Report

2008 Oregon Air Quality Data Summaries

June 2009

State of Oregon
Department of
Environmental
Quality

DEQ 09-AQ-015

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DEQ 09-AQ-015

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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
CO_2 –	Carbon dioxide – Primary greenhouse gas
CO_2e -	Carbon dioxide equivalent – Way to compare other GHG to CO_2
GHG –	Greenhouse Gas
HAPs –	Hazardous Air Pollutant as defined in Title III of the Clean Air Act
$MMTCO_2e$ -	Million metric tons of carbon dioxide equivalent
NAAQS –	National Ambient Air Quality Standards – federal air quality standards
NO –	Nitrogen oxide
NO_2 –	Nitrogen dioxide
NOx –	Nitrogen oxides – redish brown gaseous pollutant - mainly NO and NO_2
O_3 –	Ozone – a gaseous pollutant and a component of smog at ground level
$PM_{2.5}$ –	Particulate Matter 2.5 micrometers diameter and smaller
PM_{10} -	Particulate Matter 10 micrometers diameter and smaller
ppm –	Parts per million - air pollutant concentration.
ppb –	Parts per billion - air pollutant concentration.
SO_2 –	Sulfur dioxide
SOx –	Sulfur oxides - mainly SO_2
UFSG –	Unhealthy For Sensitive Groups – an AQI air quality category
$\mu g/m^3$ –	Microgram per meters cubed - air pollutant concentration
VOC –	Volatile Organic Compounds
WAQR –	Wildfire Air Quality Rating - wildfire smoke health internet page

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Air Quality Annual Report

DEQ 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.

Air Quality Division

The DEQ Air Quality Division is responsible for protecting Oregon's air quality. DEQ monitors air pollution to ensure that communities meet the national ambient air quality health standards (NAAQS), to report hourly health levels to the public, and to protect Oregon's pristine views.

The air pollutants of greatest concern in Oregon are:

- ground-level **ozone**, commonly known as smog
- fine particulate matter (mostly from wood smoke, other combustion sources, cars and dust) known as **$PM_{2.5}$** (2.5 micrometers and smaller diameter)
- hazardous air pollutants (also called **Air Toxics**)

DEQ also is concerned about **greenhouse gases** and along with the Oregon Department of Energy (DOE) is working on strategies to mitigate their release. Greenhouse gases cause global warming and according to a DOE report *"The impacts of such changes on Oregon citizens, businesses and environmental values are likely to be extensive and destructive. Coastal and river flooding, snow pack declines, lower summer river flows, impacts to farm and forest productivity, energy cost increases, public health effects, and increased pressures on many fish and wildlife species are some of the effects anticipated by scientists at Oregon and Washington universities*."

The Governor of Oregon is also taking global climate change seriously and has created an advisory group which has come up with a strategy to reduce greenhouse gases. For this report and more on what the State of Oregon is doing to lower greenhouse gases go to: http://egov.oregon.gov/ENERGY/GBLWRM/Strategy.shtml

Oregon's 2008 Ambient Air Quality in Summary:

- Carbon monoxide and PM_{10} (particulate matter 10 micrometers diameter and smaller) continue to be well below the federal health standard. The pollutants have been trending down in the past 10 to 15 years.
- $PM_{2.5}$ (particulate matter 2.5 micrometers diameter and smaller) and ground level ozone remained near or above the federal health standards in many areas. Klamath Falls, Burns, Lakeview, and Oakridge violated the daily $PM_{2.5}$ standard.
- Summer and fall 2008 $PM_{2.5}$ levels were elevated in southern and eastern Oregon because of forest fire activity mainly in Northern California. All of Western Oregon was impacted by forest fire smoke from Northern California at the end of June and beginning of July. The smoke resulted in many unhealthy days.
- Air toxics such as benzene and formaldehyde remain near or above the health benchmarks. Benchmarks are concentrations levels at which an individual has a one in a million chance of getting cancer.

Air Quality Index Defined

The Air Quality Index (AQI) reports ambient air quality using current monitoring data. The AQI health advisories are posted at www.AIRNow.Gov and shown below.

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.

Emergency Action Plan

DEQ uses the AQI to trigger its Emergency Action Plan for extreme air pollution episodes. The AQI and associated episode stages are listed in Table 2. The possible actions are:

- 100 AQI - Air Stagnation Advisory may be declared by the National Weather Service if a prolonged inversion is forecast. DEQ may issue public health advisories.
- 200 AQI - DEQ may declare an Air Pollution Alert if the conditions causing the elevated levels are forecast to persist. DEQ may issue public health advisories.
- 300 AQI – DEQ may declare an Air Pollution Warning if the conditions causing the elevated levels are forecast to persist. At the Warning level, specific sources of air pollution (such as industry) may be requested to curtail non-essential operations and additional cautions are issued to the public.
- 400 AQI – DEQ may declare an Air Pollution Emergency and emergency measures may be enacted to prevent serious health impacts to the entire population. At the Emergency levels, many air pollution sources are required to cease or severely curtail operations to alleviate pollution levels.

How the AQI is computed

The AQI is computed hourly using the 24-hour average for $PM_{2.5}$ and the eight hours average for ozone and CO. The $PM_{2.5}$ AQI is derived from light scattering data. EPA provides all states with the AQI equation for national uniformity. The AQI is reported by DEQ or Lane County Regional Air Pollution Authority (LRAPA) for various cities in Oregon.

Table 2. Air Quality Index Ranges and Episode Stages for Oregon criteria pollutants of concern.

