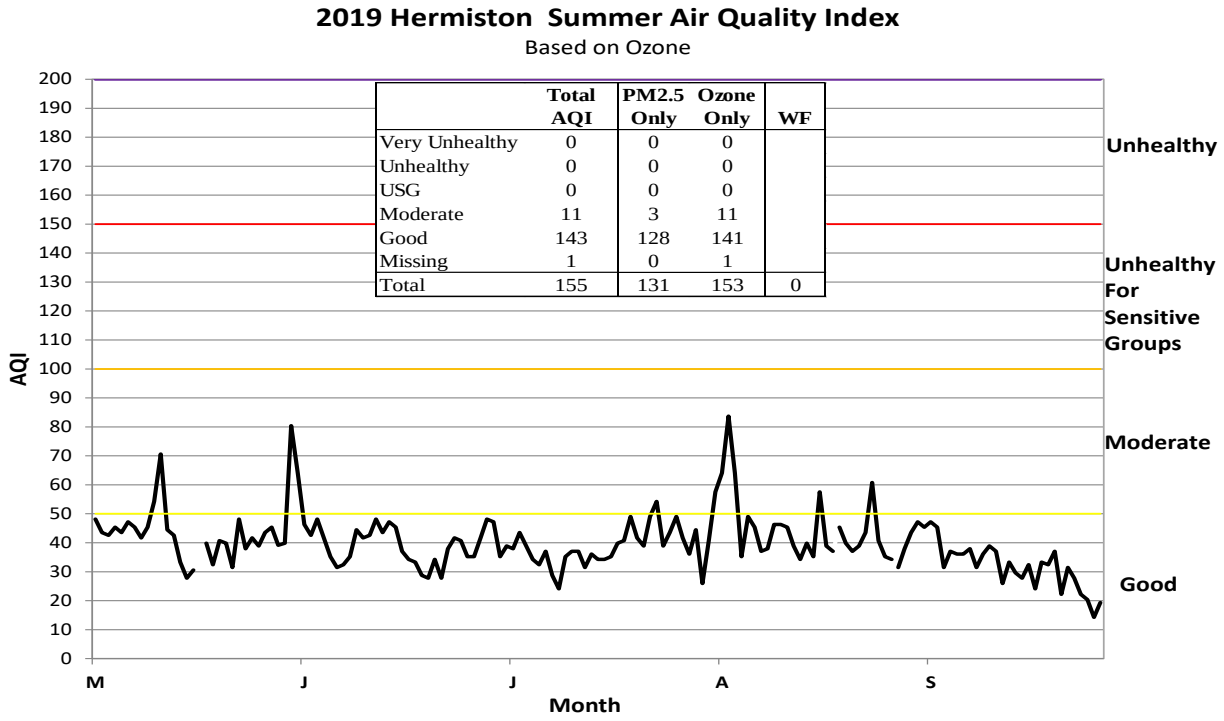



Figure 21. 2019 Hermiston Summer Air Quality Index Summary.
*Monitoring from May 1st to October 2nd.*

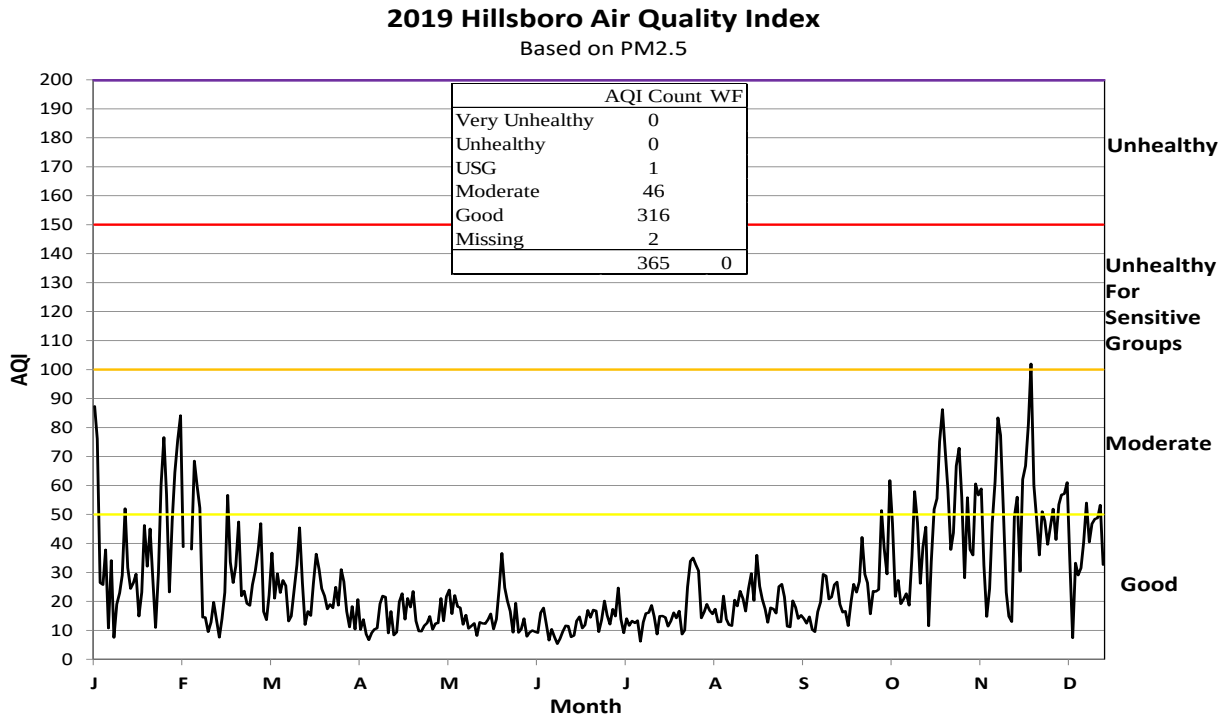



Figure 22. 2019 Hillsboro Air Quality Index Summary.

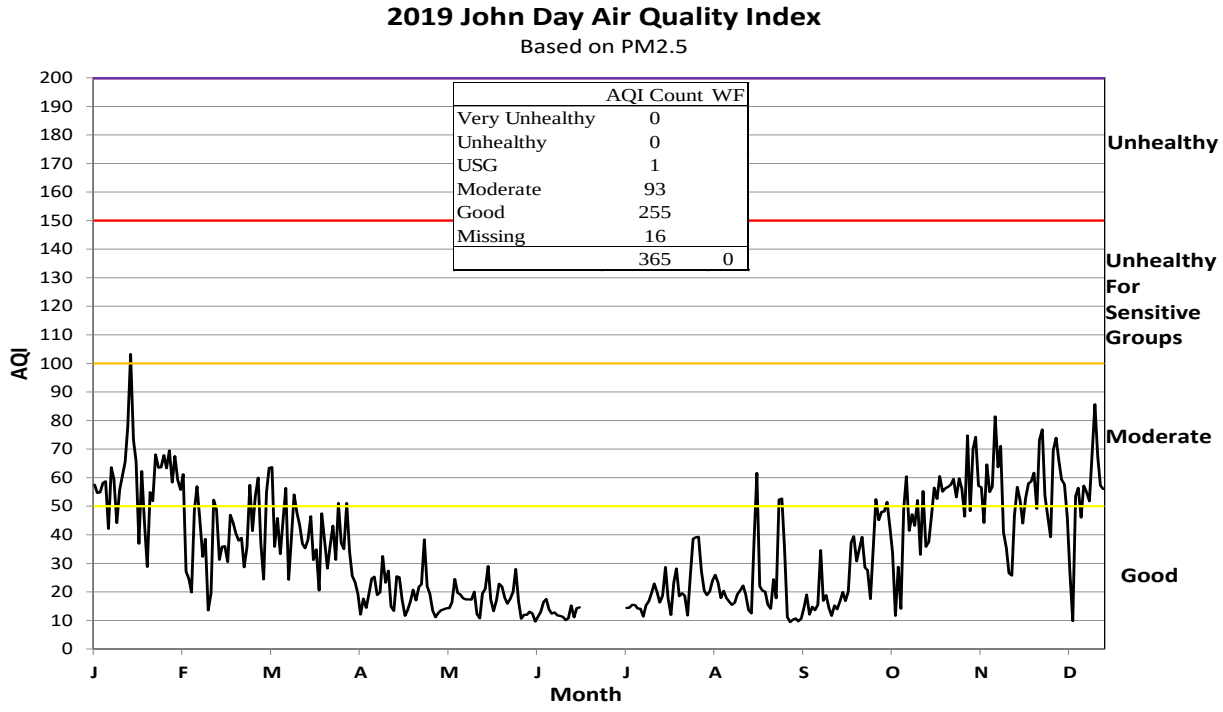



Figure 23. 2019 John Day Air Quality Index Summary.

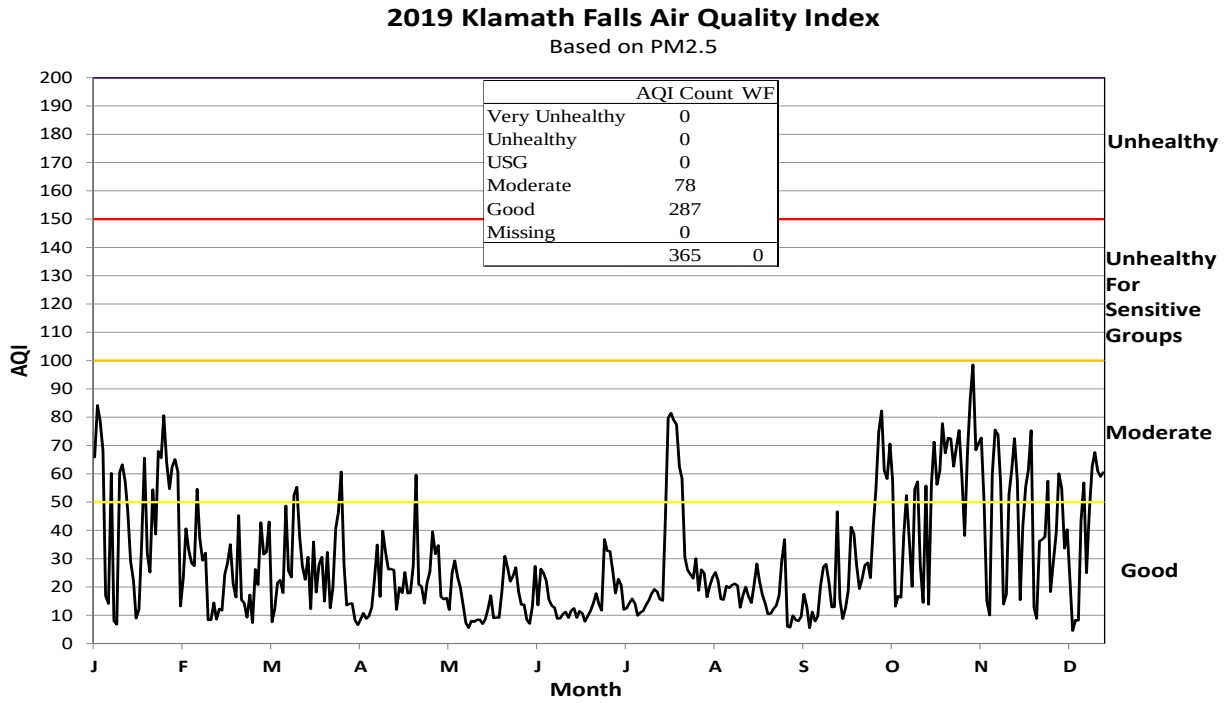



Figure 24. 2019 Klamath Falls Air Quality Index Summary.

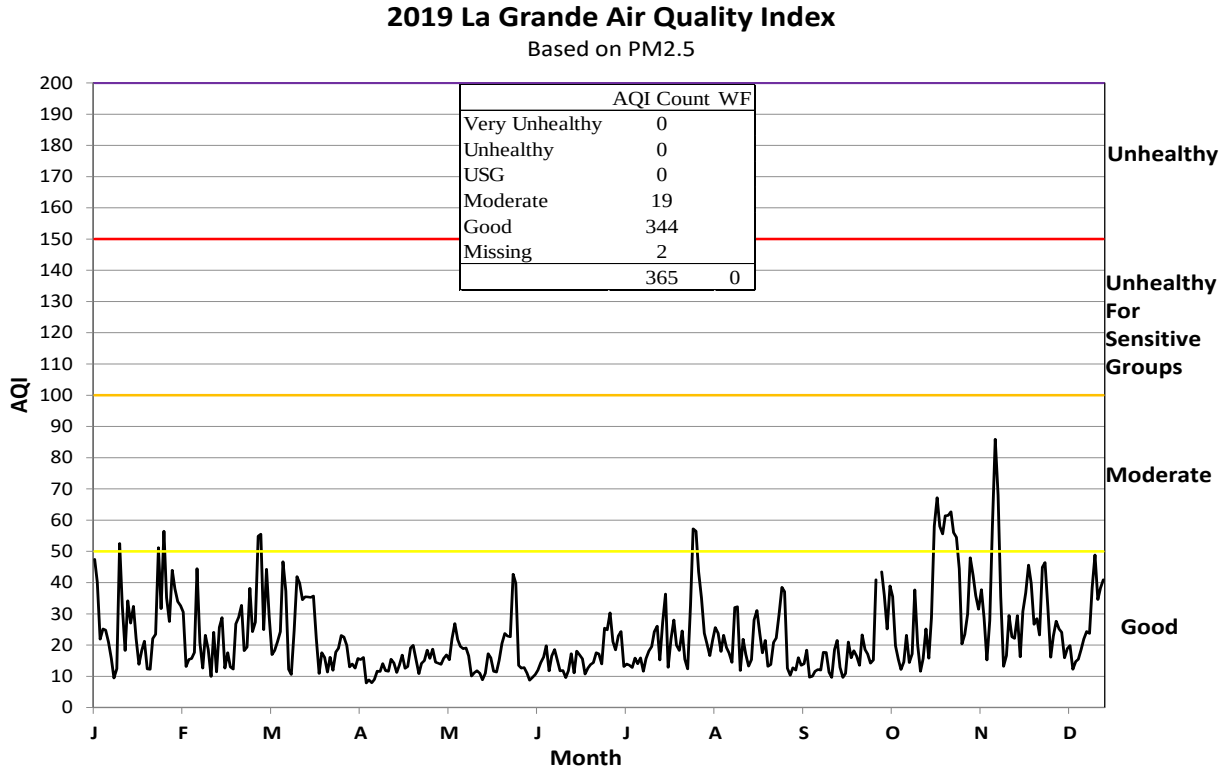



Figure 25. 2019 La Grande Air Quality Index Summary.

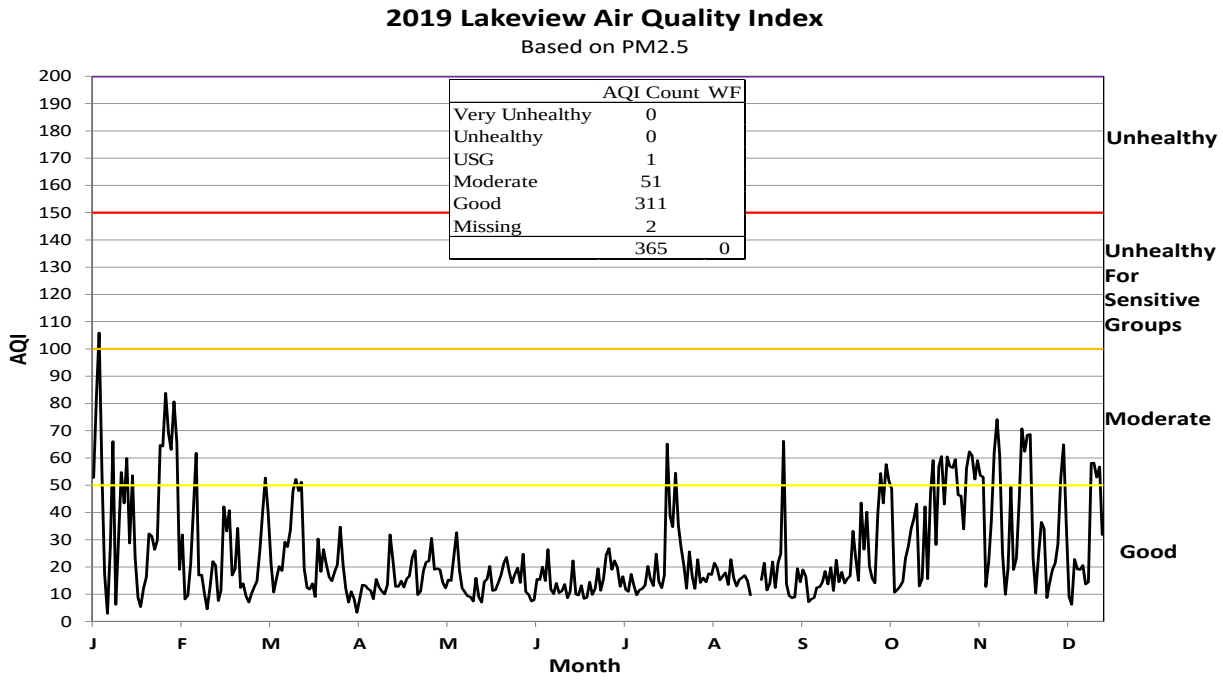



Figure 26. 2019 Lakeview Air Quality Index Summary.

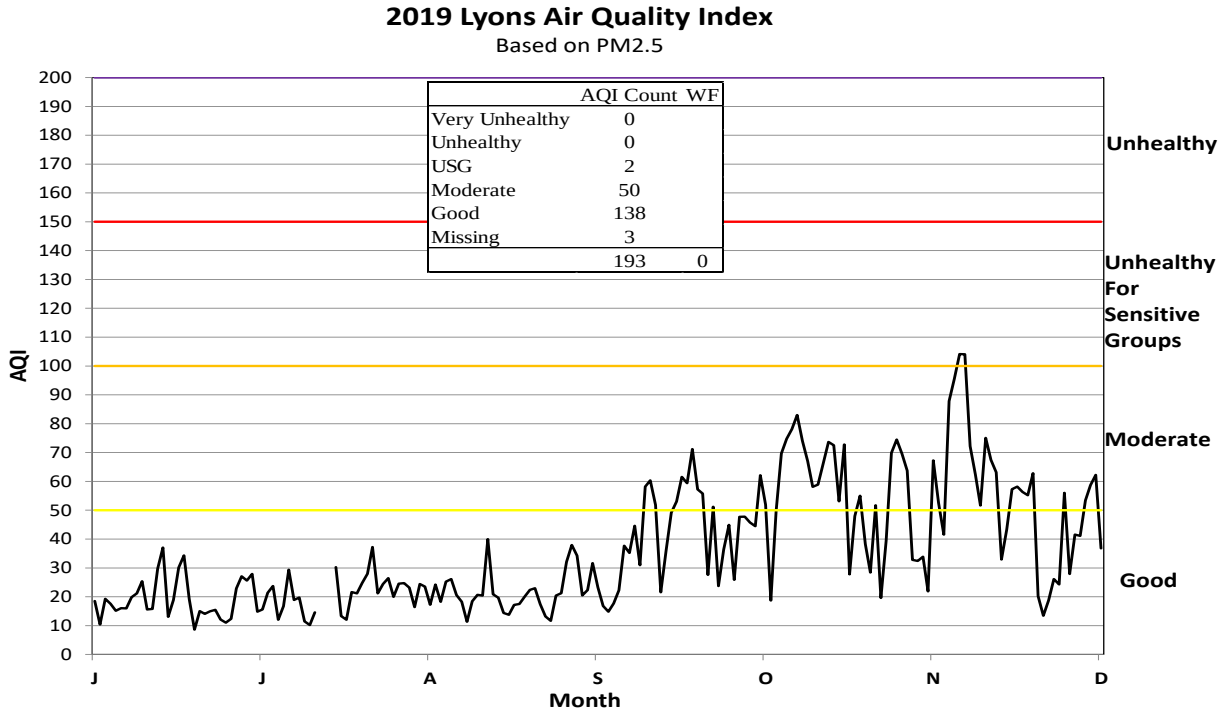



Figure 27. 2019 Lyons Air Quality Index Summary.
*Monitoring June 22nd through December 31st.*

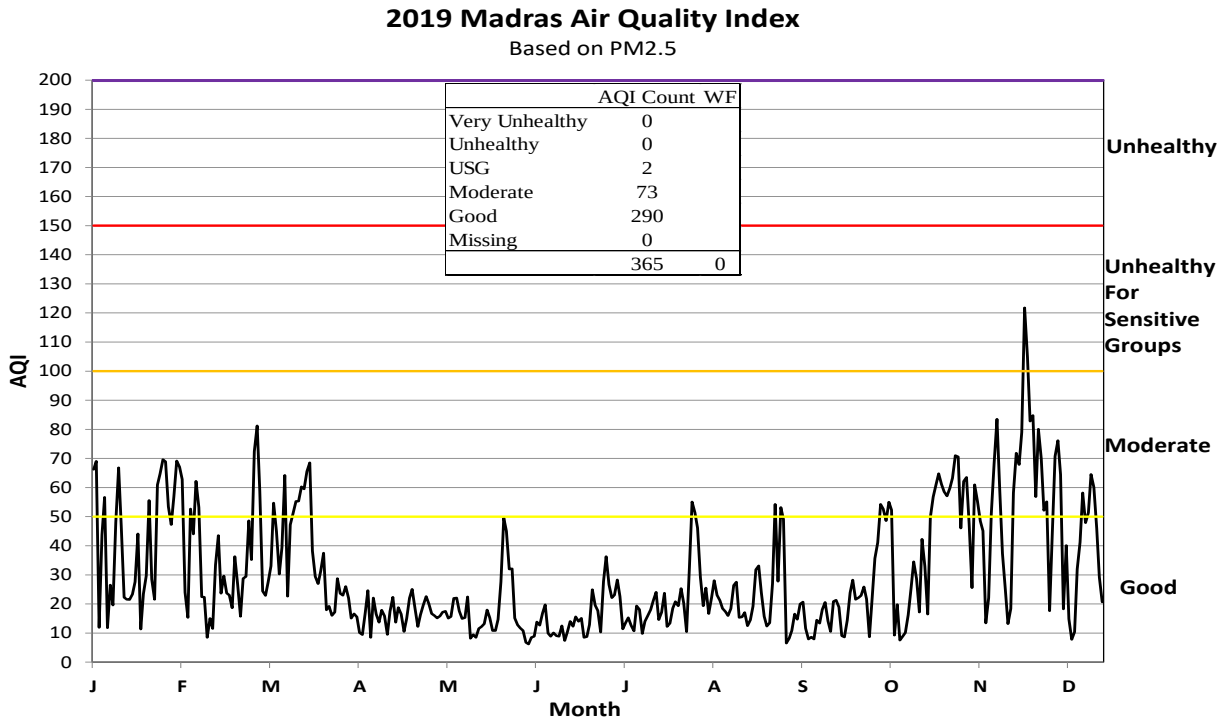



Figure 28. 2019 Madras Air Quality Index Summary.

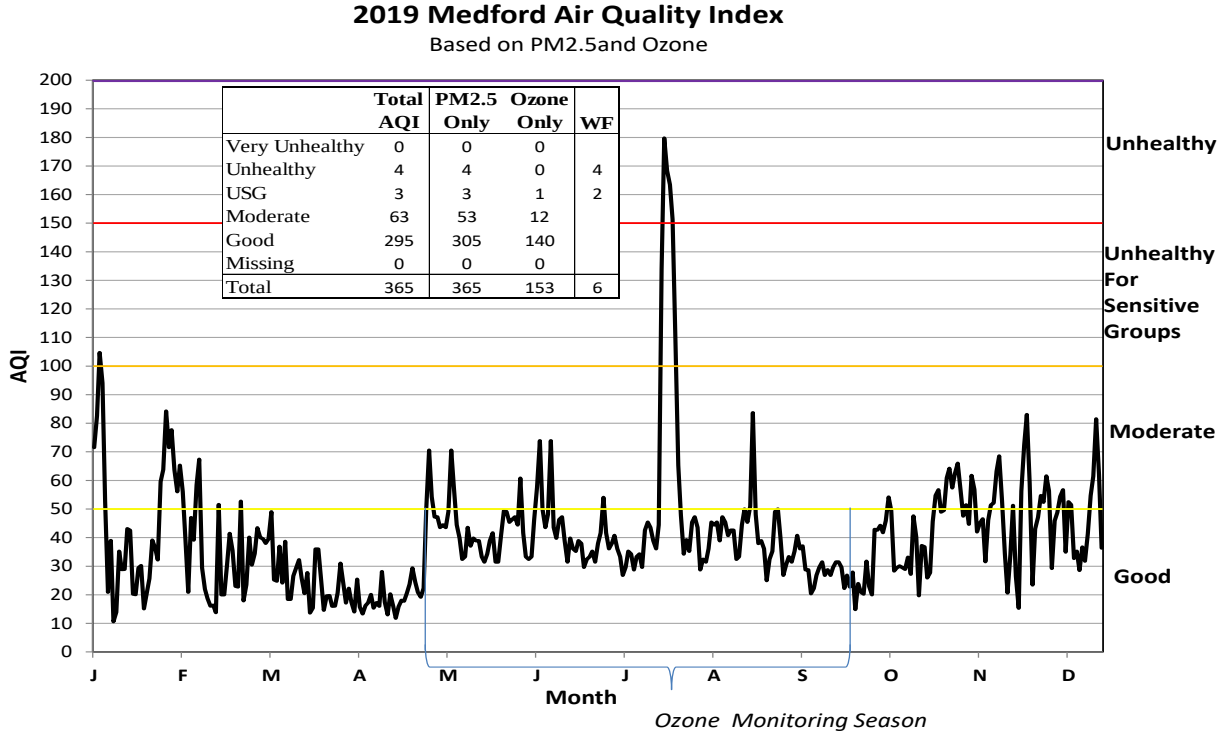



Figure 29. 2019 Medford Air Quality Index Summary.
*Note: only the maximum ozone AQI or PM2.5 AQI is reported each day during ozone season.*

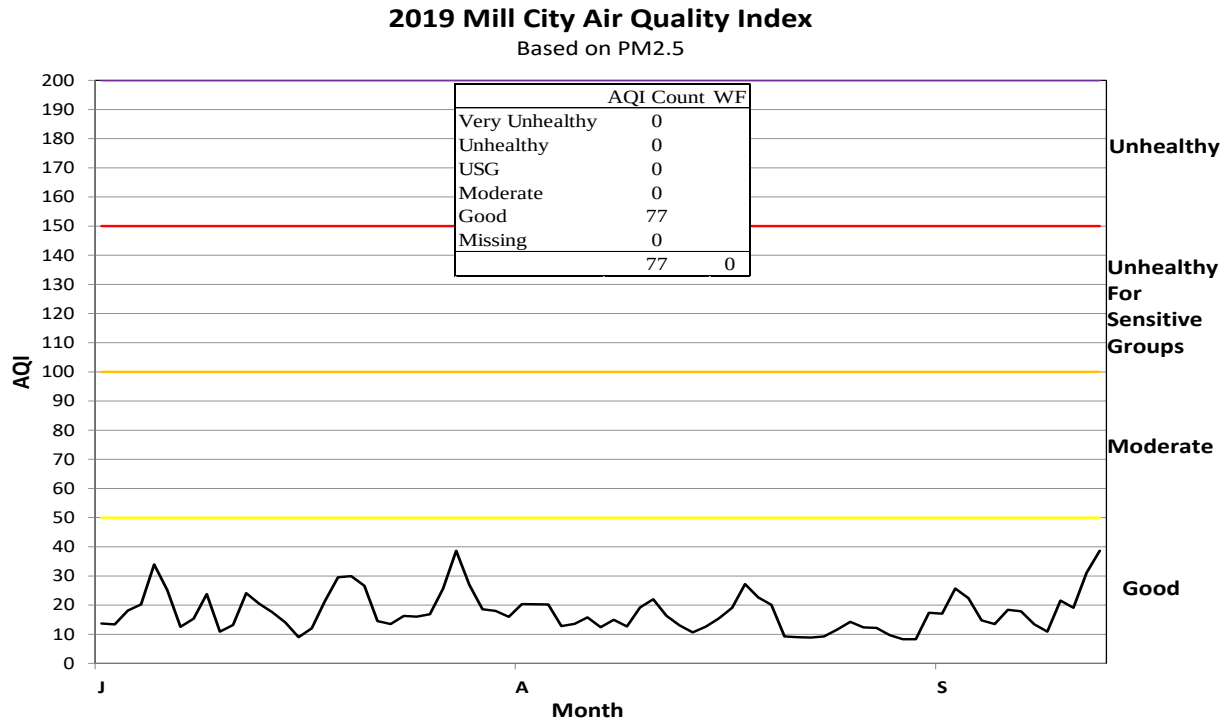



Figure 30. 2019 Mill City Summer Air Quality Index Summary.
*Monitoring from July 18th through October 2nd.*

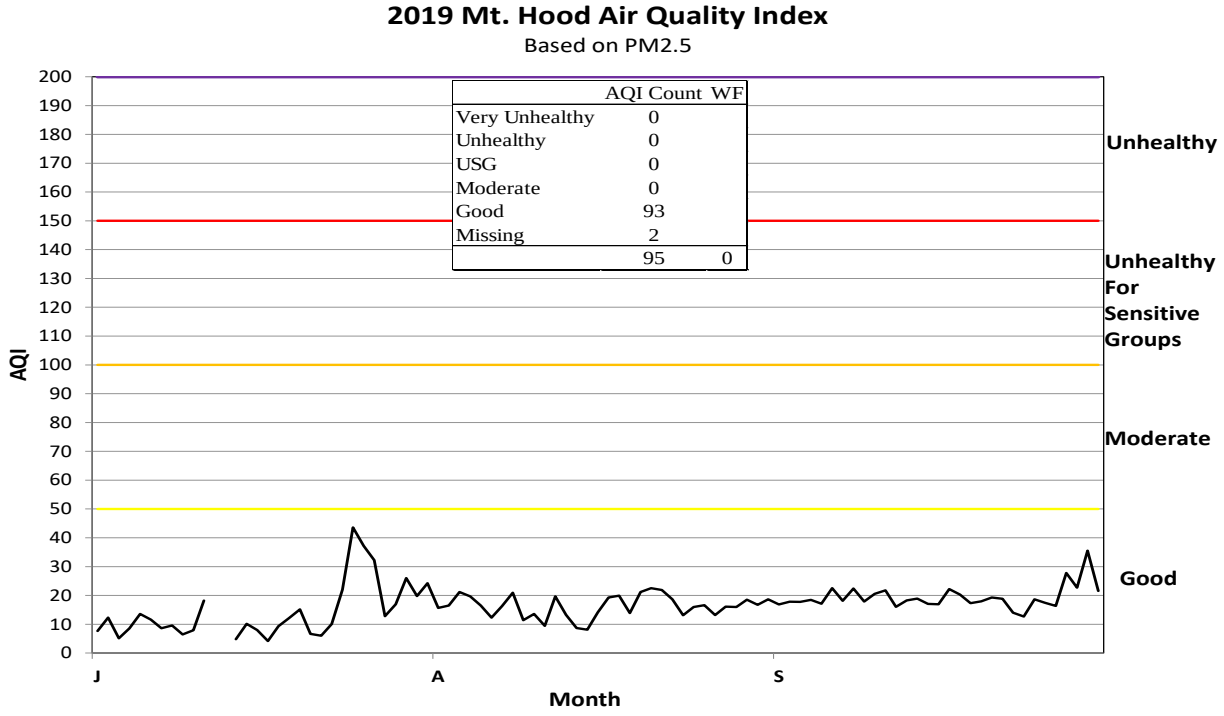



Figure 31. 2019 Mt. Hood Summer Air Quality Index Summary.
*Monitoring from July 12th through October 14th.*

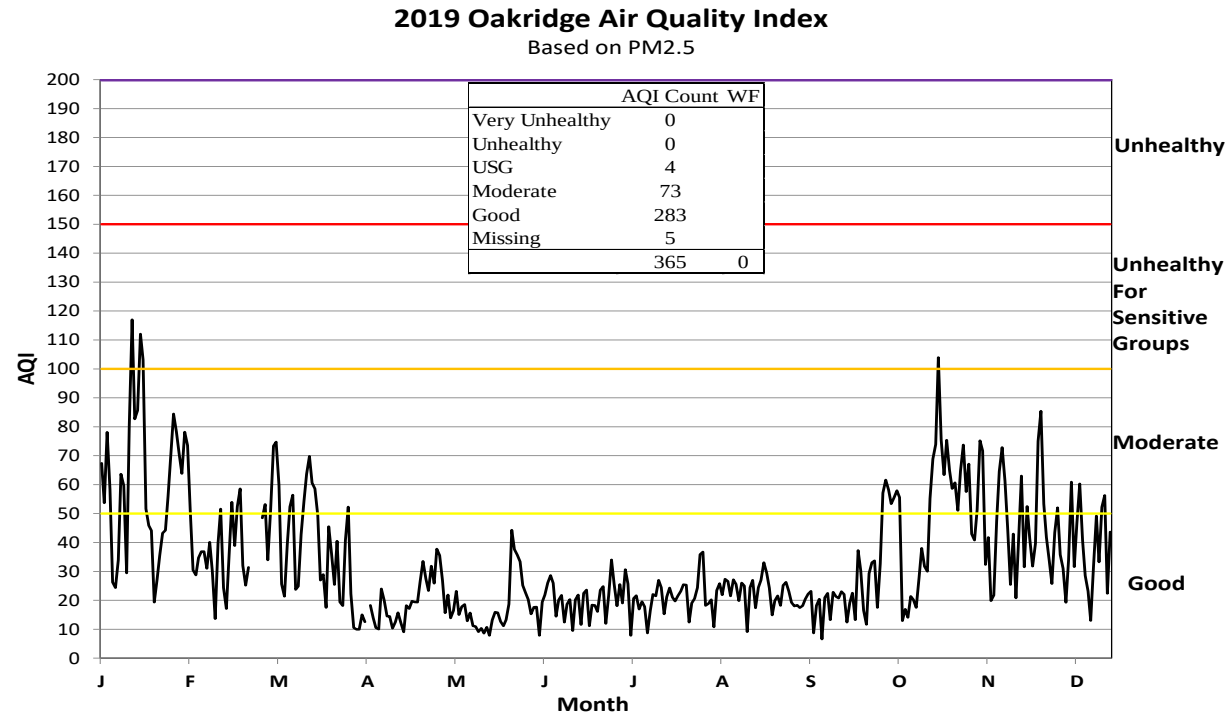



Figure 32. 2019 Oakridge Air Quality Index Summary.

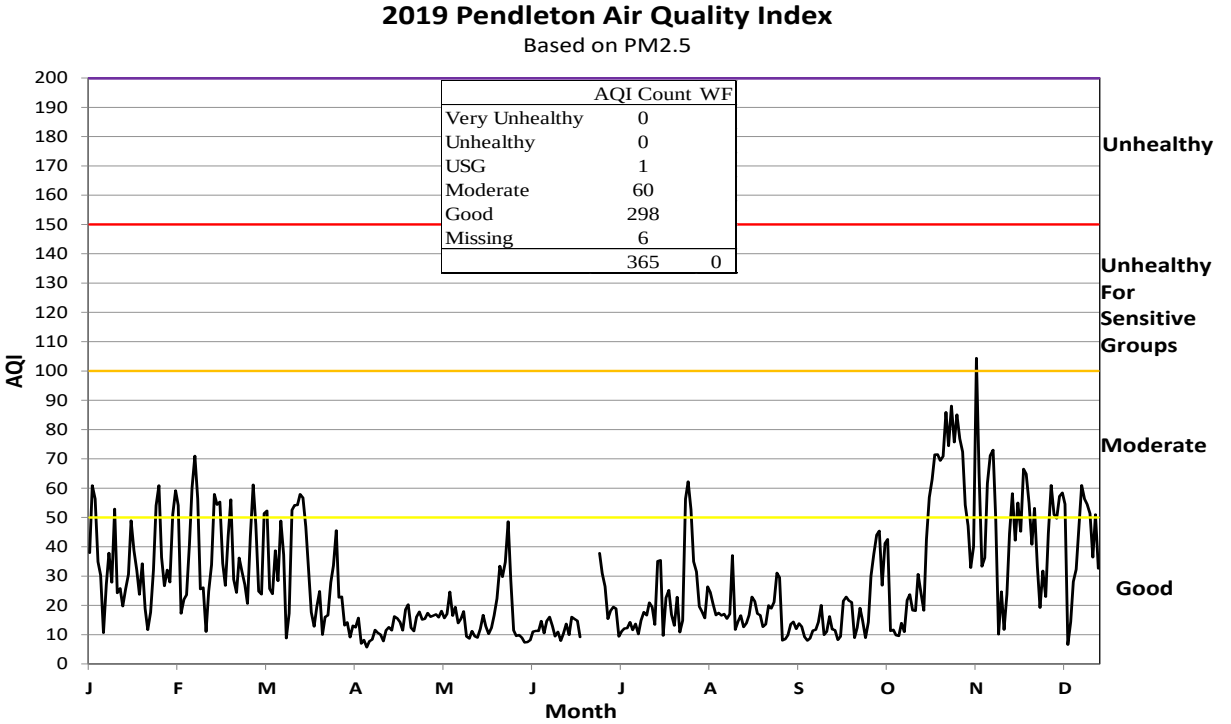



Figure 33. 2019 Pendleton Air Quality Index Summary.

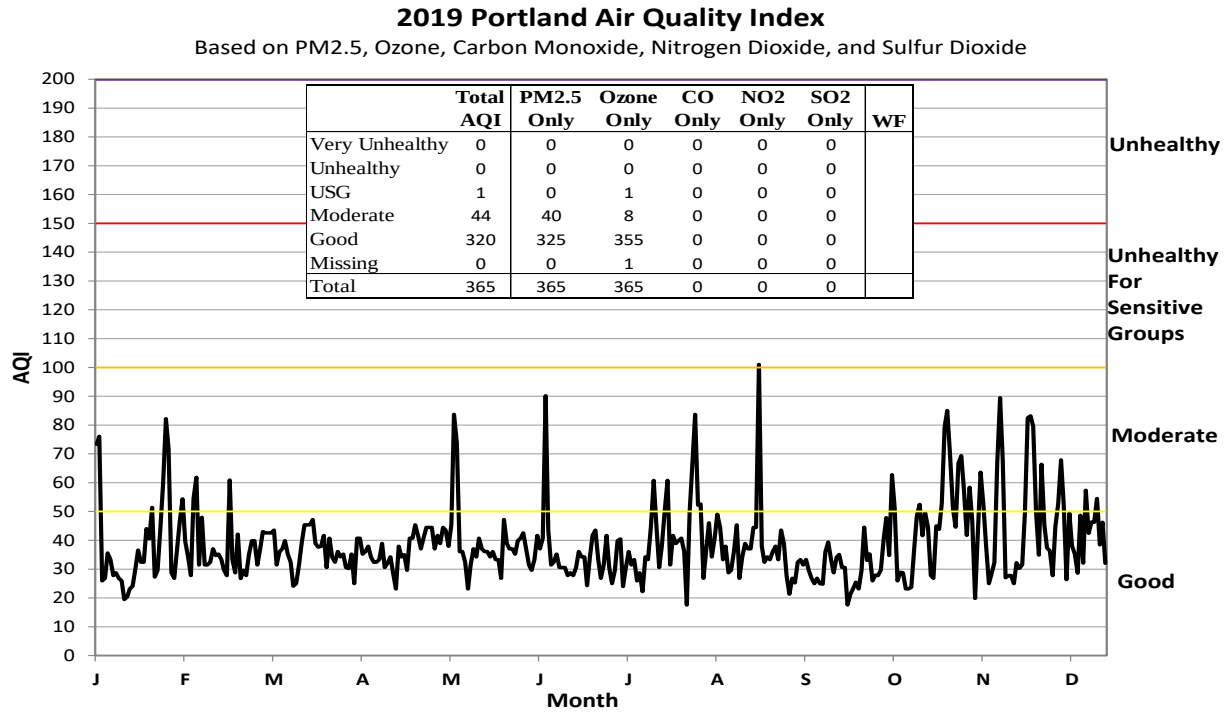



Figure 34. 2019 Portland Air Quality Index Summary.
*Note: only the maximum AQI pollutant type is reported for each day.*

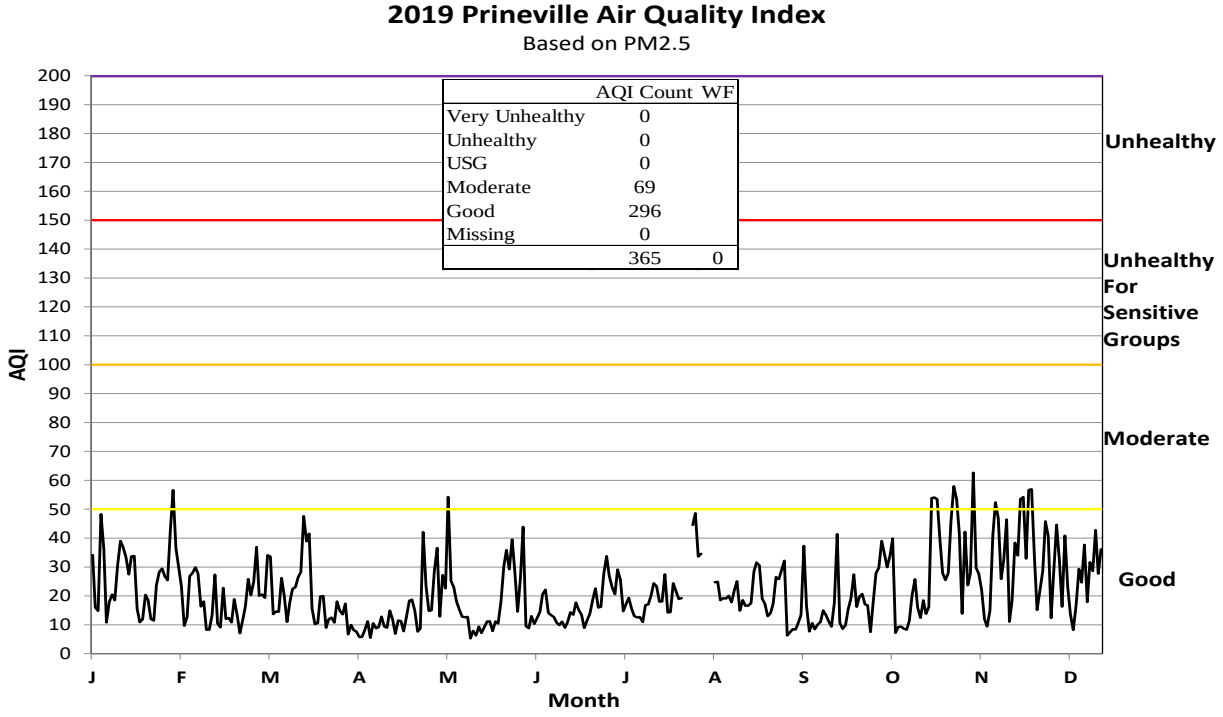



Figure 35. 2019 Prineville Air Quality Index Summary.

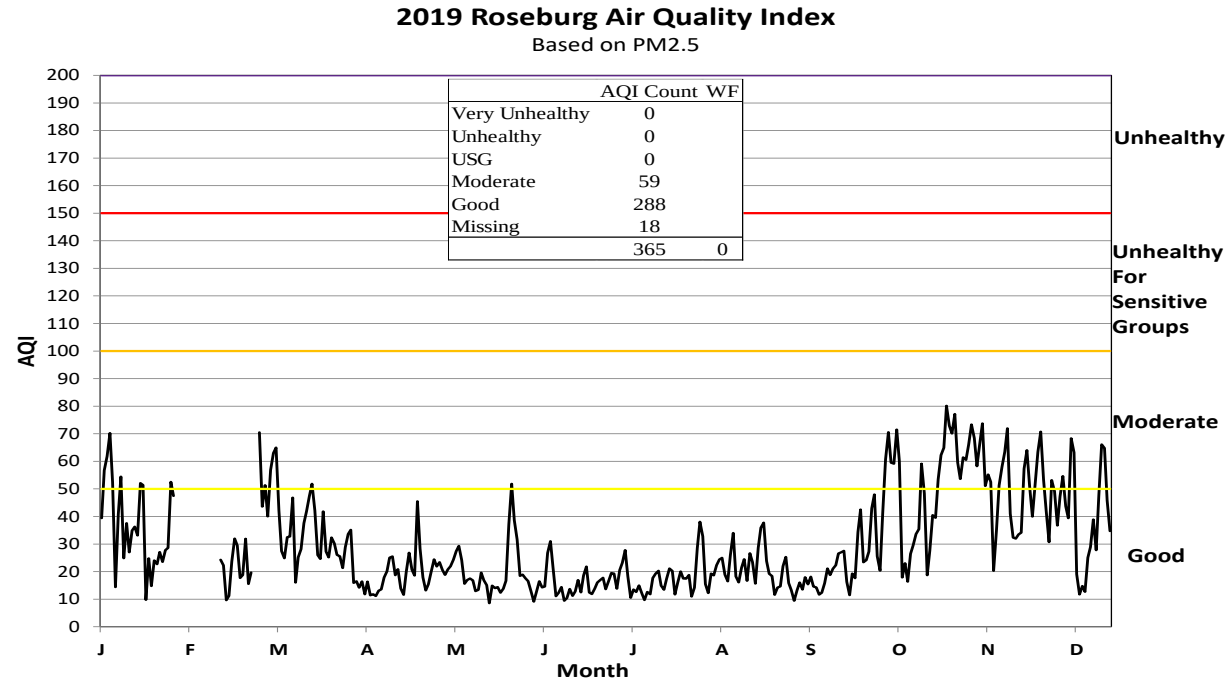



Figure 36. 2019 Roseburg Air Quality Index Summary.