AIR QUALITY INDEX, (AQI) and Episode Stage							
Episode Stage	**Within Standard**		**≥ Standard**	**Alert**	**Warning**	**Emergency**	**Significant Harm**
AQI range	0-50	51-100	101-150	151-200	201-300	301-400	401-500p
AQI Descriptor	***Good***	***Moderate***	***Unhealthy For Sensitive Groups***	***Unhealthy***	***Very Unhealthy***	***Hazardous***	***Very Hazardous***
$PM_{2.5}$ $\mu g/m^3$ (24-hr aver)	0-15.4	15.5-35.4	35.5-55.4	55.5-140.4	140.5-210.4	210.5-500.4	na
PM_{10} $\mu g/m^3$ (24-hr aver)	0-54	55-154	155-254	255-354	355-424	425-504	505-604
CO ppm (8-hr aver)	0.0-4.4	4.5-9.4	9.5-12.4	12.5-15.4	15.5-30.4	30.5-40.4	40.5-50.4
Ozone ppm (1-hr aver)	n/a	n/a	0.125-0.164	0.165-0.204	0.205-0.404	0.405-0.504	0.505-0.604
Ozone ppm (8-hr aver)	0.000-0.059	0.060-0.075	0.076-0.095	0.096-0.115	0.1-0.374	use 1hr std	use 1hr std

2008 Oregon Air Quality Indices for Cities with Air Quality Monitors

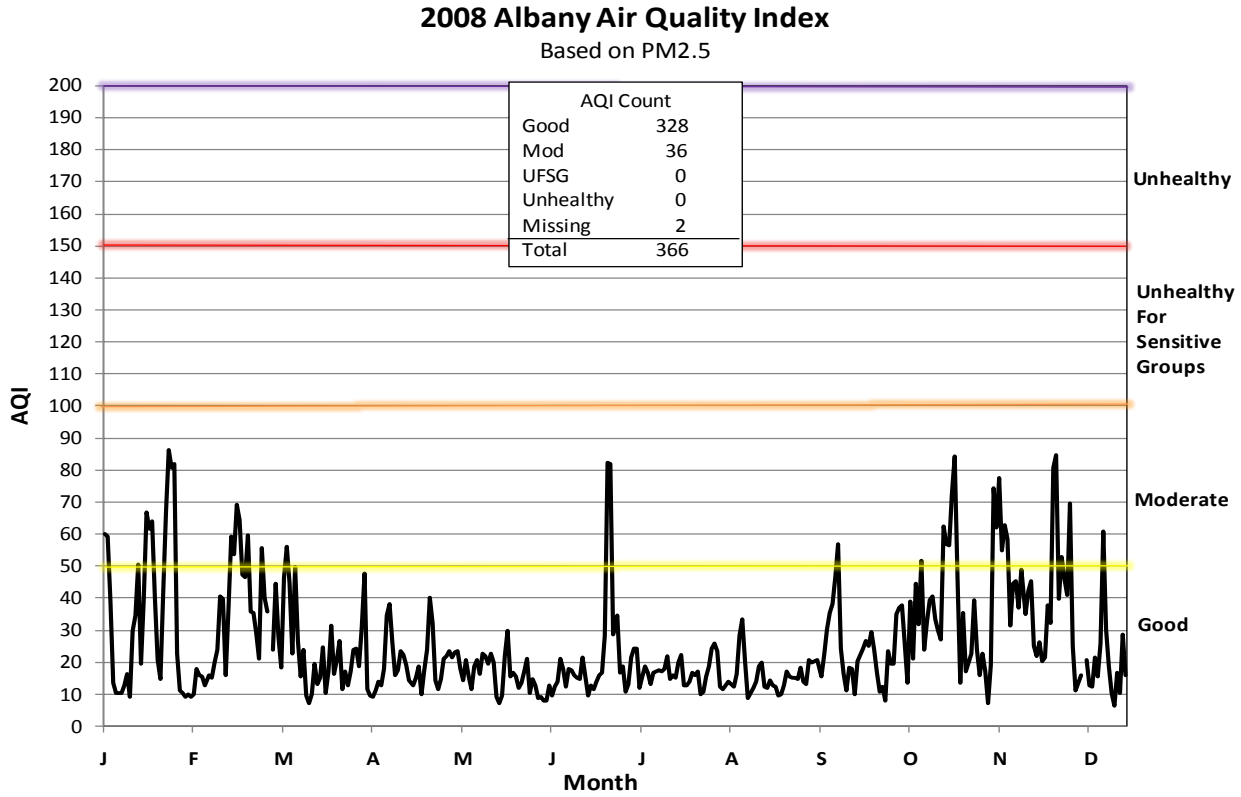


Figure 1. 2008 Albany Air Quality Summary

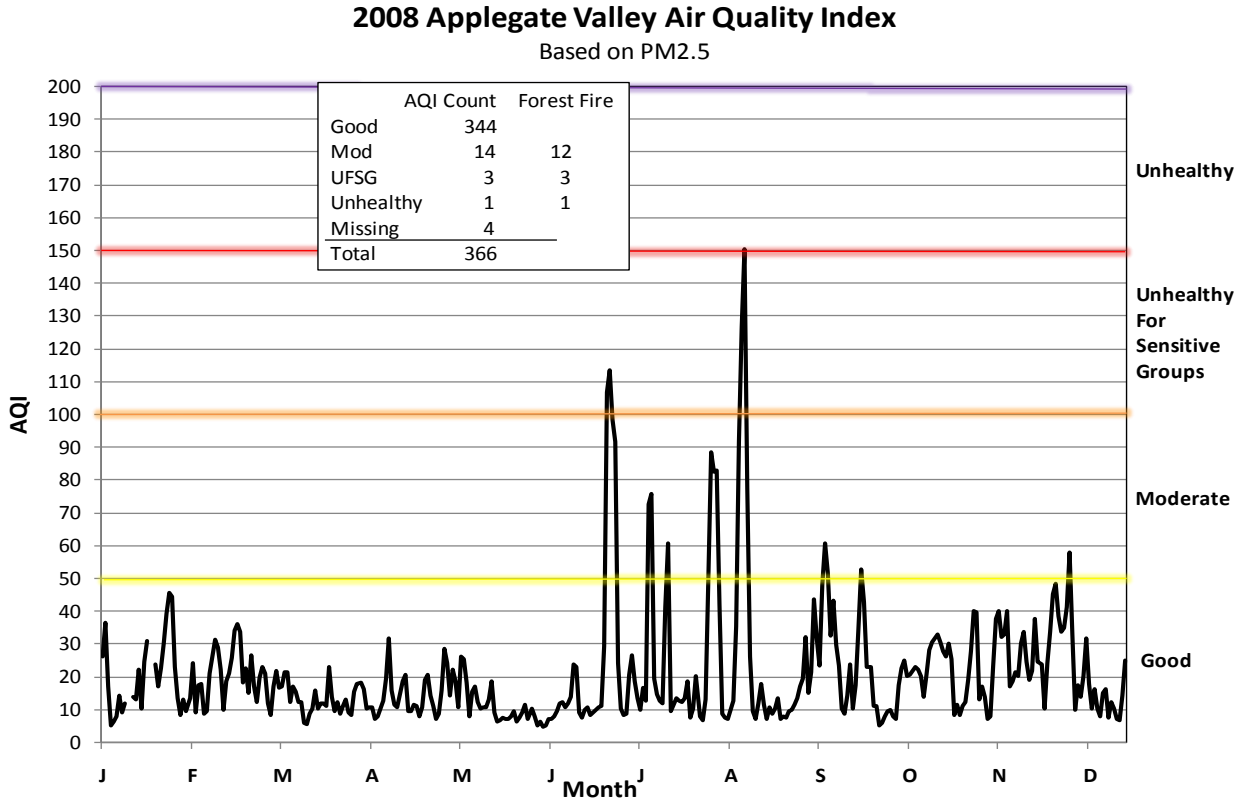