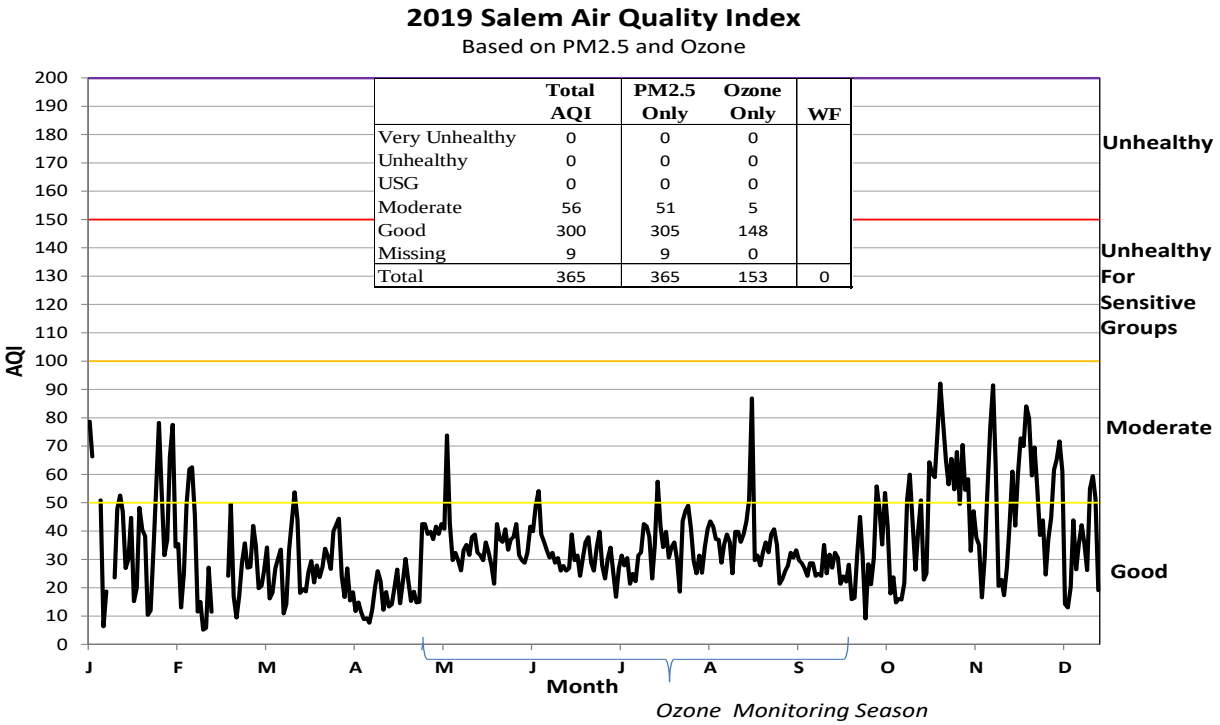



Figure 37. 2019 Salem Air Quality Index Summary.
*Note: only the maximum ozone AQI or PM2.5 AQI is reported each day during ozone season.*

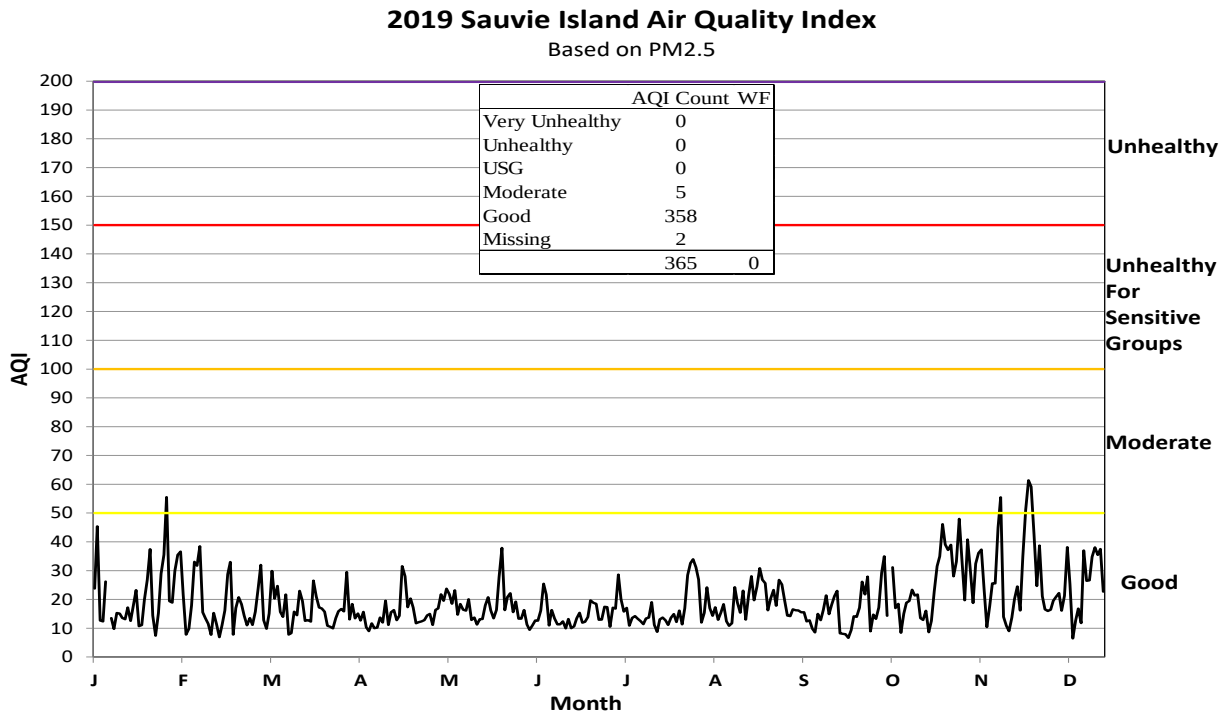



Figure 38. 2019 Sauvie Island Air Quality Index Summary.

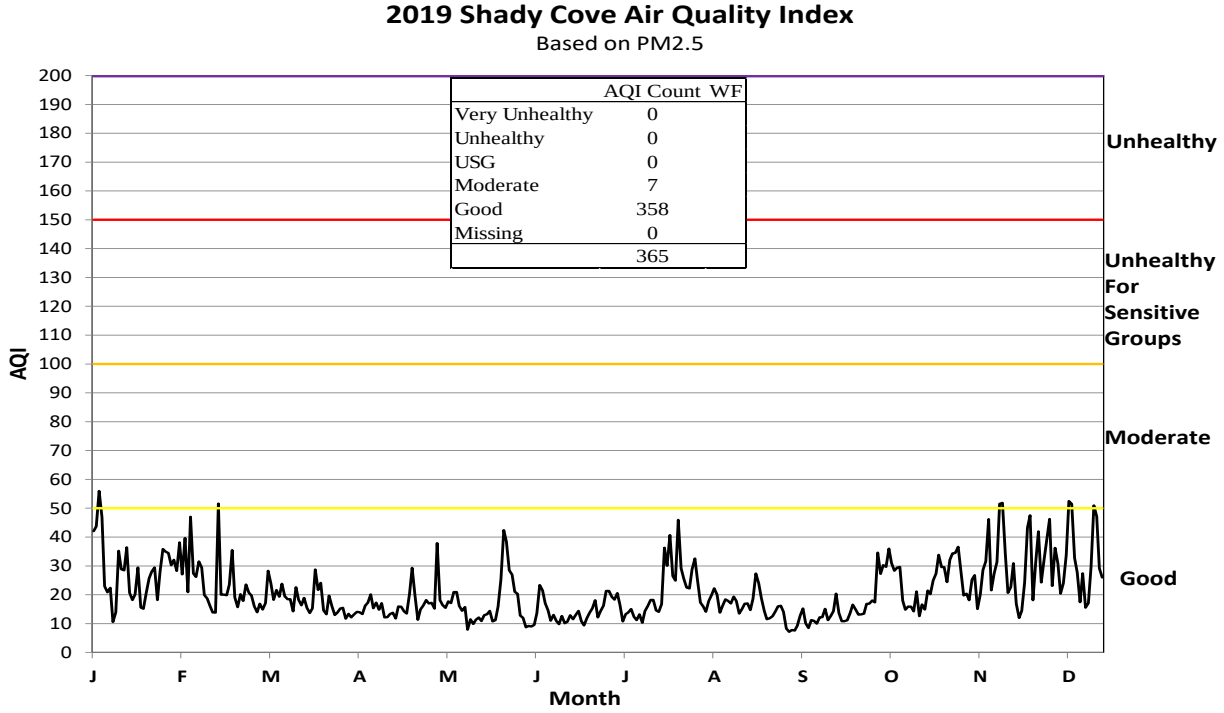



Figure 39. 2019 Shady Cove Air Quality Index Summary.

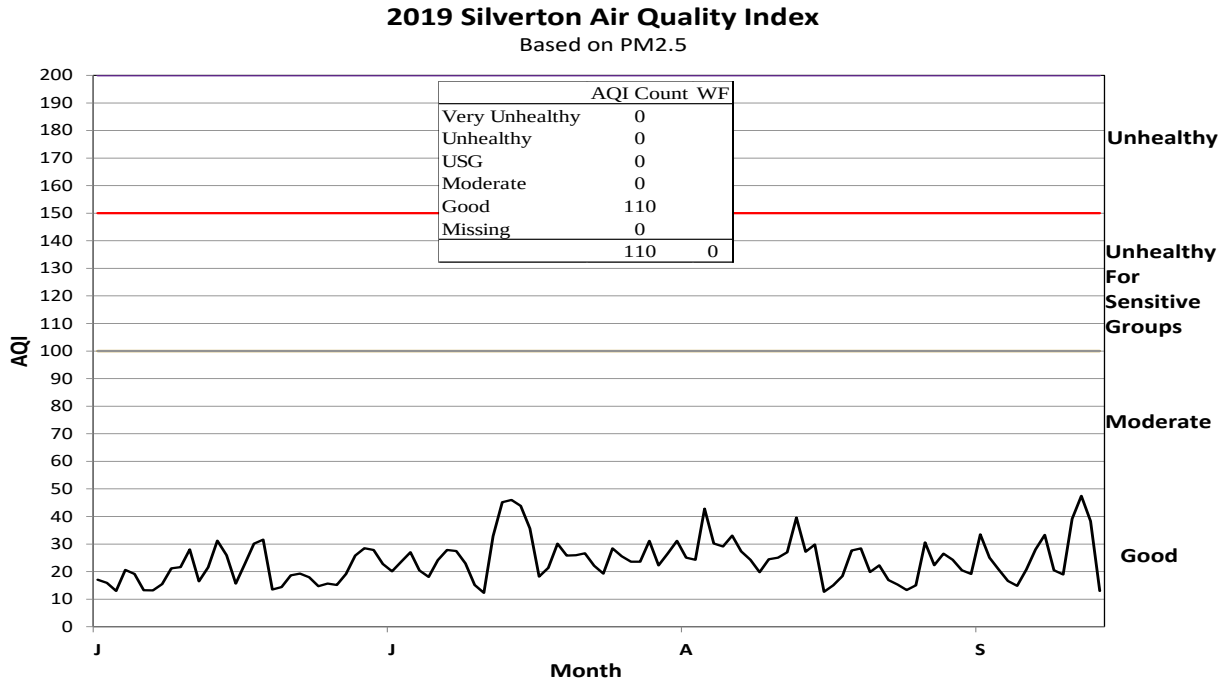



Figure 40. 2019 Silverton Summer Air Quality Index Summary.
*Monitoring from June 21st through October 8th.*

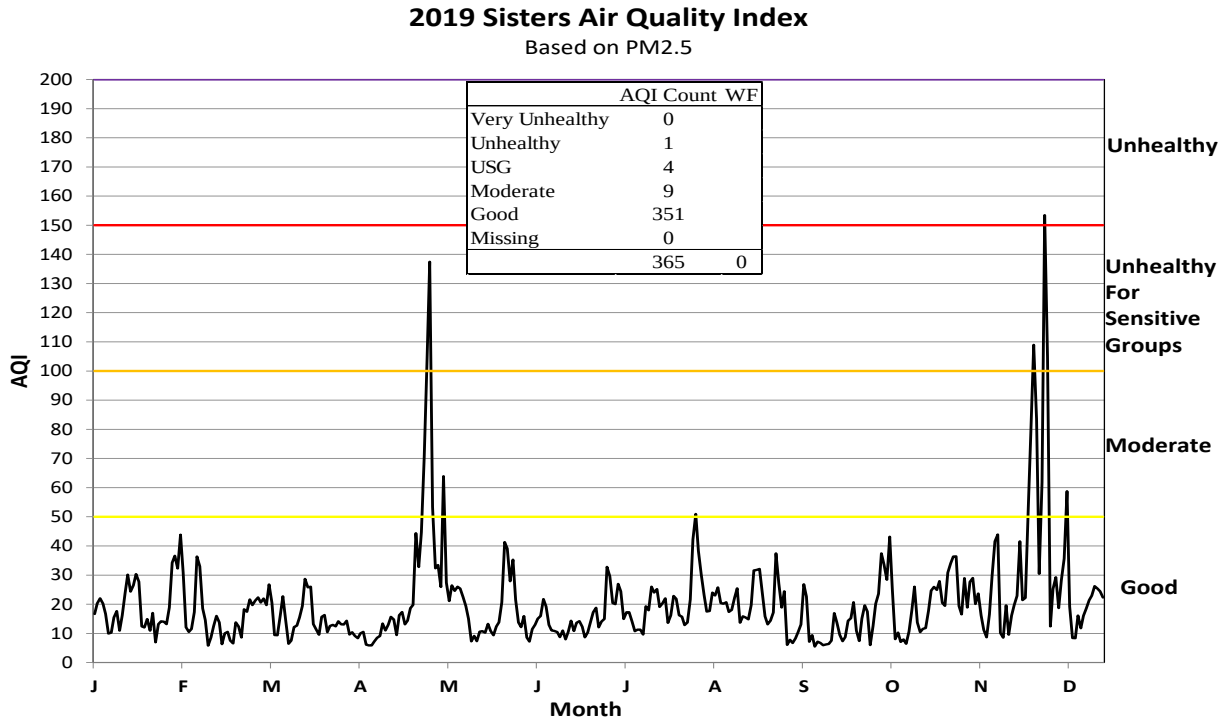



Figure 41. 2019 Sisters Air Quality Index Summary.

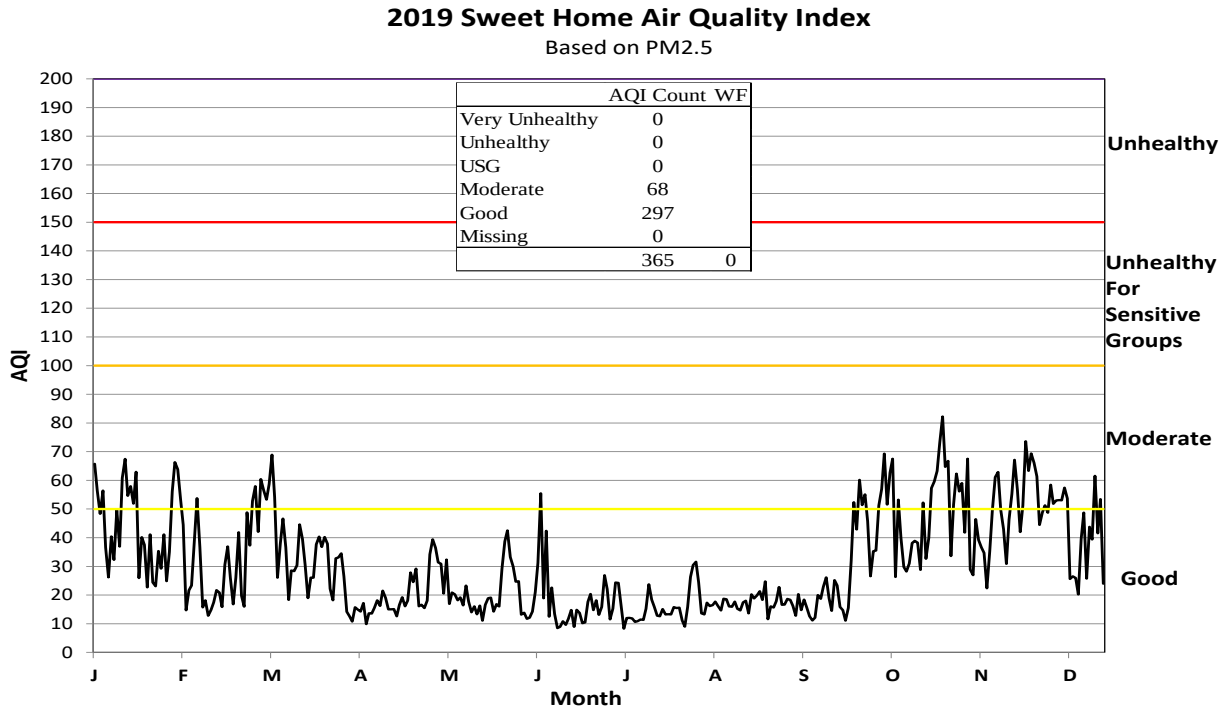



Figure 42. 2019 Sweet Home Air Quality Index Summary.

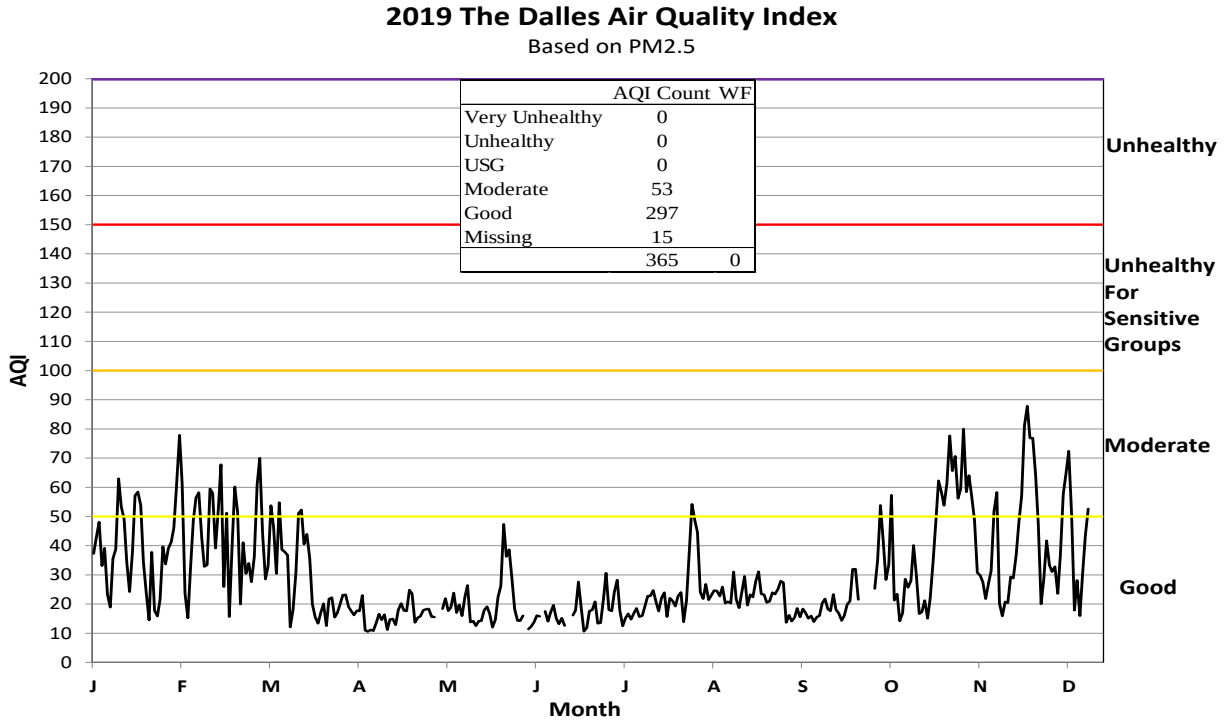



Figure 43. 2019 The Dalles Air Quality Index Summary.

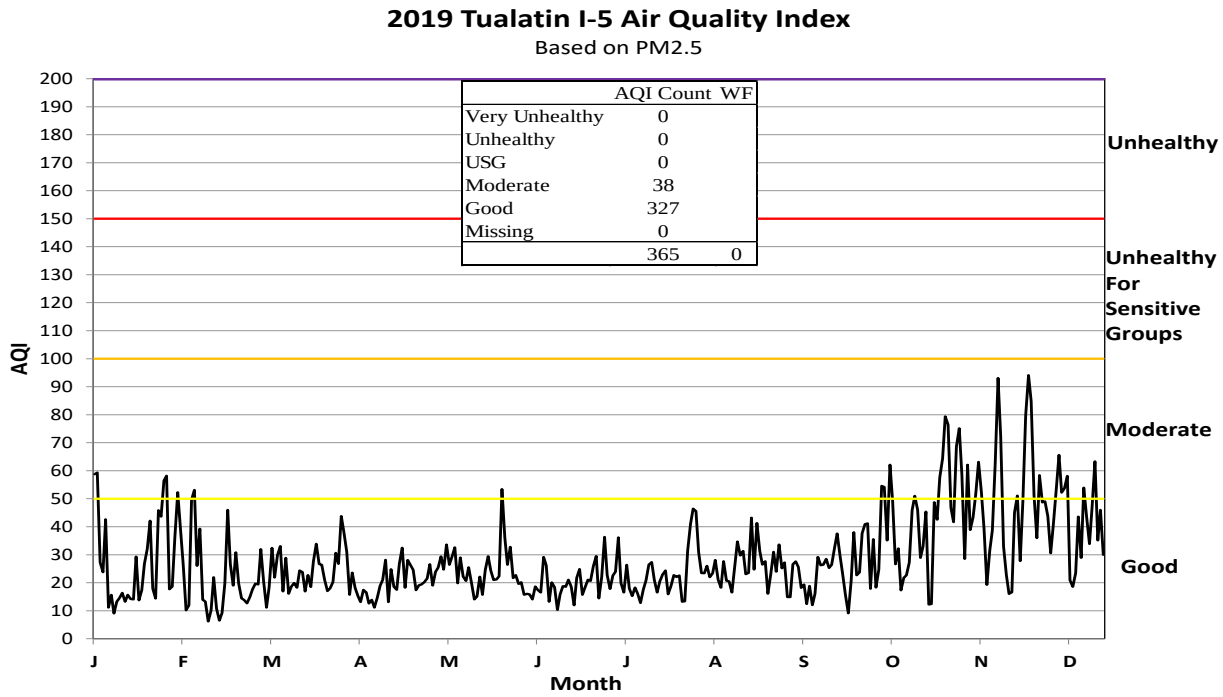



Figure 44. 2019 Tualatin Interstate-5 Near-Road Air Quality Index Summary

Table 4. Oregon 2019 AQI Summary.

| 2019 AQI Summary | Good | Moderate | USG | Unhealthy | Very Unhealthy | Missing days | Sum | Comment |
|---|---|---|---|---|---|---|---|---|
| Albany | 322 | 43 | 0 | 0 | 0 | 0 | 365 | |
| Applegate Valley | 345 | 13 | 3 | 2 | 0 | 2 | 365 | |
| Ashland | 351 | 9 | 1 | 4 | 0 | 0 | 365 | |
| Baker City | 328 | 32 | 0 | 0 | 0 | 5 | 365 | |
| Beaverton | 345 | 17 | 0 | 0 | 0 | 3 | 365 | |
| Bend | 345 | 13 | 0 | 0 | 0 | 7 | 365 | |
| Burns | 265 | 95 | 5 | 0 | 0 | 0 | 365 | |
| Cave Junction | 293 | 69 | 3 | 0 | 0 | 0 | 365 | |
| Chiloquin | 99 | 16 | 2 | 2 | 0 | 246 | 365 | Started 8/31 |
| Corvallis | 332 | 33 | 0 | 0 | 0 | 0 | 365 | |
| Cottage Grove | 311 | 53 | 0 | 0 | 0 | 1 | 365 | |
| Coos Bay | 30 | 13 | 0 | 0 | 0 | 322 | 365 | |
| Cove | 66 | 2 | 0 | 0 | 0 | 38 | 106 | 8/8 - 10/14 |
| Crater Lake | 102 | 1 | 0 | 0 | 0 | 0 | 103 | 6/25 - 10/8 |
| Detroit Lake | 83 | 0 | 0 | 0 | 0 | 0 | 83 | 7/12 - 10/2 |
| Enterprise | 333 | 29 | 1 | 0 | 0 | 2 | 365 | |
| Eugene/ Springfield | 292 | 71 | 2 | 0 | 0 | 0 | 365 | |

| 2019 AQI Summary | Good | Moderate | USG | Unhealthy | Very Unhealthy | Missing days | Sum | Comment |
|---|---|---|---|---|---|---|---|---|
| Florence | 262 | 4 | 0 | 0 | 0 | 99 | 365 | started 4/10 |
| Forest Grove | 141 | 39 | 0 | 0 | 0 | 185 | 365 | started 7/5 |
| Grants Pass | 264 | 55 | 3 | 2 | 0 | 41 | 365 | |
| Hermiston | 143 | 11 | 0 | 0 | 0 | 1 | 155 | 5/1 - 10/2 |
| Hillsboro | 316 | 46 | 1 | 0 | 0 | 2 | 365 | |
| John Day | 255 | 93 | 1 | 0 | 0 | 16 | 365 | |
| Klamath Falls | 287 | 78 | 0 | 0 | 0 | 0 | 365 | |
| La Grande | 344 | 19 | 0 | 0 | 0 | 2 | 365 | |
| Lakeview | 311 | 51 | 1 | 0 | 0 | 2 | 365 | |
| Lyons | 138 | 50 | 2 | 0 | 0 | 3 | 193 | Started 6/22 |
| Madras | 290 | 73 | 2 | 0 | 0 | 0 | 365 | |
| Medford | 295 | 63 | 3 | 4 | 0 | 0 | 365 | |
| Mill City | 77 | 0 | 0 | 0 | 0 | 0 | 77 | 7/18 - 10/2 |
| Mt. Hood | 93 | 0 | 0 | 0 | 0 | 2 | 95 | 7/12 - 10/14 |
| Oakridge | 283 | 73 | 4 | 0 | 0 | 5 | 365 | |
| Pendleton | 298 | 60 | 1 | 0 | 0 | 6 | 365 | |
| Portland | 320 | 44 | 1 | 0 | 0 | 0 | 365 | |
| Prineville | 296 | 69 | 0 | 0 | 0 | 0 | 365 | |
| Roseburg | 288 | 59 | 0 | 0 | 0 | 18 | 365 | |
| Salem | 300 | 56 | 0 | 0 | 0 | 9 | 365 | |
| Sauvie Island | 358 | 5 | 0 | 0 | 0 | 2 | 365 | |
| Shady | 358 | 7 | 0 | 0 | 0 | 0 | 365 | |
| Silverton | 110 | 0 | 0 | 0 | 0 | 0 | 110 | 6/21 - 10/8 |
| Sisters | 351 | 9 | 4 | 1 | 0 | 0 | 365 | |
| Sweet Home | 297 | 68 | 0 | 0 | 0 | 0 | 365 | |
| The Dalles | 297 | 53 | 0 | 0 | 0 | 15 | 365 | |
| Tualatin Interstate-5 | 327 | 38 | 0 | 0 | 0 | 0 | 365 | |

# Air Quality Trends

## Ozone Trends

Ozone is a secondary pollutant formed when there are elevated levels of nitrogen dioxide and volatile organic compounds that undergo chemical reactions in high temperatures, and sunlight. In Oregon, elevated ozone occurs in the summer and can be formed by human-caused pollution from fossil fuel combustion and also by naturally caused pollution from wildfire smoke, which contains NO2 and VOCs. In 2017 and 2018, most of the state experienced elevated ozone because the wildfire smoke introduced natural precursors on top of the human-caused emissions.

The graphs below show the air quality trends compared to the National Ambient Air Quality Standard (NAAQS). Data with wildfire contributions are included because it is very difficult to determine if the ozone would have exceeded the NAAQS without the smoke from wildfires.

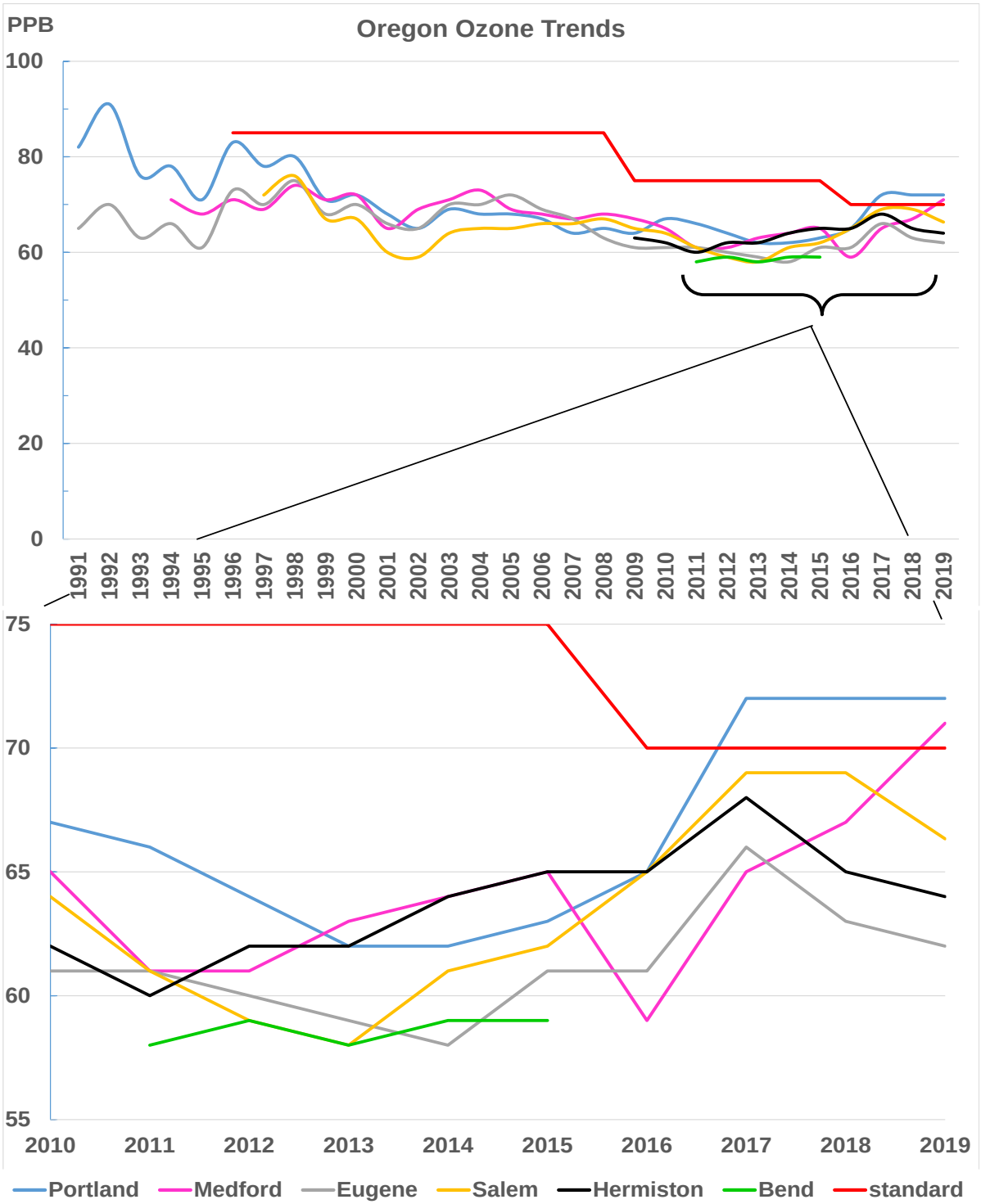



Figure 45. Oregon ozone trend.
*The data is the three year average of the 4th highest annual daily 8 hour average.*
*For more detail, see the charts by region below.*

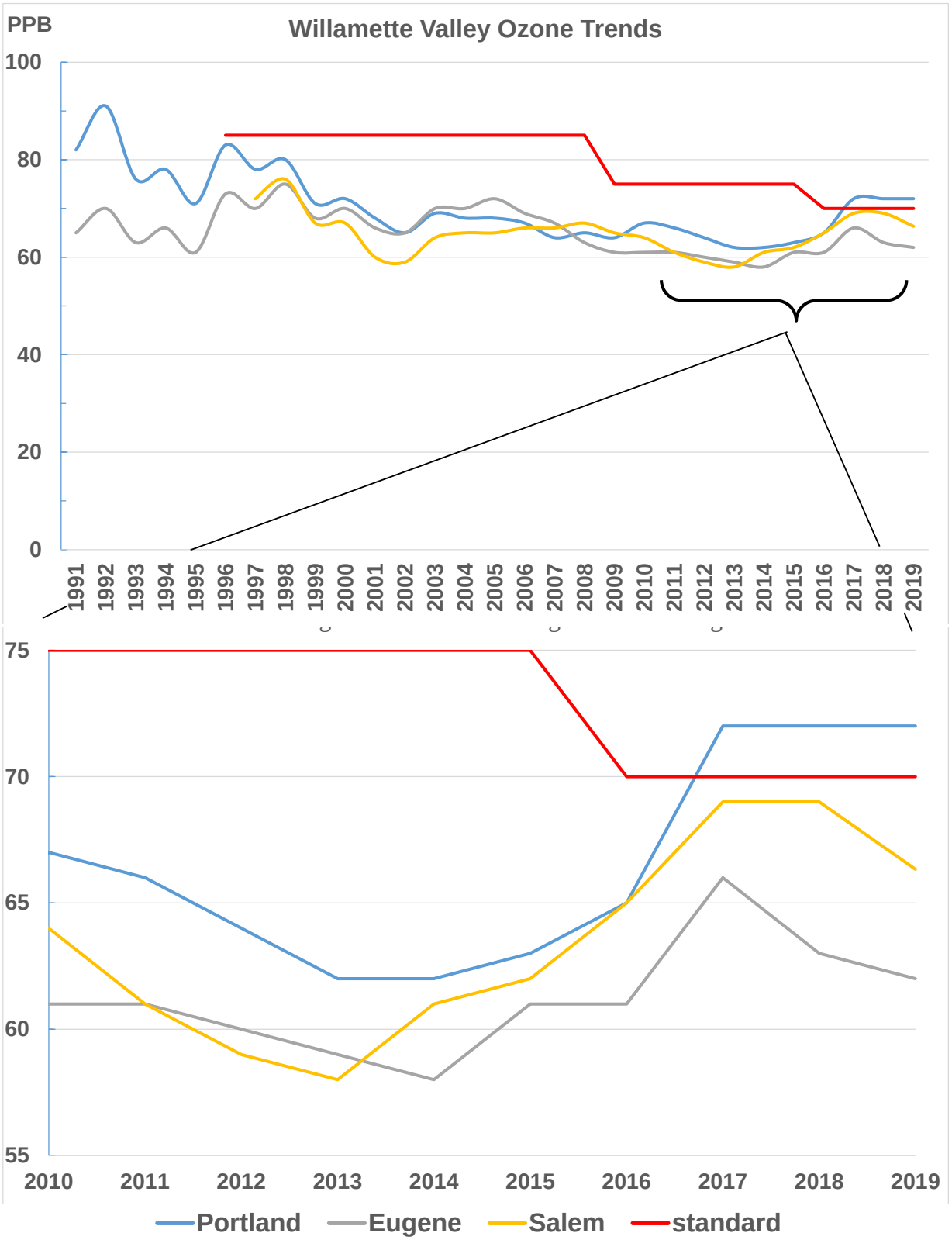



Figure 46. Willamette Valley ozone trends
*The data is the three year average of the 4th highest annual daily 8 hour average.*

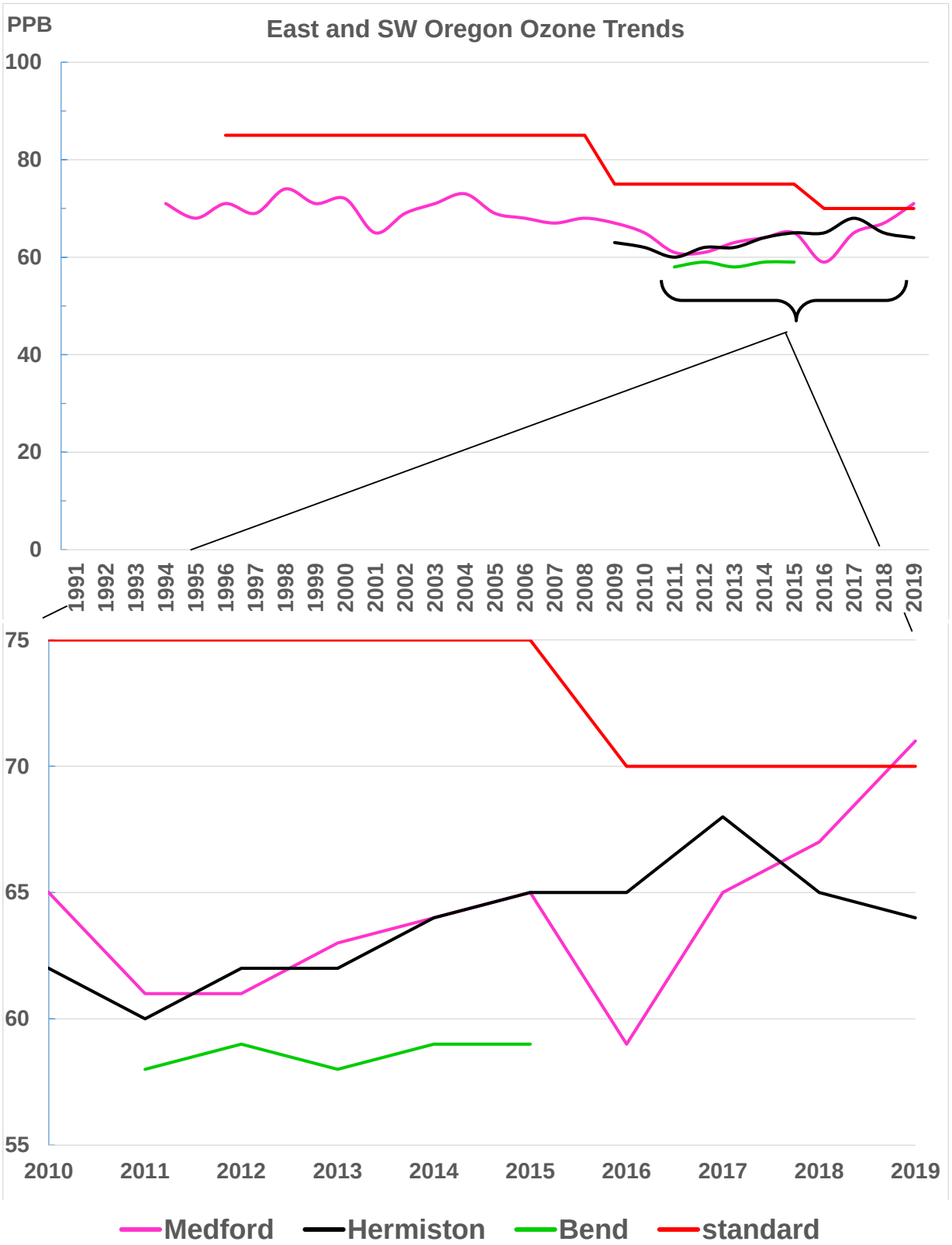



Figure 47. Southwest and Eastern Oregon ozone trends

*The data is the three year average of the 4th highest annual daily 8 hour average.*

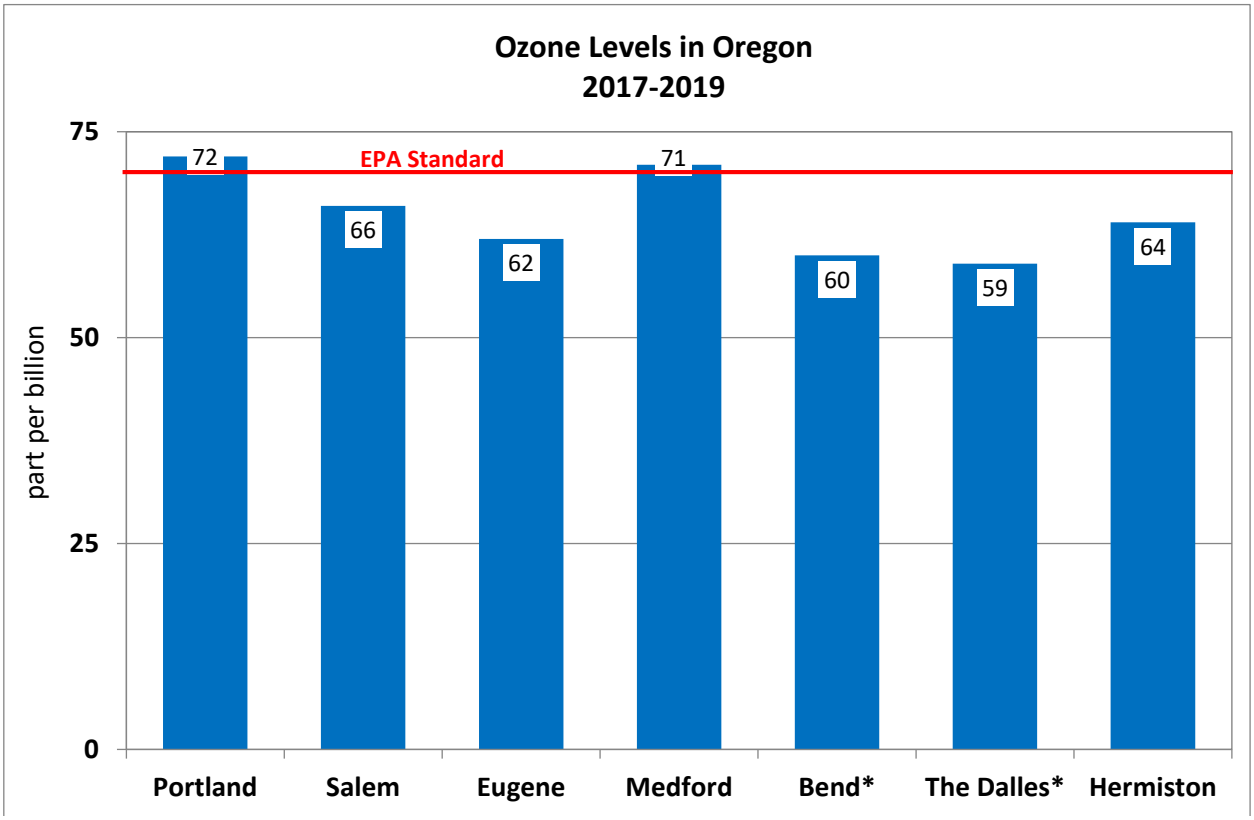



Figure 48. Oregon cities 2017-2019 Ozone Levels
*The data is the three year average of the 4th highest annual daily 8 hour average.*
** Bend and The Dalles no longer have monitors. The Bend data is for 2013-15, The Dalles data is for 2016-2018.*

Note that the wildfire smoke in 2017 and 2018 contributed to the elevated ozone levels and most likely caused Portland and Medford to violate the NAAQS. However, since high ozone occurs in the summer months precisely when wildfire smoke impacts occur, it is very difficult to determine what the ozone level would have been but for the wildfire smoke.

# PM2.5 Trends

The charts below show the trends for the 98th percentile and annual average PM2.5. The 98th Percentile is used for comparison to the daily standard. Wildfire data was separated for daily standard comparison.