Figure 2. 2008 Applegate Valley Air Quality Summary

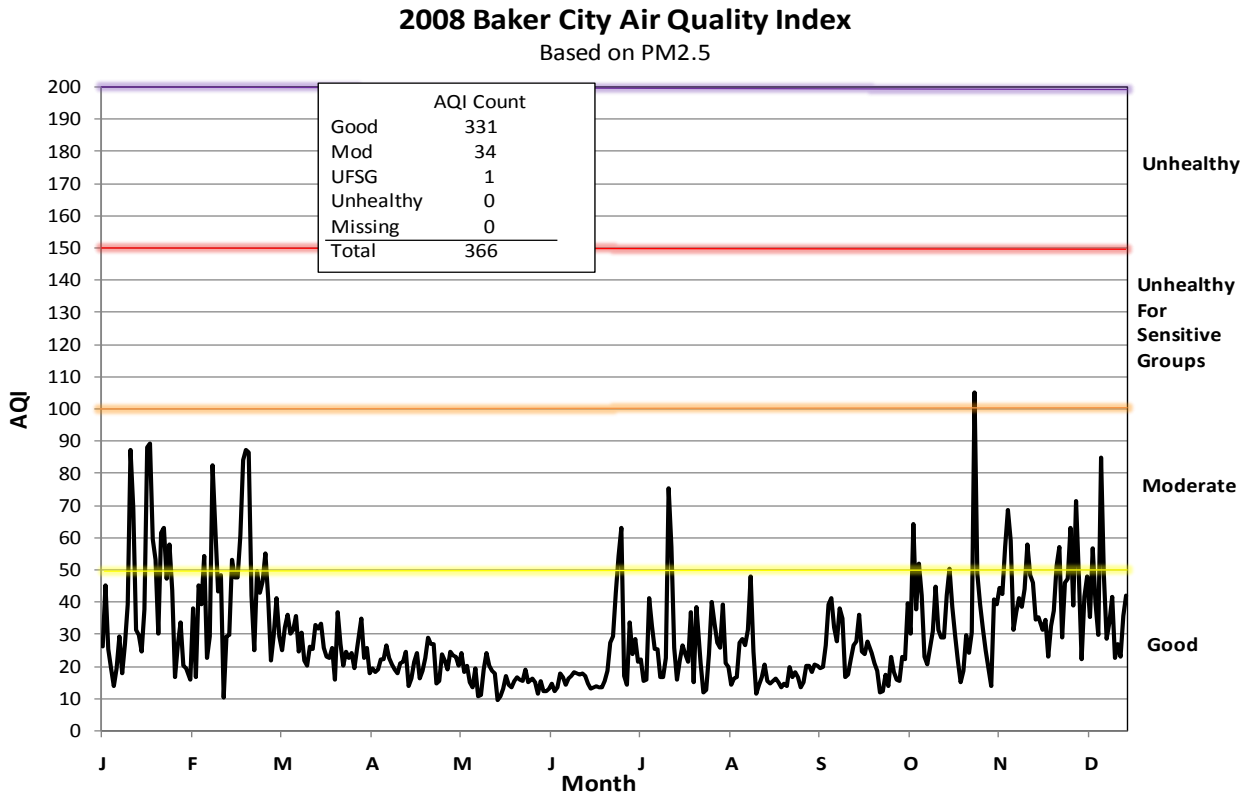


Figure 3. 2008 Baker City Air Quality Summary

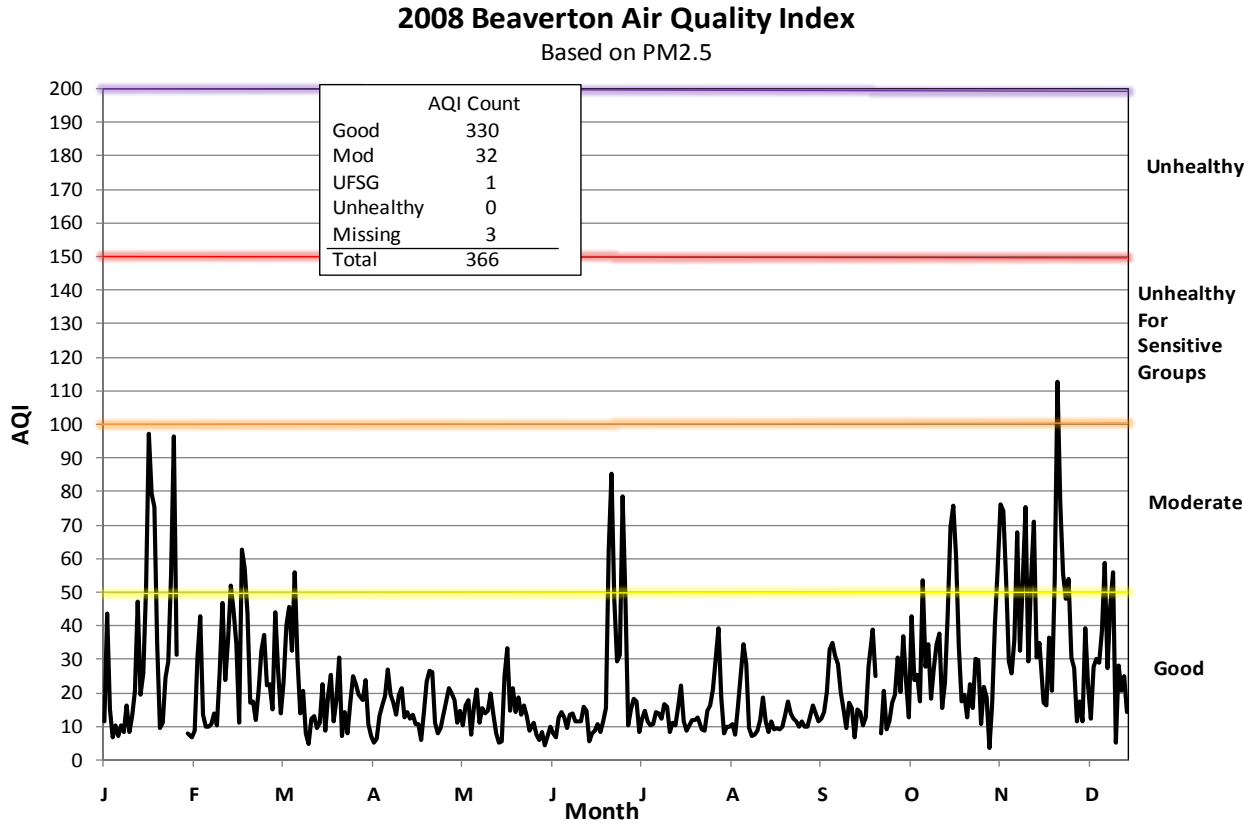


Figure 4. 2008 Beaverton Air Quality Summary

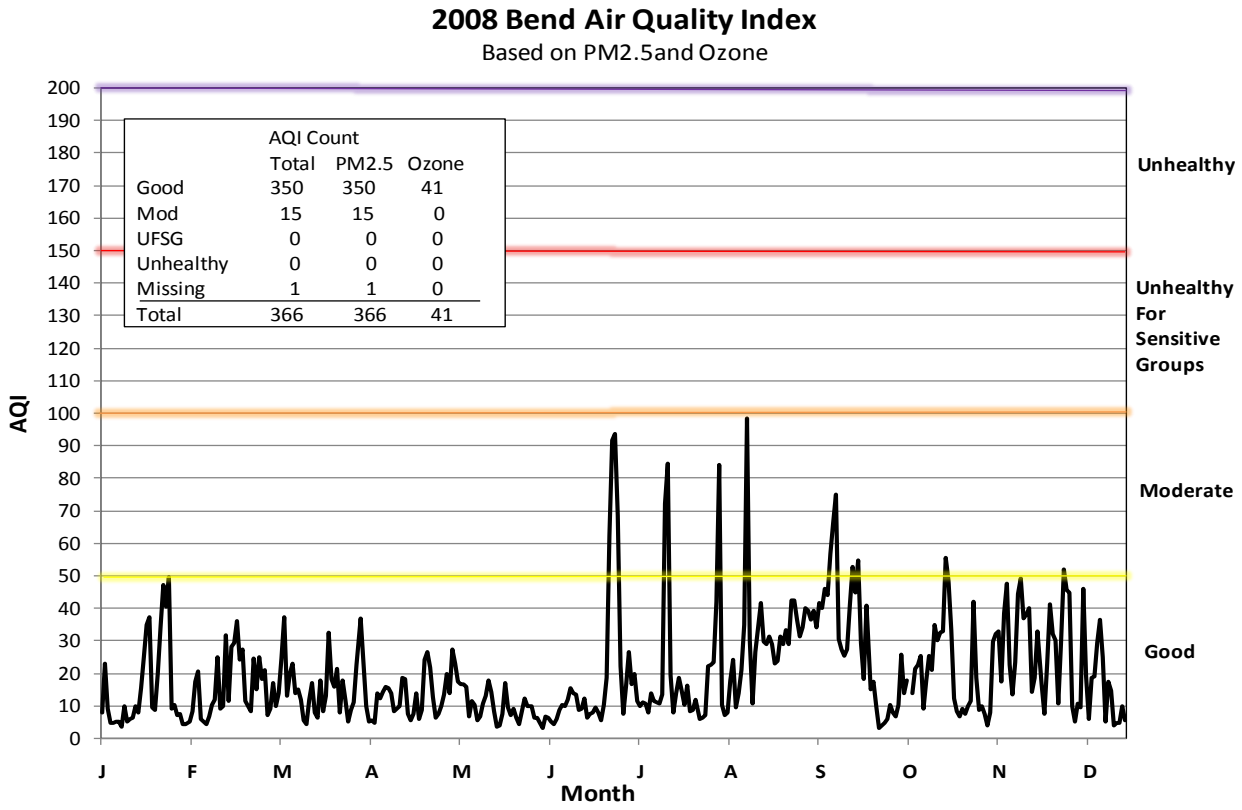


Figure 5. 2008 Bend Air Quality Summary

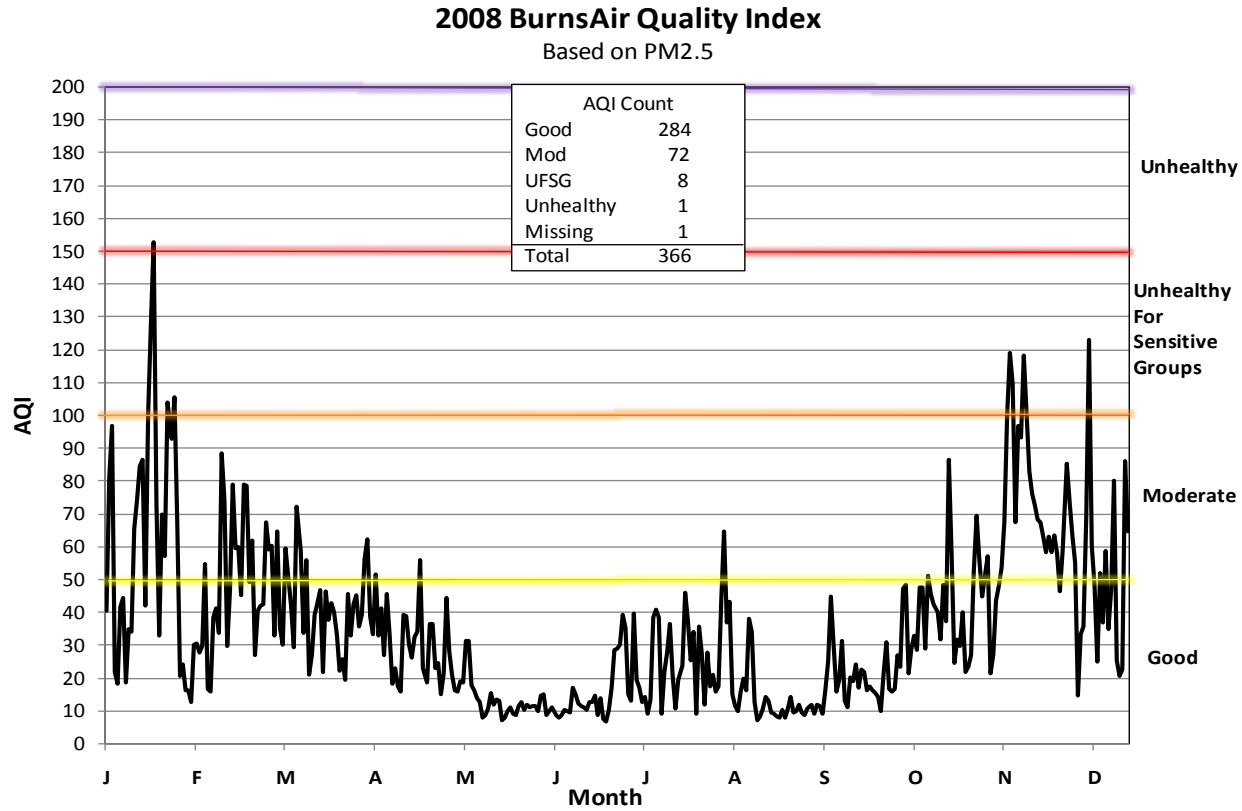