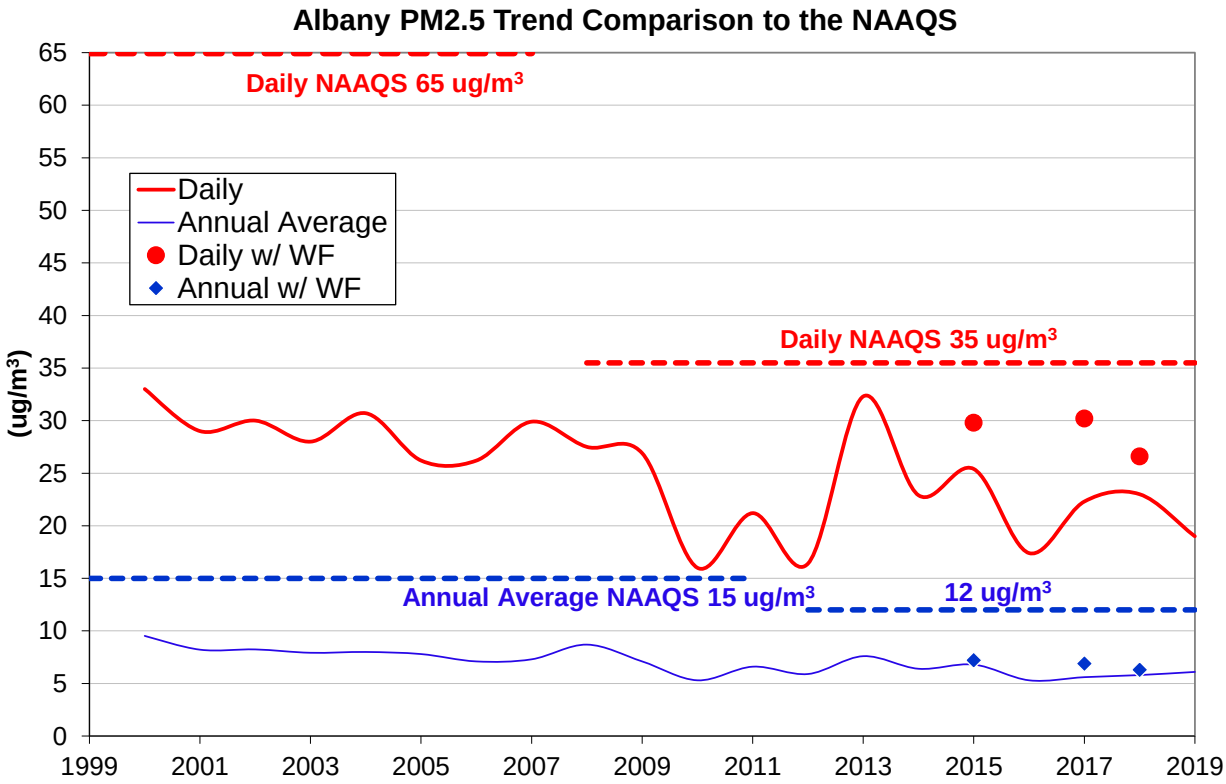



Figure 49. Albany PM2.5 trends

*WF = Wildfire Smoke Impact*

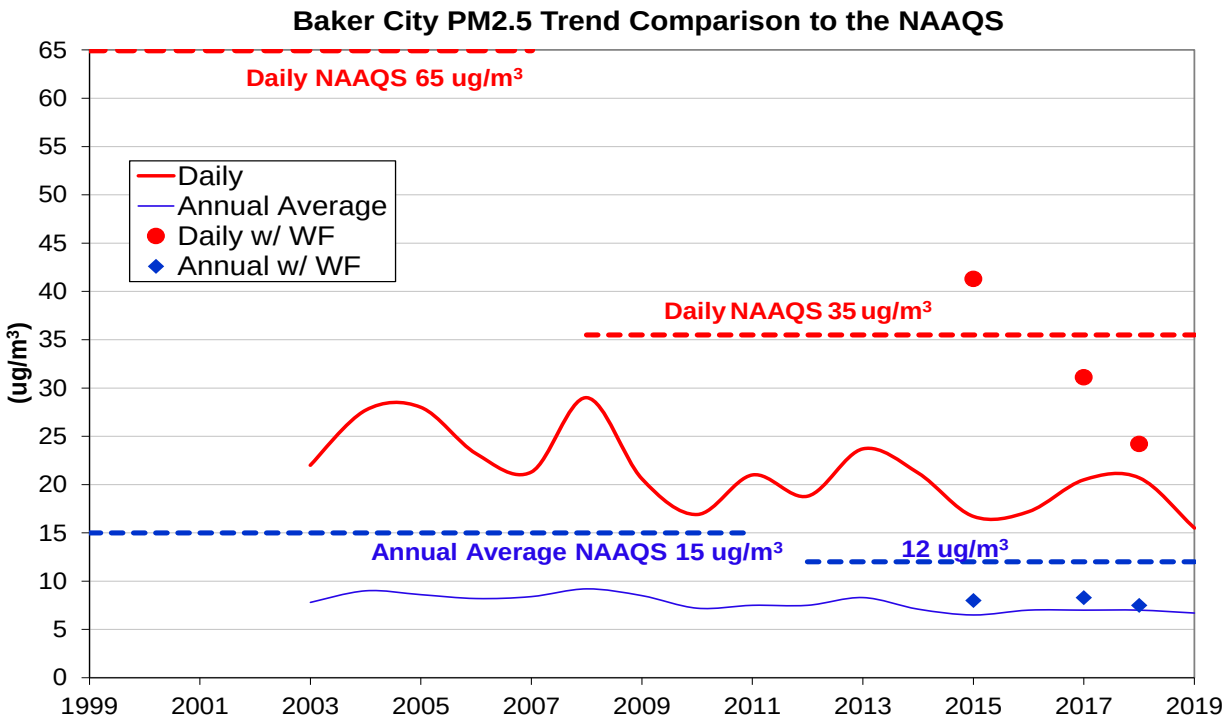



Figure 50. Baker City PM2.5 trends

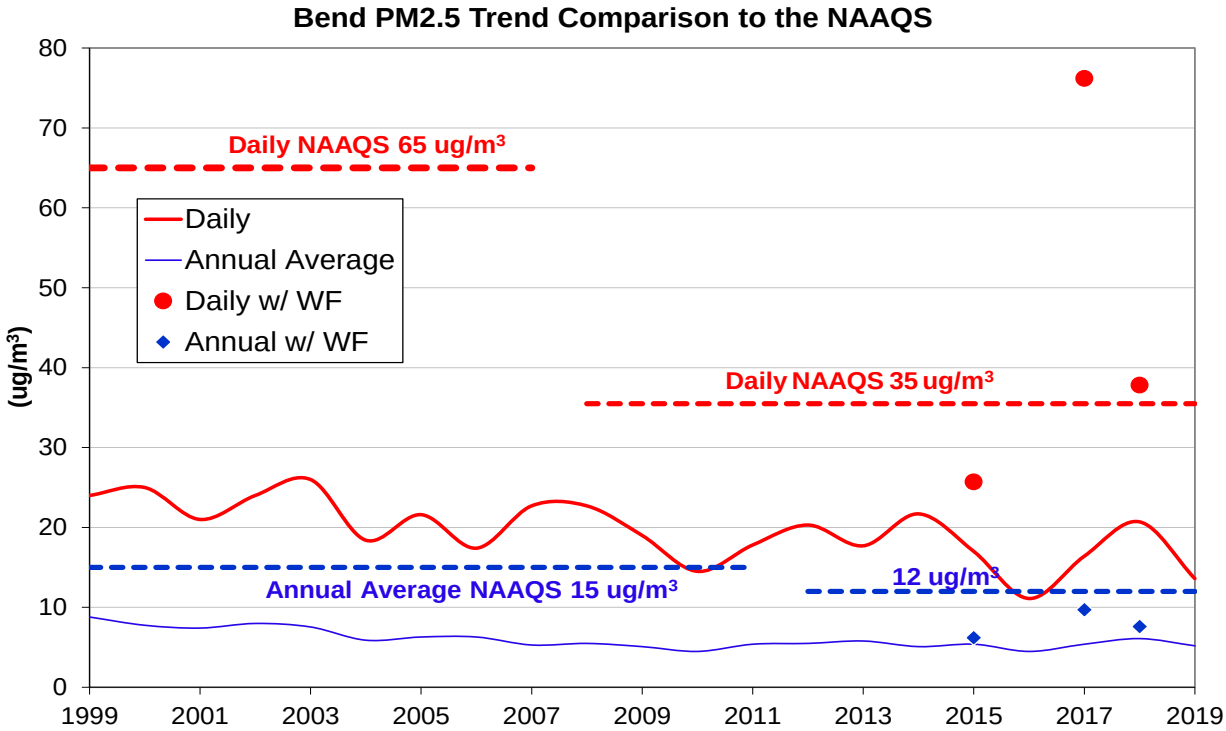



Figure 51. Bend PM2.5 trends

*WF = Wildfire Smoke Impact*

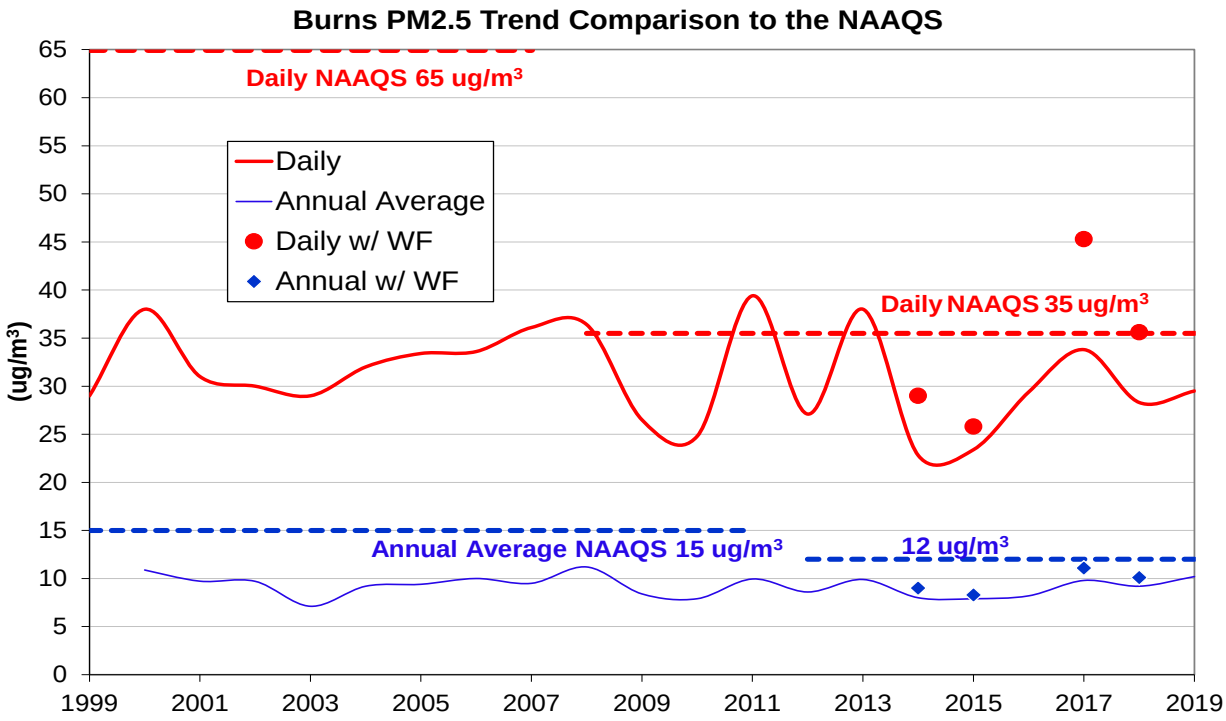



Figure 52. Burns PM2.5 trend.

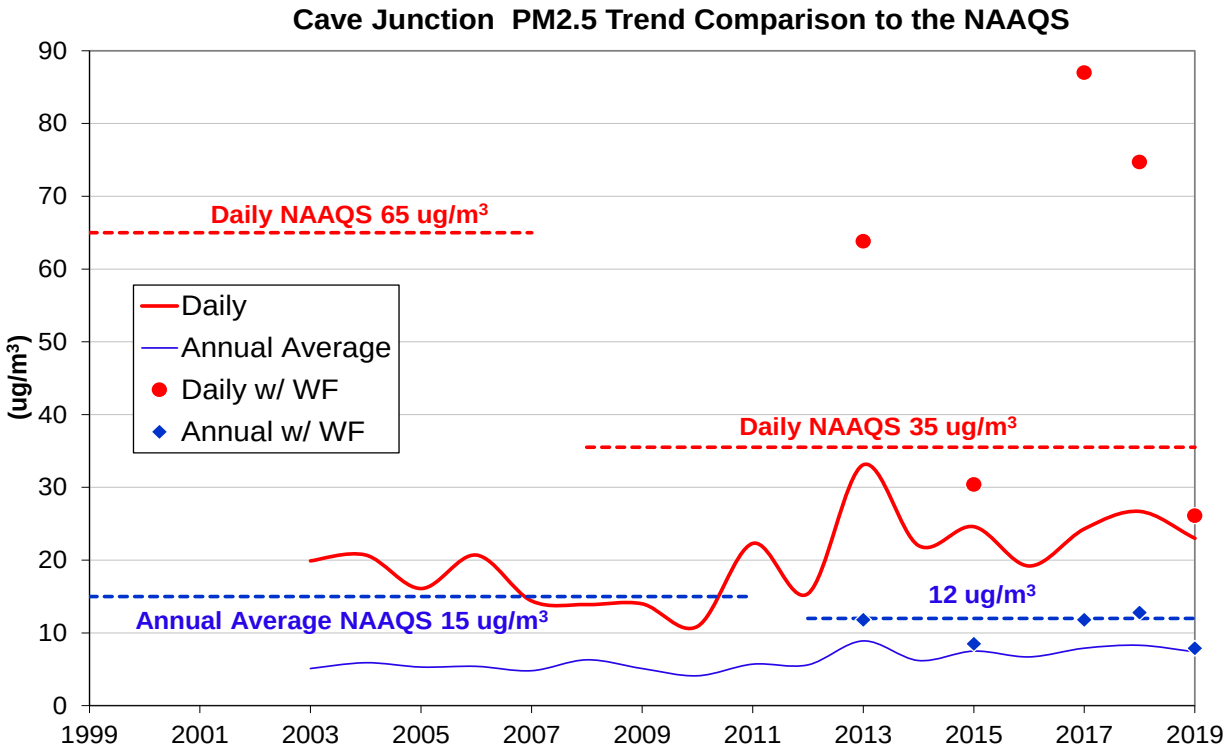



Figure 53. Cave Junction PM2.5 trend.

*WF = Wildfire Smoke Impact*

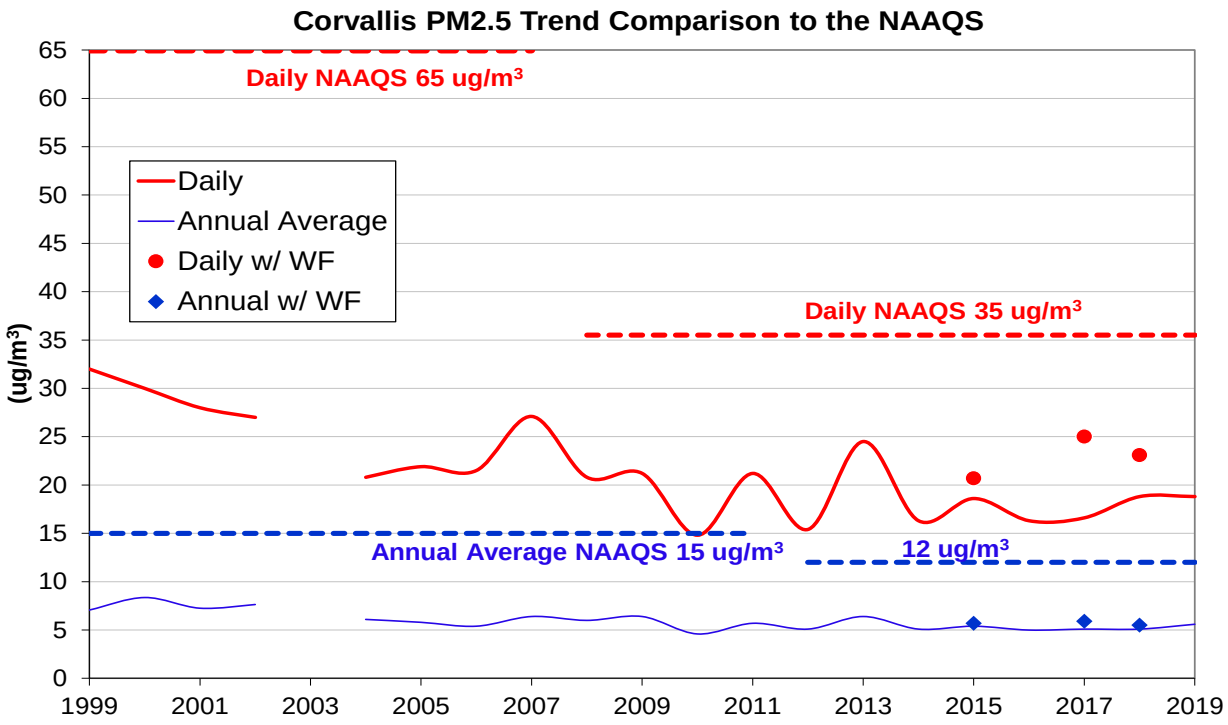



Figure 54. Corvallis PM2.5 trend.

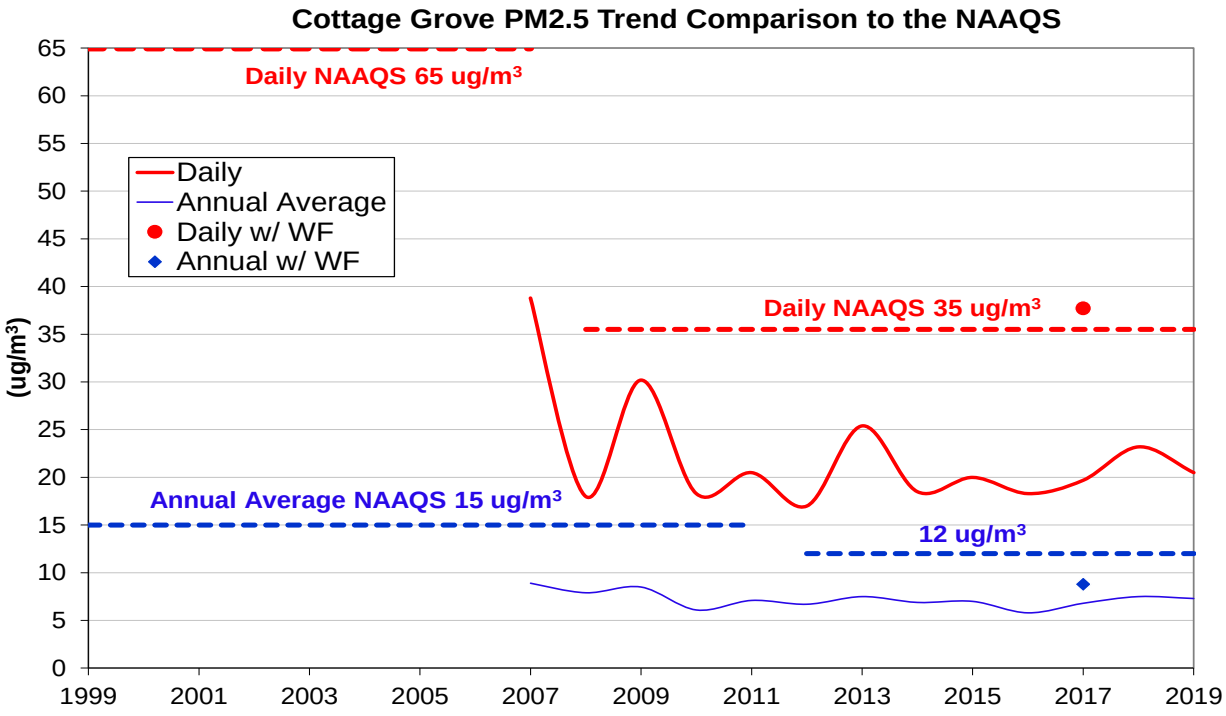



Figure 55. Cottage Grove PM2.5 trends.

*WF = Wildfire Smoke Impact*

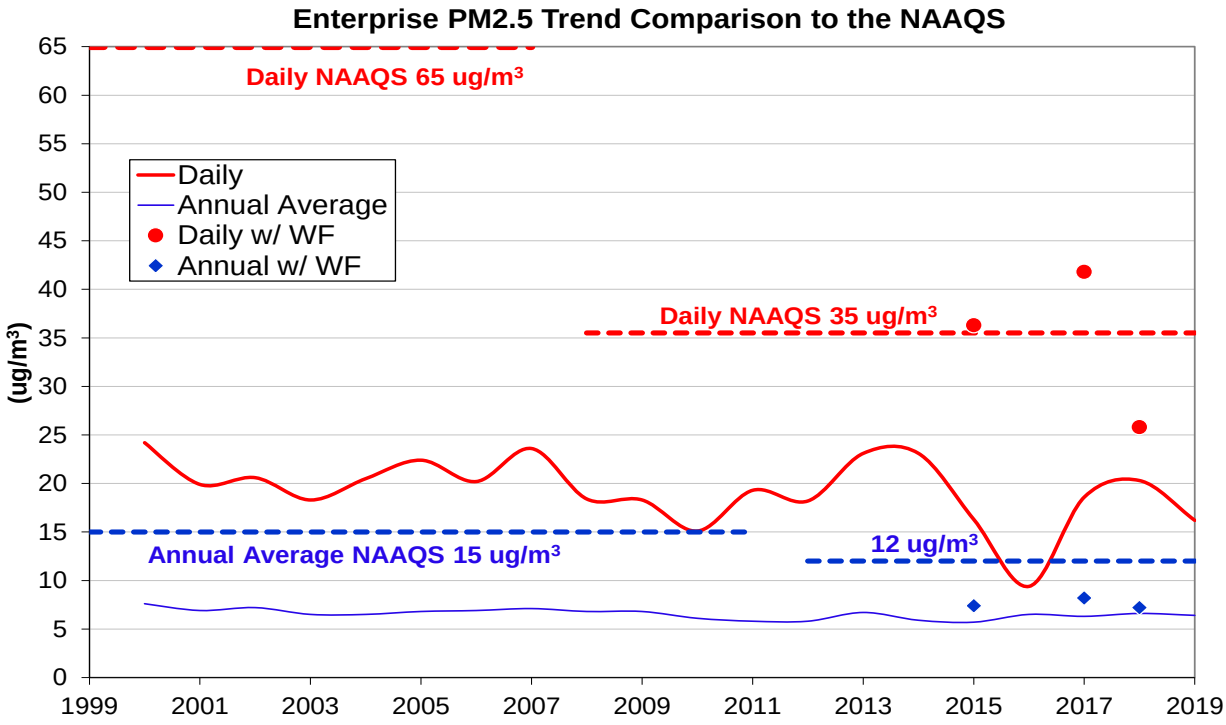



Figure 56. Enterprise PM2.5 trends.

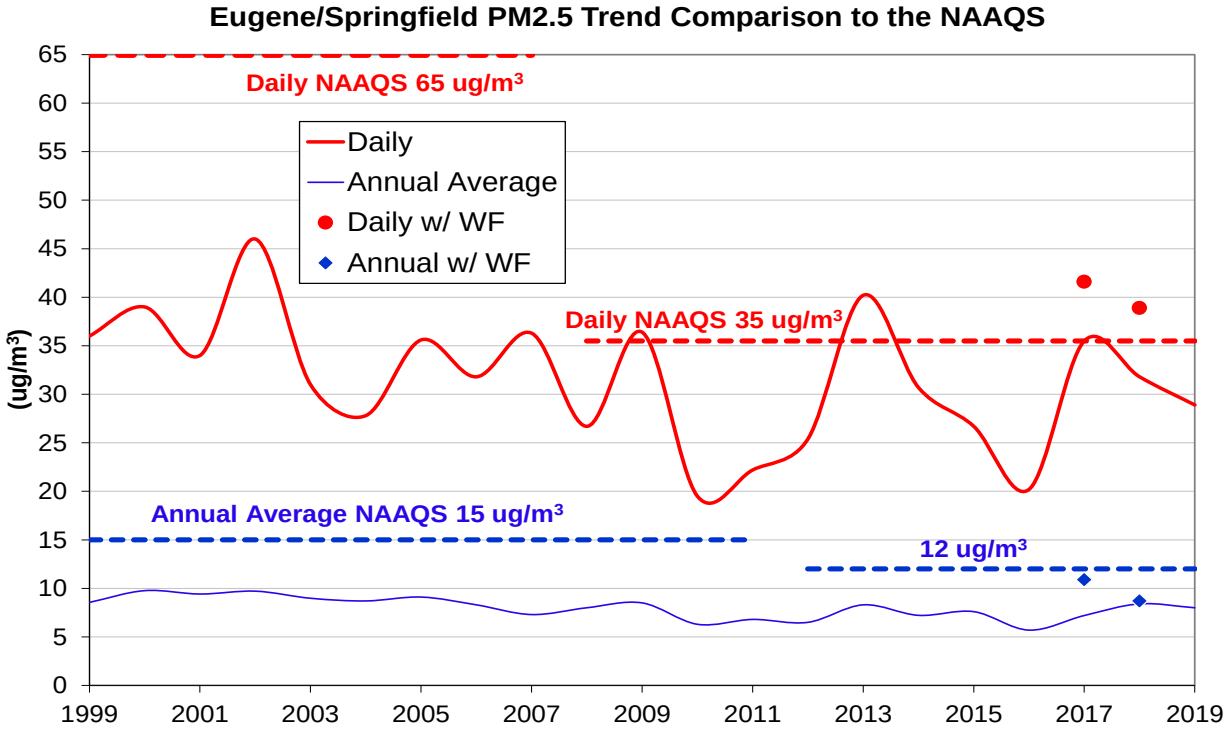



Figure 57. Eugene/Springfield PM2.5 trends.

*WF = Wildfire Smoke Impact*

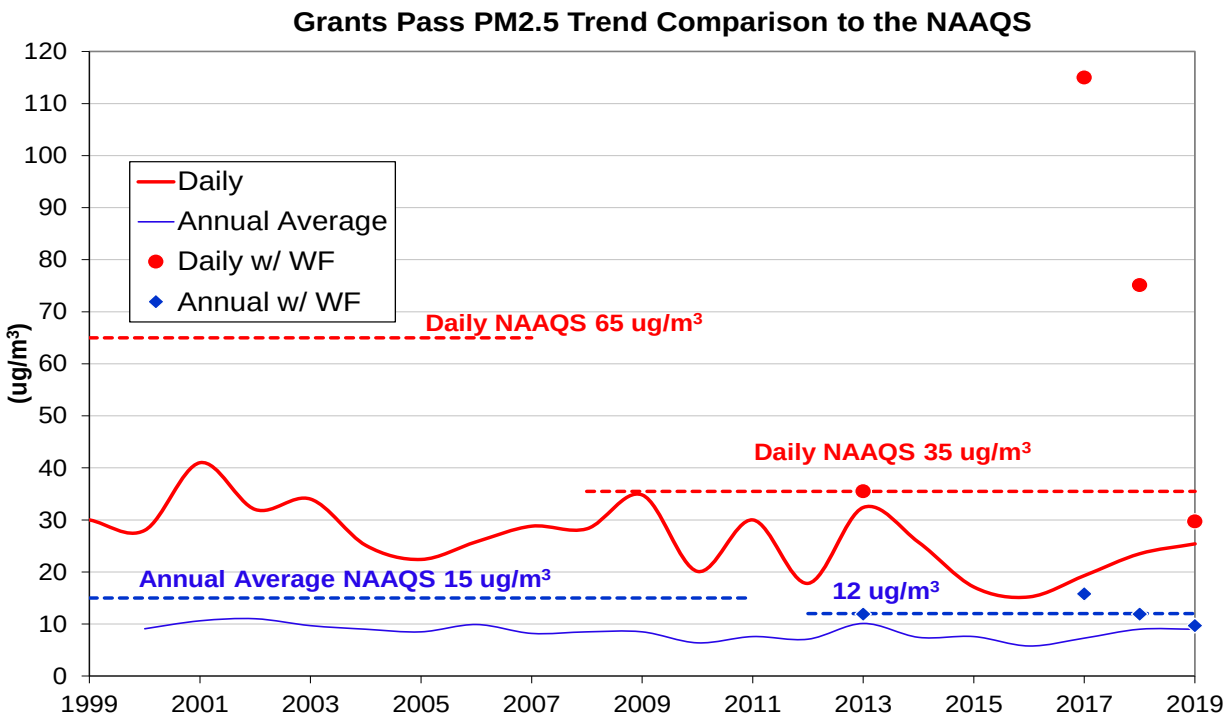



Figure 58. Grants Pass PM2.5 trends.

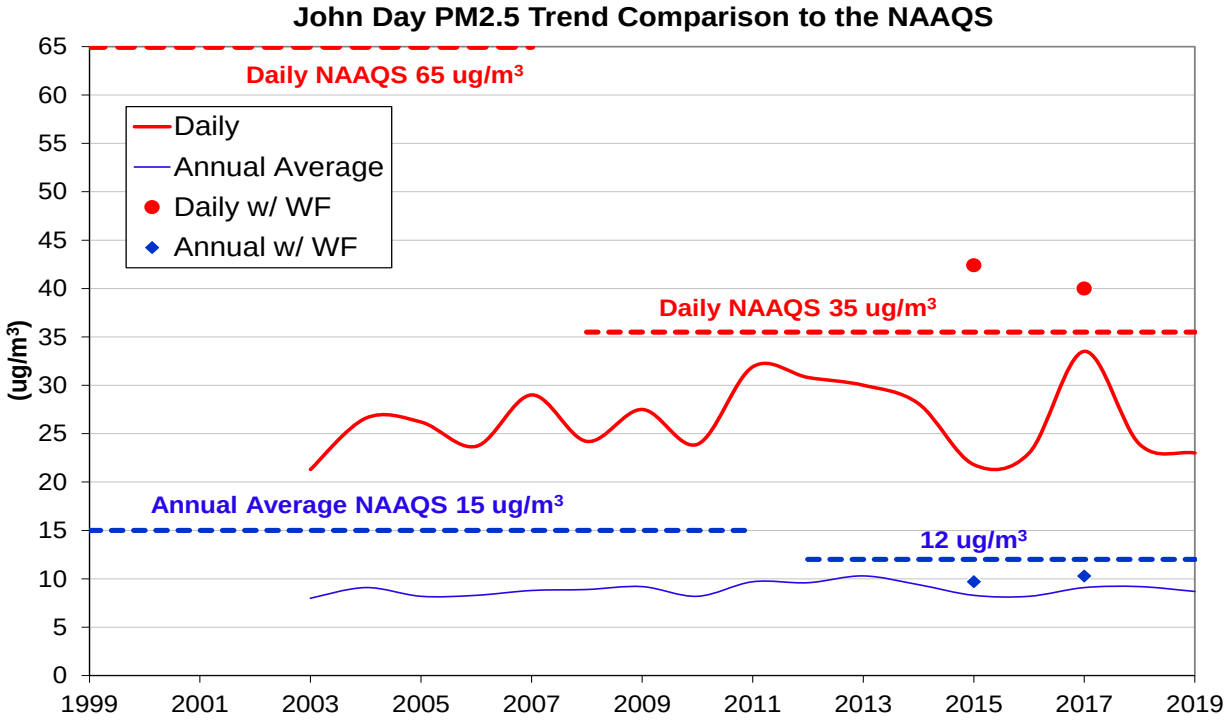



Figure 59. John Day PM2.5 trends.

*WF = Wildfire Smoke Impact*

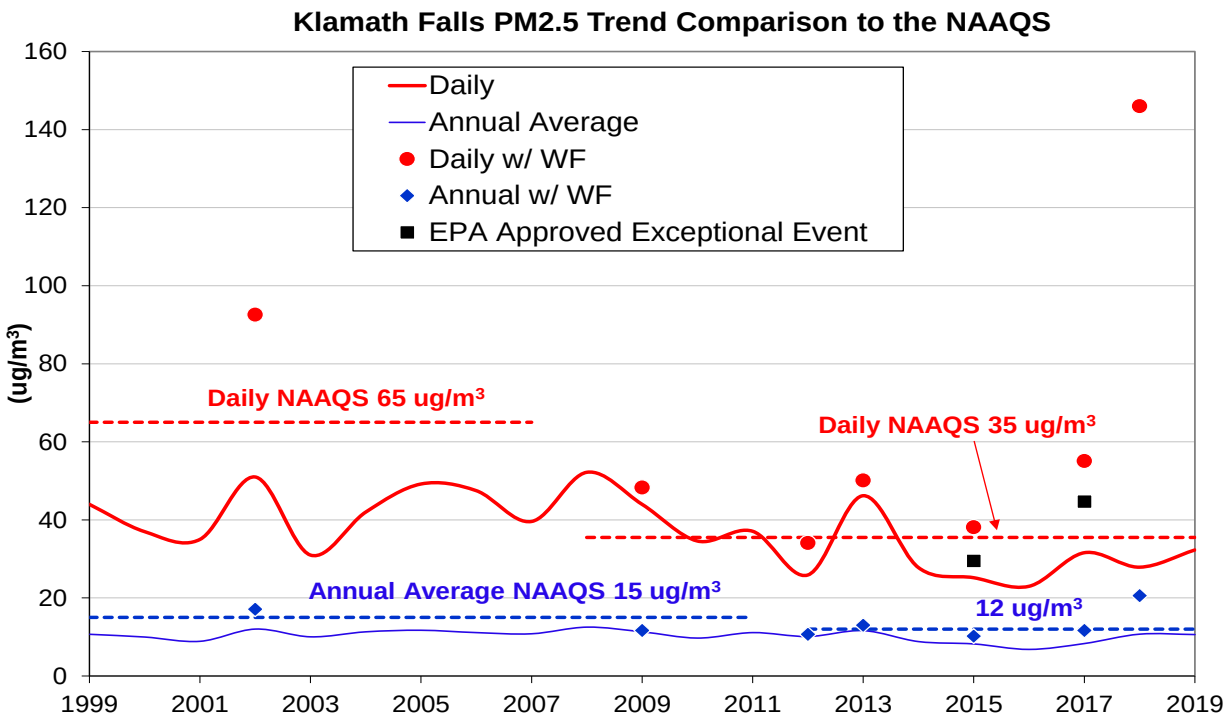



Figure 60. Klamath Falls PM2.5 trends.

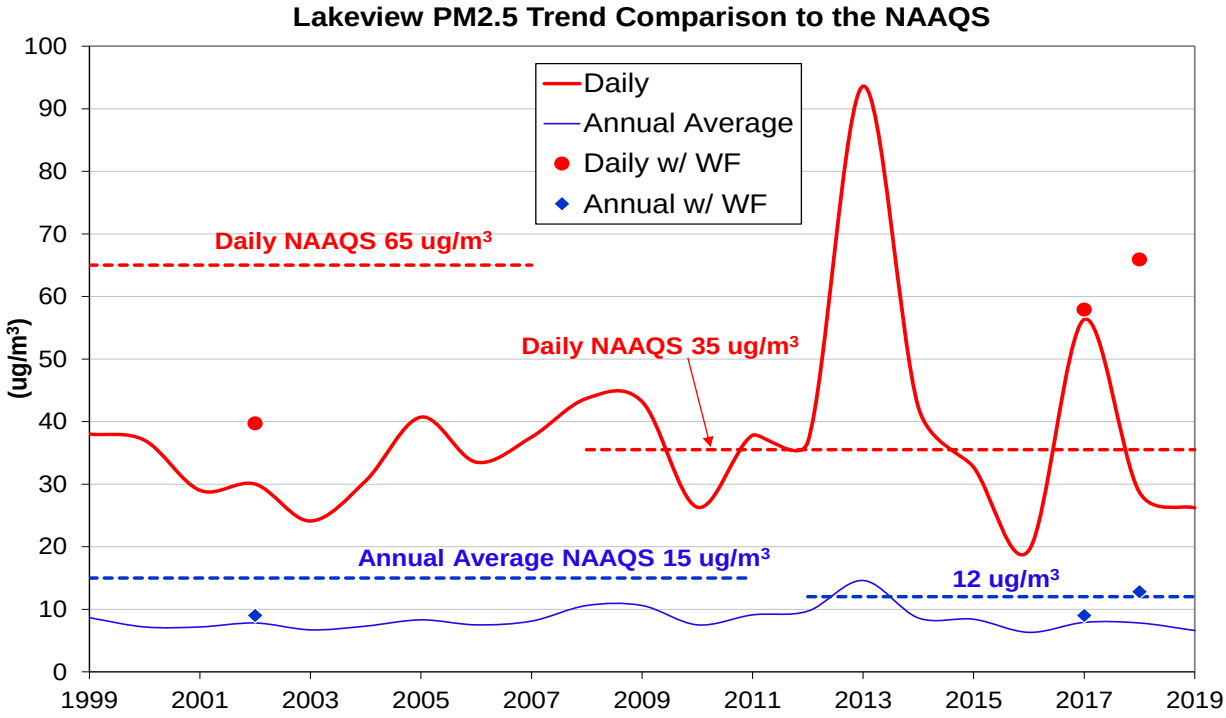



Figure 61. Lakeview PM2.5 trends.

*WF = Wildfire Smoke Impact*

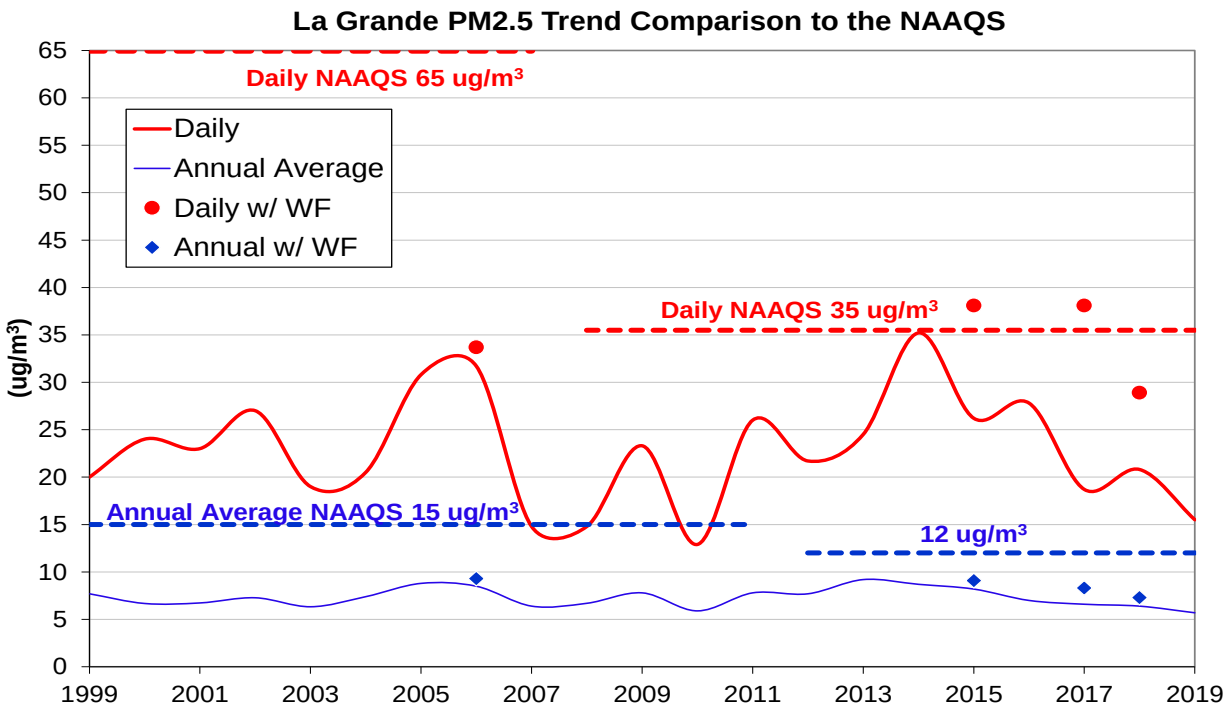



Figure 62. La Grande PM2.5 trends.

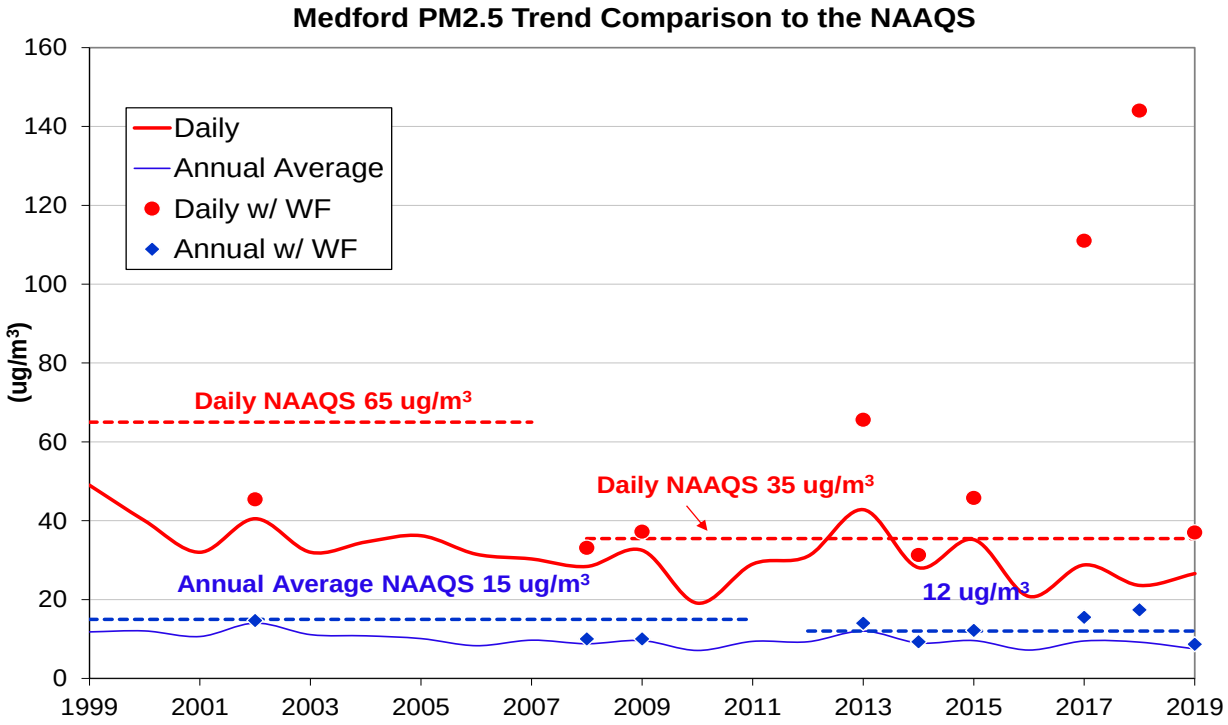



Figure 63. Medford PM2.5 trends.

*WF = Wildfire Smoke Impact*

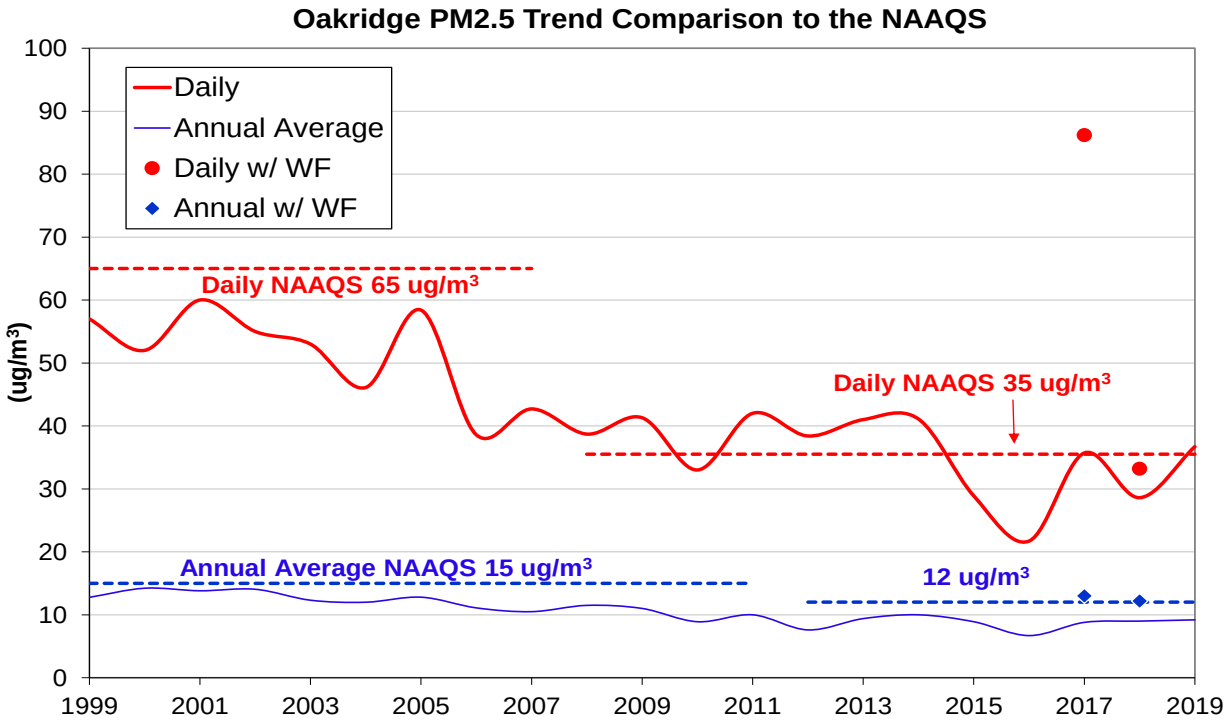



Figure 64. Oakridge PM2.5 trends.

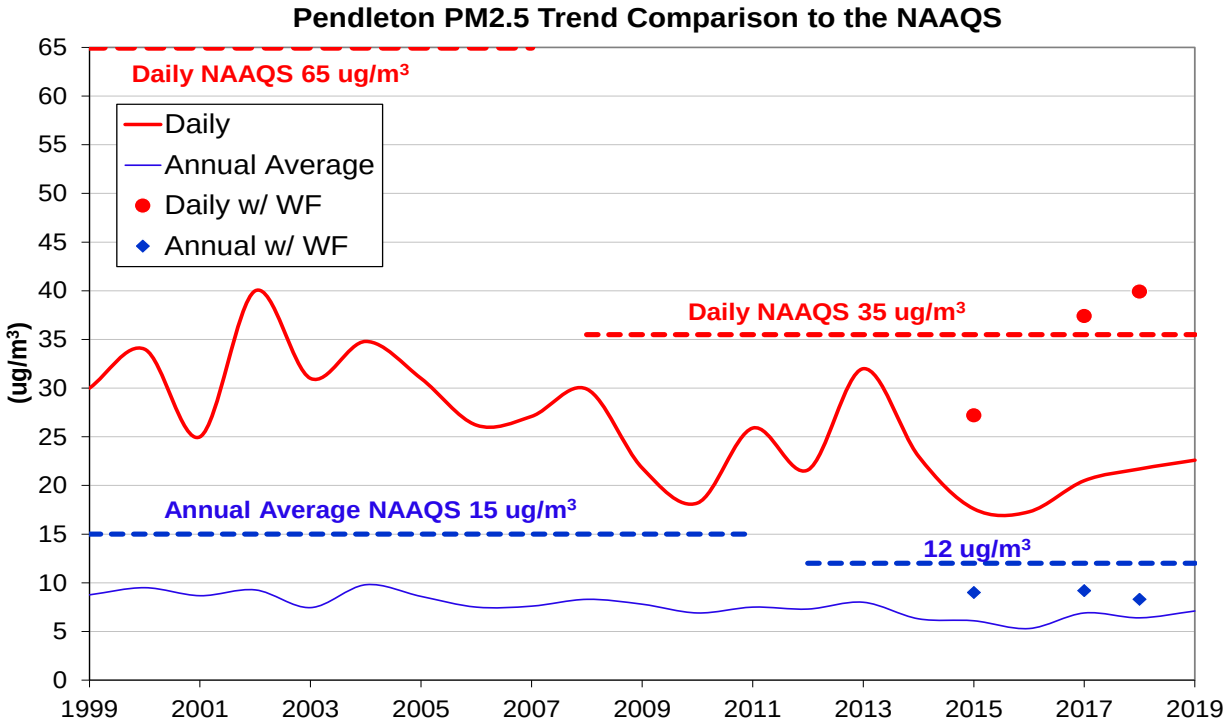



Figure 65. Pendleton PM2.5 trends.

*WF = Wildfire Smoke Impact*

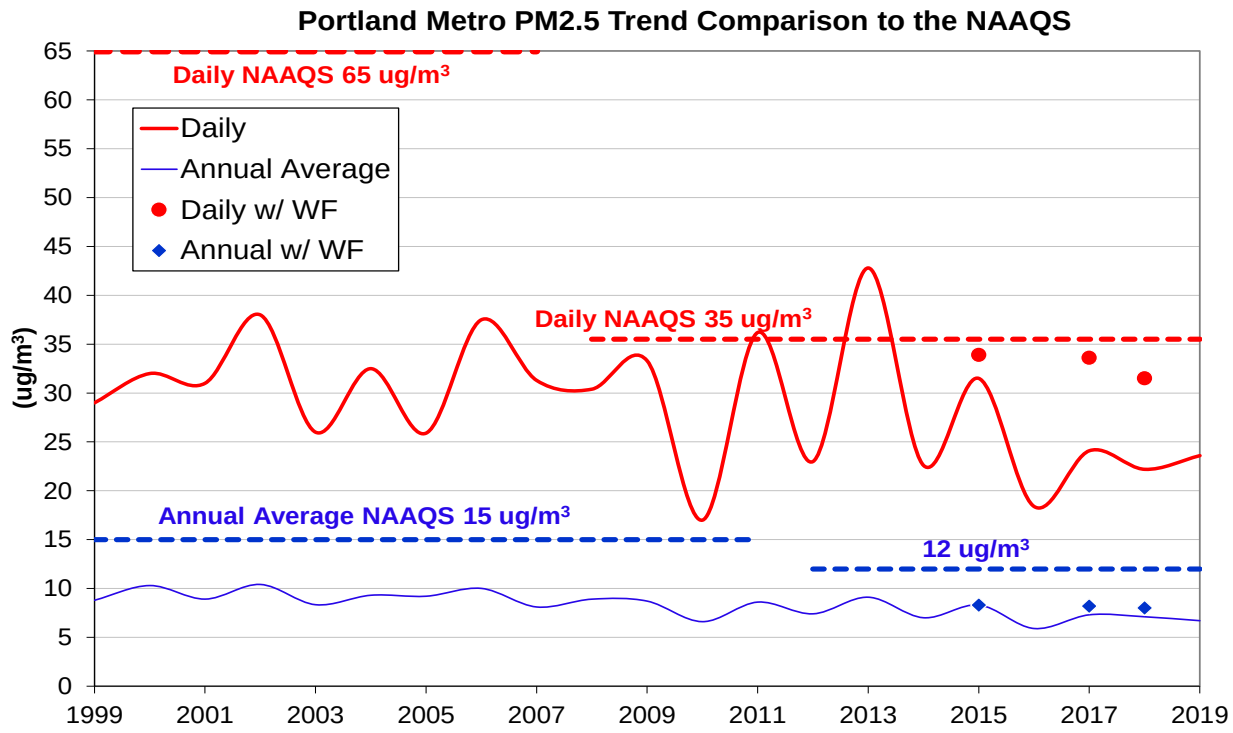



Figure 66. Portland Metro PM2.5 trends.

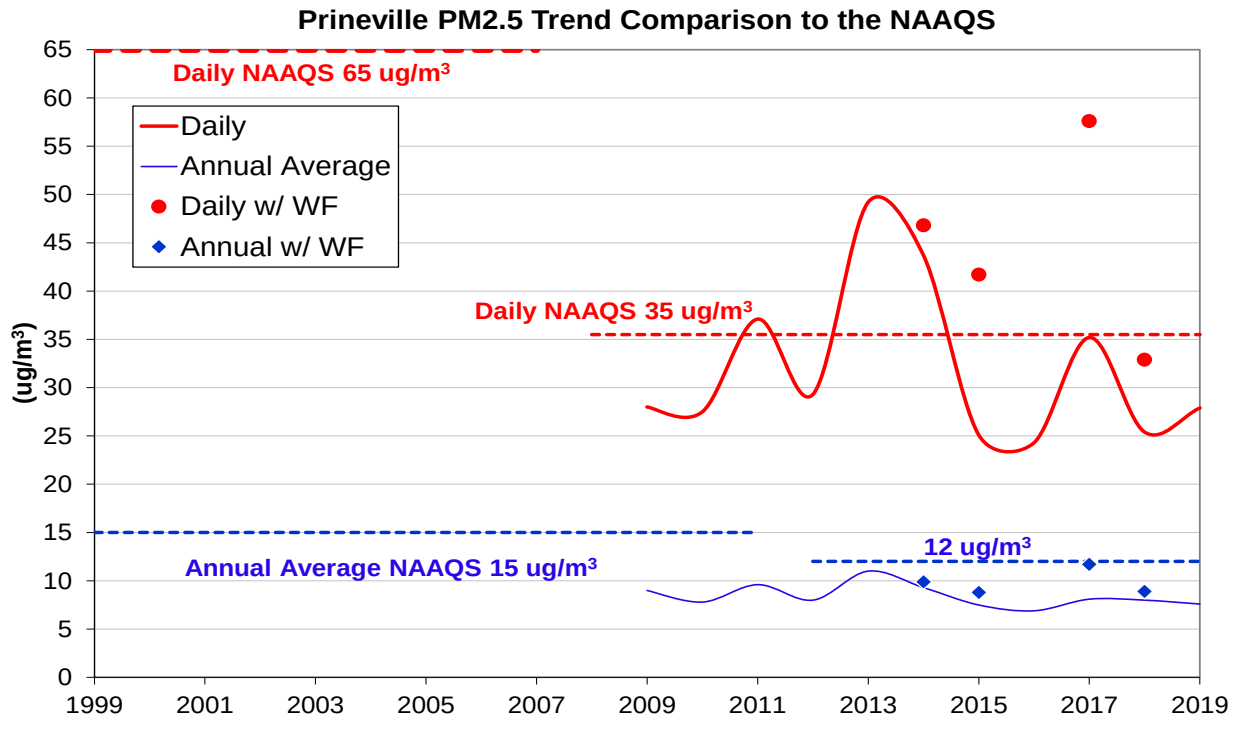



Figure 67. Prineville PM2.5 trends.

*WF = Wildfire Smoke Impact*

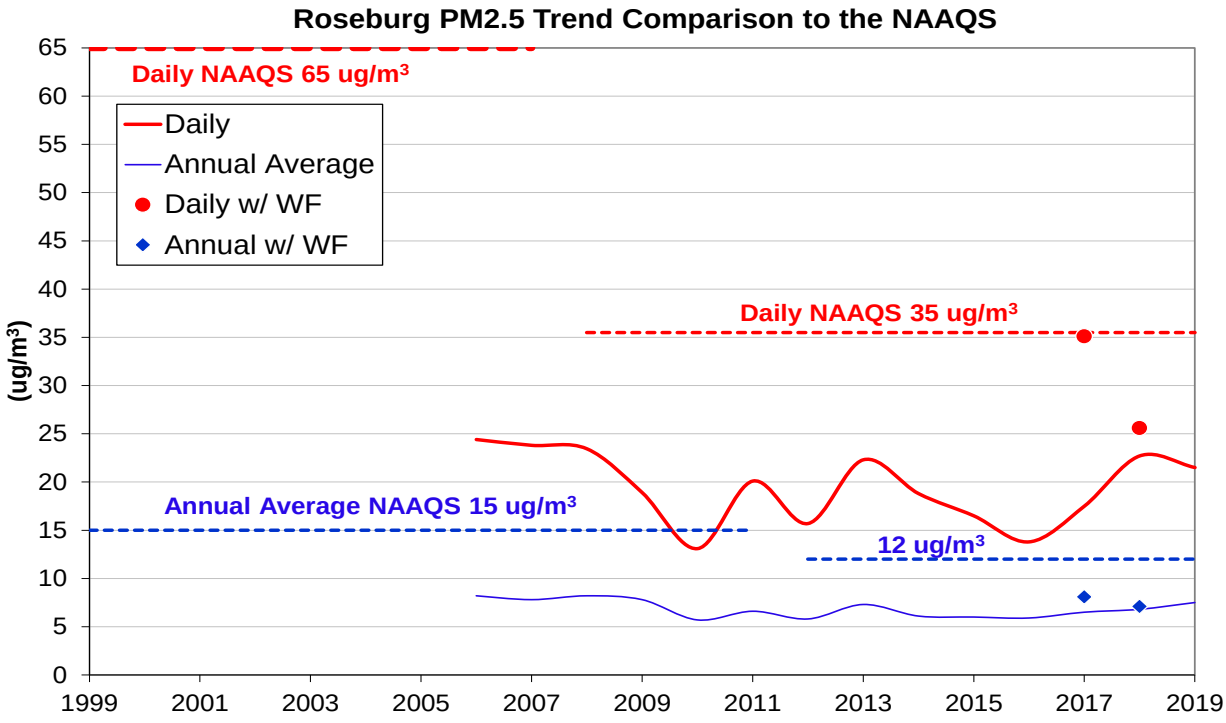



Figure 68. Roseburg PM2.5 trends.

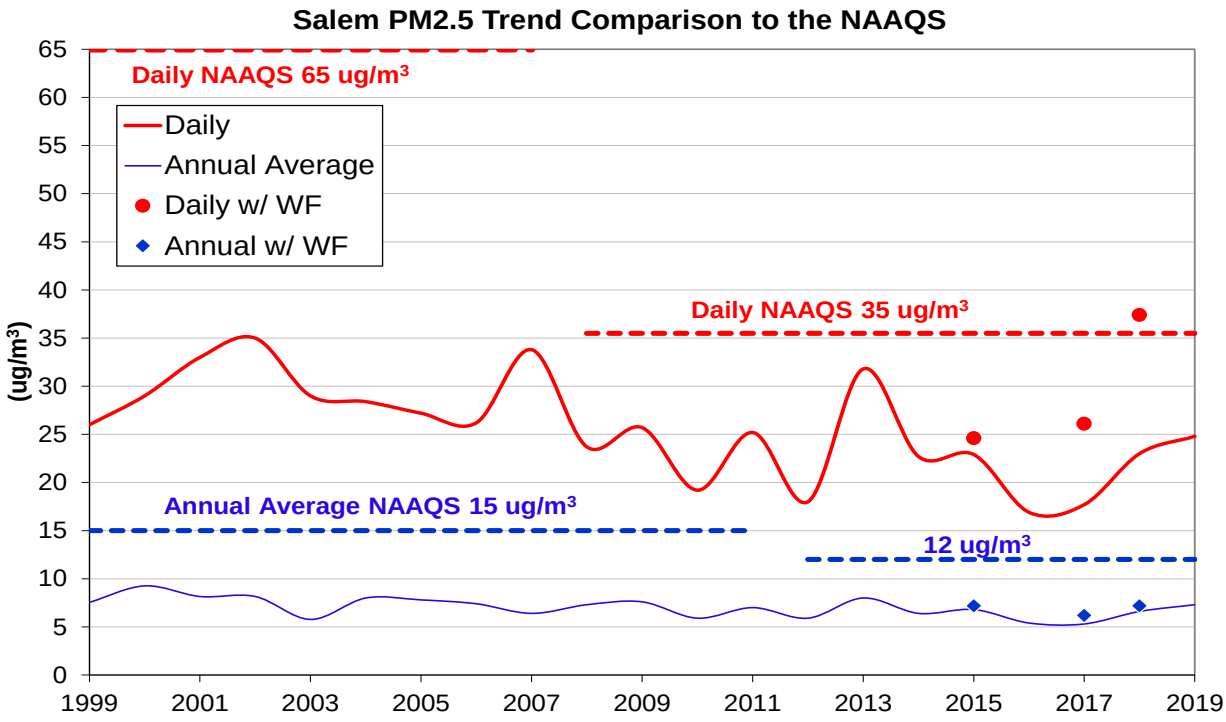



Figure 69. Salem PM2.5 trends.

*WF = Wildfire Smoke Impact*

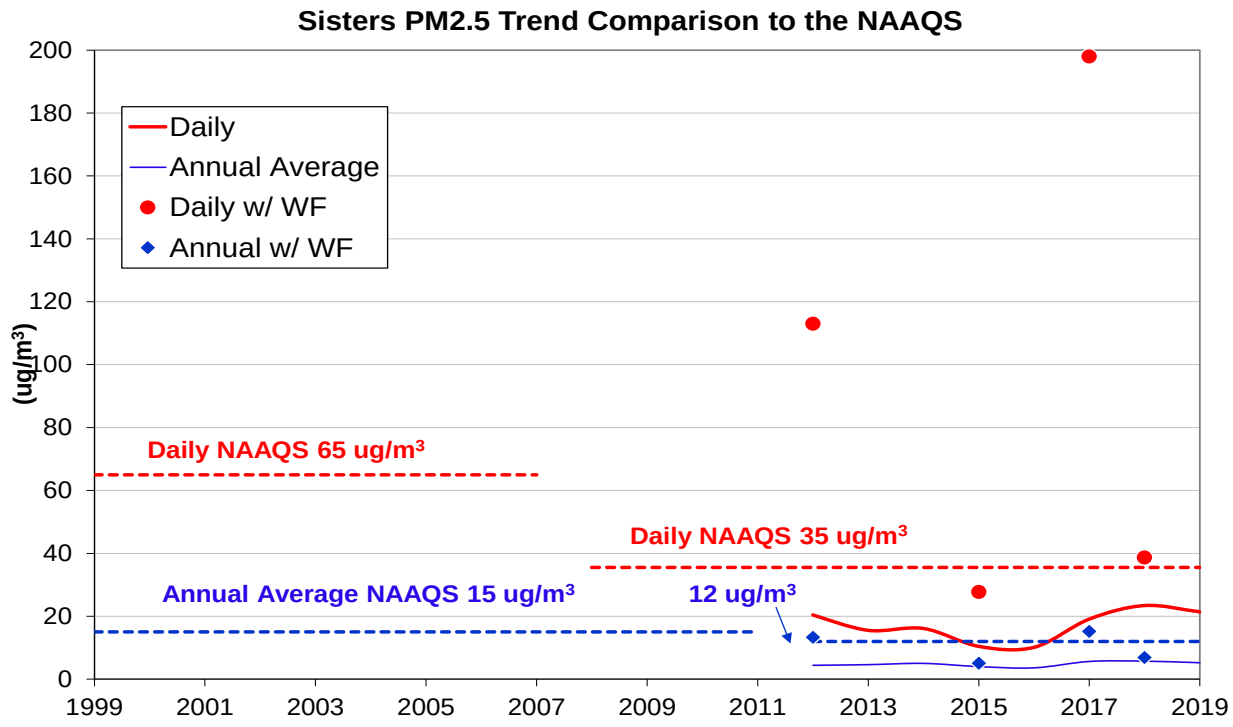



Figure 70. Sisters PM2.5 trends.

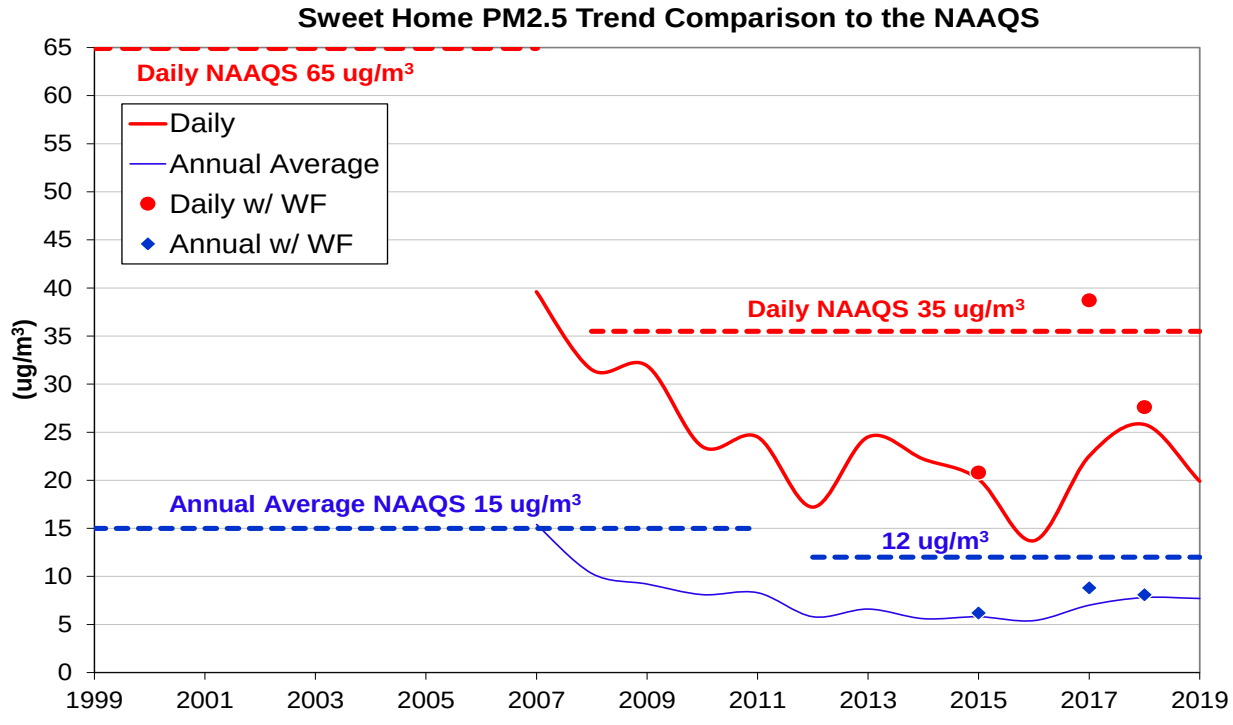



Figure 71. Sweet Home PM2.5 trends.

*WF = Wildfire Smoke Impact*

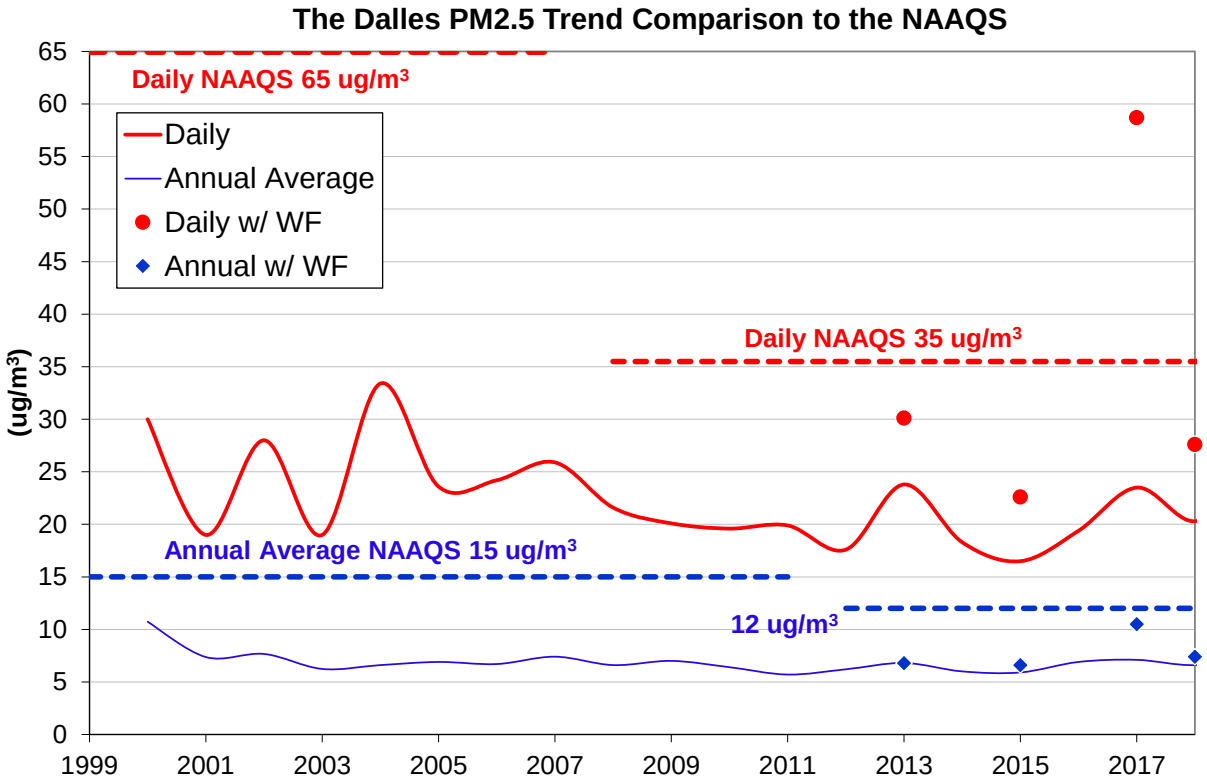
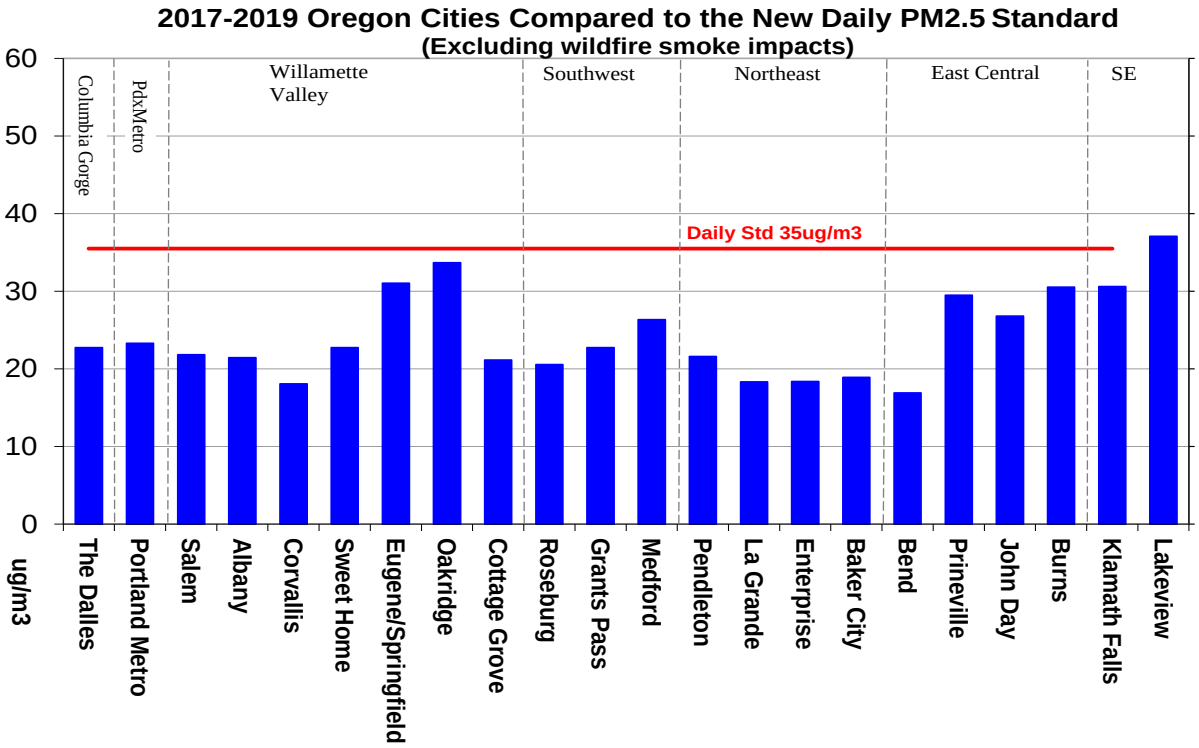



Figure 72. The Dalles PM2.5 trends.

The figures below show the three year average 98$^{th}$ Percentile PM2.5 (daily standard) and annual average PM2.5 (annual standard) levels with and without wildfire smoke impacts. It is useful to understand how much wildfire smoke contributed to raise PM2.5 concentrations above the National Ambient Air Quality Standard and what the levels would be with wildfire emissions excluded. Removing wildfire contributions show the effectiveness of local air quality improvement efforts in communities with PM2.5 reduction plans. Wildfire data would be excluded in determining airshed attainment status because it is considered an exceptional event that cannot be controlled locally.



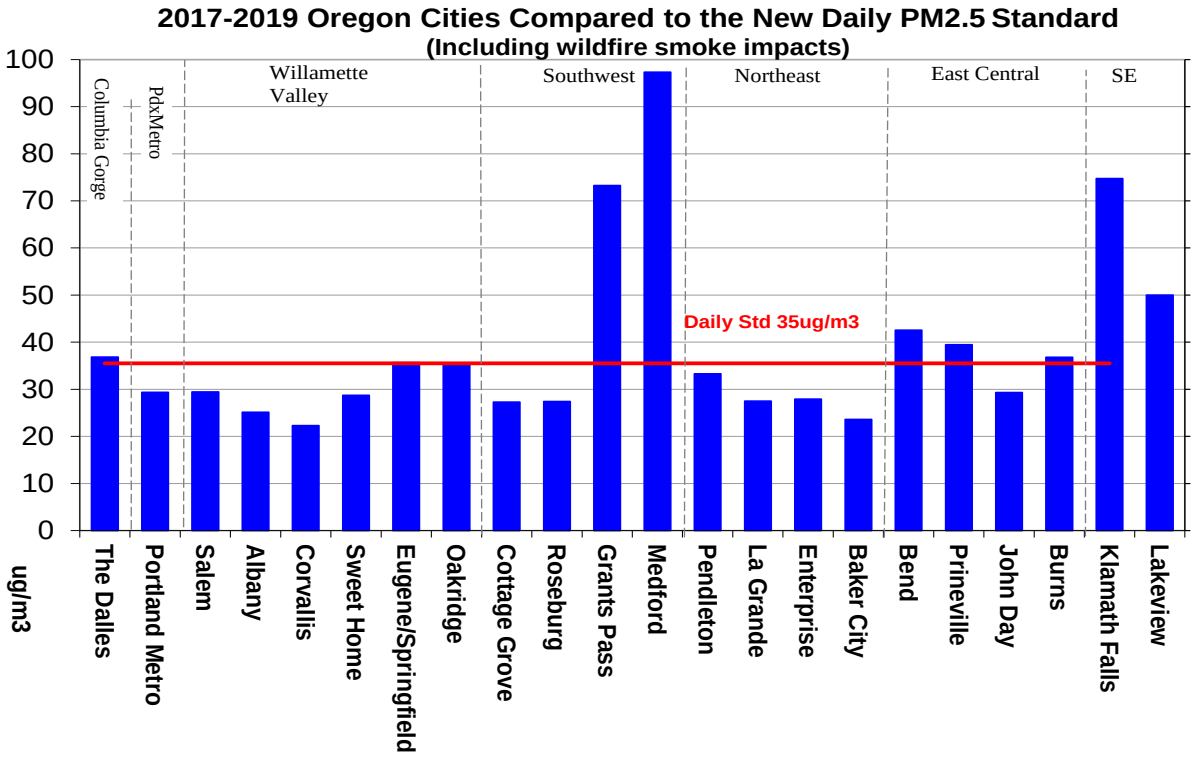
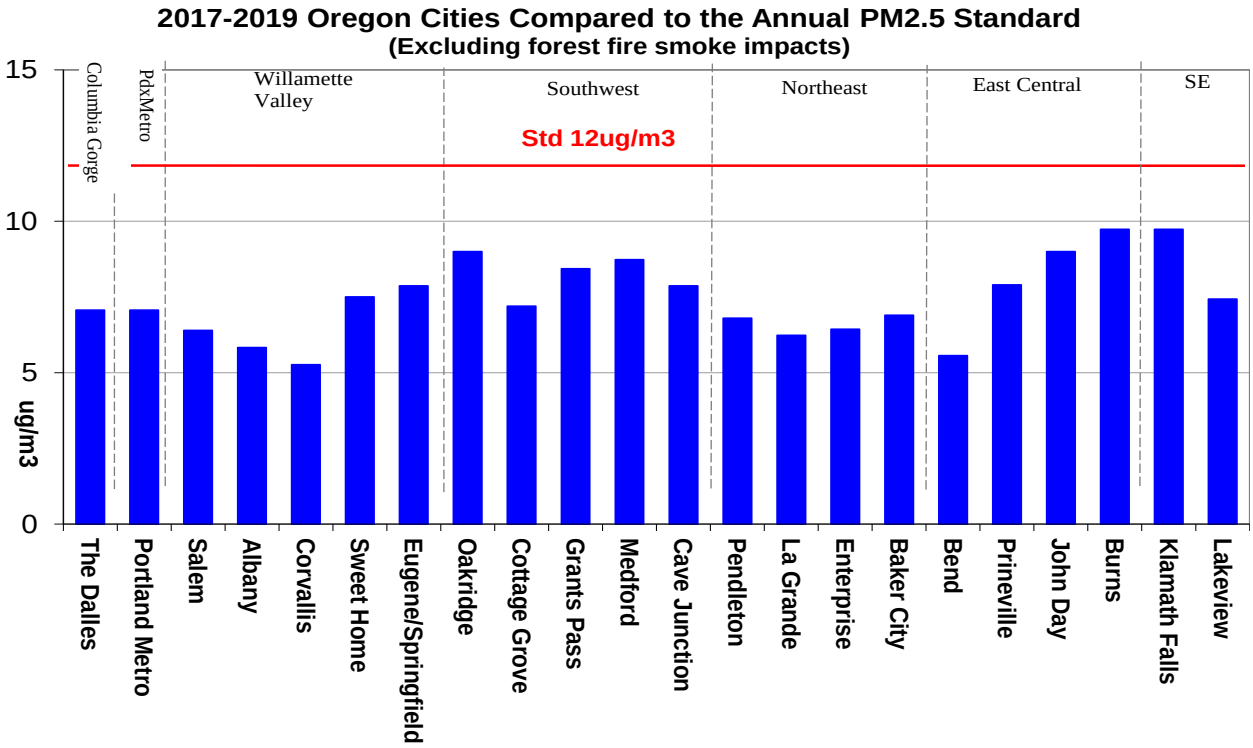




Figure 73. Oregon cities 2017-2019 daily PM2.5 comparison.
*The chart shows the three year average 98th percentile. Wildfire data excluded and included.*



*ppb = parts per billion*



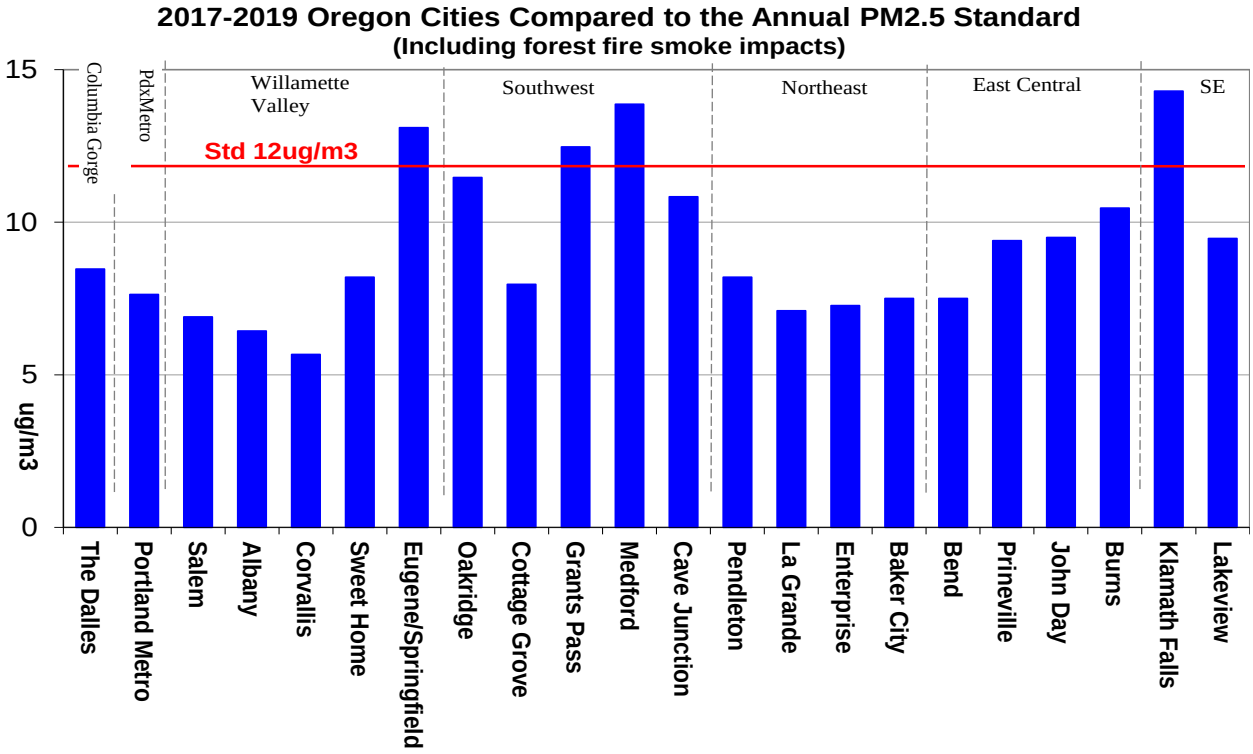




Figure 74. Oregon cities 2016-2019 annual average PM2.5 comparison.
*The chart shows the three year average of the annual average with wildfire data included.*



*ppb = parts per billion*

# PM10 Trends

The PM10 trend chart shows the values in cities with the highest, average, and lowest concentrations. All cities are well below the National Ambient Air Quality Standard.

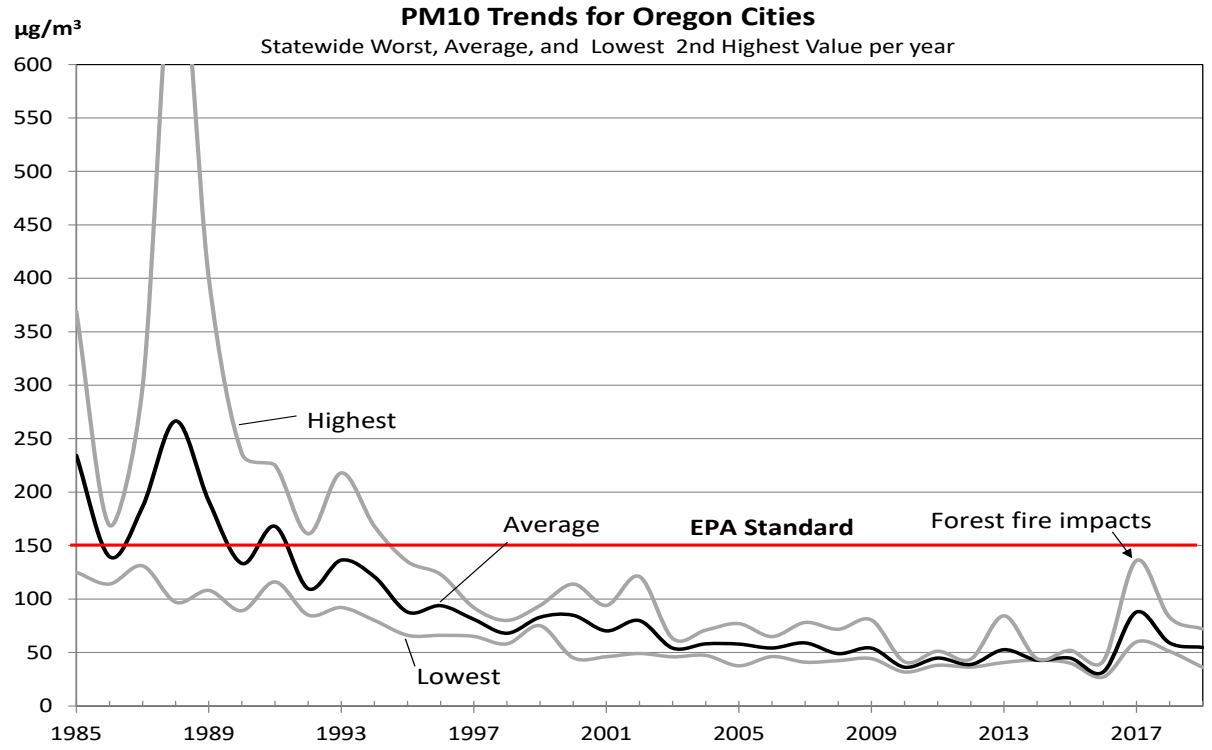



Figure 75. Oregon PM10 trends

# Carbon Monoxide Trends

The figure below shows the CO trend in comparison to the National Ambient Air Quality Standard.

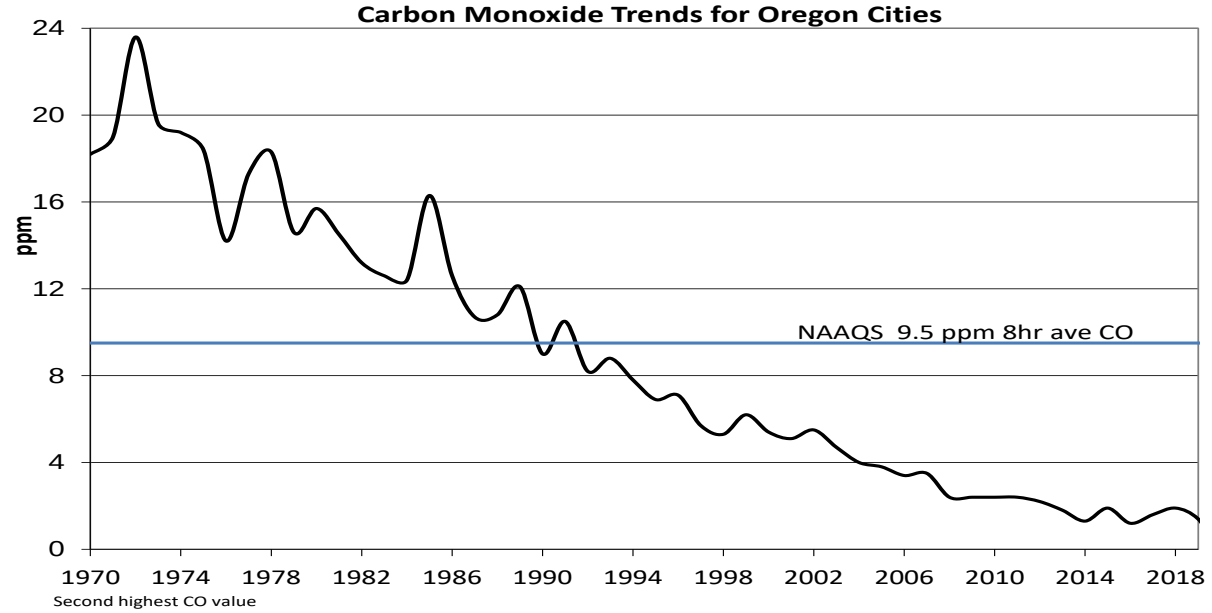



Figure 76. Oregon carbon monoxide Trend.
*Trend chart uses the second highest annual, eight hour average.*



*ppb = parts per billion*

# Sulfur Dioxide Trends

The figure below shows the $SO_2$ trends in comparison to the federal standard.

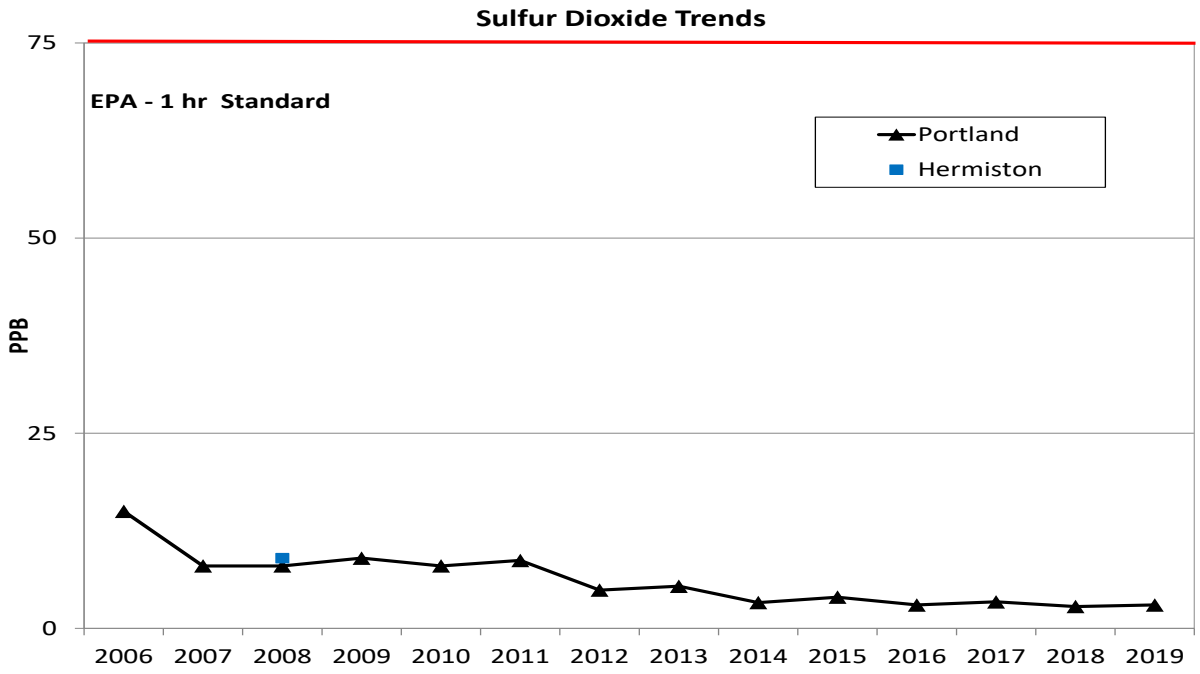



Figure 77. Oregon sulfur dioxide one hour average trends.