Figure 6. 2008 Burns Air Quality Summary

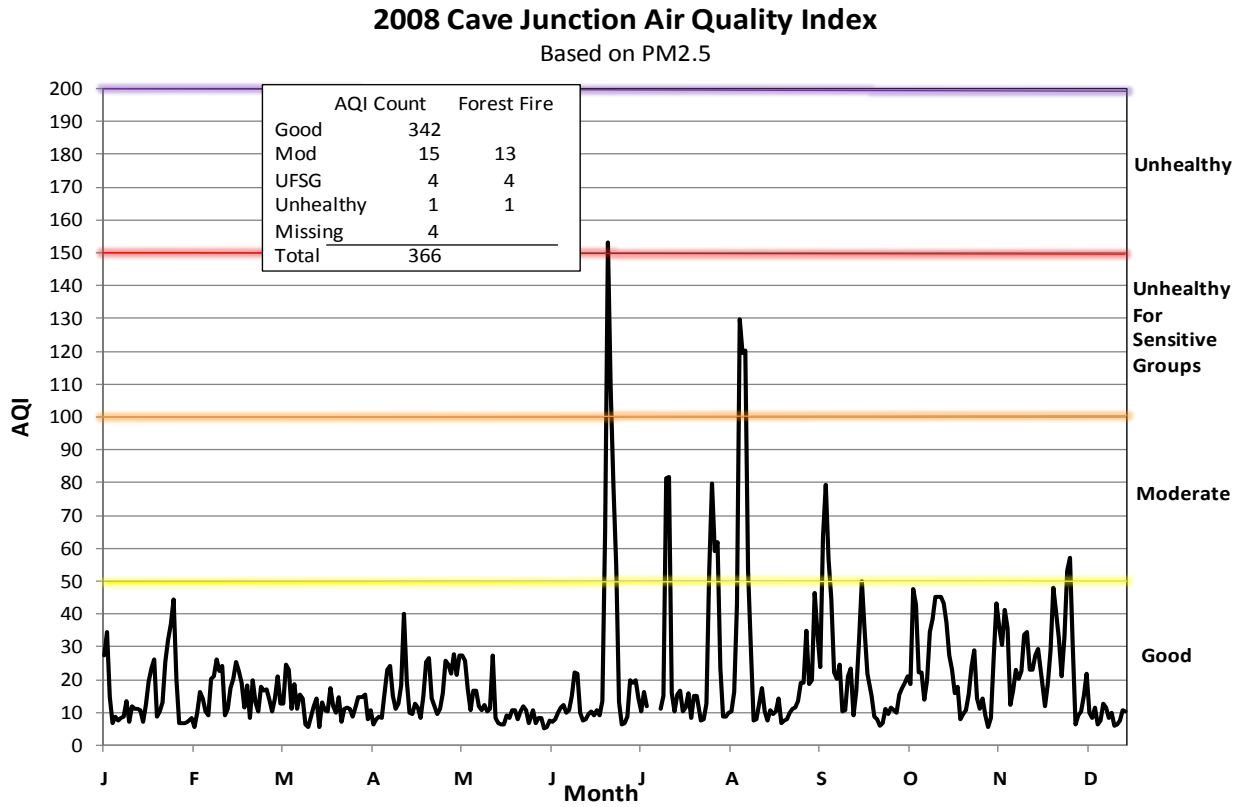


Figure 7. 2008 Cave Junction Air Quality Summary

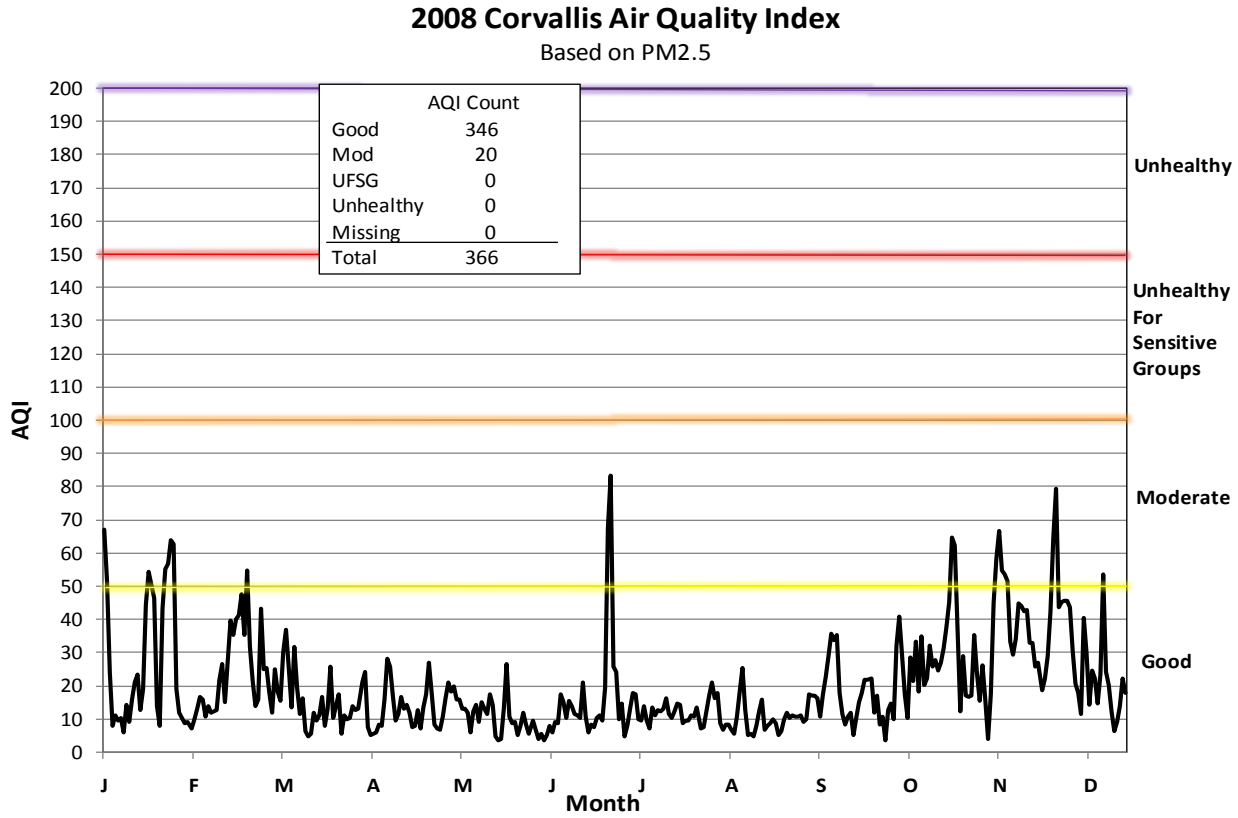


Figure 8. 2008 Corvallis Air Quality Summary