# Nitrogen Dioxide Trends

The Figure below shows the $NO_2$ trends in comparison to the federal standard.

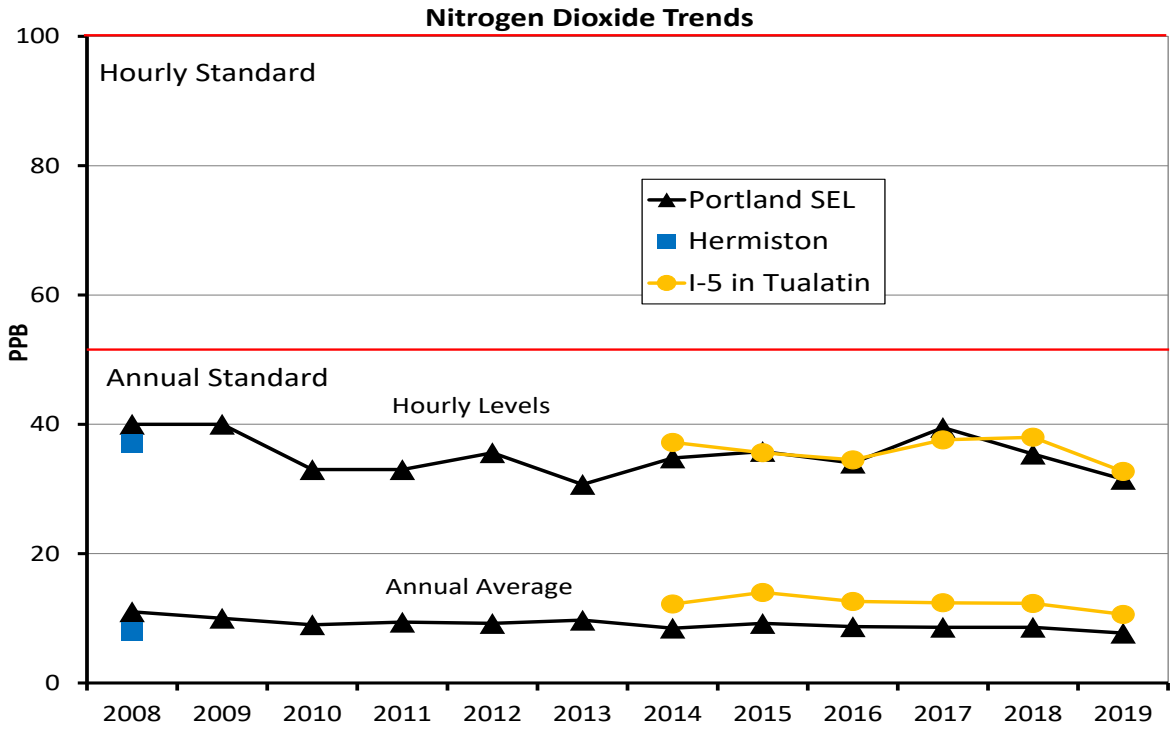



Figure 78. Oregon nitrogen dioxide one hour and annual average trends.



*ppb = parts per billion*

# Air Toxics Trends

Oregon DEQ and LRAPA began sampling for air toxics in Oregon in 1999. The Figures below show the trends for some air toxics of concern. More air toxic information can be found in Appendix H and at EPA's Air Data web site. The values are compared to the Oregon ambient concentration health benchmarks which are the levels where people exposed for a lifetime have an additional one in a million risk of cancer or of experiencing non-cancer health effects.

This information is for neighborhood monitoring only and does not include monitoring next to industrial facilities. That information is presented in separate reports specific to the monitoring project and facility. These graphs were made using the air toxics summary data from EPA's Air Data Web page which summarizes the air toxics data that the state and local agencies load into EPA's AQS database. Oregon DEQ loads all the sampled data below into EPA's database.

Note that years with < 50% data completeness were not included. Years with data competition between

50% and 74% are denoted with an asterisk " * " in the graphs.

Note that MDL = Minimum Detection Limit. Values below the MDL are below the detection limit of the analysis method. EPA defines the MDL as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte".

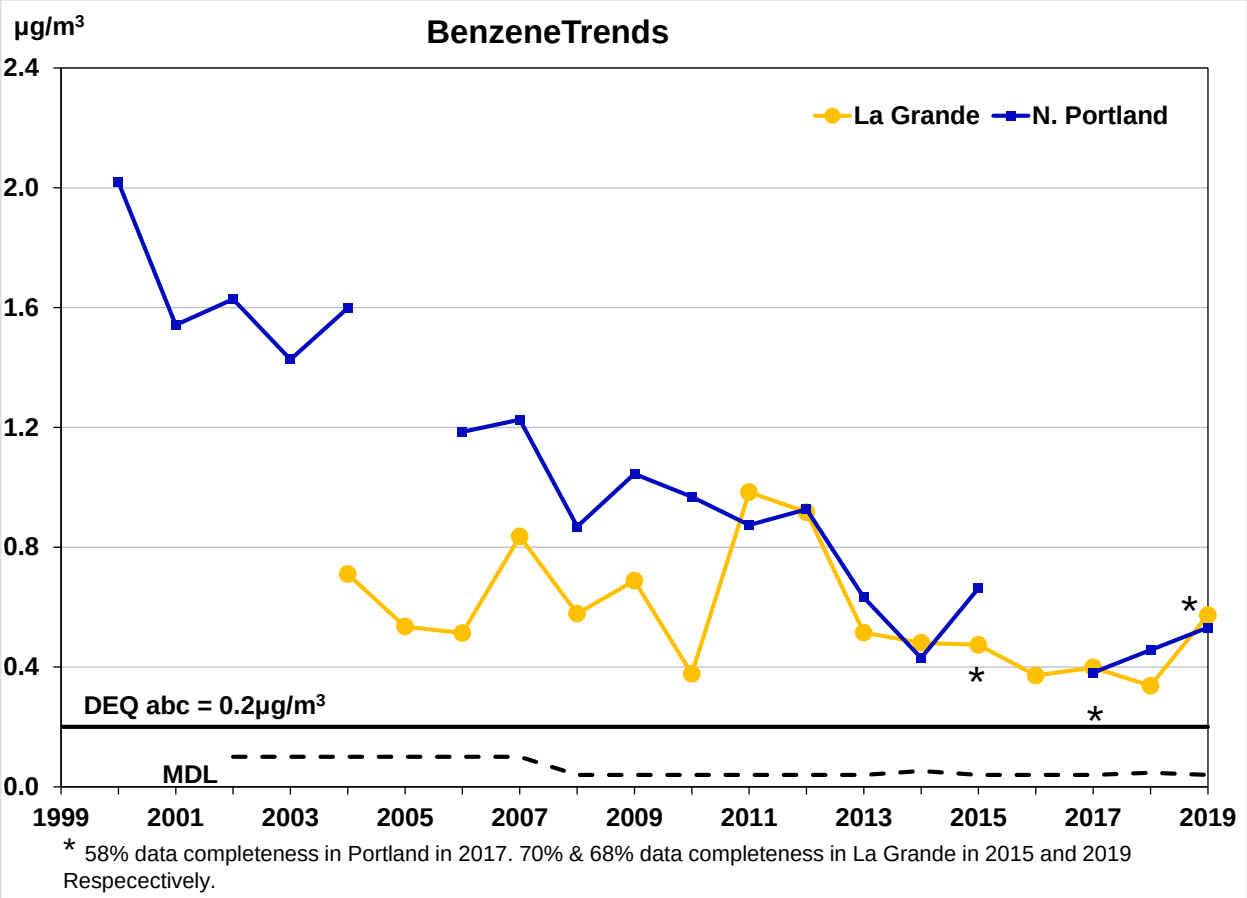



Figure 79. Oregon benzene trends.

*Units are in Standard Temperature and Pressure (25°C). The MDL definition is above the graphs.*



*$\mu g/m^3$= micrograms/meter cubed*

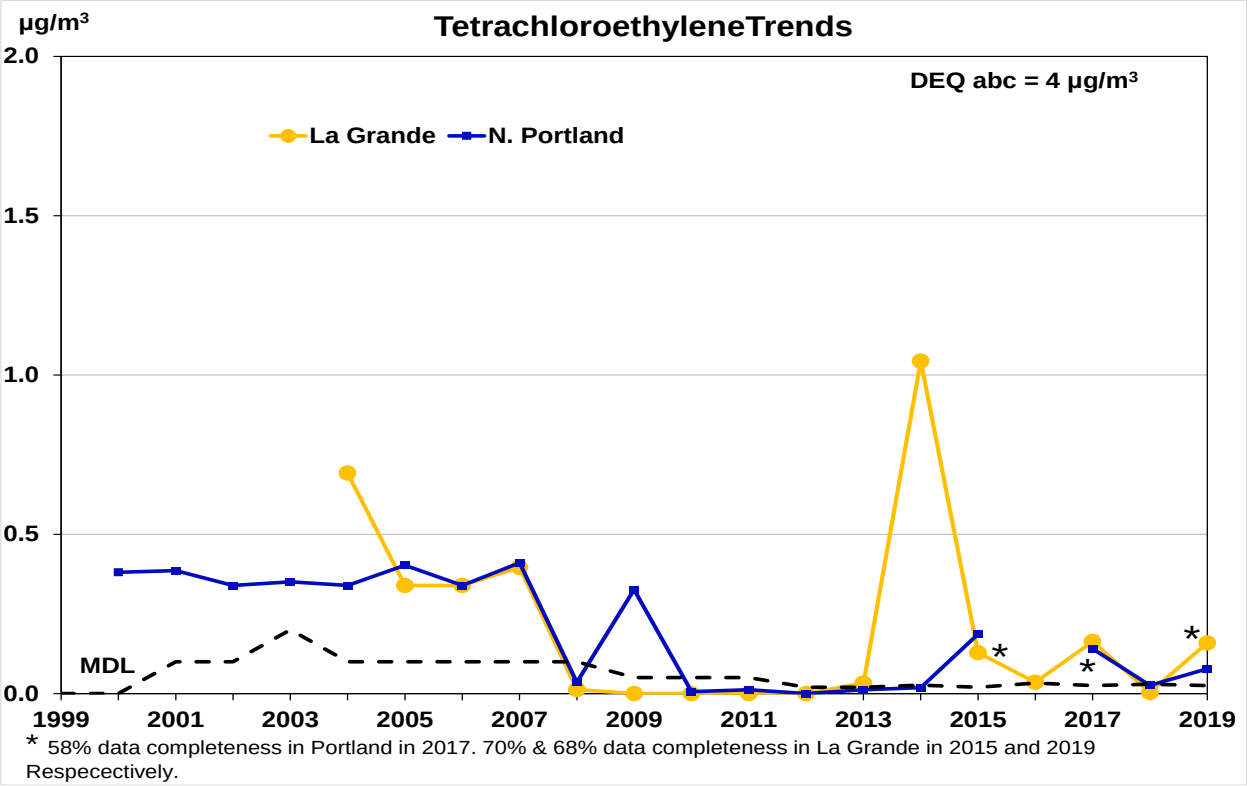



Figure 80. Oregon tetrachloroethylene (PERC) trends.
*Units are in Standard Temperature and Pressure (25°C). The MDL definition is above the graphs.*

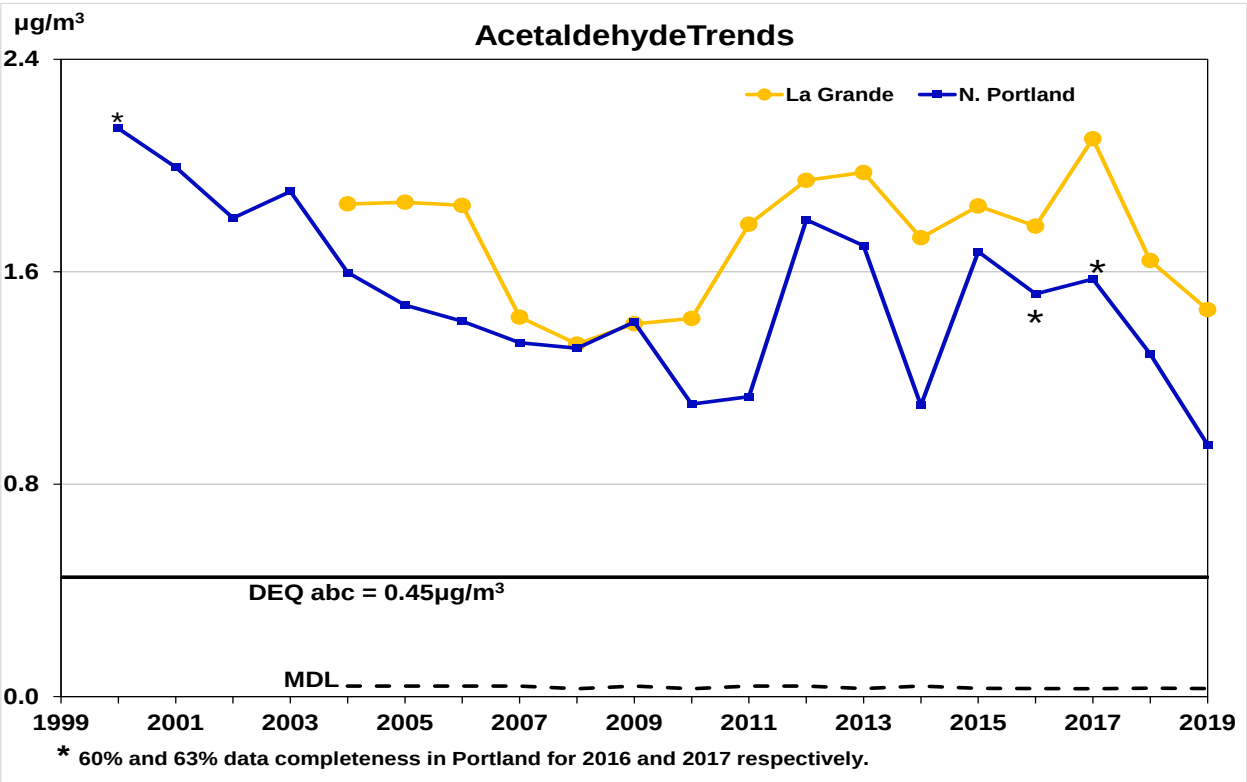



Figure 81. Oregon acetaldehyde trends.
*Units are in Standard Temperature and Pressure (25°C). The MDL definition is above the graphs.*



*$\mu g/m^3$= micrograms/meter cubed*

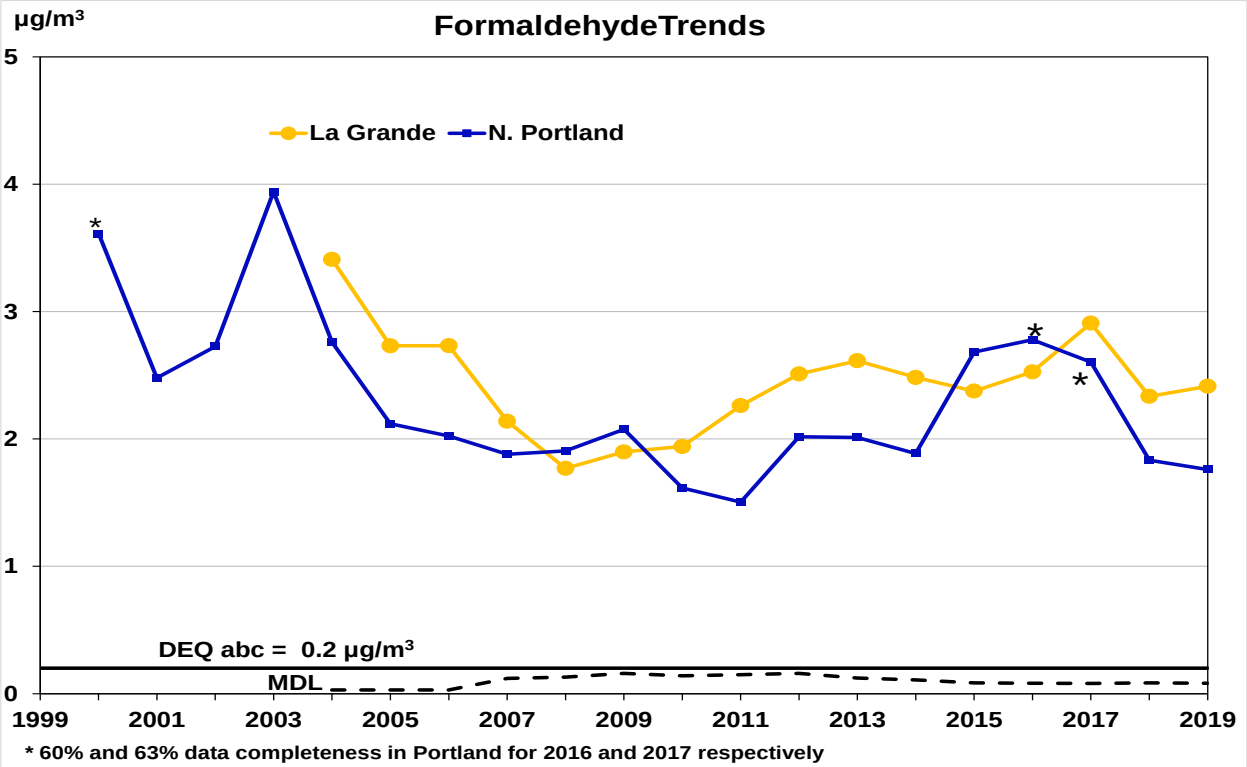



Figure 82. Oregon formaldehyde trends.
*Units are in Standard Temperature and Pressure (25°C). The MDL definition is above the graphs.*

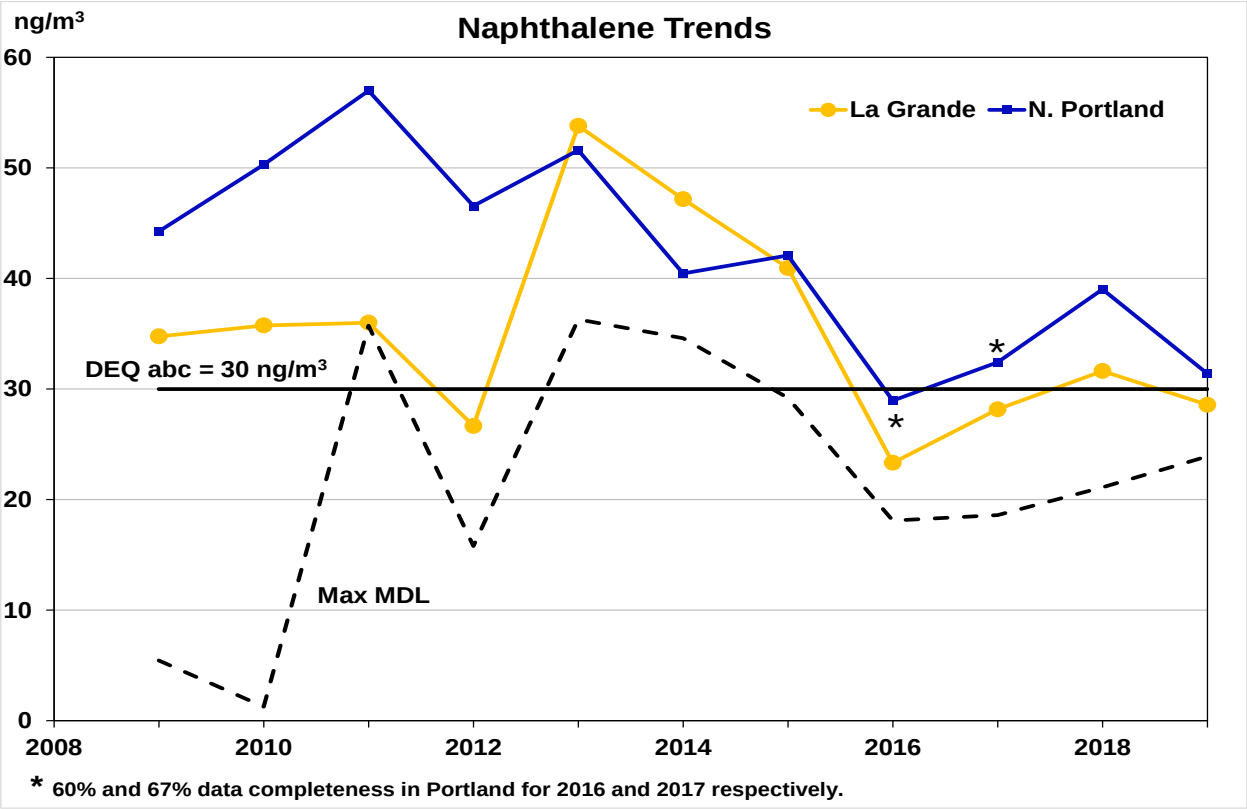



Figure 83. Oregon TSP naphthalene trends
*Units are in Standard Temperature and Pressure (25°C). The MDL definition is above the graphs.*



*$\mu g/m^3$= micrograms/meter cubed*
*$ng/m^3$= nanograms/meter cubed*

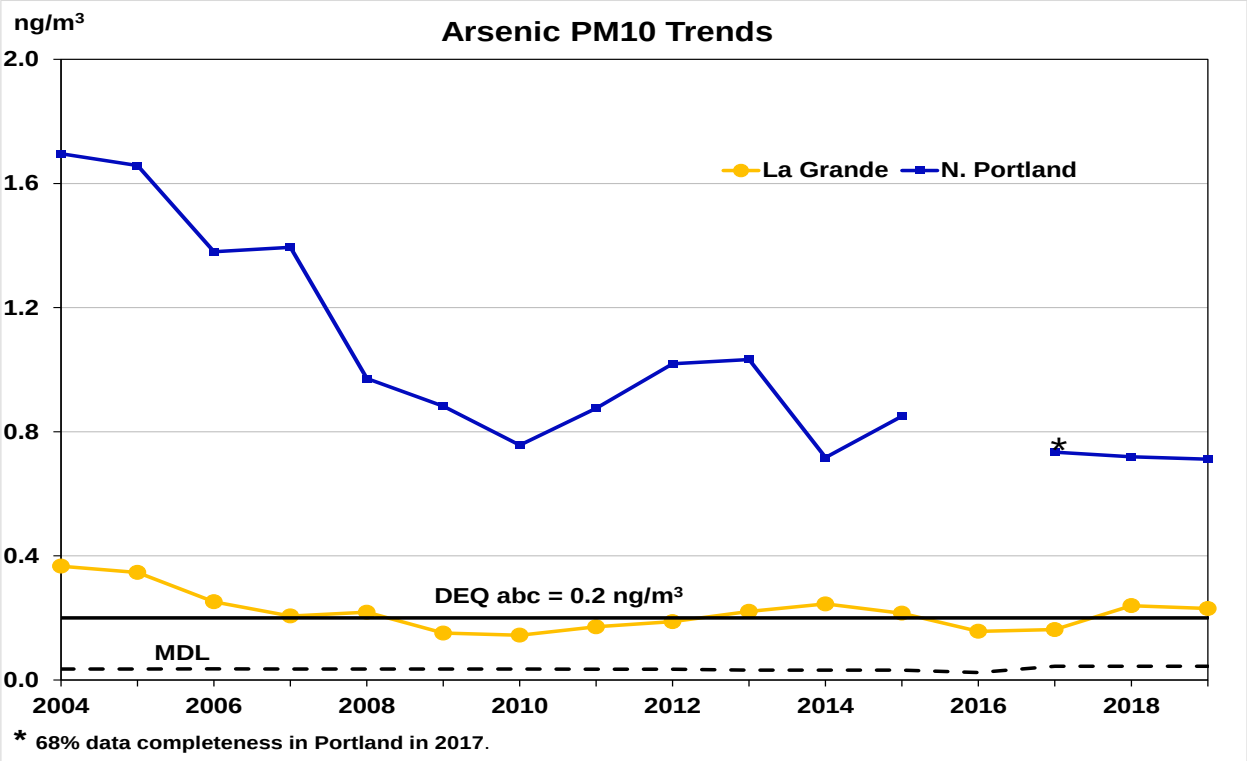



Figure 84. Oregon PM10 arsenic trends.

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*

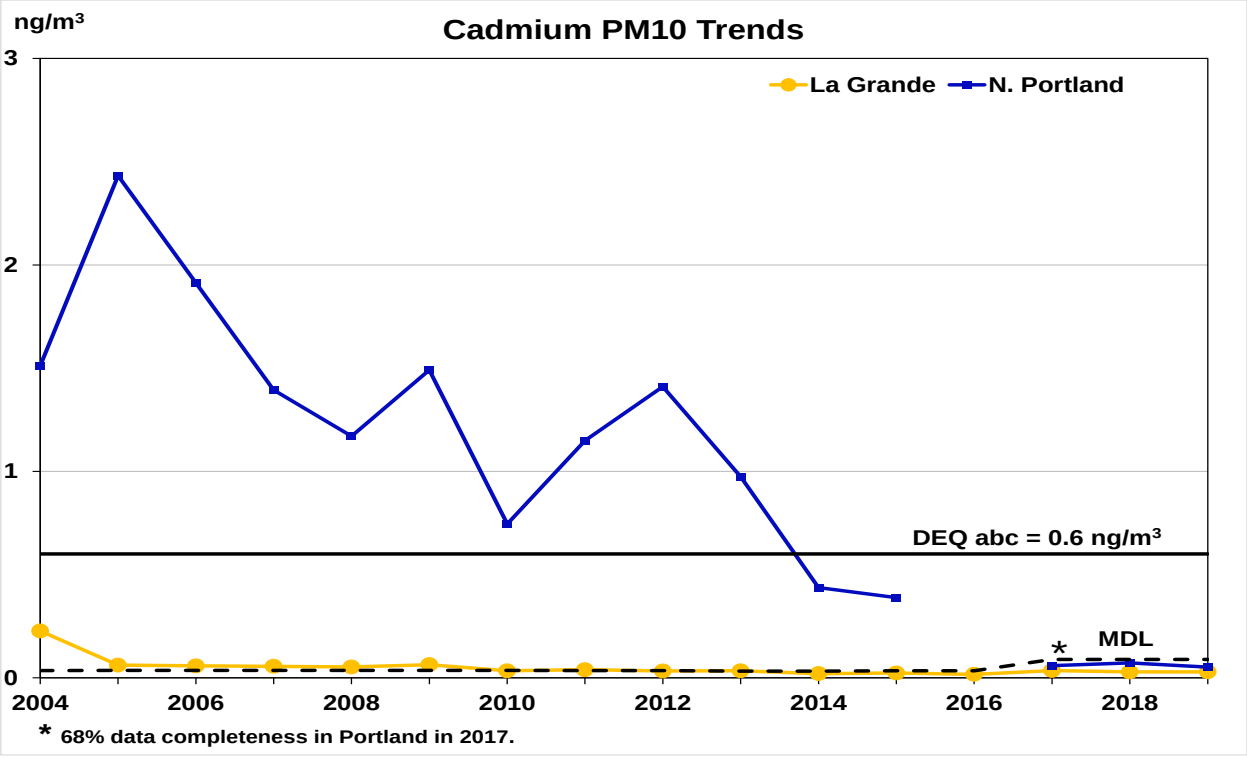



Figure 85. Oregon PM10 cadmium trends.

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*



*$ng/m^3$= nanograms/meter cubed*

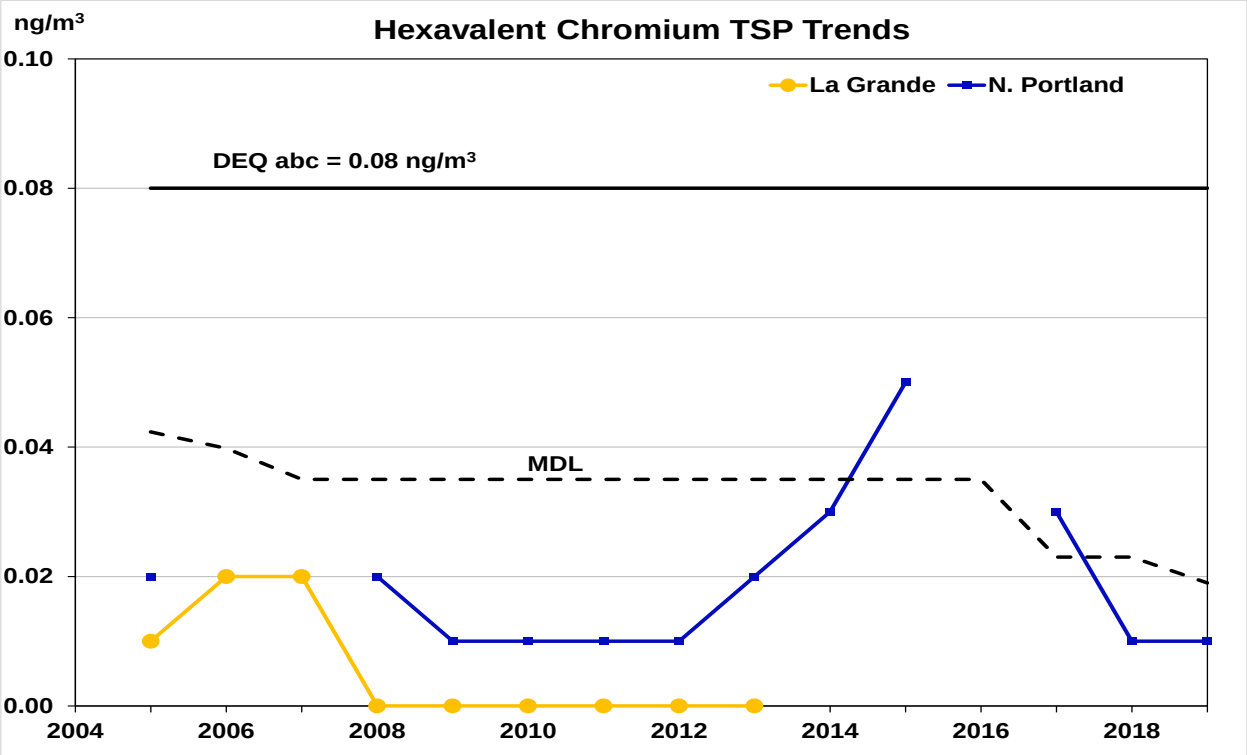



Figure 86. Oregon TSP hexavalent chromium trends

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*

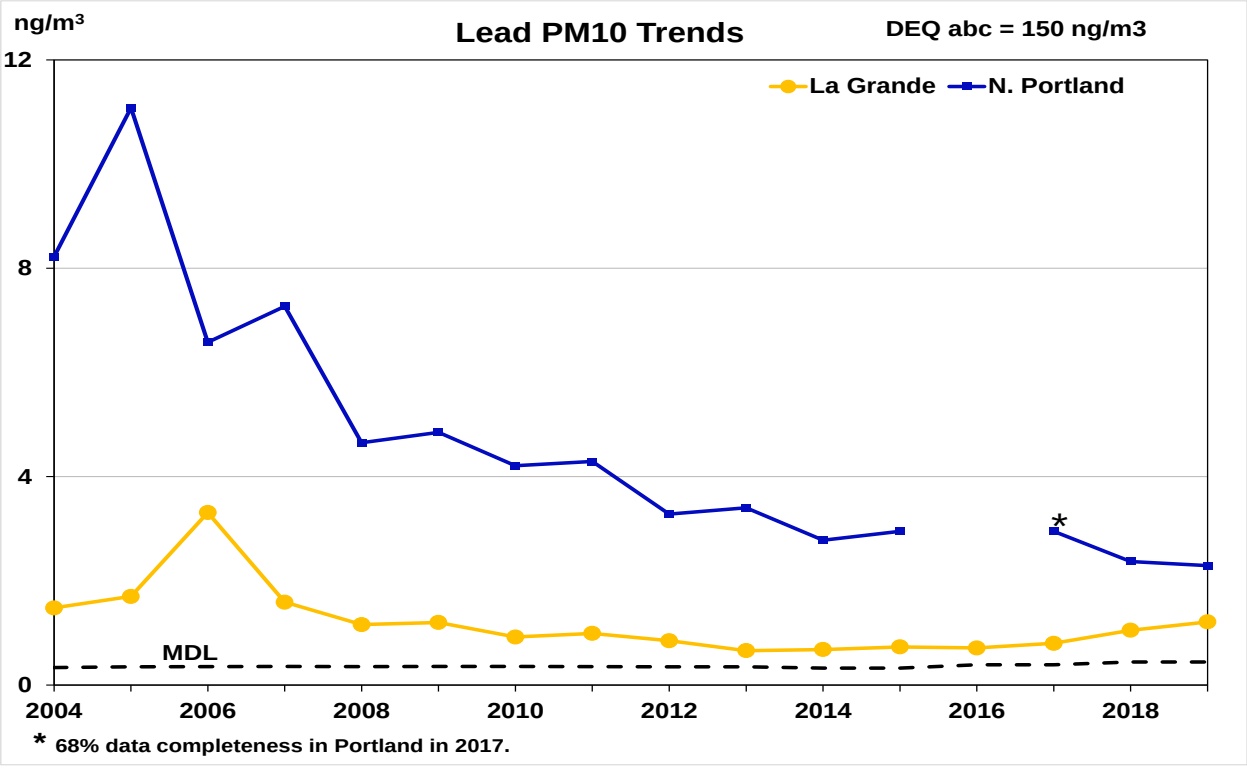



Figure 87. Oregon PM10 lead trends.

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*



*$ng/m^3$= nanograms/meter cubed*

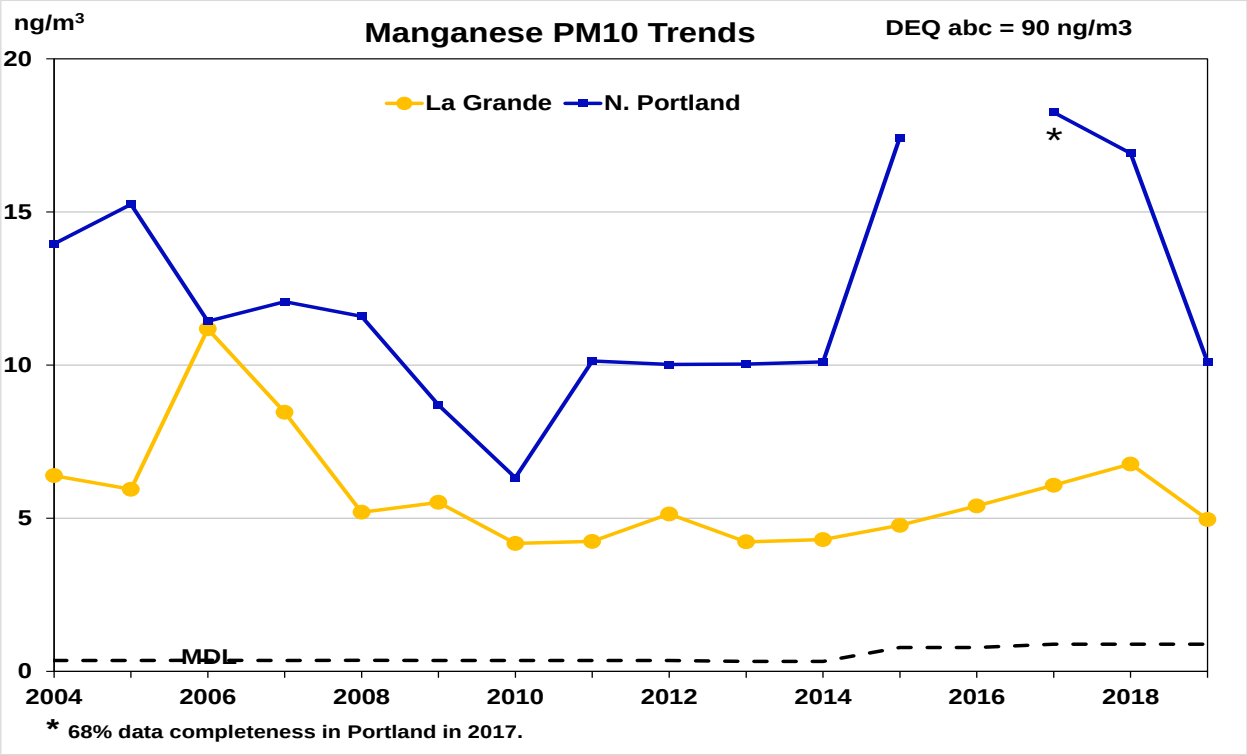



Figure 88. Oregon PM10 manganese trends.

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*

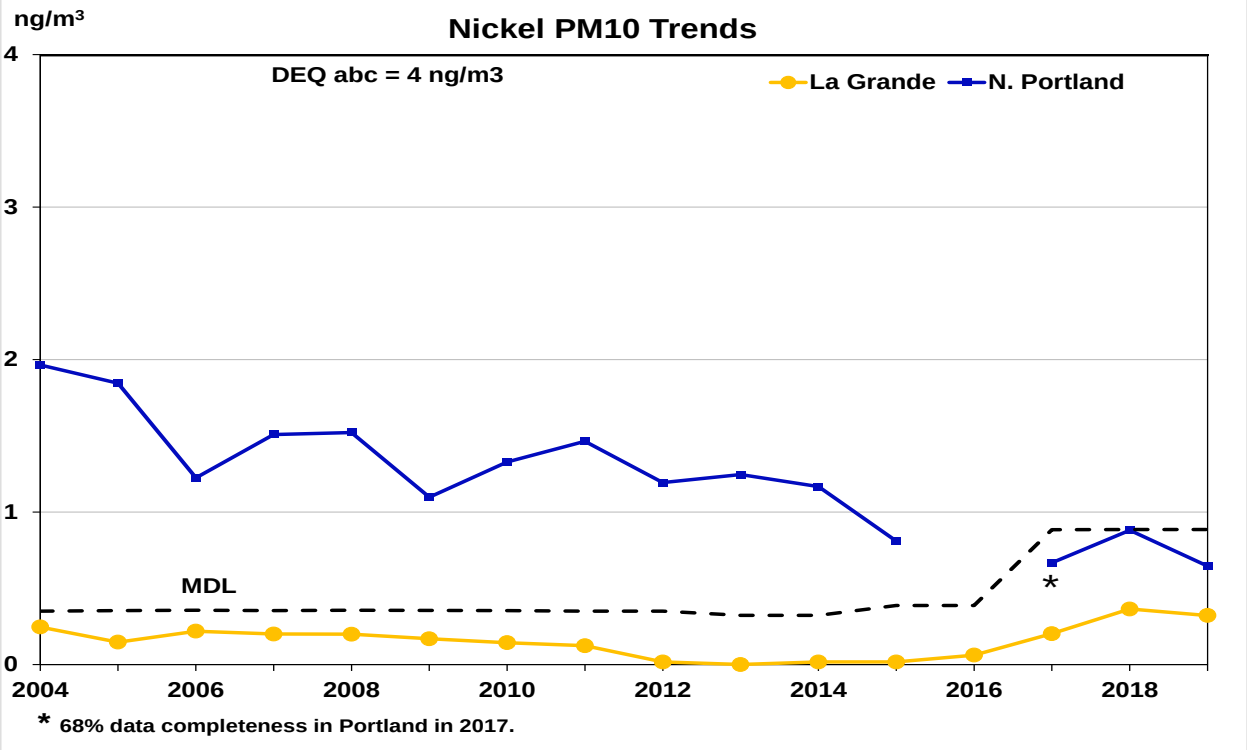



Figure 89. Oregon PM10 nickel trends.

*Units are in Standard Temperature and Pressure (25°C) until 2011, then they are in Local Temperature and Pressure. The MDL definition is above the graphs.*



*$ng/m^3$= nanograms/meter cubed*

# Oregon Greenhouse Gas (GHG) Emissions Trends

Oregonians produce greenhouse gas emissions directly from activities like driving cars and heating homes. We also indirectly contribute to greenhouse gas emissions when we purchase electricity, goods or food manufactured in other states or countries. These emissions are contributing to global climate change.

DEQ divides statewide greenhouse gas emissions into two categories:

- Sector-based Emissions: Emissions produced in Oregon from transportation, residential, commercial, industrial, and agriculture sectors, including electricity produced elsewhere but used in state.
- Consumption-based Emissions: Emissions produced around the world due to Oregon's consumption of energy, goods and services. Over half of Oregon's consumption-based emissions occur in other states or nations but still impact Oregonians because climate change is a global problem.

**Trends:**

Oregon's sector-based emissions are 10 percent above 1990 levels. Consumption-based emissions are 42 percent above 1990 levels. See chart below. Oregon has goals to reduce emissions 10 percent below 1990 levels by 2020 and 75 percent by 2050.

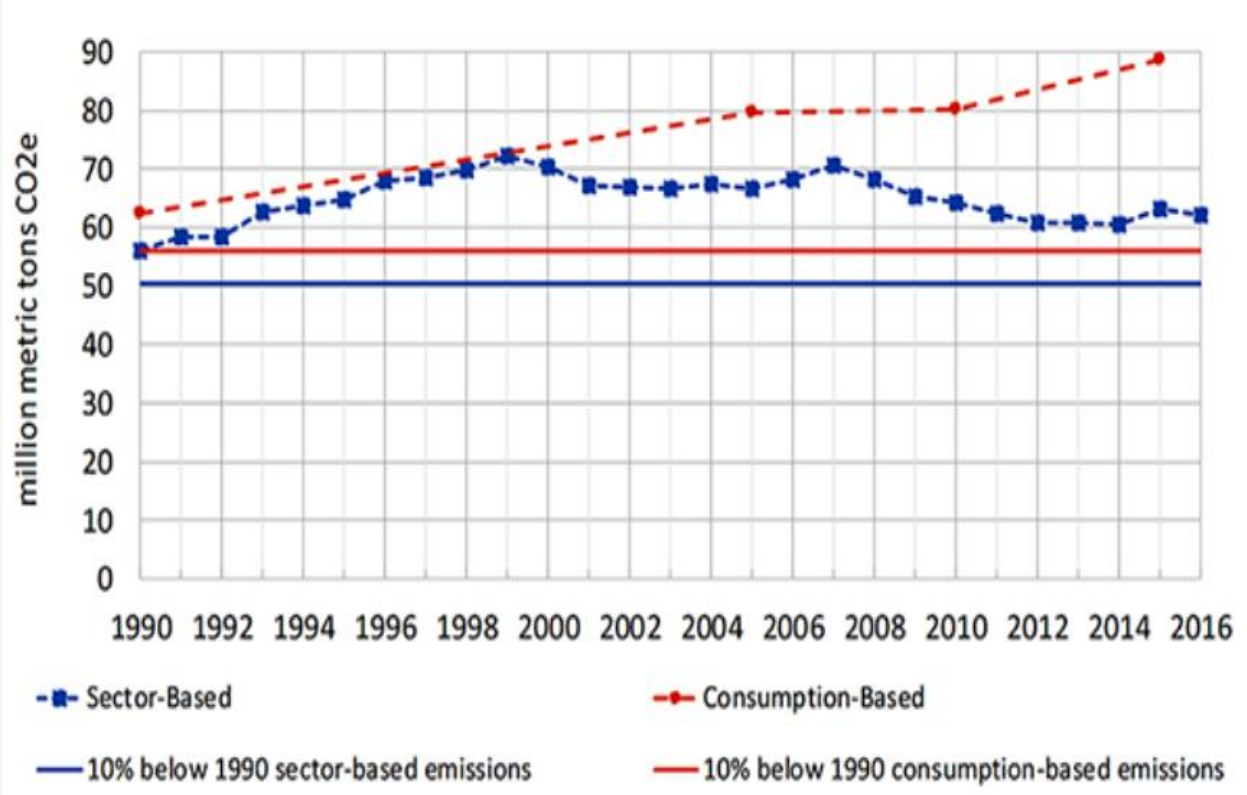



Figure 90. Oregon total greenhouse gas emissions by sector 1990-2016

DEQ publishes a comprehensive report every five years that evaluates Oregon's greenhouse gas emissions with data from the sector-based and consumption-based inventories. The latest report is the Oregon's Greenhouse Gas Emissions through 2015 published May 2018. More information can be found on DEQ's Oregon Greenhouse Gas Reporting web page.



*ng/m$^3$= nanograms/meter cubed*

# Sector-based GHG Emission Trends:

Oregon's Sector-based emissions are human-caused greenhouse gas emissions produced within Oregon by economic sector. These emissions also includes the emissions associated with the electricity used in Oregon regardless of where it is generated. The chart below shows the Sector based greenhouse gas emissions for Oregon.