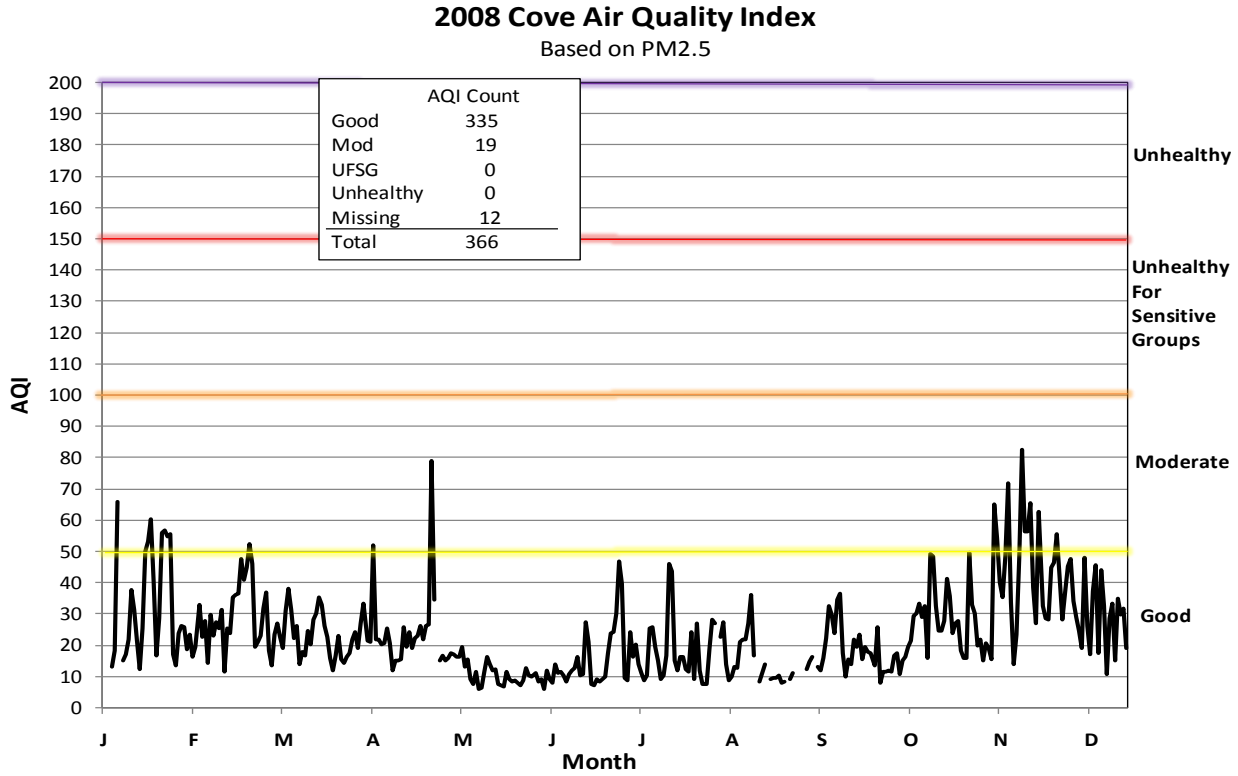


Figure 9. 2008 Cove Air Quality Summary

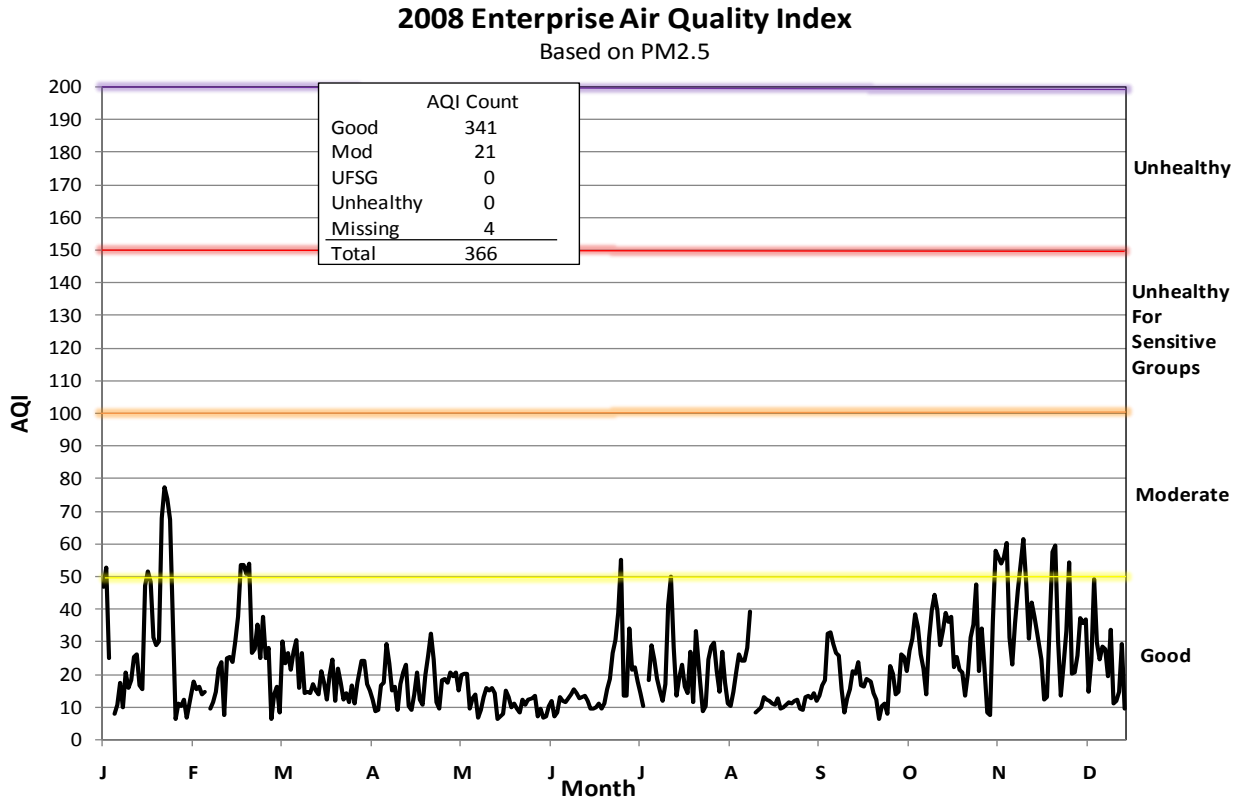


Figure 10. 2008 Enterprise Air Quality Summary