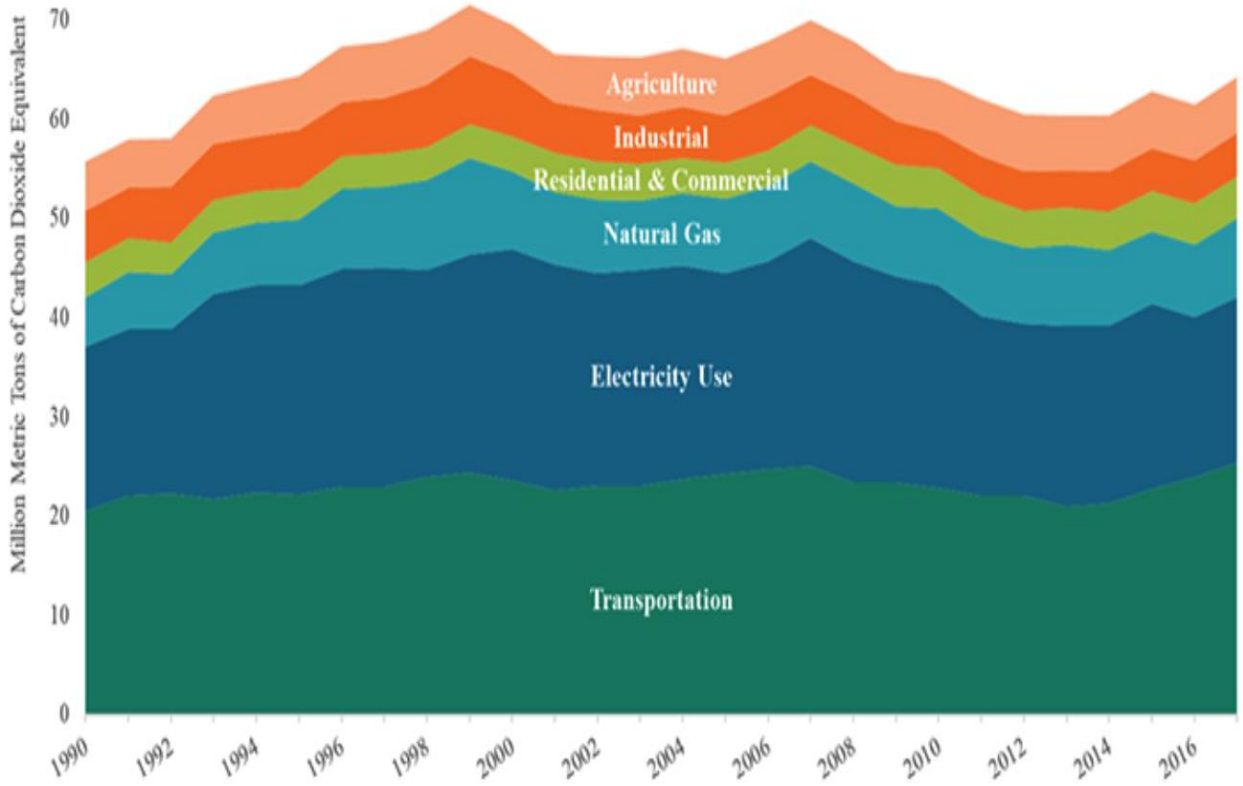



Figure 91. Oregon total Sector-based emissions by economic sector.
*Emissions from transportation and electricity use are Oregon's largest sources of greenhouse gas emissions.*



*ng/m$^3$= nanograms/meter cubed*

# Consumption-based GHG Emission Trends:

Oregon's consumption-based greenhouse gas emissions are produced to meet the state's consumption of goods and services like cars, food, fuels, appliances and clothing—most of which are produced in other states or overseas. This inventory accounts for total emissions from producing, using and disposing of a product. More than half of the consumption-based emissions occur in other states or nations but are driven by Oregon consumption. The chart below shows the 2015 emissions by consumption type.

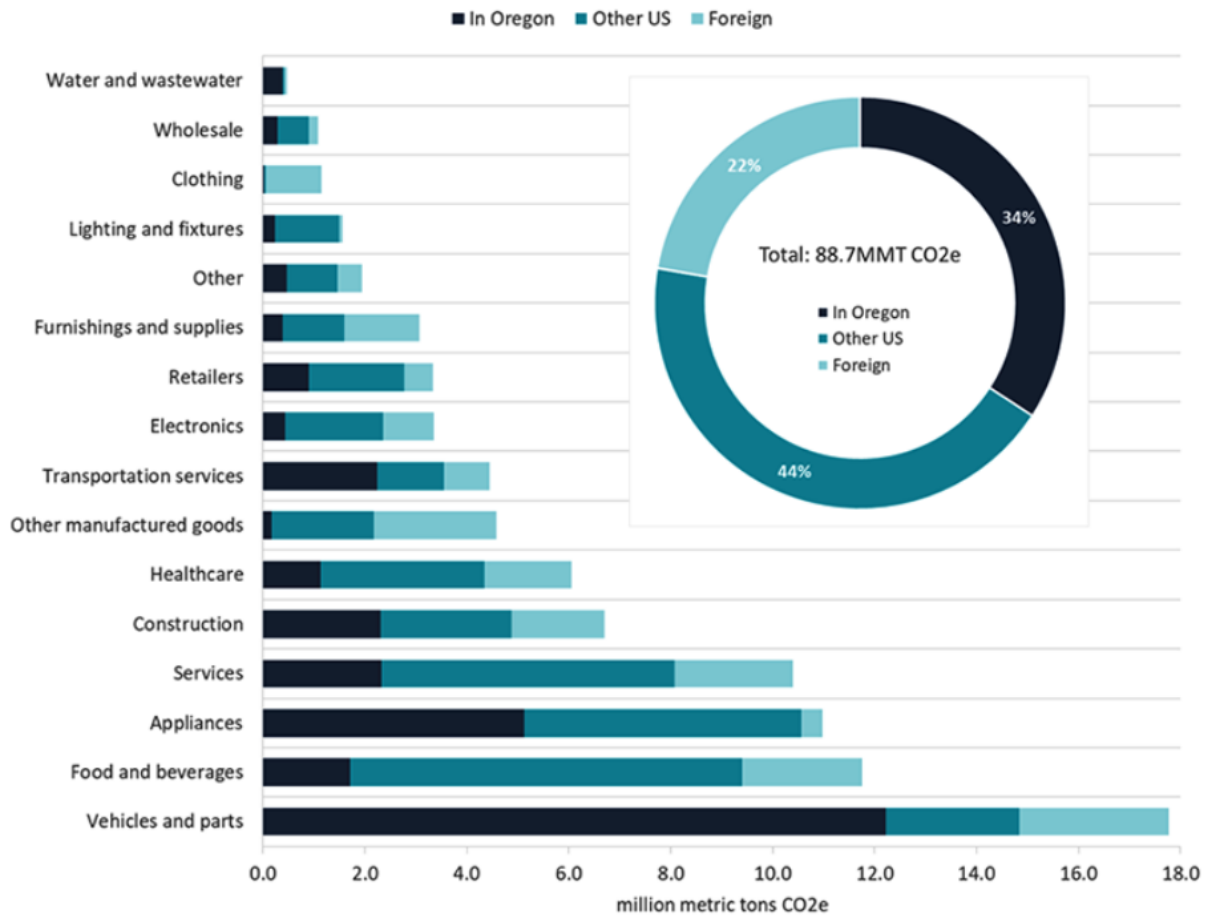



Figure 92. Oregon total Consumption-based GHG emissions by consumption type.
*The consumption-based greenhouse gas emissions inventory tracks emissions produced in Oregon and around the world due to the products and services Oregonians consume.*



*ng/m$^3$= nanograms/meter cubed*

# National Ambient Air Quality Standards (NAAQS)

The EPA has established primary NAAQS to protect public health and secondary NAAQS to protect public welfare such as agriculture. The following Table has the NAAQS standards for the criteria pollutants. EPA summarizes the NAAQS at: https://www.epa.gov/criteria-air-pollutants/naaqs-table

Table 5. 2017 National Ambient Air Quality Standards (NAAQS).

| **Pollutant** | **Averaging Time** | **National Ambient Air Quality Standard (NAAQS) Violation Determination** | **Primary NAAQS Exceedance Level** | **Secondary NAAQS Exceedance Level** |
|---|---|---|---|---|
| Carbon monoxide | 1-hour | Not to be exceeded more than once/year. | 35 ppm | - |
| | 8-hour | Not to be exceeded more than once/year. | 9 ppm | - |
| Lead | Three Months | Rolling 3 Month Average | 0.15 $\mu g/m^3$ | 0.15 $\mu g/m^3$ |
| Nitrogen dioxide | Annual | Annual arithmetic mean | 53 ppb | 53 ppb |
| | 1-hour | 3yr average of the maximum daily 98$^{th}$ percentile one hour average. | 100 ppb | - |
| Ozone | 8-hour | 3-year average of the annual 4th highest daily maximum 8-hour average. | 0.070 ppm | 0.070 ppm |
| PM2.5 | 24-hour | 3-year average of the 24 hour average daily 98$^{th}$ percentile. | 35 $\mu g/m^3$ | 35 $\mu g/m^3$ |
| | Annual Average | 3-year average of the annual arithmetic mean | 12 $\mu g/m^3$ | 12 $\mu g/m^3$ |
| PM10 | 24-hour | Not to be exceeded more than once per year on average over 3 years. | 150 $\mu g/m^3$ | 150 $\mu g/m^3$ |
| Sulfur dioxide | 1-hour | 3yr average of the maximum daily 99$^{th}$ percentile one hour average. | 75 ppb | - |
| | 3-hour | Not to be exceeded more than once per year. | - | 0.5 ppm |

**Notes:** **$\mu g/m^3$** = *micrograms of pollutant per cubic meter of air*
**ppm** = *parts per million*
**ppb** = *parts per billion*

## Exceedances vs. Violation

Exceedances occur when the NAAQS is surpassed but is not necessarily violated. Violations occur when the standards described in the table above are surpassed. An area can have multiple exceedances without violating the NAAQS. For example, an ozone violation is the three year average of the fourth highest, maximum daily eight hour average. For one year the fourth highest day may exceed the NAAQS but the other two years in the average may be below the NAAQS, bringing the three year average below the NAAQS. During wildfires or other events outside of the control of the community, a violation can be excused by EPA as an exceptional event.



*$ng/m^3$= nanograms/meter cubed*

# Recent NAAQS Exceedances.

The following Tables summarize Oregon's NAAQS exceedances for the last 10 years for PM2.5, PM10, CO, and Ozone. PM2.5 comparison to the NAAQS is determined by the 98th percentile.

Table 6. PM2.5 98th Percentile – Eastern Oregon.

| Year | Bend | Burns | Klamath Falls | La Grande | Lakeview | Pendleton | Prineville | The Dalles |
|---|---|---|---|---|---|---|---|---|
| 2010 | 14.5 | 24.8 | 34.6 | 12.9 | 26.3 | 18.2 | 27.5 | *19.6* |
| 2011 | *17.8* | 39.4 | 37.1 | *26.0* | 37.8 | 25.9 | 37.1 | *19.9* |
| 2012 | *20.3* | 27.1 | 34.1 | *21.7* | 36.7 | 21.6 | 29.3 | *17.6* |
| 2013 | *17.7* | 38.0 | 46.5 | *32.9* | 93.6 | 32.0 | 49.2 | *30.1* |
| 2014 | *21.7* | 29.0 | 29.6 | *35.2* | 42.3 | 23.0 | 46.8 | *18.3* |
| 2015 | *17.0* | 25.8 | 25.2 | *26.2* | 32.7 | 17.6 | 41.7 | *16.7* |
| 2016 | *11.1* | 29.4 | 23.0 | *27.8* | 19.4 | 17.3 | 24.3 | *19.4* |
| 2017 | *16.4* | 33.8 | 31.6 | *18.7* | 56.3 | 20.5 | 35.2 | *23.5* |
| 2017⚐ | *76.2* | 45.3 | 55.1 | *38.1* | 57.9 | 37.4 | 57.6 | *58.7* |
| 2018 | *20.7* | 28.3 | 27.9 | *20.8* | 28.7 | 21.7 | 25.4 | *20.3* |
| 2018⚐ | *37.8* | 35.6 | 146 | *28.9* | 65.9 | 39.9 | 32.9 | *27.6* |
| 2019 | *13.6* | 29.5 | 32.3 | *15.5* | 26.2 | 22.6 | 27.9 | *24.4* |
| 2019⚐ | | | 33.5 | | | | | |

Table 7. PM2.5 98th Percentile – Western Oregon.

| Year | Albany | Beaverton | Corvallis | Cottage Grove | Eugene/ Springfield | Grants Pass | Hillsboro | Medford | Oakridge | Portland | Salem |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | *16.0* | *15.0* | *14.8* | 18.3 | 19.5 | 20.1 | 15.8 | 19.1 | 33.0 | 17.0 | *19.2* |
| 2011 | *21.2* | *23.4* | *21.2* | 20.5 | 22.2 | 30.0 | 36.2 | 29.0 | 42.0 | 36.1 | *25.2* |
| 2012 | *16.4* | *17.9* | *15.4* | 17.0 | 25.4 | 17.8 | 17.8 | 31.0 | 38.4 | 15.7 | *18* |
| 2013 | *32.3* | *27.3* | *24.5* | 31.1 | 40.2 | 32.4 | 42.8 | 65.6 | 41.0 | 35.6 | *31.8* |
| 2014 | *22.9* | *20.4* | *16.3* | 21.3 | 31.6 | 25.7 | 27.7 | 31.3 | 41.1 | 22.1 | *22.7* |
| 2015 | *25.4* | *17.8* | *18.6* | 20.1 | 26.7 | 18.4 | 33.9 | 35.2 | 28.9 | 29.9 | *22.9* |
| 2016 | *17.1* | *12.8* | *16.3* | 18.3 | 25.9 | 15.2 | 18.4 | 20.8 | 21.7 | 13.6 | *16.9* |
| 2017 | *22.3* | *16.8* | *16.6* | 19.7 | 37.0 | 19.3 | 24.1 | 28.8 | 35.7 | 22.2 | *17.7* |
| 2017⚐ | *30.2* | *34.5* | *25.0* | 37.7 | 41.6 | 115 | 33.0 | 111 | 86.2 | 25.7 | *26.1* |
| 2018 | *23.0* | *16.6* | *18.8* | 23.2 | 31.8 | 23.5 | 22.2 | 23.6 | 28.6 | 17.4 | *23.0* |
| 2018⚐ | *26.2* | *23.7* | *23.1* | 23.7 | 38.9 | 75.1 | 31.5 | 144 | 33.2 | 20.3 | *37.4* |
| 2019 | *19.0* | *17.0* | *18.8* | 20.5 | 28.9 | 25.4 | 23.6 | 26.6 | 36.7 | 20.0 | *24.8* |
| 2019⚐ | | | | | | 29.7 | | 37.0 | | | |

Notes:

1. *Blue, italicized* values are from a non-Federal Reference Method and are informational.
2. ⚐Wildfire smoke impact data included
3. NAAQS is 35.5 µg/$m^3$



*ng/$m^3$= nanograms/meter cubed*

Table 8. PM10 Number of Exceedances per year.

| Year | Bend | Burns | Klamath Falls | La Grande | Lakeview | Pendleton | Cottage Grove | Eugene/ Springfield | Grants Pass | Medford | Oakridge | Portland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | - | - | 0 | 0 | - | 0 | - | 0 | - | 0 | 0 | 0 |
| 2011 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2012 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2013 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2014 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2015 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2016 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2017[⚐] | - | - | 0 | 0 | - | - | - | 3 | 0 | 1 | 4 | 0 |
| 2017 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2018 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 2019 | - | - | 0 | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 |

[⚐]Wildfire smoke impact data included

Table 9. Carbon Monoxide Number of Exceedances per year.

| Year | Eugene | Portland |
|---|---|---|
| 2010 | 0 | 0 |
| 2011 | - | 0 |
| 2012 | - | 0 |
| 2013 | - | 0 |
| 2014 | - | 0 |
| 2015 | - | 0 |
| 2016 | - | 0 |
| 2017 | - | 0 |
| 2018 | - | 0 |
| 2019 | - | 0 |

Table 10. Ozone Number of Exceedances per year.

| Year | Bend | Eugene | Medford | Portland | Salem | Hermiston | The Dalles |
|---|---|---|---|---|---|---|---|
| 2010 | 0 | 0 | 0 | **2** | **1** | 0 | - |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| 2013 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| 2014 | 0 | 0 | 0 | **1** | **1** | 0 | - |
| 2015 | 0 | **1** | **1** | 0 | **1** | 0 | - |
| Standard lowered from 0.075 to 0.070ppm | | | | | | | |
| 2016 | - | 0 | 0 | 0 | 0 | 1 | 0 |
| 2017 | - | 5 | 5 | 9 | 6 | 7 | 1 |
| 2018 | - | 0 | 6 | 4 | 0 | 0 | 0 |
| 2019 | - | 0 | 1 | 1 | 0 | 0 | - |



*ng/m$^3$= nanograms/meter cubed*

# Appendix 1. Data Summaries

Oregon's Air Quality Monitors collect criteria pollutant data using EPA Federal Reference Methods. DEQ and LRAPA use other EPA approved methods for PM2.5 estimates for the AQI, and methods used for air toxics. The criteria data are summarized for comparison to the NAAQS. PM2.5 estimate and ozone AQI data are provided and Air Toxics are compared to Oregon Ambient Benchmark Concentration.

## DEQ Air Monitoring Methods:

### Appendix 1 -A&B. Particulate (PM10 and PM2.5)

A. The PM2.5 annual average is determined by averaging the quarterly means.
B. The PM2.5 maximum daily sample is determined by taking the highest daily sample for the year.
C. The PM2.5 98$^{th}$ percentile is the value on the 98$^{th}$ percent highest day. (# of days sampled*0.98). E.g. 120 sample days*0.98 = 118; 120 is the highest day, 118$^{th}$ day is the third highest day.
D. The PM10 maximum daily sample is determined by taking the highest 24 hour sample for the year.
E. The PM10 2$^{nd}$ highest daily sample is determined by taking the 2$^{nd}$ highest sample for the year.

### Appendix 1-C. Ozone ($O_3$)

A. Maximum daily, eight hour ozone average is calculated using a rolling eight hour average.
B. Fourth highest eight hour average is determined from the data in C.

### Appendix 1-D. Oxides of Nitrogen (NO2 and NO)

A. The one hour value is calculated using the 98$^{th}$ percentile of the maximum daily, hourly average.
B. The annual standard is determined by averaging the annual one hour values.

### Appendix 1-E. Sulfur Dioxide (SO2)

A. The one hour value is calculated using the 99$^{th}$ percentile of the maximum daily, hourly average.
B. The maximum three hour average is calculated using three consecutive hours.

### Appendix 1-F. Carbon Monoxide (CO)

A. Maximum eight hour CO average is determined by calculating an eight hour rolling average.
B. Second highest eight hour average CO is determined from the data in A. Only one maximum per CO episode is used to count to the second highest.

### Appendix 1-G. Air Quality Index based on PM2.5 and ozone

A. PM2.5 FRM filter data is used first if available.
B. Where PM2.5 FRM filter data is unavailable, nephelometer data is used to estimate PM2.5.
C. The maximum eight hour average daily ozone is used to calculate the daily ozone AQI.
D. Where ozone and PM2.5 are both available, the higher AQI of the two is used for the day.

### Appendix 1-H. Air Toxics (Hazardous Air Pollution)

A. Air toxic levels are compared to benchmark levels.
B. The annual averages are determined by taking the arithmetic mean of the quarterly averages. Where the values are below the minimum detection limit (MDL), the MDL is halved prior to inclusion in the average. If the quarterly average is below the MDL, the MDL is used.



*$ng/m^3$= nanograms/meter cubed*

The lists of the Federal Reference Methods and codes are at: http://www.epa.gov/ttnamti1/

Table 11. Ambient Air Quality Monitoring Methods

| **Pollutant** | **Method Code** | **Method Description** |
|---|---|---|
| PM2.5 | 117, 118, 145 | Low volume filter sampler and pre and post filter weighing. |
| | 170 | FEM Beta Attenuation |
| | 238 | FEM Light Scattering |
| PM10 | 127 | Low volume filter sampler and pre and post filter weighing. |
| | 141 | High volume filter sampler and pre and post filter weighing. |
| | 122 | FEM Beta Attenuation |
| | 239 | FEM Light Scattering |
| PM10 Lead | 811 | Low volume filter sampler and XRF analysis |
| Ozone | 047, 087,214 | Ultraviolet photometry (214 method starting in 2019) |
| NO2 | 590, 186, 200 | Chemiluminescent Detection |
| SO2 | 592, 100 | Ultraviolet fluorescence spectrometer |
| CO | 588, 093 | Nondispersive infrared trace monitor |
| Visibility | 027 | Beta Light Scattering |
| PM2.5 Est | 027/145<br>791/145 | Beta Light Scattering correlated with PM2.5 filter sampling |
| **Air Toxics** | | |
| Carbonyls | 156 | Cartridge-DNPH-Silica-SEP-PAK/ HPLC photodiode Array |
| Volatile Organic Compounds | 176 | 6L Sub-ambient Canister sampling, GC/MS analysis |
| Poly Aromatic Hydrocarbon | 118 | TSP High Volume sampling on PUF/XAD media, Soxhlet Extraction, GCMS analysis. |
| PM10 Metals | 501 | High Volume PM10 with ICP/MS analysis on a Quartz Filter |
| Diesel Particulate | 886 | Aethalometer (optical absorption) black carbon surrogate |



*$ng/m^3$= nanograms/meter cubed*

# APPENDIX 1A PM2.5

## PM2.5 Data Summary

| Portland Area | | | | | |
|---|---|---|---|---|---|
| City and Station | Year | Sample days: Actual/ Expected | Arithmetic mean | Maximum ($\mu g/m^3$) | 98th Percentile ($\mu g/m^3$) |
| Hillsboro (HHF) | 2010 | 93/122 | 6.6 | 40 (11/25) | 16 (10/20) |
| Hare Field | 2011 | 111/121 | 8.6 | 54 (12/05) | 36 (01/03) |
| EPA # 410670004 | 2012 | 109/122 | 7.2 | 39 (01/13) | 22 (11/11) |
| ⚐*forest fire data included* | 2013 | 119/122 | 9.1 | 55 (12/12) | 43 (11/30) |
| ** forest fire flagged data removed* | 2014 | 117/122 | 7.0 | 37 (01/26) | 23 (12/31) |
| | 2015⚐ | 120/121 | 8.3 | 58 (08/22) | 34 (11/29) |
| | 2015* | 119/121 | 7.6 | 34 (11/29) | 32 (01/03) |
| | 2016 | 120/122 | 5.9 | 21 (12/17) | 18 (10/12) |
| | 2017⚐ | 119/122 | 8.2 | 40 (08/02) | 33 (08/08) |
| | 2017* | 115/122 | 7.3 | 36 (01/13) | 24 (01/16) |
| | 2018⚐ | 116/122 | 8.0 | 52 (08/21) | 32 (11/13) |
| | 2018* | 114/122 | 7.2 | 32 (11/13) | 22 (12/22) |
| | 2019 | 114/121 | 6.7 | 36 (12/05) | 24 (11/02) |
| S.E. Portland (SEL) | 2010 | 117/122 | 6.3 | 31 (11/25) | 17 (02/07) |
| SE Lafayette and 57th | 2011 | 111/121 | 8.3 | 42 (02/11) | 36 (12/11) |
| EPA # 410510080 | 2012 | 118/122 | 7.4 | 35 (01/28) | 23 (09/18) |
| ⚐*forest fire data included* | 2013 | 120/122 | 8.7 | 42 (11/30) | 36 (01/19) |
| ** forest fire flagged data removed* | 2014 | 120/122 | 6.3 | 30 (02/10) | 15 (01/17) |
| | 2015⚐ | 121/121 | 7.2 | 56 (08/22) | 29 (01/03) |
| | 2015* | 120/121 | 6.8 | 30 (11/23) | 24 (01/24) |
| | 2016 | 122/122 | 5.6 | 28 (12/26) | 14 (02/21) |
| | 2017⚐ | 119/122 | 7.9 | 53 (09/16) | 34 (08/29) |
| | 2017* | 115/122 | 6.8 | 24 (12/21) | 22 (10/16) |
| | 2018⚐ | 120/122 | 7.4 | 48 (08/21) | 20 (11/13) |
| | 2018* | 118/122 | 6.8 | 20 (11/13) | 17 (11/07) |
| | 2019 | 121/121 | 6.5 | 30 (11/23) | 20 (11/05) |
| Tualatin | 2016 | 108/122 | 6.3 | 22 (10/12) | 18 (12/17) |
| Bradbury Court (I-5 site) | 2017⚐ | 118/122 | 7.9 | 50 (09/16) | 36 (08/29) |
| EPA # 410670005 | 2017* | 115/122 | 6.9 | 24 (12/15) | 20 (10/31) |
| ⚐*forest fire data included* | 2018⚐ | 121/122 | 7.7 | 47 (08/21) | 19 (11/13) |
| ** forest fire flagged data removed* | 2018* | 119/122 | 7.1 | 19 (11/13) | 17 (10/20) |
| | 2019 | 120/121 | 6.8 | 32 (11/23) | 21 (11/08) |



*$ng/m^3$= nanograms/meter cubed*

# APPENDIX 1A PM2.5

| Eugene Area | | | | | |
|---|---|---|---|---|---|
| City and Station | Year | Sample days: Actual/ Expected | Arithmetic mean | Maximum (µg/m$^3$) | 98$^{th}$ Percentile (µg/m$^3$) |
| Eugene Amazon Park (AMZ) | 2010 | 356/365 | 5.7 | 21 (01/29) | 16 (01/03) |
| EPA # 410390060 | 2011 | 119/121 | 6.5 | 25 (02/02) | 21 (12/05) |
| ⚐*forest fire data included* | 2012 | 121/122 | 6.4 | 32 (01/13) | 25 (02/06) |
| ** forest fire flagged data removed* | 2013 | 122/122 | 7.8 | 52 (12/09) | 39 (11/27) |
| | 2014 | 123/122 | 7.2 | 36 (01/26) | 31 (11/16) |
| | 2015⚐ | 121/121 | 7.4 | 55 (08/22) | 27 (11/26) |
| | 2016 | 122/122 | 5.4 | 38 (01/01) | 20 (01/04) |
| | 2017⚐ | 119/122 | 9.0 | 145 (09/04) | 42 (01/16) |
| | 2017* | 115/122 | 6.9 | 42 (01/06) | 37 (12/12) |
| | 2018⚐ | 121/122 | 7.5 | 40 (08/21) | 32 (11/13) |
| | 2018* | 120/122 | 7.2 | 34 (12/07) | 29 (11/10) |
| | 2019 | 120/121 | 7.3 | 30 (11/23) | 25 (12/05) |
| Eugene Hwy 99 (E99) | 2010 | 119/122 | 6.3 | 23 (12/07) | 20 (01/29) |
| Pacific Hwy 99 N | 2011 | 115/121 | 6.8 | 27 (01/03) | 22 (10/18) |
| EPA# 410390059 | 2012 | 118/122 | 6.5 | 30 (02/06) | 21 (10/18) |
| ⚐*forest fire data included* | 2013 | 122/122 | 8.3 | 55 (12/09) | 40 (11/24) |
| ** forest fire flagged data removed* | 2014 | 120/122 | 7.2 | 44 (01/26) | 31 (11/16) |
| | 2015⚐ | 122/121 | 8.0 | 55 (08/22) | 27 (11/26) |
| | 2016 | 119/122 | 5.7 | 18 (01/04) | 16 (02/09) |
| | 2017⚐ | 120/122 | 10.9 | 330 (09/04) | 43 (01/16) |
| | 2017* | 117/122 | 7.2 | 43 (01/16) | 32 (12/12) |
| | 2018⚐ | 122/122 | 8.7 | 46 (11/13) | 39 (11/19) |
| | 2018* | 121/122 | 8.4 | 46 (11/13) | 32 (12/07) |
| | 2019 | 121/121 | 8.0 | 31 (01/12) | 29 (11/02) |
| **Springfield** | 2010 | 63/61 | 5.8 | 18 (08/06) | 14 (09/29) |
| City Hall (SCH) | 2011 | 63/61 | 5.6 | 19 (01/03) | 15 (12/14) |
| EPA# 410391009 | 2012 | 66/61 | 5.6 | 18 (10/18) | 15 (09/18) |
| ⚐*forest fire data included* | 2013 | 61/61 | 6.3 | 19 (11/24) | 17 (01/22) |
| ** forest fire flagged data removed* | 2014 | 61/61 | 6.4 | 36 (11/19) | 14 (12/07) |
| | 2015⚐ | 60/60 | 6.3 | 54 (08/22) | 13 (10/27) |
| | 2016 | 58/61 | 4.7 | 10 (01/01) | 9 (06/05) |
| | 2017⚐ | 58/61 | 13.6 | 287 (09/04) | 134 (08/29) |
| | 2017* | 56/61 | 6.2 | 28 (12/12) | 21 (12/15) |



*ng/m$^3$= nanograms/meter cubed*

# APPENDIX 1A PM2.5

| Western Oregon | | | | | |
|---|---|---|---|---|---|
| City and Station | Year | Sample days: Actual/ Expected | Arithmetic mean | Maximum (µg/m$^3$) | 98$^{th}$ Percentile (µg/m$^3$) |
| **Cottage Grove** | 2010 | 121/122 | 6.9 | 21 (12/07) | 18 (12/22) |
| City Shops (CGS) | 2011 | 119/121 | 7.1 | 32 (02/02) | 21 (12/23) |
| EPA # 410399004 | 2012 | 119/122 | 6.7 | 25 (01/13) | 17 (11/02) |
| ⚐*forest fire data included* | 2013 | 120/122 | 7.5 | 38 (12/09) | 25 (11/27) |
| ** forest fire flagged data removed* | 2014 | 124/122 | 6.9 | 34 (11/19) | 21 (12/04) |
| | 2015⚐ | 118/121 | 7.3 | 40 (08/22) | 20 (02/23) |
| | 2016 | 121/122 | 5.8 | 26 (01/01) | 18 (11/02) |
| | 2017⚐ | 117/122 | 8.8 | 116 (09/04) | 38 (09/07) |
| | 2017* | 111/122 | 6.8 | 28 (01/16) | 20 (12/28) |
| | 2018⚐ | 123/122 | 7.8 | 44 (08/21) | 24 (11/13) |
| | 2018* | 122/122 | 7.5 | 26 (12/07) | 23 (11/19) |
| | 2019 | 120/121 | 7.3 | 29 (12/11) | 21 (11/23) |
| **Grants Pass** | 2010 | 57/61 | 6.4 | 36 (12/04) | 20 (10/29) |
| Parkside School (GPP) | 2011 | 61/61 | 7.6 | 32 (12/23) | 30 (11/11) |
| EPA # 410330114 | 2012 | 61/61 | 7.1 | 19 (01/04) | 18 (11/17) |
| ⚐*forest fire data included* | 2013⚐ | 61/61 | 11.9 | 90 (08/02) | 36 (11/24) |
| ** forest fire flagged data removed* | 2013* | 59/61 | 10.1 | 36 (11/24) | 32 (12/12) |
| | 2014 | 61/61 | 7.4 | 43 (11/19) | 26 (01/05) |
| | 2015⚐ | 57/60 | 8.2 | 24 (08/28) | 18 (08/22) |
| | 2016 | 61/61 | 5.8 | 17 (12/20) | 15 (10/21) |
| | 2017⚐ | 58/61 | 15.8 | 283 (09/04) | 115 (08/29) |
| | 2017* | 54/61 | 7.4 | 24 (01/01) | 19 (08/11) |
| | 2018⚐ | 61/61 | 11.9 | 99 (08/06) | 75 (07/25) |
| | 2018* | 58/61 | 9.0 | 31 (11/16) | 24 (11/10) |
| | 2019⚐ | 59/60 | 9.7 | 46 (07/26) | 30 (01/15) |
| | 2019* | 60/61 | 9.0 | 30 (01/15) | 25 (12/17) |
| **Medford** | 2010 | 117/122 | 7.1 | 22 (12/04) | 19 (11/19) |
| Grant & Belmont (MGB) | 2011 | 113/121 | 9.4 | 43 (12/11) | 29 (12/23) |
| 902 Grant Ave. | 2012 | 119/122 | 9.3 | 33 (01/28) | 31 (01/13) |
| EPA # 410290133 | 2013⚐ | 121/122 | 14.2 | 157 (07/30) | 66 (12/12) |
| | 2013* | 118/122 | 12.0 | 66 (12/12) | 43 (01/19) |
| | 2014⚐ | 122/122 | 9.3 | 39 (01/02) | 31 (01/20) |
| | 2014* | 121/122 | 9.1 | 39 (01/02) | 28 (12/31) |
| Welch & Jackson | 2015⚐ | 119/121 | 12.1 | 112 (08/01) | 46 (08/22) |
| EPA # 410292129 | 2015* | 115/121 | 9.6 | 36 (11/23) | 35 (11/14) |
| Moved to Welch and Jackson | 2016 | 120/122 | 7.2 | 25 (12/17) | 21 (01/04) |
| In 2018 | 2017⚐ | 117/122 | 15.5 | 151 (09/04) | 111 (08/29) |
| | 2017* | 110/122 | 10.2 | 37 (12/15) | 29 (01/16) |
| | 2018⚐ | 120/122 | 17.4 | 180 (08/09) | 144 (08/06) |
| ⚐*forest fire data included* | 2018* | 105/122 | 9.2 | 26 (01/14) | 24 (11/16) |
| ** forest fire flagged data removed* | 2019⚐ | 117/119 | 8.7 | 105 (07/26) | 37 (01/03) |
| | 2019* | 119/121 | 7.5 | 37 (01/03) | 27 (12/29) |



*ng/m$^3$= nanograms/meter cubed*

# APPENDIX 1A PM2.5

| Western Oregon | | | | | |
|---|---|---|---|---|---|
| City and Station | Year | Sample days: Actual/ Expected | Arithmetic mean | Maximum (µg/m$^3$) | 98$^{th}$ Percentile (µg/m$^3$) |
| **Oakridge** | 2010 | 119/122 | 8.9 | 43 (02/22) | 33 (02/19) |
| Willamette Cntr. (OAK) | 2011 | 119/121 | 10.0 | 48 (12/23) | 42 (02/02) |
| School St. | 2012 | 116/122 | 7.6 | 50 (01/13) | 38 (02/06) |
| EPA # 410392013 | 2013 | 120/122 | 9.8 | 55 (12/09) | 41 (01/19) |
| ⚐*forest fire data included* | 2014 | 122/122 | 10.0 | 46 (01/05) | 41 (11/16) |
| ** forest fire flagged data removed* | 2015 | 121/121 | 8.9 | 39 (11/29) | 29 (02/23) |
| | 2016 | 120/122 | 6.7 | 31 (12/08) | 22 (02/24) |
| | 2017⚐ | 125/122 | 13.0 | 200 (09/04) | 86 (09/01) |
| | 2017* | 116/122 | 8.8 | 42 (12/12) | 36 (01/07) |
| | 2018⚐ | 114/122 | 12.2 | 62 (08/21) | 33 (11/13) |
| | 2018* | 114/122 | 9.0 | 35 (02/13) | 29 (12/07) |
| | 2019 | 354/365 | 9.2 | 42 (01/12) | 37 (10/30) |
| **Eastern Oregon** | | | | | |
| **Burns** | 2010 | 118/122 | 7.9 | 32 (01/05) | 25 (12/01) |
| Washington Park (BWS) | 2011 | 116/121 | 10.0 | 47 (01/06) | 39 (11/11) |
| EPA # 410250003 | 2012 | 121/122 | 8.6 | 49 (09/21) | 27 (11/11) |
| ⚐*forest fire data included* | 2013 | 119/122 | 9.9 | 39 (12/12) | 38 (12/09) |
| ** forest fire flagged data removed* | 2014⚐ | 119/122 | 9.0 | 61(08/06) | 29 (12/04) |
| | 2015⚐ | 360/365 | 8.3 | 46 (08/29) | 26 (01/28) |
| | 2016 | 118/122 | 8.2 | 30 (11/17) | 29 (11/05) |
| | 2017⚐ | 122/122 | 11.1 | 90 (09/07) | 45 (09/04) |
| | 2017* | 119/122 | 9.8 | 52 (01/16) | 34 (12/27) |
| | 2018⚐ | 116/122 | 10.1 | 88 (08/21) | 36 (01/05) |
| | 2018* | 115/122 | 9.2 | 36 (12/16) | 28 (11/16) |
| | 2019 | 350/365 | 10.2 | 48 (02/01) | 30 (01/31) |
| **Klamath Falls** | 2010 | 118/122 | 9.8 | 53 (11/25) | 35 (01/05) |
| Peterson School (KFP) | 2011 | 115/121 | 11.1 | 38 (11/26) | 37 (02/11) |
| 4856 Clinton St. | 2012 | 115/122 | 10.7 | 43 (08/28) | 34 (08/31) |
| EPA # 410350004 | 2013* | 112/122 | 11.6 | 50 (01/16) | 46 (12/09) |
| ⚐*forest fire data included* | 2014 | 118/122 | 8.8 | 31 (08/03) | 30 (01/20) |
| ** forest fire flagged data removed* | 2015⚐ | 112/121 | 10.2 | 85 (08/01) | 44 (08/19) |
| | 2015* | 108/121 | 8.2 | 38 (11/29) | 25 (11/14) |
| | 2016 | 118/122 | 6.8 | 29 (12/08) | 23 (01/07) |
| | 2017⚐ | 122/122 | 11.7 | 102 (09/04) | 55 (08/20) |
| | 2017* | 115/122 | 8.5 | 32 (12/12) | 32 (12/15) |
| | 2018⚐ | 117/122 | 20.6 | 156 (08/03) | 146 (07/31) |
| | 2018* | 103/122 | 10.7 | 28 (12/13) | 22 (02/13) |
| | 2019⚐ | 361/365 | 10.6 | 39 (10/12) | 34 (11/09) |
| | 2019* | 357/365 | 10.2 | 39 (10/12) | 32 (12/05) |



*ng/m$^3$= nanograms/meter cubed*

# APPENDIX 1A PM2.5

| Eastern Oregon | | | | | |
|---|---|---|---|---|---|
| City and Station | Year | Sample days: Actual/ Expected | Arithmetic mean | Maximum (µg/m$^3$) | 98$^{th}$ Percentile (µg/m$^3$) |
| **Lakeview** | 2010 | 116/122 | 7.5 | 34 (12/31) | 26 (01/05) |
| Center and M Street (LCM) | 2011 | 110/121 | 9.1 | 58 (01/03) | 38 (01/27) |
| EPA # 410370001 | 2012 | 113/122 | 9.7 | 42 (11/15) | 37 (01/10) |
| ⚐*forest fire data included* | 2013 | 121/122 | 14.6 | 104 (01/19) | 94 (01/16) |
| ** forest fire flagged data removed* | 2014 | 120/122 | 8.6 | 47 (01/20) | 42 (01/14) |
| | 2015 | 115/121 | 8.4 | 45 (11/29) | 33 (01/06) |
| | 2016 | 106/122 | 6.3 | 70 (12/29) | 19 (02/09) |
| | 2017⚐ | 108/122 | 11.0 | 64 (12/12) | 58 (09/04) |
| | 2017* | 107/122 | 8.3 | 64 (12/12) | 56 (12/08) |
| | 2018⚐ | 101/122 | 12.8 | 112 (07/31) | 66 (08/24) |
| | 2018* | 91/122 | 7.8 | 30 (11/13) | 29 (12/07) |
| | 2019 | 121/121 | 6.6 | 38 (01/03) | 26 (01/30) |
| **Prineville** | 2010 | 75/92 | 7.8 | 28 (01/02) | 28 (12/07) |
| Davidson Park (PDP) | 2011 | 99/121 | 9.6 | 40 (02/02) | 37 (12/17) |
| EPA # 410130100 | 2012 | 119/122 | 8.0 | 37 (11/26) | 29 (09/21) |
| ⚐*forest fire data included* | 2013 | 122/122 | 11.0 | 56 (12/27) | 49 (11/27) |
| ** forest fire flagged data removed* | 2014⚐ | 119/122 | 9.9 | 69 (07/19) | 47 (02/10) |
| | 2014* | 118/122 | 9.4 | 48 (01/17) | 44 (11/16) |
| | 2015⚐ | 108/121 | 8.9 | 83 (08/13) | 42 (08/22) |
| | 2015* | 104/121 | 7.5 | 42 (01/06) | 25 (01/21) |
| | 2016 | 116/122 | 6.9 | 41 (12/17) | 24 (12/11) |
| | 2017⚐ | 112/122 | 11.7 | 131(09/07) | 58 (09/04) |
| | 2017* | 107/122 | 8.5 | 50 (12/15) | 35 (12/18) |
| | 2018⚐ | 113/122 | 8.9 | 60 (08/21) | 33 (10/17) |
| | 2018* | 110/122 | 8.0 | 33 (10/17) | 25 (11/19) |
| | 2019 | 116/121 | 7.6 | 33 (09/06) | 28 (12/05) |



*ng/m$^3$= nanograms/meter cubed*

# APPENDIX 1B PM10

## PM10 Data Summary

| City and Station | Year | Sample days: Actual/ Expected | Days >150 | 24-Hour Averages (µg/m³) | |
|---|---|---|---|---|---|
| | | | | Maximum (date) | 2nd Highest (date) |
| **Eugene Area** | | | | | |
| Eugene Pacific Hwy 99 N (EKB) | 2010 | 116/122 | 0 | 49 (08/24) | 41 (02/19) |
| Eugene Hwy 99 N (E99) | 2011 | 65/61 | 0 | 58 (09/06) | 38 (01/03) |
| EPA# 410390059 | 2012 | 61/61 | 0 | 47 (08/13) | 43 (09/06) |
| ⚐*forest fire data included* | 2013 | 60/61 | 0 | 59 (08/20) | 42 (11/24) |
| ** forest fire flagged data removed* | 2014 | 61/61 | 0 | 46 (11/19) | 37 (09/08) |
| | 2015⚐ | 60/60 | 0 | 97 (08/22) | 53 (07/29) |
| | 2016 | 60/61 | 0 | 57 (08/22) | 42 (09/13) |
| | 2017⚐ | 355/365 | 3 | 239 (09/04) | 226 (09/03) |
| | 2017* | 338/365 | 0 | 57 (01/16) | 52 (12/09) |
| | 2018⚐ | 339/365 | 0 | 134 (08/21) | 83 (08/20) |
| | 2019 | 354/365 | 0 | 77 (08/26) | 31 (08/27) |
| Amazon Park (AMZ) EPA#410390060 | 2019 | 58/61 | 0 | 33 (08/19) | 31 (11/23) |
| **La Grande** | 2010 | 55/61 | 0 | 37 (07/25) | 32 (08/06) |
| Ash Street (LAS) | 2011 | 56/61 | 0 | 32 (09/24) | 32 (09/12) |
| EPA # 410610119 | 2012 | 57/61 | 0 | 37 (08/07) | 36 (08/13) |
| ⚐*forest fire data included* | 2013 | 62/61 | 0 | 76 (01/22) | 35 (12/06) |
| | 2014 | 60/61 | 0 | 50 (11/19) | 43 (11/13) |
| | 2015⚐ | 60/60 | 0 | 69 (08/22) | 41 (08/28) |
| *Moved to Hall and N Street (Sept, 2016)* | 2016 | 45/61 | 0 | 45 (11/02) | 27 (12/20) |
| Hall and North St. (LHN) | 2017⚐ | 56/61 | 0 | 64 (08/11) | 55 (08/05) |
| EPA # 410610123 | 2018⚐ | 61/61 | 0 | 54 (07/14) | 51 (08/06) |
| | 2019 | 61/61 | 0 | 48 (03/16) | 36 (11/05) |
| **Klamath Falls** | | | | | |
| Peterson School (KFP) | 2019 | 361/365 | 0 | 62 (10/12) | 58 (10/15) |
| EPA # 410350004 | | | | | |
| **Medford** | 2012⚐ | 44/61 | 0 | 37 (01/28) | 36 (08/13) |
| Welch & Jackson (MWJ) | 2013⚐ | 58/61 | 0 | 91 (08/08) | 84 (08/14) |
| EPA # 410292129 | 2014 | 54/61 | 0 | 41 (01/05) | 35 (12/31) |
| ⚐*forest fire data included* | 2015⚐ | 57/60 | 0 | 61 (08/22) | 52 (08/28) |
| ** forest fire flagged data removed* | 2016 | 53/61 | 0 | 33 (12/20) | 28 (01/07) |
| | 2017⚐ | 58/61 | 1 | 175 (09/04) | 136 (08/29) |
| | 2017* | 53/61 | 0 | 47 (01/31) | 39 (12/09) |
| | 2018⚐ | 55/61 | 0 | 99 (07/25) | 66 (07/19) |
| | 2019⚐ | 58/61 | 0 | 118 (07/26) | 54 (01/03) |



*$ng/m^3$= nanograms/meter cubed*

# APPENDIX 1B PM10

| City and Station | Year | Sample days: Actual/ Expected | Days >150 | 24-Hour Averages (µg/m³) | |
|---|---|---|---|---|---|
| | | | | Maximum (date) | 2nd Highest (date) |
| **Oakridge** | 2010 | 118/122 | 0 | 51 (02/22) | 39 (01/05) |
| Willamette Center Trailer (OAK) | 2011 | 59/61 | 0 | 53 (12/23) | 49 (02/02) |
| EPA# 410392013 | 2012 | 63/61 | 0 | 47 (02/03) | 44 (01/04) |
| ** forest fire flagged data removed* | 2013 | 61/61 | 0 | 53 (12/30) | 41 (01/22) |
| ⚐*forest fire data included* | 2014 | 61/61 | 0 | 55 (01/05) | 43 (08/27) |
| | 2015 | 60/60 | 0 | 37 (02/17) | 32 (02/23) |
| | 2016 | 60/61 | 0 | 30 (12/08) | 25 (02/24) |
| | 2017* | 336/365 | 0 | 55 (12/07) | 44 (12/13) |
| | 2017⚐ | 352/365 | 4 | 210 (09/04) | 173 (09/05) |
| | 2018⚐ | 354/365 | 0 | 76 (08/21) | 60 (08/22) |
| | 2019 | 354/365 | 0 | 53 (05/04) | 49 (06/14) |
| **Portland Area** | 2010 | 117/122 | 0 | 38 (11/25) | 31 (11/10) |
| SE Portland (SEL) | 2011 | 111/121 | 0 | 56 (02/11) | 51 (12/23) |
| SE Lafayette | 2012 | 111/122 | 0 | 45 (01/28) | 34 (09/18) |
| EPA# 410510080 | 2013 | 120/122 | 0 | 44 (12/12) | 43 (12/12) |
| | 2014 | 120/122 | 0 | 37 (02/10) | 30 (09/11) |
| | 2015⚐ | 119/121 | 0 | 68 (08/22) | 33 (11/24) |
| | 2016 | 119/122 | 0 | 34 (08/19) | 32 (12/26) |
| | 2017⚐ | 120/122 | 0 | 70 (09/16) | 59 (08/02) |
| ⚐*forest fire data included* | 2018⚐ | 117/122 | 0 | 54 (08/15) | 27 (02/07) |
| ** forest fire flagged data removed* | 2019 | 119/122 | 0 | 33 (11/23) | 29 (12/05) |
| **N. Portland (PNR)** | 2010 | 57/61 | 0 | 22 (08/24) | 22 (01/26) |
| N. Emerson (N. Roselawn) | 2011 | 59/61 | 0 | 38 (12/23) | 35 (12/11) |
| EPA # 410510246 | 2012 | 58/61 | 0 | 36 (01/28) | 35 (09/18) |
| ⚐*forest fire data included* | 2013 | 61/61 | 0 | 43 (11/30) | 40 (12/12) |
| *Site shut down, restarted as PHS in* | 2014 | 60/61 | 0 | 18 (09/14) | 17 (11/19) |
| *2017* | 2015⚐ | 58/60 | 0 | 73 (08/22) | 45 (11/24) |
| **N. Portland (PHS)** | 2017⚐ | 46/61 | 0 | 52 (09/16) | 29 (08/29) |
| Humboldt School | 2018 | 61/61 | 0 | 29 (02/07) | 27 (10/17) |
| EPA # 410512010 | 2019 | 61/61 | 0 | 29 (11/23) | 28 (12/05) |
| **Hillsboro (HHF)** | | | | | |
| Hare Field | 2019 | 56/61 | 0 | 35 (12/05) | 32 (07/14) |
| EPA # 410670004 | | | | | |
| **Gresham (GLC)** | | | | | |
| Learning Center | 2017⚐ | 57/61 | 0 | 90 (09/16) | 62 (09/04) |
| EPA # 410512008 | 2017* | 54/61 | 0 | 34 (12/21) | 34 (01/07) |



*ng/m³= nanograms/meter cubed*

# APPENDIX 1C Ozone

## Ozone Data Summary

| Station Location and Number | Year | Sample days: Actual/ Expected | 8 Hr Aver. Maximum (ppm) | 4th Highest 8hr Aver. (ppm) | # of Days >Std | 3 Yr Aver. of 4th High (ppb) |
|---|---|---|---|---|---|---|
| **Eugene Area** | 2010 | 153/153 | 73 (08/25) | 56 (07/07) | 0 | 59 |
| **Eugene** | 2011 | 153/153 | 72 (09/10) | 59 (09/09) | 0 | 59 |
| **Amazon Park (AMZ)** | 2012 | 153/153 | 65 (08/12) | 59 (05/13) | 0 | 58 |
| EPA# 410390060 | 2013 | 153/153 | 57 (07/09) | 53 (05/03) | 0 | 57 |
| ⚐*Wildfire smoke – this can* | 2014 | 153/153 | 61 (07/15) | 58 (08/26) | 0 | 56 |
| *elevate ozone concentrations* | 2015⚐ | 152/153 | 78 (07/02) | 68 (07/30) | 1 | 59 |
| | 2016 | 153/153 | 64 (08/19) | 57 (08/13) | 0 | 61 |
| | 2017⚐ | 153/153 | 91 (08/02) | 70 (08/08) | 3 | 65 |
| | 2018⚐ | 148/153 | 65 (07/25) | 60 (08/21) | 0 | 62 |
| | 2019 | 153/153 | 62 (08/27) | 54 (05/10) | 0 | 61 |
| **Saginaw (SAG)** | 2010 | 150/153 | 74 (08/25) | 60 (08/13) | 0 | 61 |
| 79980 Delight Valley | 2011 | 152/153 | 68 (09/10) | 59 (08/20) | 0 | 61 |
| School Road | 2012 | 152/153 | 65 (09/17) | 62 (09/13) | 0 | 60 |
| EPA# 410391007 | 2013 | 153/153 | 59 (07/09) | 56 (07/26) | 0 | 59 |
| ⚐*Wildfire smoke – this can* | 2014 | 153/153 | 62 (07/15) | 58 (08/01) | 0 | 58 |
| *elevate ozone concentrations* | 2015 | 153/153 | 80 (07/02) | 71 (08/19) | 1 | 61 |
| | 2016 | 153/153 | 63 (08/19) | 56 (07/28) | 0 | 61 |
| | 2017⚐ | 153/153 | 91 (08/02) | 73 (08/01) | 4 | 66 |
| | 2018⚐ | 153/153 | 68 (07/25) | 60 (07/12) | 0 | 63 |
| | 2019 | 153/153 | 65 (08/27) | 55 (07/25) | 0 | 62 |
| **Bend** | 2010 | 153/153 | 65 (07/29) | 59 (08/05) | 0 | - |
| **Road Dept. (BRD)** | 2011 | 135/153 | 61 (09/12) | 57 (06/20) | 0 | 58 |
| EPA# 410170121 | 2012 | 152/153 | 67 (07/11) | 62 (08/12) | 0 | 59 |
| | 2013 | 153/153 | 59 (05/02) | 56 (07/21) | 0 | 58 |
| | 2014 | 153/153 | 65 (07/10) | 60 (07/15) | 0 | 59 |
| | 2015 | 153/153 | 71 (07/03) | 63 (06/10) | 0 | 60 |
| **Hermiston** | 2010 | 150/153 | 68 (07/29) | 63 (08/17) | 0 | 63 |
| **Municipal** | 2011 | 152/153 | 63 (09/09) | 58 (09/11) | 0 | 60 |
| **Airport (HMA)** | 2012 | 150/153 | 73 (05/15) | 68 (08/07) | 0 | 63 |
| EPA # 410591003 | 2013 | 151/153 | 66 (07/19) | 62 (05/07) | 0 | 62 |
| ⚐*Wildfire smoke – this can* | 2014 | 146/153 | 67 (07/12) | 64 (08/03) | 0 | 64 |
| *elevate ozone concentrations* | 2015 | 151/153 | 73 (07/03) | 70 (08/19) | 0 | 65 |
| | 2016 | 137/153 | 74 (06/07) | 63 (07/14) | 0 | 65 |
| | 2017⚐ | 153/153 | 80 (08/08) | 73 (08/09) | 7 | 68 |
| | 2018⚐ | 97/153 | 66 (07/13) | 60 (05/22) | 0 | 65 |
| | 2019 | 152/153 | 65 (08/06) | 59 (06/01) | 0 | 64 |

*Parts per million

The 8 hr standard is the 3-year average of the 4th highest value.

# APPENDIX 1C Ozone

| Station Location and Number | Year | Sample days: Actual/ Expected | 8 Hr Aver. Maximum (ppm) | 4th Highest 8hr Aver. (ppm) | # of Days >Std | 3 Yr Aver. of 4th High (ppb) |
|---|---|---|---|---|---|---|
| **The Dalles** | | | | | | |
| **Cherry Heights (TDC)** | | | | | | |
| EPA# 410670007 | 2016 | 152/153 | 62 (05/12) | 56 (05/31) | 0 | - |
| ⚐*forest fire data included* | 2017⚐ | 148/153 | 73 (08/09) | 68 (08/11) | 1 | - |
| **Insufficient data completion* | 2018* | 118/153 | 69 (09/16) | 53 (07/24) | 0 | 59* |
| **Medford Area** | 2010 | 153/153 | 68 (08/25) | 61 (08/24) | 0 | 65 |
| **Talent (TAL)** | 2011 | 153/153 | 63 (09/07) | 57 (09/10) | 0 | 61 |
| 7112 Rapp Lane | 2012 | 153/153 | 73 (08/14) | 66 (07/11) | 0 | 61 |
| EPA# 410290201 | 2013 | 149/153 | 70 (07/09) | 67 (08/06) | 0 | 63 |
| ⚐*Wildfire smoke – this can* | 2014 | 152/153 | 64 (07/16) | 59 (07/10) | 0 | 64 |
| *elevate ozone concentrations* | 2015⚐ | 140/153 | 86 (08/01) | 69 (07/03) | 1 | 64 |
| | 2016 | 131/153 | 50 (05/13) | 49 (05/11) | 0 | 58 |
| | 2017⚐ | 150/153 | 83 (08/02) | 78 (08/03) | 5 | 65 |
| | 2018⚐ | 153/153 | 76 (07/23) | 74 (07/24) | 6 | 67 |
| | 2019⚐ | 153/153 | 80 (07/26) | 62 (06/15) | 1 | 71 |
| **Salem Area** | 2010 | 152/153 | 78 (08/25) | 57 (08/24) | 1 | 64 |
| **Cascade Jr High (CJH)** | 2011 | 153/153 | 68 (09/10) | 58 (09/09) | 0 | 61 |
| Turner | 2012 | 150/153 | 68 (09/14) | 63 (08/04) | 0 | 59 |
| EPA# 410470004 | 2013 | 150/153 | 62 (08/21) | 55 (05/10) | 0 | 58 |
| ⚐*Wildfire smoke – this can* | 2014 | 145/153 | 81 (09/15) | 62 (07/12) | 1 | 59 |
| *elevate ozone concentrations* | 2015 | 153/153 | 78 (08/18) | 65 (06/27) | 1 | 60 |
| | 2016 | 150/153 | 69 (08/18) | 65 (08/12) | 0 | 64 |
| | 2017⚐ | 152/153 | 85 (08/03) | 78 (08/28) | 6 | 69 |
| | 2018⚐ | 150/153 | 70 (08/14) | 66 (07/25) | 0 | 69 |
| | 2019 | 149/153 | 66 (08/28) | 55 (08/27) | 0 | 66 |
| **State Hospital (SSH)** | | | | | | |
| EPA# 410470041 | 2018⚐ | 109/153 | 58 (07/16) | 55 (07/15) | 0 | - |
| | 2019 | 151/153 | 64 (08/28) | 52 (08/27) | 0 | - |
| **Portland Metro Area** | 2010 | 153/153 | 94 (07/08) | 66 (08/05) | 0 | 67 |
| **Carus (SPR)** | 2011 | 153/153 | 68 (09/07) | 63 (09/10) | 0 | 66 |
| 13575 Spangler Road | 2012 | 153/153 | 73 (08/17) | 65 (05/13) | 0 | 64 |
| Canby | 2013 | 153/153 | 65 (09/11) | 59 (05/06) | 0 | 62 |
| EPA# 410050004 | 2014 | 153/153 | 72 (08/11) | 62 (09/14) | 0 | 62 |
| ⚐*Wildfire smoke – this can* | 2015 | 147/153 | 73 (08/18) | 69 (07/30) | 0 | 63 |
| *elevate ozone concentrations* | 2016 | 153/153 | 63 (08/19) | 64 (07/28) | 0 | 65 |
| | 2017⚐ | 147/153 | 116 (08/03) | 83 (08/28) | 8 | 72 |
| | 2018⚐ | 149/153 | 76 (08/22) | 70 (08/07) | 3 | 72 |
| | 2019 | 152/153 | 71 (08/28) | 65 (08/05) | 1 | 72 |

*Parts per million

The 8 hr standard is the 3-year average of the 4th highest value.

# APPENDIX 1C Ozone

| Station Location And Number | Year | Sample days: Actual/ Expected | 8-Hour Average Maximum (ppb) | 4th Highest 8-Hour Average (ppb) | # Of Days >Std** | 3 Year Avg Of 4th High (ppb) |
|---|---|---|---|---|---|---|
| **Sherwood (SLR)** | 2010 | 153/153 | 71 (08/25) | 56 (08/24) | 0 | - |
| EPA# 410671004 | 2011 | 152/153 | 67 (09/07) | 56 (09/08) | 0 | 59 |
| ⚐*Wildfire smoke – this can* | 2012 | 153/153 | 70 (08/17) | 62 (09/14) | 0 | 58 |
| *elevate ozone concentrations* | 2013 | 153/153 | 55 (05/06) | 52 (05/04) | 0 | 56 |
| | 2014 | 151/153 | 76 (08/11) | 57 (05/14) | 1 | 57 |
| | 2015 | 153/153 | 70 (08/23) | 63 (06/27) | 0 | 57 |
| | 2016 | 150/153 | 60 (08/12) | 58 (05/13) | 0 | 59 |
| *Site discontinued after 2017* | 2017⚐ | 153/153 | 93 (08/03) | 76 (08/02) | 6 | 65 |
| **SE Portland (SEL)** | 2010 | 362/365 | 64 (08/25) | 54 (08/16) | 0 | 58 |
| SE 57 & SE Lafayette | 2011 | 362/365 | 76 (09/11) | 57 (09/07) | 1 | 57 |
| EPA# 410510080 | 2012 | 364/366 | 63 (08/16) | 61 (05/14) | 0 | 57 |
| ⚐*Wildfire smoke – this can* | 2013 | 359/365 | 58 (06/30) | 53 (05/06) | 0 | 57 |
| *elevate ozone concentrations* | 2014 | 364/365 | 75 (08/11) | 55 (05/01) | 0 | 56 |
| | 2015 | 363/365 | 62 (08/18) | 57 (08/01) | 0 | 55 |
| | 2016 | 357/366 | 60 (08/12) | 55 (08/12) | 0 | 55 |
| | 2017⚐ | 317/365 | 87 (08/02) | 68 (08/09) | 1 | 60 |
| | 2018⚐ | 353/365 | 76 (08/08) | 67 (07/15) | 2 | 63 |
| | 2019 | 330/365 | 66 (08/28) | 58 (07/21) | 0 | 64 |
| **Sauvie Island (SIS)** | 2010 | 147/153 | 61 (08/25) | 49 (06/23) | 0 | 56 |
| Social Security | 2011 | 152/153 | 57 (09/11) | 51 (09/07) | 0 | 53 |
| Beach | 2012 | 144/153 | 57 (05/13) | 53 (05/14) | 0 | 51 |
| EPA# 410090004 | 2013 | 150/153 | 52 (08/21) | 47 (05/04) | 0 | 50 |
| ⚐*Wildfire smoke – this can* | 2014 | 153/153 | 56 (05/01) | 50 (05/13) | 0 | 50 |
| *elevate ozone concentrations* | 2015 | 150/153 | 63 (07/30) | 58 (07/01) | 0 | 52 |
| | 2016 | 152/153 | 58 (08/18) | 51 (08/12) | 0 | 54 |
| | 2017⚐ | 149/153 | 86 (08/02) | 64 (08/04) | 2 | 57 |
| | 2018⚐ | 152/153 | 55 (08/21) | 53 (08/08) | 0 | 56 |
| | 2019 | 150/153 | 65 (06/12) | 51 (08/04) | 0 | 56 |
| **Tualatin** | 2014 | 231/365 | 72 (08/11) | 53 (09/07) | 1 | - |
| Near Road I-5 | 2015 | 361/365 | 67 (08/23) | 52 (07/04) | 0 | - |
| EPA# 410670005 | 2016 | 355/366 | 57 (06/05) | 48 (04/18) | 0 | 51 |
| ⚐*Wildfire smoke – this can* | 2017⚐ | 315/365 | 85 (08/03) | 71 (08/02) | 4 | 57 |
| *elevate ozone concentrations* | 2018⚐ | 336/365 | 56 (07/15) | 54 (08/15) | 0 | 57 |
| | 2019 | 152/153 | 65 (08/28) | 50 (05/11) | 0 | 58 |

*Parts per million

The 8 hr standard is the 3-year average of the 4th highest value.

## APPENDICES 1D Nitrogen Dioxide, 1E Sulfur Dioxide, 1F Carbon Monoxide

# Nitrogen Dioxide Data Summary

| Station Location And Number | Year | Sample days: Actual/ Expected | Annual Arithmetic Mean (ppb) | 98th Percentile Of Daily Maximum (ppb) | 3Yr Aver. of 98th Percentile Daily Max (ppb) |
|---|---|---|---|---|---|
| **Portland** | 2010 | 363/365 | 9 | 33 | - |
| **SE Lafayette at 57th** | 2011 | 348/365 | 9 | 33 | 35 |
| **(SEL)** | 2012 | 348/366 | 9 | 36 | 34 |
| EPA # 410510080 | 2013 | 351/365 | 10 | 33 | 33 |
| | 2014 | 340/365 | 8 | 35 | 34 |
| | 2015 | 365/365 | 9 | 36 | 34 |
| | 2016 | 366/366 | 9 | 34 | 35 |
| | 2017 | 346/365 | 9 | 40 | 36 |
| | 2018 | 337/365 | 9 | 35 | 36 |
| | 2019 | 352/365 | 8 | 32 | 36 |
| **Tualatin Bradbury Ct.** | 2015 | 332/365 | 14 | 36 | - |
| **(TBC)** | 2016 | 363/366 | 13 | 35 | - |
| **(25meters from I-5)** | 2017 | 361/365 | 12 | 38 | 36 |
| EPA# 410670005 | 2018 | 341/365 | 12 | 38 | 37 |
| | 2019 | 326/365 | 11 | 33 | 36 |

# Sulfur Dioxide Data Summary

| Station Location And Number | Year | Sample days: Actual/ Expected | One Hr Aver. 99th Percentile (ppb) | 3 Hr Aver. Maximum (ppb) | 3 Hr Aver. 2nd Highest (ppb) |
|---|---|---|---|---|---|
| **Portland** | 2010 | 365/365 | 8 | 8 | 8 |
| **SE Lafayette at 57th** | 2011 | 343/365 | 9 | 6 | 6 |
| **(SEL)** | 2012 | 334/366 | 10 | 5 | 5 |
| EPA # 410510080 | 2013 | 342/365 | 5 | 6 | 6 |
| | 2014 | 343/365 | 3 | 4 | 4 |
| | 2015 | 359/365 | 4 | 8 | 8 |
| | 2016 | 353/366 | 3 | 3 | 3 |
| | 2017 | 332/365 | 3 | 4 | 4 |
| | 2018 | 330/365 | 3 | 3 | 3 |
| | 2019 | 345/365 | 3 | 3 | 3 |

# Carbon Monoxide Data Summary

| Station Location And Number | Year | Sample days: Actual/ Expected | Days > std | 8-Hr Aver. | |
|---|---|---|---|---|---|
| | | | | Maximum (ppm) | 2ND Highest (ppm) |
| **Portland** | 2010 | 365/365 | 0 | 2.4 | 2.4 |
| **SE Lafayette at 57th** | 2011 | 365/365 | 0 | 2.6 | 2.4 |
| **(SEL)** | 2012 | 349/366 | 0 | 2.3 | 2.2 |
| EPA # 410510080 | 2013 | 337/365 | 0 | 2.0 | 1.8 |
| | 2014 | 356/365 | 0 | 1.3 | 1.3 |
| | 2015 | 365/365 | 0 | 2.0 | 1.9 |
| | 2016 | 311/366 | 0 | 1.5 | 1.5 |
| | 2017 | 215/365 | 0 | 1.7 | 1.6 |
| | 2018 | 361/365 | 0 | 1.6 | 1.6 |
| | 2019 | 244/365 | 0 | 1.6 | 1.4 |
| **Tualatin Bradbury Ct.** | 2015 | 336/365 | 0 | 1.3 | 1.3 |
| **(TBC)** | 2016 | 317/366 | 0 | 1.3 | 1.3 |
| **(25meters from I-5)** | 2017 | 296/365 | 0 | 1.4 | 1.3 |
| EPA# 410670005 | 2018 | 325/365 | 0 | 1.0 | 1.0 |
| | 2019 | 355/365 | 0 | 1.0 | 1.0 |

ppm - parts per million
ppb – parts per billion

# APPENDIX G Air Quality Index

## Air Quality Index Summary

### Number of days in each health category by year.

| Portland Metro | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Portland (Includes: PM2.5, Ozone, $CO$, $NO_2$, & $SO_2$) | 2010 | 342 | 21 | 2 | 0 | 0 | 0 | 0 |
| | 2011 | 310 | 49 | 6 | 0 | 0 | 0 | 0 |
| | 2012 | 330 | 35 | 0 | 0 | 0 | 0 | 1 |
| | 2013 | 282 | 77 | 5 | 0 | 0 | 0 | 1 |
| | 2014 | 332 | 32 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 305 | 58 | 0 | 2 | 0 | 0 | 0 |
| | 2016 | 340 | 26 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 309 | 41 | 9 | 5 | 1 | 0 | 0 |
| | 2018 | 301 | 54 | 9 | 1 | 0 | 0 | 0 |
| | 2019 | 320 | 44 | 1 | 0 | 0 | 0 | 0 |
| Hillsboro (PM2.5 only) | 2010 | 338 | 17 | 1 | 0 | 0 | 0 | 9 |
| | 2011 | 308 | 50 | 7 | 0 | 0 | 0 | 0 |
| | 2012 | 334 | 29 | 1 | 0 | 0 | 0 | 2 |
| | 2013 | 281 | 71 | 8 | 1 | 0 | 0 | 4 |
| | 2014 | 324 | 40 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 309 | 54 | 1 | 1 | 0 | 0 | 0 |
| | 2016 | 331 | 33 | 0 | 0 | 0 | 0 | 2 |
| | 2017 | 298 | 60 | 5 | 0 | 0 | 0 | 2 |
| | 2018 | 306 | 51 | 6 | 0 | 0 | 0 | 2 |
| | 2019 | 316 | 46 | 1 | 0 | 0 | 0 | 2 |
| Beaverton (PM2.5 only) | 2010 | 358 | 6 | 0 | 0 | 0 | 0 | 1 |
| | 2011 | 337 | 24 | 0 | 0 | 0 | 0 | 4 |
| | 2012 | 354 | 12 | 0 | 0 | 0 | 0 | 0 |
| | 2013 | 307 | 53 | 5 | 0 | 0 | 0 | 0 |
| | 2014 | 349 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2015 | 338 | 24 | 1 | 1 | 0 | 0 | 1 |
| | 2016 | 357 | 9 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 334 | 23 | 7 | 0 | 0 | 0 | 1 |
| | 2018 | 328 | 28 | 6 | 0 | 0 | 0 | 3 |
| | 2019 | 345 | 17 | 0 | 0 | 0 | 0 | 3 |
| Forest Grove (PM2.5 only) | 2019 | 141 | 39 | 0 | 0 | 0 | 0 | 185 |
| | Started 7/5 | | | | | | | |
| McMinnville (PM2.5 only) Shut down | 2010 | 360 | 3 | 0 | 0 | 0 | 0 | 2 |
| | 2011 | 183 | 4 | 0 | 0 | 0 | 0 | 0 |
| **Coast** | | | | | | | | |
| Florence (PM2.5 only) | 2019 | 262 | 4 | 0 | 0 | 0 | 0 | 99 |
| | Started 4/1 | | | | | | | |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| Willamette Valley | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Salem (PM2.5 and Ozone) | 2010 | 346 | 18 | 1 | 0 | 0 | 0 | 0 |
| | 2011 | 355 | 10 | 0 | 0 | 0 | 0 | 0 |
| | 2012 | 340 | 24 | 0 | 0 | 0 | 0 | 2 |
| | 2013 | 283 | 71 | 5 | 0 | 0 | 0 | 6 |
| | 2014 | 322 | 42 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 311 | 51 | 1 | 2 | 0 | 0 | 0 |
| | 2016 | 326 | 35 | 0 | 0 | 0 | 0 | 5 |
| | 2017 | 301 | 53 | 6 | 2 | 0 | 0 | 3 |
| | 2018 | 294 | 37 | 7 | 1 | 0 | 0 | 26 |
| | 2019 | 300 | 56 | 0 | 0 | 0 | 0 | 9 |
| Albany (PM2.5 only) | 2010 | 348 | 11 | 0 | 0 | 0 | 0 | 6 |
| | 2011 | 329 | 30 | 1 | 0 | 0 | 0 | 5 |
| | 2012 | 354 | 12 | 0 | 0 | 0 | 0 | 0 |
| | 2013 | 305 | 56 | 4 | 0 | 0 | 0 | 0 |
| | 2014 | 335 | 28 | 2 | 0 | 0 | 0 | 0 |
| | 2015 | 305 | 43 | 2 | 3 | 0 | 0 | 12 |
| | 2016 | 343 | 23 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 320 | 39 | 3 | 3 | 0 | 0 | 0 |
| | 2018 | 328 | 34 | 3 | 0 | 0 | 0 | 0 |
| | 2019 | 322 | 43 | 0 | 0 | 0 | 0 | 0 |
| Sweet Home (PM2.5 only) | 2010 | 310 | 48 | 0 | 0 | 0 | 0 | 7 |
| | 2011 | 329 | 32 | 1 | 0 | 0 | 0 | 3 |
| | 2012 | 355 | 9 | 0 | 0 | 0 | 0 | 2 |
| | 2013 | 284 | 70 | 5 | 0 | 0 | 0 | 6 |
| | 2014 | 336 | 27 | 0 | 0 | 0 | 0 | 2 |
| | 2015 | 332 | 31 | 0 | 2 | 0 | 0 | 0 |
| | 2016 | 346 | 19 | 0 | 0 | 0 | 0 | 1 |
| | 2017 | 299 | 57 | 4 | 5 | 0 | 0 | 0 |
| | 2018 | 299 | 65 | 1 | 0 | 0 | 0 | 0 |
| | 2019 | 297 | 68 | 0 | 0 | 0 | 0 | 0 |
| Corvallis (PM2.5 only) *Site closed in summer | 2010 | 358 | 6 | 0 | 0 | 0 | 0 | 1 |
| | 2011 | 343 | 18 | 0 | 0 | 0 | 0 | 4 |
| | 2012 | 348 | 7 | 0 | 0 | 0 | 0 | 11 |
| | 2013 | 302 | 52 | 1 | 0 | 0 | 0 | 10 |
| | 2014 | 344 | 19 | 1 | 0 | 0 | 0 | 1 |
| | 2015 | 333 | 30 | 1 | 1 | 0 | 0 | 0 |
| | 2016* | 185 | 9 | 0 | 0 | 0 | 0 | 172* |
| | 2017 | 319 | 36 | 2 | 0 | 0 | 0 | 8 |
| | 2018 | 340 | 23 | 2 | 0 | 0 | 0 | 0 |
| | 2019 | 332 | 33 | 0 | 0 | 0 | 0 | 0 |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| Willamette Valley | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Eugene/ Springfield (PM2.5 and Ozone) | 2010 | 341 | 24 | 0 | 0 | 0 | 0 | 0 |
| | 2011 | 324 | 41 | 0 | 0 | 0 | 0 | 0 |
| | 2012 | 333 | 32 | 1 | 0 | 0 | 0 | 0 |
| | 2013 | 282 | 69 | 0 | 1 | 0 | 0 | 0 |
| | 2014 | 301 | 59 | 5 | 0 | 0 | 0 | 0 |
| | 2015 | 282 | 77 | 4 | 2 | 0 | 0 | 0 |
| | 2016 | 335 | 30 | 0 | 0 | 0 | 0 | 1 |
| | 2017 | 290 | 57 | 10 | 5 | 2 | 1 | 0 |
| | 2018 | 290 | 69 | 6 | 0 | 0 | 0 | 0 |
| | 2019 | 292 | 71 | 2 | 0 | 0 | 0 | 0 |
| **SW OR** | 2010 | 309 | 48 | 6 | 0 | 0 | 0 | 2 |
| Oakridge (PM2.5 only) | 2011 | 296 | 54 | 15 | 0 | 0 | 0 | 0 |
| | 2012 | 339 | 19 | 6 | 0 | 0 | 0 | 2 |
| | 2013 | 272 | 80 | 13 | 0 | 0 | 0 | 0 |
| | 2014 | 277 | 75 | 13 | 0 | 0 | 0 | 0 |
| | 2015 | 286 | 71 | 6 | 1 | 0 | 0 | 1 |
| | 2016 | 330 | 36 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 267 | 74 | 13 | 8 | 2 | 0 | 1 |
| | 2018 | 286 | 74 | 2 | 1 | 0 | 0 | 2 |
| | 2019 | 283 | 73 | 4 | 0 | 0 | 0 | 5 |
| Cottage Grove (PM2.5 only) | 2010 | 354 | 11 | 0 | 0 | 0 | 0 | 0 |
| | 2011 | 349 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2012 | 348 | 18 | 0 | 0 | 0 | 0 | 0 |
| | 2013 | 296 | 65 | 3 | 0 | 0 | 0 | 1 |
| | 2014 | 323 | 40 | 1 | 1 | 0 | 0 | 0 |
| | 2015 | 329 | 34 | 1 | 1 | 0 | 0 | 0 |
| | 2016 | 346 | 20 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 295 | 60 | 3 | 7 | 0 | 0 | 0 |
| | 2018 | 318 | 45 | 1 | 0 | 0 | 0 | 1 |
| | 2019 | 311 | 53 | 0 | 0 | 0 | 0 | 1 |
| Roseburg (PM2.5 only) | 2010 | 361 | 2 | 0 | 0 | 0 | 0 | 2 |
| | 2011 | 336 | 23 | 1 | 0 | 0 | 0 | 5 |
| | 2012 | 354 | 8 | 0 | 0 | 0 | 0 | 4 |
| | 2013 | 301 | 64 | 0 | 0 | 0 | 0 | 0 |
| | 2014 | 330 | 34 | 0 | 0 | 0 | 0 | 1 |
| | 2015 | 326 | 35 | 1 | 0 | 0 | 0 | 3 |
| | 2016 | 314 | 14 | 0 | 0 | 0 | 0 | 27 |
| | 2017 | 303 | 49 | 4 | 3 | 0 | 0 | 6 |
| | 2018 | 293 | 43 | 2 | 0 | 0 | 0 | 27 |
| | 2019 | 288 | 59 | 0 | 0 | 0 | 0 | 18 |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| SW Oregon | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Grants Pass (PM2.5 only) | 2010 | 342 | 17 | 1 | 0 | 0 | 0 | 5 |
| | 2011 | 326 | 34 | 1 | 0 | 0 | 0 | 4 |
| | 2012 | 343 | 20 | 0 | 0 | 0 | 0 | 3 |
| | 2013 | 262 | 91 | 2 | 6 | 2 | 1 | 1 |
| | 2014 | 323 | 40 | 2 | 0 | 0 | 0 | 0 |
| | 2015 | 307 | 55 | 2 | 1 | 0 | 0 | 0 |
| | 2016 | 322 | 39 | 0 | 0 | 0 | 0 | 5 |
| | 2017 | 265 | 81 | 2 | 9 | 4 | 1 | 3 |
| | 2018 | 252 | 85 | 9 | 14 | 0 | 0 | 5 |
| | 2019 | 264 | 55 | 3 | 2 | 0 | 0 | 41 |
| Cave Junction (PM2.5 only) | 2010 | 361 | 1 | 0 | 0 | 0 | 0 | 3 |
| | 2011 | 337 | 18 | 0 | 0 | 0 | 0 | 10 |
| | 2012 | 357 | 7 | 0 | 0 | 0 | 0 | 2 |
| | 2013 | 267 | 83 | 6 | 7 | 1 | 1 | 0 |
| | 2014 | 327 | 38 | 0 | 0 | 0 | 0 | 0 |
| | 2015 | 275 | 71 | 3 | 1 | 0 | 0 | 15 |
| | 2016 | 337 | 29 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 273 | 75 | 4 | 7 | 4 | 0 | 2 |
| | 2018 | 261 | 71 | 18 | 15 | 0 | 0 | 0 |
| | 2019 | 293 | 69 | 3 | 0 | 0 | 0 | 0 |
| Applegate Valley (PM2.5 only) | 2010 | 358 | 6 | 1 | 0 | 0 | 0 | 0 |
| | 2011 | 350 | 7 | 0 | 0 | 0 | 0 | 8 |
| | 2012 | 356 | 2 | 0 | 0 | 0 | 0 | 8 |
| | 2013 | 311 | 37 | 1 | 8 | 2 | 0 | 6 |
| | 2014 | 349 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2015 | 330 | 27 | 3 | 2 | 0 | 0 | 3 |
| | 2016 | 360 | 5 | 0 | 0 | 0 | 0 | 1 |
| | 2017 | 298 | 39 | 5 | 9 | 5 | 1 | 8 |
| | 2018 | 288 | 40 | 6 | 19 | 0 | 0 | 12 |
| | 2019 | 345 | 13 | 3 | 2 | 0 | 0 | 2 |
| Shady Cove (PM2.5 only) | 2010 | 362 | 2 | 0 | 0 | 0 | 0 | 1 |
| | 2011 | 360 | 1 | 0 | 0 | 0 | 0 | 4 |
| | 2012 | 364 | 0 | 0 | 0 | 0 | 0 | 2 |
| | 2013 | 308 | 46 | 4 | 5 | 0 | 0 | 2 |
| | 2014 | 341 | 20 | 1 | 0 | 0 | 0 | 3 |
| | 2015 | 333 | 15 | 9 | 6 | 1 | 1 | 0 |
| | 2016 | 346 | 5 | 0 | 0 | 0 | 0 | 15 |
| | 2017 | 294 | 32 | 9 | 11 | 1 | 0 | 18 |
| | 2018 | 303 | 25 | 9 | 27 | 1 | 0 | 0 |
| | 2019 | 358 | 7 | 0 | 0 | 0 | 0 | 0 |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| SW Oregon | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Medford (PM2.5 and Ozone) | 2010 | 331 | 34 | 0 | 0 | 0 | 0 | 0 |
| | 2011 | 283 | 74 | 4 | 0 | 0 | 0 | 4 |
| | 2012 | 286 | 79 | 1 | 0 | 0 | 0 | 0 |
| | 2013 | 222 | 126 | 10 | 5 | 2 | 0 | 0 |
| | 2014 | 276 | 88 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 248 | 99 | 11 | 7 | 0 | 0 | 0 |
| | 2016 | 312 | 54 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 238 | 98 | 14 | 9 | 5 | 1 | 0 |
| | 2018 | 232 | 87 | 8 | 22 | 3 | 0 | 13 |
| | 2019 | 295 | 63 | 3 | 4 | 0 | 0 | 0 |
| Ashland (PM2.5 only) | 2016 | 163 | 8 | 0 | 0 | 0 | 0 | 195 |
| | 2017 | 300 | 43 | 7 | 11 | 1 | 2 | 1 |
| | 2018 | 300 | 26 | 11 | 20 | 4 | 0 | 4 |
| | 2019 | 351 | 9 | 1 | 4 | 0 | 0 | 0 |
| **Central OR** | | | | | | | | |
| Bend (PM2.5 only) | 2010 | 357 | 8 | 0 | 0 | 0 | 0 | 0 |
| | 2011 | 349 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2012 | 343 | 15 | 3 | 0 | 0 | 0 | 5 |
| | 2013 | 332 | 33 | 0 | 0 | 0 | 0 | 0 |
| | 2014 | 335 | 29 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 329 | 33 | 2 | 1 | 0 | 0 | 0 |
| | 2016 | 335 | 5 | 1 | 0 | 0 | 0 | 25 |
| | 2017 | 291 | 48 | 4 | 8 | 3 | 0 | 11 |
| | 2018 | 307 | 47 | 5 | 4 | 0 | 0 | 2 |
| | 2019 | 345 | 13 | 0 | 0 | 0 | 0 | 7 |
| Prineville (PM2.5 only) | 2010 | 333 | 26 | 0 | 0 | 0 | 0 | 6 |
| | 2011 | 293 | 56 | 7 | 0 | 0 | 0 | 9 |
| | 2012 | 313 | 45 | 2 | 0 | 0 | 0 | 6 |
| | 2013 | 255 | 97 | 11 | 2 | 0 | 0 | 0 |
| | 2014 | 289 | 66 | 4 | 6 | 0 | 0 | 0 |
| | 2015 | 290 | 63 | 6 | 2 | 0 | 0 | 4 |
| | 2016 | 288 | 59 | 1 | 0 | 0 | 0 | 18 |
| | 2017 | 260 | 81 | 8 | 8 | 0 | 0 | 8 |
| | 2018 | 289 | 71 | 3 | 2 | 0 | 0 | 0 |
| | 2019 | 296 | 69 | 0 | 0 | 0 | 0 | 0 |
| Madras (PM2.5 only) | 2019 | 290 | 73 | 2 | 0 | 0 | 0 | 0 |

# APPENDIX G Air Quality Index

| Central OR | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Sisters | 2012 | 334 | 10 | 1 | 11 | 2 | 3 | 4 |
| (PM2.5 only) | 2013 | 348 | 16 | 0 | 0 | 0 | 0 | 1 |
| | 2014 | 350 | 15 | 0 | 0 | 0 | 0 | 0 |
| | 2015 | 332 | 31 | 0 | 2 | 0 | 0 | 0 |
| | 2016 | 346 | 1 | 0 | 0 | 0 | 0 | 19 |
| | 2017 | 286 | 29 | 2 | 15 | 8 | 0 | 22 |
| | 2018 | 317 | 33 | 7 | 3 | 0 | 0 | 5 |
| | 2019 | 351 | 9 | 4 | 1 | 0 | 0 | 0 |
| Madras | 2010 | 323 | 24 | 0 | 0 | 0 | 0 | 18 |
| Summer | 2011 | 145 | 19 | 1 | 0 | 0 | 0 | 12 |
| | 2012 | 63 | 7 | 0 | 0 | 0 | 0 | 0 |
| (PM2.5 only) | 2013 | 76 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2014 | 61 | 19 | 0 | 2 | 0 | 0 | 0 |
| | 2015 | 75 | 13 | 3 | 1 | 0 | 0 | 0 |
| | 2016 | 119 | 1 | 0 | 0 | 0 | 0 | 2 |
| | 2017 | 58 | 25 | 5 | 3 | 1 | 0 | 0 |
| | 2018 | 135 | 46 | 6 | 1 | 0 | 0 | 177 |
| Annual | 2019 | 290 | 73 | 2 | 0 | 0 | 0 | 0 |
| John | 2010 | 331 | 33 | 1 | 0 | 0 | 0 | 0 |
| Day | 2011 | 289 | 59 | 4 | 0 | 0 | 0 | 13 |
| (PM2.5 only) | 2012 | 302 | 58 | 2 | 1 | 0 | 0 | 3 |
| | 2013 | 221 | 127 | 3 | 0 | 0 | 0 | 14 |
| | 2014 | 266 | 91 | 1 | 1 | 0 | 0 | 6 |
| | 2015 | 279 | 75 | 4 | 5 | 0 | 0 | 2 |
| | 2016 | 285 | 56 | 0 | 0 | 0 | 0 | 25 |
| | 2017 | 257 | 89 | 9 | 3 | 0 | 0 | 7 |
| | 2018 | 251 | 104 | 1 | 2 | 0 | 0 | 7 |
| | 2019 | 255 | 93 | 1 | 0 | 0 | 0 | 16 |
| Burns | 2010 | 308 | 51 | 0 | 0 | 0 | 0 | 6 |
| (PM2.5 only) | 2011 | 292 | 64 | 8 | 0 | 0 | 0 | 1 |
| | 2012 | 314 | 49 | 1 | 0 | 0 | 0 | 2 |
| | 2013 | 266 | 89 | 8 | 0 | 0 | 0 | 2 |
| | 2014 | 277 | 83 | 3 | 2 | 0 | 0 | 0 |
| | 2015 | 282 | 80 | 3 | 0 | 0 | 0 | 0 |
| | 2016 | 279 | 77 | 1 | 0 | 0 | 0 | 8 |
| | 2017 | 248 | 109 | 6 | 2 | 0 | 0 | 9 |
| | 2018 | 251 | 104 | 1 | 2 | 0 | 0 | 7 |
| | 2019 | 265 | 95 | 5 | 0 | 0 | 0 | 0 |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| SE Oregon | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Klamath Falls (PM2.5 only) | 2010 | 295 | 57 | 5 | 0 | 0 | 0 | 8 |
| | 2011 | 274 | 75 | 11 | 0 | 0 | 0 | 5 |
| | 2012 | 280 | 70 | 9 | 0 | 0 | 0 | 7 |
| | 2013 | 220 | 118 | 21 | 3 | 0 | 0 | 3 |
| | 2014 | 274 | 89 | 2 | 0 | 0 | 0 | 0 |
| | 2015 | 263 | 92 | 8 | 2 | 0 | 0 | 0 |
| | 2016 | 292 | 71 | 0 | 0 | 0 | 0 | 3 |
| | 2017 | 246 | 93 | 13 | 8 | 1 | 0 | 4 |
| | 2018 | 219 | 105 | 11 | 25 | 3 | 0 | 2 |
| | 2019 | 287 | 78 | 0 | 0 | 0 | 0 | 0 |
| Lakeview (PM2.5 only) | 2010 | 334 | 27 | 2 | 0 | 0 | 0 | 2 |
| | 2011 | 296 | 50 | 13 | 5 | 0 | 0 | 1 |
| | 2012 | 292 | 48 | 8 | 2 | 0 | 0 | 16 |
| | 2013 | 262 | 63 | 18 | 20 | 0 | 0 | 2 |
| | 2014 | 302 | 48 | 12 | 1 | 0 | 0 | 2 |
| | 2015 | 294 | 68 | 3 | 0 | 0 | 0 | 0 |
| | 2016 | 318 | 41 | 0 | 1 | 0 | 0 | 6 |
| | 2017 | 288 | 57 | 17 | 1 | 0 | 0 | 2 |
| | 2018 | 277 | 59 | 13 | 9 | 0 | 0 | 7 |
| | 2019 | 311 | 51 | 1 | 0 | 0 | 0 | 2 |
| **NE Oregon** | 2010 | 340 | 24 | 1 | 0 | 0 | 0 | 0 |
| The Dalles (PM2.5 only) | 2011 | 349 | 16 | 0 | 0 | 0 | 0 | 0 |
| | 2012 | 350 | 15 | 0 | 0 | 0 | 0 | 1 |
| | 2013 | 322 | 35 | 3 | 1 | 0 | 0 | 4 |
| | 2014 | 331 | 33 | 1 | 0 | 0 | 0 | 0 |
| | 2015 | 326 | 30 | 0 | 2 | 0 | 0 | 7 |
| | 2016 | 319 | 31 | 0 | 0 | 0 | 0 | 16 |
| | 2017 | 287 | 59 | 6 | 8 | 1 | 0 | 4 |
| | 2018 | 293 | 33 | 4 | 2 | 0 | 0 | 33 |
| | 2019 | 297 | 53 | 0 | 0 | 0 | 0 | 15 |
| Hermiston (Ozone - summer only) | 2010 | 139 | 10 | 0 | 0 | 0 | 0 | 4 |
| | 2011 | 150 | 2 | 0 | 0 | 0 | 0 | 1 |
| | 2012 | 130 | 19 | 0 | 0 | 0 | 0 | 4 |
| | 2013 | 140 | 11 | 0 | 0 | 0 | 0 | 2 |
| | 2014 | 132 | 11 | 0 | 0 | 0 | 0 | 10 |
| | 2015 | 133 | 18 | 0 | 0 | 0 | 0 | 2 |
| | 2016 | 115 | 19 | 1 | 0 | 0 | 0 | 18 |
| | 2017 | 103 | 43 | 6 | 1 | 0 | 0 | 0 |
| | 2018 | 90 | 7 | 0 | 0 | 0 | 0 | 56 |
| *PM2.5 & ozone | 2019* | 143 | 11 | 0 | 0 | 0 | 0 | 1 |

USG - Unhealthy for sensitive groups

# APPENDIX G Air Quality Index

| NE Oregon | | Good | Moderate | USG | Unhealthy | Very Unhealthy | Hazardous | Missing days |
|---|---|---|---|---|---|---|---|---|
| Pendleton | 2010 | 325 | 38 | 0 | 0 | 0 | 0 | 2 |
| (PM2.5 only) | 2011 | 317 | 44 | 1 | 0 | 0 | 0 | 3 |
| | 2012 | 339 | 24 | 0 | 0 | 0 | 0 | 3 |
| | 2013 | 298 | 58 | 6 | 0 | 0 | 0 | 3 |
| | 2014 | 312 | 40 | 0 | 0 | 0 | 0 | 13 |
| | 2015 | 312 | 47 | 2 | 2 | 0 | 0 | 2 |
| | 2016 | 341 | 25 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 279 | 74 | 7 | 2 | 1 | 0 | 2 |
| | 2018 | 276 | 40 | 5 | 3 | 1 | 0 | 40 |
| | 2019 | 298 | 60 | 1 | 0 | 0 | 0 | 6 |
| La Grande | 2010 | 339 | 23 | 1 | 0 | 0 | 0 | 2 |
| (PM2.5 only) | 2011 | 318 | 39 | 3 | 1 | 0 | 0 | 4 |
| | 2012 | 332 | 31 | 1 | 0 | 0 | 0 | 2 |
| | 2013 | 286 | 73 | 6 | 0 | 0 | 0 | 0 |
| | 2014 | 291 | 66 | 6 | 0 | 0 | 0 | 2 |
| | 2015 | 285 | 59 | 8 | 3 | 0 | 0 | 10 |
| | 2016 | 329 | 35 | 0 | 0 | 0 | 0 | 2 |
| | 2017 | 308 | 49 | 5 | 3 | 0 | 0 | 0 |
| | 2018 | 322 | 35 | 5 | 1 | 0 | 0 | 2 |
| | 2019 | 344 | 19 | 0 | 0 | 0 | 0 | 2 |
| Enterprise | 2010 | 355 | 5 | 0 | 1 | 0 | 0 | 4 |
| (PM2.5 only) | 2011 | 342 | 18 | 0 | 0 | 0 | 0 | 5 |
| | 2012 | 340 | 13 | 1 | 0 | 0 | 0 | 12 |
| | 2013 | 323 | 41 | 0 | 0 | 0 | 0 | 1 |
| | 2014 | 329 | 33 | 3 | 0 | 0 | 0 | 0 |
| | 2015 | 322 | 34 | 3 | 5 | 0 | 0 | 1 |
| | 2016 | 318 | 31 | 0 | 0 | 0 | 0 | 17 |
| | 2017 | 291 | 50 | 6 | 3 | 0 | 0 | 15 |
| | 2018 | 272 | 46 | 2 | 0 | 0 | 0 | 45 |
| | 2019 | 333 | 29 | 1 | 0 | 0 | 0 | 2 |
| Baker City | 2010 | 343 | 13 | 0 | 0 | 0 | 0 | 9 |
| (PM2.5 only) | 2011 | 324 | 26 | 0 | 0 | 0 | 0 | 15 |
| | 2012 | 349 | 15 | 2 | 0 | 0 | 0 | 0 |
| | 2013 | 302 | 63 | 0 | 0 | 0 | 0 | 0 |
| | 2014 | 317 | 48 | 0 | 0 | 0 | 0 | 0 |
| | 2015 | 326 | 29 | 8 | 2 | 0 | 0 | 0 |
| | 2016 | 339 | 27 | 0 | 0 | 0 | 0 | 0 |
| | 2017 | 307 | 52 | 3 | 3 | 0 | 0 | 0 |
| | 2018 | 313 | 35 | 1 | 1 | 0 | 0 | 15 |
| | 2019 | 328 | 32 | 0 | 0 | 0 | 0 | 5 |

USG - Unhealthy for sensitive groups

# APPENDIX 1H Air Toxics

## Air Toxics Trends Summary

Urban National Air Toxics Trends Site

| Pollutant | | Acetaldehyde | | Formaldehyde | | Benzene | | 1,3-butadiene | | Perchloroethylene | | Arsenic | | Cadmium | | Chromium (VI) TSP | | Lead | | Manganese | | Nickel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | |
| City/Site | Year | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average |
| **Portland** | 2003 | 57 | 2.0 | 57 | 4.2 | 58 | 1.5 | 58 | <0.2 | *58* | <0.7 | 54 | < 1.0 | -- | -- | -- | -- | 48 | 9.3 | -- | -- | 54 | < 0.8 |
| NE Portland | 2004 | 59 | 1.7 | 59 | 2.9 | 58 | *1.6* | 59 | <0.2 | 59 | <0.5 | 56 | 1.8 | 58 | *1.6* | -- | -- | 56 | 8.8 | 58 | *14.6* | 56 | *2.1* |
| N Roselawn | 2005 | 55 | 1.5 | 58 | 2.2 | * | * | 59 | <0.2 | 59 | <0.7 | 59 | 1.7 | 60 | *2.5* | 49 | <0.04 | 59 | 11.7 | 60 | *15.9* | 59 | *1.8* |
| 24 N Emerson | 2006 | 57 | 1.5 | 54 | 2.1 | 56 | *1.2* | 61 | <0.2 | 61 | <0.7 | 60 | 1.4 | 60 | *2.0* | -- | -- | 60 | 6.8 | 61 | *11.9* | 61 | < 1.0 |
| (PNR) | 2007 | 53 | 1.4 | 52 | 2.0 | 56 | *1.2* | 57 | <0.4 | 57 | <0.7 | 56 | 1.4 | 56 | *1.4* | -- | -- | 57 | 7.4 | 57 | *12.1* | 57 | < 1.0 |
| | 2008 | 45 | 1.4 | 52 | 1.9 | 50 | *0.8* | 49 | <0.2 | 52 | <0.7 | 56 | 1.1 | 56 | *2.1* | 59 | <0.04 | 56 | *4.9* | 56 | *15.3* | 56 | *1.7* |
| | 2009 | 57 | 1.4 | 57 | 2.1 | 43 | *1.0* | 45 | <0.2 | 50 | <0.3 | 56 | *0.9* | 57 | *1.5* | 60 | <0.04 | 57 | 5.1 | 57 | *9.0* | 57 | *1.1* |
| | 2010 | 55 | 1.1 | 53 | 1.6 | 46 | *1.1* | 52 | <0.2 | 52 | <0.3 | 55 | 0.8 | 55 | *0.8* | 61 | <0.04 | 55 | 4.4 | 55 | 6.6 | 55 | *1.4* |
| | 2011 | 61 | 1.2 | 61 | 1.6 | 46 | *0.8* | 60 | *0.11* | 60 | *0.14* | 59 | 0.9 | 59 | *1.2* | 59 | <0.04 | 59 | 4.4 | 59 | 10.6 | 59 | *1.5* |
| | 2012 | 57 | 1.8 | 57 | 2.1 | 58 | 0.9 | 58 | *0.09* | 58 | <0.1 | 57 | 1.0 | 57 | *1.6* | 59 | <0.04 | 57 | 3.4 | 57 | 9.8 | 57 | *1.2* |
| | 2013 | 61 | 1.7 | 61 | 2.0 | 51 | 0.7 | 53 | *0.09* | 51 | *0.14* | 61 | 1.0 | 61 | *1.0* | 59 | <0.04 | 61 | 3.4 | 61 | 10.0 | 61 | *1.3* |
| | 2014 | 52 | 1.1 | 52 | 1.8 | 49 | 0.5 | 50 | <0.09 | 49 | *0.14* | 60 | 0.7 | 60 | *0.4* | 58 | <0.04 | 60 | 2.8 | 60 | 10.2 | 60 | *1.2* |
| | 2015 | 59 | 1.7 | 59 | 2.7 | 52 | 0.7 | 52 | *0.13* | 52 | *0.22* | 58 | 0.7 | 58 | *0.4* | - | - | 58 | 3.0 | 58 | 17.6 | 58 | *0.8* |
| N. Portland | 2017 | 38 | 1.6 | 38 | 2.6 | 35 | 0.4 | 35 | *0.03* | 35 | *0.14* | 41 | 0.7 | 41 | *0.1* | 40 | *0.03* | 41 | 2.9 | 41 | 18.3 | 41 | *0.6* |
| Humboldt (PHS) | 2018 | 56 | 1.3 | 56 | 1.8 | 51 | *0.5* | 51 | *0.02* | 51 | *0.03* | 61 | 0.7 | 61 | *0.07* | 60 | *0.03* | 61 | 2.4 | 61 | 16.9 | 61 | *0.6* |
| | 2019 | 59 | 0.9 | 59 | 1.8 | 59 | *0.5* | 59 | *0.04* | 59 | *0.08* | 61 | 0.7 | 61 | *0.05* | 58 | *0.01* | 61 | 2.3 | 61 | 10.1 | 61 | *0.6* |
| **ODEQ Benchmarks** | | 0.45 | | 0.2 | | 0.13 | | 0.03 | | 4 | | 0.2 | | 0.6 | | 0.08 | | 150 | | 90 | | 4 | |

# APPENDIX 1H Air Toxics

Rural National Air Toxics Trends Site

| Pollutant | | Acet aldehyde | | Form aldehyde | | Benzene | | 1,3-butadiene | | Perchloro ethylene | | Arsenic[3] | | Cadmium[3] | | Chromium (VI) TSP | | Lead[3] | | Mang anese[3] | | Nickel[3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (µg/m3) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | | (ng/m$^3$) | |
| City/Site | Year | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Samples | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average | Samples | Annual Average |
| **La Grande** | 2004 | 52 | 1.9 | 52 | 3.4 | 50 | *0.6* | 50 | <0.2 | 50 | <0.5 | 48 | *0.33* | 48 | *0.2* | -- | -- | 48 | *1.3* | 48 | *6.2* | 48 | < 1.0 |
| Ash St. (LAS) | 2005 | 52 | 1.8 | 56 | 2.6 | 55 | <0.3 | 55 | <0.2 | 55 | <0.7 | 60 | *0.33* | 60 | <0.1 | -- | -- | 60 | *1.5* | 60 | *5.7* | 60 | < 1.0 |
| | 2006 | 53 | 1.8 | 52 | 2.7 | 57 | *0.5* | 58 | <0.2 | 58 | <0.7 | 58 | *0.23* | 58 | <0.1 | 50 | <0.04 | 58 | *3.0* | 58 | *10.2* | 58 | < 1.0 |
| | 2007 | 53 | 1.4 | 52 | 2.1 | 54 | *0.8* | 55 | <0.4 | 55 | <0.7 | 56 | *0.19* | 56 | <0.1 | 59 | <0.04 | 56 | *1.4* | 56 | *8.2* | 56 | < 1.0 |
| | 2008 | 48 | 1.3 | 51 | 1.7 | 52 | *0.5* | 54 | <0.4 | 54 | <0.7 | 51 | *0.21* | 51 | <0.1 | 48 | <0.04 | 51 | < 1.0 | 51 | *4.8* | 51 | < 1.0 |
| | 2009 | 58 | 1.4 | 58 | 1.8 | 42 | *0.7* | 47 | <0.4 | 47 | <0.3 | 53 | *0.14* | 53 | <0.1 | 54 | <0.04 | 53 | < 1.0 | 53 | *5.0* | 53 | < 1.0 |
| | 2010 | 52 | 1.4 | 53 | 1.9 | 51 | *0.5* | 46 | <0.2 | 50 | <0.3 | 55 | *0.13* | 55 | <0.1 | 57 | <0.04 | 55 | < 1.0 | 55 | *3.7* | 55 | < 1.0 |
| | 2011 | 56 | 1.7 | 56 | 2.2 | 57 | *0.9* | 57 | *0.09* | 57 | <0.3 | 59 | *0.16* | 56 | <0.1 | 57 | <0.04 | 56 | < 1.0 | 56 | *4.0* | 56 | < 1.0 |
| | 2012 | 55 | 2.0 | 55 | 2.5 | 55 | 0.9 | 55 | *0.09* | 55 | <0.1 | 59 | *0.18* | 59 | <0.1 | 60 | <0.04 | 59 | < 1.0 | 59 | *5.2* | 59 | < 1.0 |
| | 2013 | 60 | 2.0 | 60 | 2.6 | 54 | 0.6 | 57 | *0.1* | 57 | *0.17* | 62 | *0.22* | 62 | *0.05* | 61 | <0.04 | 62 | *0.7* | 62 | 4.2 | 62 | < 0.3 |
| **1 outlier removed* | 2014 | 58 | 1.7 | 58 | 2.5 | 50 | *0.5* | 50 | *0.1* | 49 | *0.15** | 60 | *0.25* | 60 | <0.03 | - | - | 60 | *0.7* | 60 | 4.3 | 60 | < 0.3 |
| *from average* | 2015 | 51 | 1.8 | 51 | 2.4 | 40 | *0.5* | 42 | *0.1* | 42 | *0.19* | 59 | *0.21* | 59 | <0.03 | - | - | 60 | *0.8* | 60 | 4.8 | 60 | < 0.3 |
| | 2016 | 59 | 1.8 | 59 | 2.5 | 58 | *0.4* | 49 | *0.04* | 58 | *0.04* | 60 | *0.16* | 60 | *0.014* | - | - | 60 | *0.7* | 60 | 5.5 | 60 | <0.4 |
| N. Hall Ave. & E N St. (LHN) | 2017 | 61 | 2.1 | 61 | 2.9 | 58 | *0.4* | 58 | *0.02* | 58 | *0.2* | 56 | *0.17* | 56 | *0.02* | - | - | 56 | *0.8* | 56 | 6.1 | 56 | *0.4* |
| | 2018 | 59 | 1.6 | 59 | 2.3 | 58 | *0.3* | 58 | *0.01* | 58 | *0.004* | 61 | *0.24* | 60 | *0.03* | - | - | 61 | 1.1 | 61 | 6.8 | 61 | *0.4* |
| | 2019 | 47 | 1.5 | 47 | 2.4 | 41 | 0.6 | 41 | *0.05* | 41 | *0.2* | 61 | *0.23* | 61 | *0.03* | - | - | 61 | 1.2 | 61 | 5.0 | 61 | *0.3* |
| **ODEQ Benchmarks** | | 0.45 | | 0.2 | | 0.13 | | 0.03 | | 4 | | 0.2 | | 0.6 | | 0.08 | | 150 | | 90 | | 4 | |

# APPENDIX 1H Air Toxics

DEQ analyzes more air toxics than are shown in the table above. Here is list of the main air toxics and some additional compounds not classified as air toxics that DEQ measures. Summary data for all air toxics can be found in EPA's "air data" web site which you can access from EPA AIRNow.

| **Carbonyl** | | **PAH** | |
|---|---|---|---|
| **Parameter** | **CAS #** | **Parameter** | **CAS #** |
| Acetaldehyde | 75070 | Acenaphthene | 83329 |
| Benzaldehyde | 100527 | Acenaphthylene | 208968 |
| Butyraldehyde | 123728 | Anthracene | 120127 |
| Crotonaldehyde | 123739 | Benzo(a)anthracene | 56553 |
| Formaldehyde | 50000 | Benzo(a)pyrene | 50328 |
| Heptaldehyde | 111717 | Benzo(a)pyrene-d12 | |
| Hexaldehyde | 66251 | Benzo(b)fluoranthene | 205992 |
| Isovaleraldehyde | 590863 | Benzo(e)pyrene | 197972 |
| m-Tolualdehyde | 620235 | Benzo(g,h,i)perylene | 191242 |
| o-Tolualdehyde | 529204 | Benzo(k)fluoranthene | 207089 |
| Propionaldehyde | 123386 | Chrysene | 218019 |
| p-Tolualdehyde | 104870 | Coronene | 191071 |
| Valeraldehyde | 110623 | Dibenzo(a,h)anthracene | 53703 |
| **Metals** | | Dibenzofuran | 132649 |
| Antimony, Total | | Dibenzothiophene | 132650 |
| Arsenic, Total | | Fluoranthene | 206440 |
| Beryllium, Total | | Fluoranthene-d10 | |
| Cadmium, Total | | Fluorene | 86737 |
| Chromium, Total | | Fluorene-d10 | |
| Cobalt, Total | | Indeno(1,2,3-cd)pyrene | 193395 |
| Hexavalent Chromium [Cr(VI)] | | Naphthalene | 91203 |
| Lead, Total | | Perylene | 198550 |
| Manganese, Total | | Phenanthrene | 85018 |
| Nickel, Total | | Pyrene | 129000 |
| Selenium, Total | | Pyrene-d10 | |

# APPENDIX 1H Air Toxics

| VOC | | | |
|---|---|---|---|
| **Parameter** | **CAS #** | **Parameter** | **CAS #** |
| 1,1,1-Trichloroethane | 71556 | Carbon disulfide | 75150 |
| 1,1,2,2-Tetrachloroethane | 79345 | Carbon tetrachloride | 56235 |
| 1,1,2-Trichloroethane | 79005 | Chlorobenzene | 108907 |
| 1,1-Dichloroethane | 75343 | Chloroethane | 75003 |
| 1,1-Dichloroethylene | 75354 | Chloroform | 67663 |
| 1,2,4-Trichlorobenzene | 120821 | Chloromethane | 74873 |
| 1,2,4-Trimethylbenzene | 95636 | cis-1,2-Dichloroethene | 156592 |
| 1,2-Dibromoethane (EDB) | 106934 | cis-1,3-Dichloropropene | 10061015 |
| 1,2-Dichlorobenzene | 95501 | Cyclohexane | 110827 |
| 1,2-Dichloroethane (EDC) | 107062 | Dibromochloromethane | 124481 |
| 1,2-Dichloropropane | 78875 | Dichlorodifluoromethane (Freon 12) | 75718 |
| O-Xylene | 95476 | Dichlorotetrafluoroethane (Freon 114) | 76142 |
| 1,3,5-Trimethylbenzene | 108678 | Ethylbenzene | 100414 |
| 1,3-Butadiene | 106990 | Hexachloro-1,3-butadiene | 87683 |
| 1,3-Dichlorobenzene | 541731 | Isopropanol | 67630 |
| p-Xylene + m-Xylene | 106423 + 108383 | Methyl tert-butyl ether (MTBE) | 1634044 |
| 2,5-Dimethylbenzaldehyde | 5779942 | Methylene chloride | 75092 |
| 2-Butanone (MEK) | 78933 | Methylmethacrylate | 80626 |
| Chloroprene | 126998 | n-Heptane | 142825 |
| 2-Hexanone | 591786 | n-Hexane | 110543 |
| 4-Ethyltoluene | 622968 | 1,4-Dichlorobenzene | 106467 |
| Methyl Isobutyl Ketone (MIBK) | 108101 | Perchloroethylene (Perc) | 127184 |
| Acetonitrile | 75058 | Styrene | 100425 |
| Acrolein | 107028 | Tetrahydrofuran | 109999 |
| Acrylonitrile | 107131 | Toluene | 108883 |
| Benzene | 71432 | trans-1,2-Dichloroethene | 156605 |
| Benzyl chloride | 100447 | trans-1,3-Dichloropropene | 10061026 |
| Bromodichloromethane | 75274 | Trichloroethylene | 79016 |
| Bromofluorobenzene | 460004 | Trichlorofluoromethane (Freon 11) | 75694 |
| Bromoform | 75252 | Trichlotrifluoroethane (Freon 113) | 76131 |
| Bromomethane | 74839 | Vinyl chloride | 75014 |

# APPENDIX 2 Oregon Ambient Air Monitoring Network

## Appendix 2. Oregon Air Quality Monitoring Network

The following tables and map describe the air quality monitoring network.
The following abbreviations are used in the network location tables and maps:

| | |
|---|---|
| BP | Barometric pressure |
| CO | Carbon monoxide |
| DT | Delta temperature (inversion indicator) |
| HAPS | Air Toxics (Hazardous Air Pollutants) |
| IMPROVE | EPA visibility program |
| Lead | Lead sampling |
| NADP | National Atmospheric Deposition Program |
| $NO_2$ | Nitrogen dioxide |
| $O_3$ | Ozone |
| PM2.5 | Fine particulate (2.5 microns) based on filter sampling |
| PM2.5 Estimate | PM2.5 estimate based on light scattering. |
| PM2.5 Spec | PM2.5 chemically speciated |
| PM10 | Fine particulate (10 micron) |
| RH | Relative humidity |
| $SO_2$ | Sulfur dioxide |
| SR | Solar radiation |
| Temp | Temperature |
| WS/WD | Wind direction and speed |

Table 12. Oregon Ambient Air Monitoring Network.

| City | Address | Site Code | EPA# | $SO_2$ | CO | $NO_2$ | Ozone | PM2.5 | PM2.5 Est | PM2.5 Spec | PM10 | HAPS | Lead | WS/WD | TEMP | DT | BP | RH | SR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany | Calapooia School | ACS | 410430009 | | | | | | x | | | | | | | | | | |
| Applegate | Provolt | PSO | 410330011 | | | | | | x | | | | | | | | | | |
| Bend | Bend Pump Station | BPS | 410170120 | | | | | | x | | | | | | | | | | |
| | Road Department | BRD | 410140121 | | | | | | | | | | | x | x | | | x | x |
| Baker City | Forest Service | BFS | 410010004 | | | | | | x | | | | | | | | | | |
| Burns | Washington St. | BWS | 410250003 | | | | | x | x | x | | | | x | x | | x | | |
| Cave Junction | USFS Station | CJFS | 410330036 | | | | | | x | | | | | | | | | | |
| Corvallis | FD #3, Circle Blvd | CCB | 410030013 | | | | | | x | | | | | | | | | | |
| Cottage Grove | City Shops | CGC | 410399004 | | | | | x | x | | | | | | | | | | |
| Crater Lake | Lodge at Rim | CLM | 410351002 | | | | | | x | | | | | | | | | | |
| Detroit Lake | USFS Station | DFS | 410470123 | | | | | | x | | | | | | | | | | |
| Eugene | Pacific Highway 99N | E99 | 410390059 | | | | | x | x | | x | | | | | | | | |
| | Amazon Park | AMZ | 410390060 | | | | x | x | x | | | | | | | | | | |
| | Wilkes Drive | EWD | 41039 | | | | | | x | | | | | x | | | | | |
| (Saginaw) | Delight Valley Road | SAG | 410391007 | | | | x | | x | | | | | | | | | | |
| Enterprise | Forest Service | EFS | 410630001 | | | | | | x | | | | | | | | | | |
| Florence | Forestry Department | FDF | 410390100 | | | | | | x | | | | | | | | | | |
| Grants Pass | Parkside School | GPP | 410330114 | | | | | x | x | | | | | x | x | | | | |
| Hermiston | Municipal Airport | HMA | 410591003 | | | | x | | x | | | | | x | x | | | | |
| John Day | Davidson Street | JDD | 410230002 | | | | | | x | | | | | | | | | | |
| Klamath Falls | Peterson School | KFP | 410350004 | | | | | x | x | | | | | x | x | x | x | | |
| La Grande | N Hall Ave & E N St | LHN | 410610123 | | | | | | x | | x | x | x | x | x | | x | x | |
| (Cove) | City Hall | CCH | 410610120 | | | | | | x | | | | | x | | | | | |
| Lakeview | Center & M Streets | LCM | 410370001 | | | | | x | x | | | | | x | x | | x | | |
| Lyons | Mari-lynn School | LMS | 410432003 | | | | | | x | | | | | | | | | | |
| Madras | Westside School | MWS | 410310007 | | | | | | x | | | | | | | | | | |
| Medford | Rapp Rd Talent | TAL | 410290201 | | | | x | | | | | | | | | | | | |
| | Rossanley Drive | MTV | 410291002 | | | | | | | | | | | x | x | x | x | x | x |
| | Welch & Jackson | MWJ | 410292129 | | | | | x | x | | x | x | | | | | | | |
| (Ashland) | Fire Department | AFD | 410290203 | | | | | | x | | | | | | | | | | |
| Mill City | High School | MCS | 410430104 | | | | | | x | | | | | | | | | | |
| Mt. Hood | Multorpor | MUL | 410050102 | | | | | | x | | | | | | | | | | |
| Oakridge | School Street | OAK | 410392013 | | | | | x | x | | x | | | x | | | | | |
| Pendleton | SW Marshall Place | PMC | 410590121 | | | | | | x | | | | | | | | | | |

Oregon Ambient Air Monitoring Network. (Continued)

| City | Address | Site Code | EPA# | SO2 | CO | NO2 | Ozone | PM2.5 | PM2.5 Est | PM2.5 Spec | PM10 | HAPS | Lead | WS/WD | TEMP | DT | BP | RH | SR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Portland | 57th &SE Lafayette | SEL | 410510080 | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| | Tualatin – I-5 | NRS | 410670005 | | x | x | x | x | x | | | | | x | x | | | x | |
| | Humboldt School | PHS | 410512010 | | | | | | | | x | x | x | | | | | | |
| | Jefferson High Sch. | PJH | 410511191 | | | | | | | | | | | x | | | | | |
| (Beaverton) | Highland Park Sch. | BHP | 410670111 | | | | | | x | | | | | | | | | | |
| (Carus) | Spangler Rd. | SPR | 410050004 | | | | x | | x | | | | | x | x | | | | |
| (Hillsboro) | NE Grant Street | HHF | 410670004 | | | | | x | x | | | x | x | | | | | | |
| (Sauvie Is) | NW Sauvie Island | SIS | 410090004 | | | | x | | x | | | | | x | x | | | | |
| Prineville | SE Court Street | PDP | 410130100 | | | | | x | x | | | | | x | x | | x | x | x |
| Roseburg | NW Garden Valley | RGV | 410190002 | | | | | | x | | | | | | | | | | |
| Salem | Salem State Hosp. | SSH | 410470041 | | | | x | | x | | | | | | | | | | |
| (Turner) | Cascade Jr. High | CJH | 410470004 | | | | x | | | | | | | x | x | | | | |
| Shady Cove | Shady Cove School | SCS | 410290019 | | | | | | x | | | | | | | | | | |
| Sisters | USFS office | SFS | 410170004 | | | | | | x | | | | | | | | | | |
| Springfield | City Hall | SCH | 410391009 | | | | | x | x | | | | | x | | | | | |
| Sweet Home | Fire Department | SFD | 410432002 | | | | | | x | | | | | | | | | | |
| The Dalles | Cherry Heights | TDC | 410650007 | | | | | | x | | | | | | | | | | |
| | Wasco Co. Library | TWL | 410650008 | | | | | | x | | x | x | x | x | | | | | |

Table 13. Oregon Ambient Air Monitoring Visibility and Forest Health Network.

| Region | Location | EPA & IMPROVE Code | Neph | IMPROVE | WS/WD |
|---|---|---|---|---|---|
| **Visibility Sites** | | | | | |
| Crater Lake NP | Park HQ | CRLA | x | x | x |
| Eagle Cap Wild. | Strawberry Mt. | STAR | | x | |
| Kalmiopsis Wild. | Kalmiopsis | KALM | | x | |
| Mt Hood Wild. | Multopor | 410050102/ MOHO | x | x | x |
| Three Sisters Wild. | Three Sisters | THIS | | x | |
| **Forest Health Sites (funded by USFS & BLM)** | | | | | |
| Wallolla -Whitman NF | Baker City | 410010003 | x | | |
| Malheur & Ochoco NF | Burns | 410250003 | x | | |
| Wallolla-Whitman NF | Enterprise | 410630001 | x | | |
| Siskiyou NF | Grants Pass | 410330114 | x | | |
| Siskiyou NF | Cave Junction | 410330036 | x | | |
| Malheur NF | John Day | 410230002 | x | | |
| Winema, Fremont NF | Klamath Falls | 410350004 | x | | |
| Siskiyou NF | Provolt | 410330011 | x | | |
| | Roseburg | 410190002 | x | | |
| Rogue River NF | Shady Cove | 410290019 | x | | |
| | Sisters | 410170004 | x | | |
| **Ag Burning Sites** | | | | | |
| Willamette Valley | Carus, | 410050004 | x | | x |
| Willamette Valley | Silverton | 410470007 | x | | x |
| Willamette Valley | Lyons | 410432003 | x | | |
| Willamette Valley | Mill City | 410430104 | x | | |
| Willamette Valley | Detroit Lake | 410470123 | x | | |
| Willamette Valley | Salem | 410470041 | x | | |
| Union County | Cove | 410610120 | x | | x |

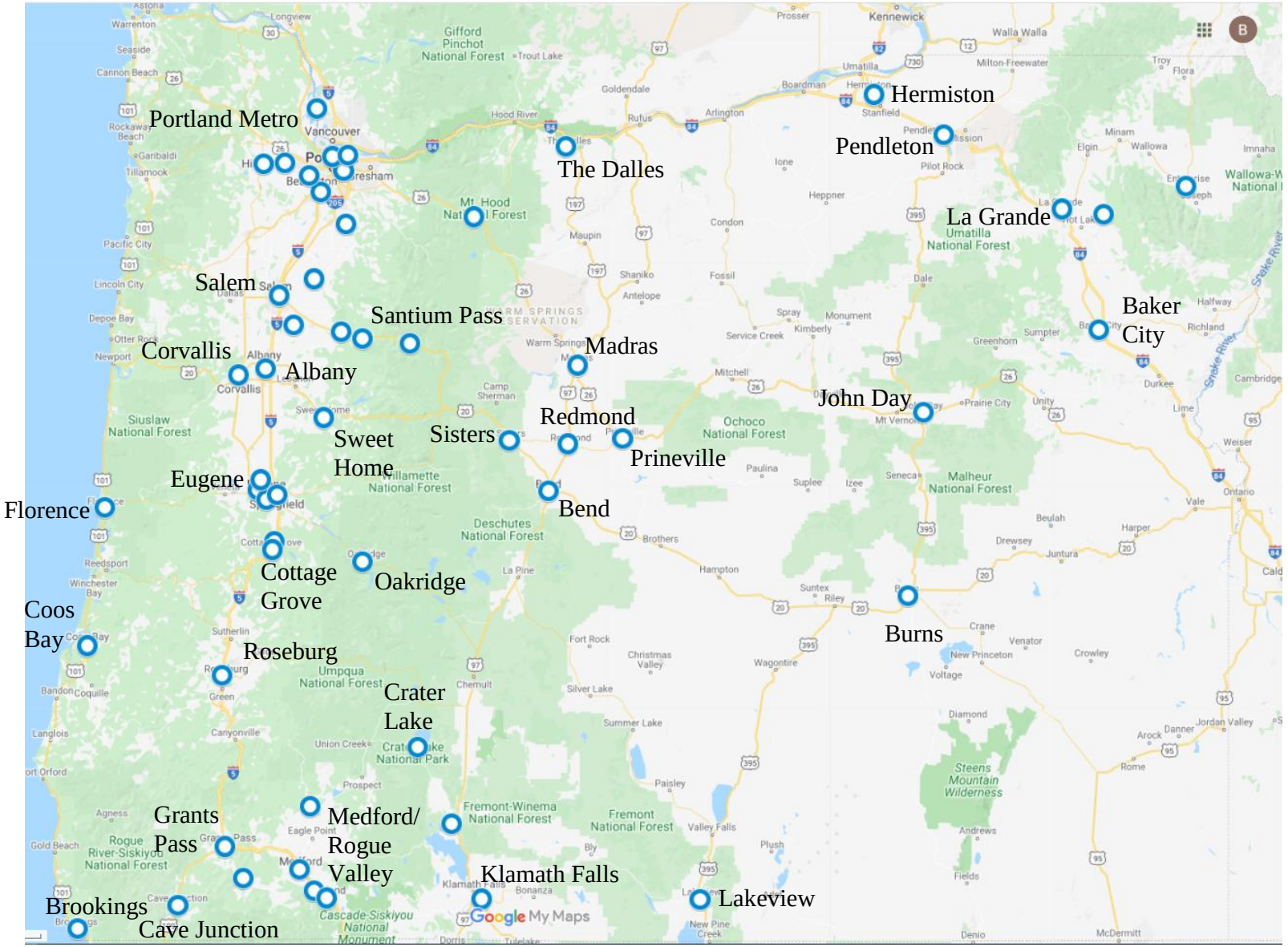



Figure 93. 2019 Ambient Air Quality Monitoring Network.

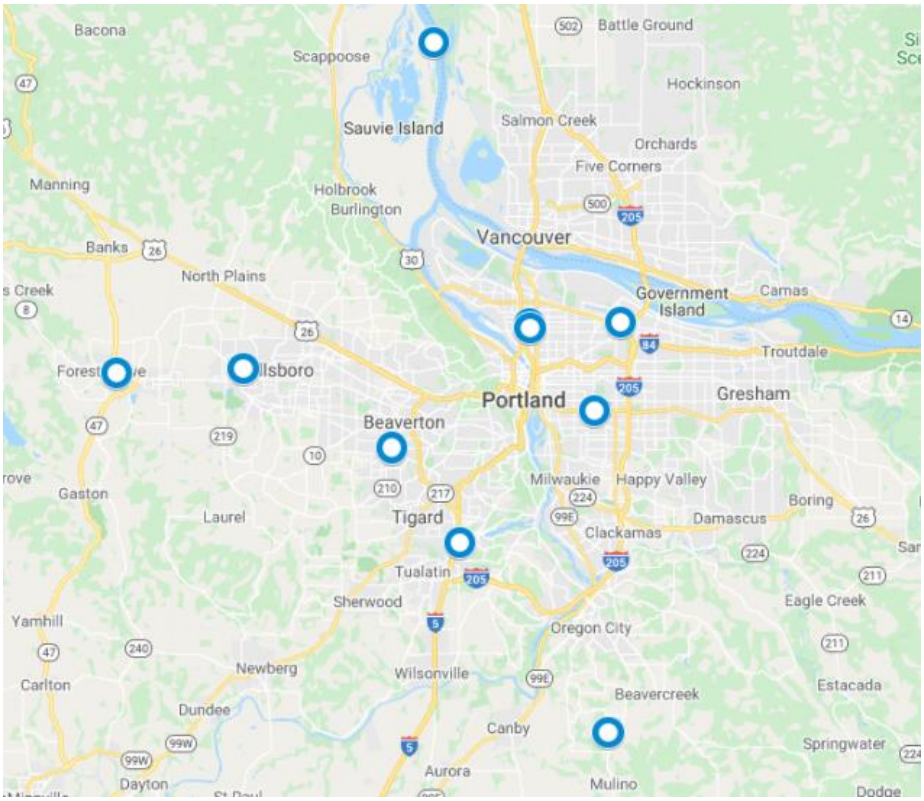


Figure 94. 2019 Portland Metro Ambient Air Quality Monitoring Network

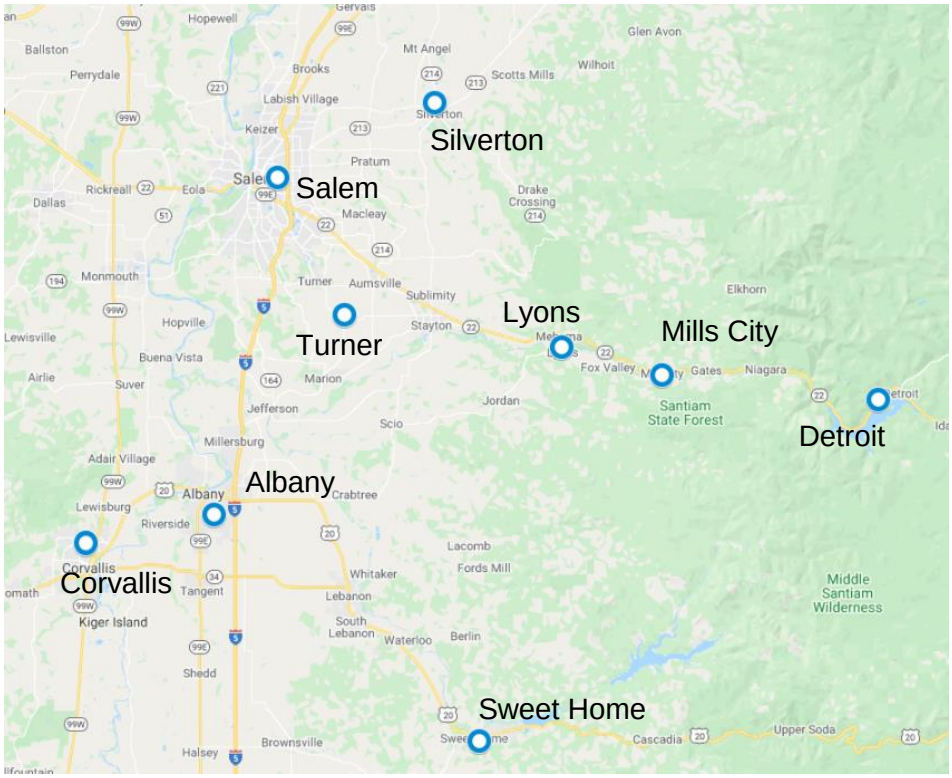


Figure 95. 2019 Mid Willamette Valley Ambient Air Quality Monitoring Network

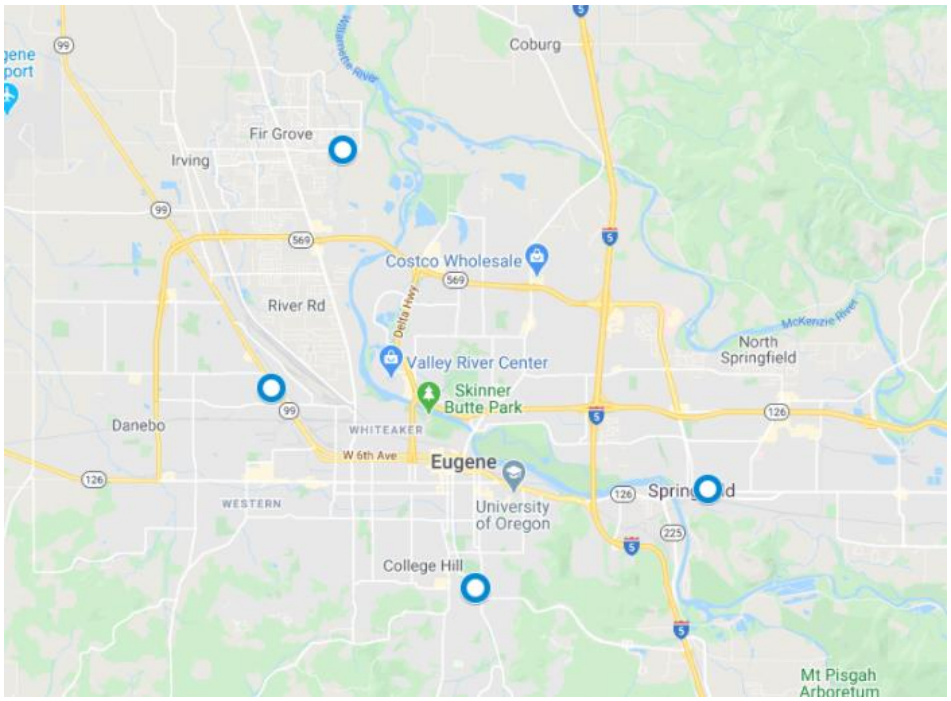


Figure 96. 2019 Eugene-Springfield Ambient Air Quality Monitoring Network

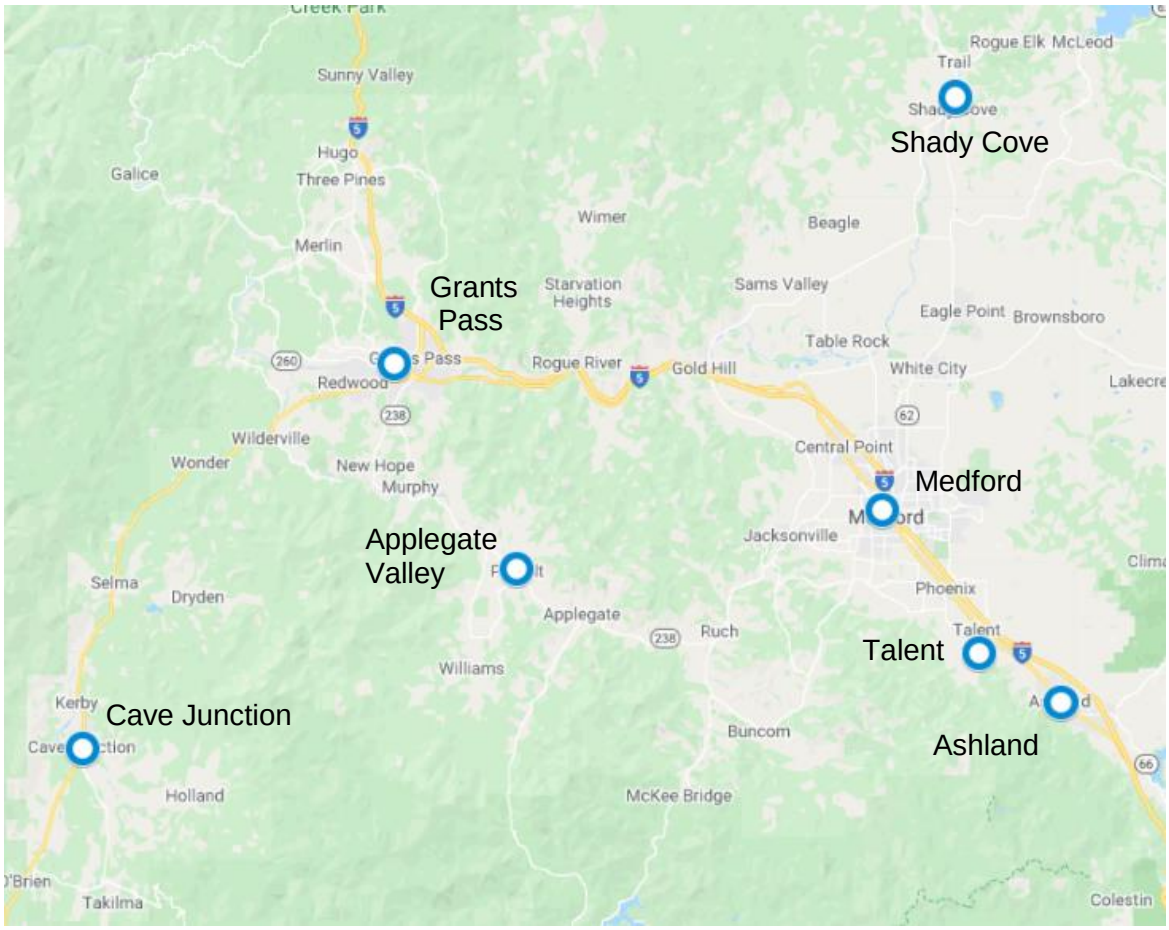


Figure 97. 2019 SW Oregon Ambient Air Quality Monitoring Network

# Appendix 3 Data Quality

## Quality Assurance

It is a policy of DEQ that all data used by the Department will be of sufficient quality to support the regulatory decisions based upon them. The minimum quality assurance requirements set by EPA are consistently met or exceeded by DEQ.

The continued assurance of data quality requires carrying out the two complimentary tasks discussed below:

## Quality Control

The ambient air quality monitoring and sampling done by the Department follows a number of procedures intended to maintain the system within control. Standard operating procedures are documented and followed throughout. Federal Reference or Equivalent Methods are used wherever applicable. Care in using accepted methodology is what makes the Department's air quality data representative and also comparable to the data collected in other states. Routine preventative maintenance and periodic calibrations, using National Institute of Standards Technology gases or other primary standards, are used to achieve a database sufficient in quantity and quality to meet the needs of the Air Quality Program.

## Quality Assessment

Evaluations of data quality are made in several ways. At least each quarter, DEQ conducts a system audit in which each sampling and monitoring site is visited to evaluate whether the site location is still appropriate, whether procedures are being followed, and to ensure that documentation is complete. Data quality is assessed in terms of precision, accuracy, and completeness. Precision, or repeatability, is determined by analysis of a known control sample or by replicate analyses. Accuracy, or the ability to measure a "true" value, is assessed by quarterly audits of analyzer performance or sampler flow. DEQ reports these assessments to EPA as summary statistics. Completeness is measured by the amount of data actually captured relative to the amount which ideally could have been collected. EPA also hires independent contractors to evaluate Oregon’s sites for accuracy.

For more information, refer to Quality Assurance Project Plan Air Quality Monitoring for the Measurement of Criteria Air Pollutants, April 2018 (DEQ09-LAB-0004-QAP Version 2.0). This is available upon request. If you have further questions, contact us at: AQM.Questions@deq.state.or.us.