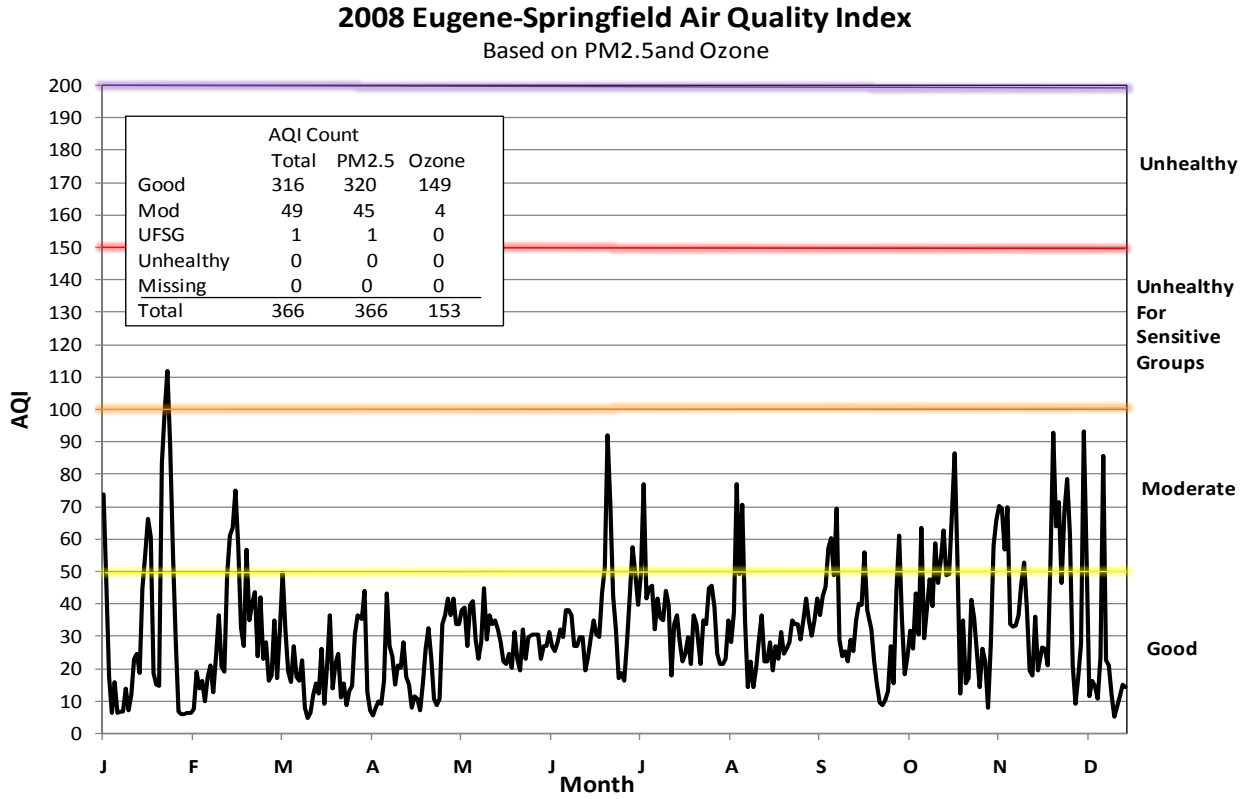


Figure 11. 2008 Eugene/Springfield Air Quality Summary

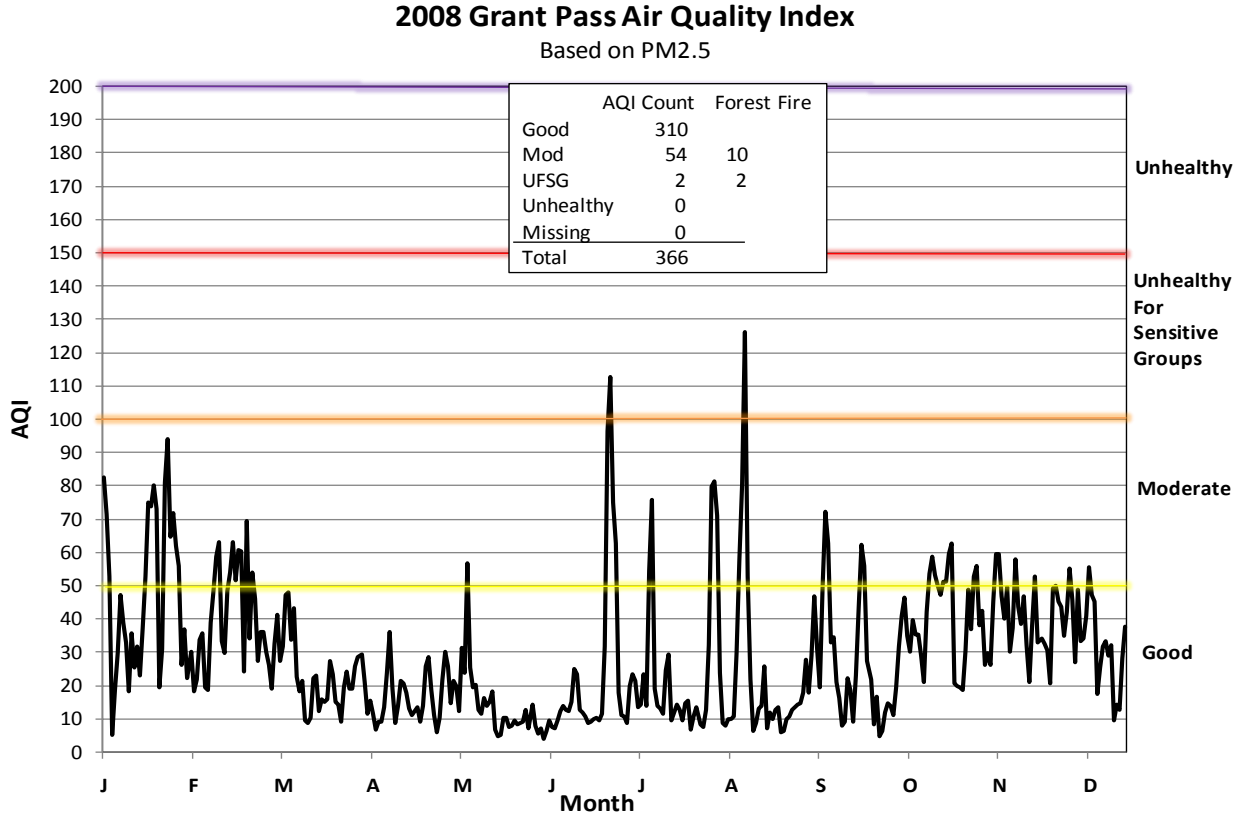


Figure 12. 2008 Grants Pass Air Quality Summary

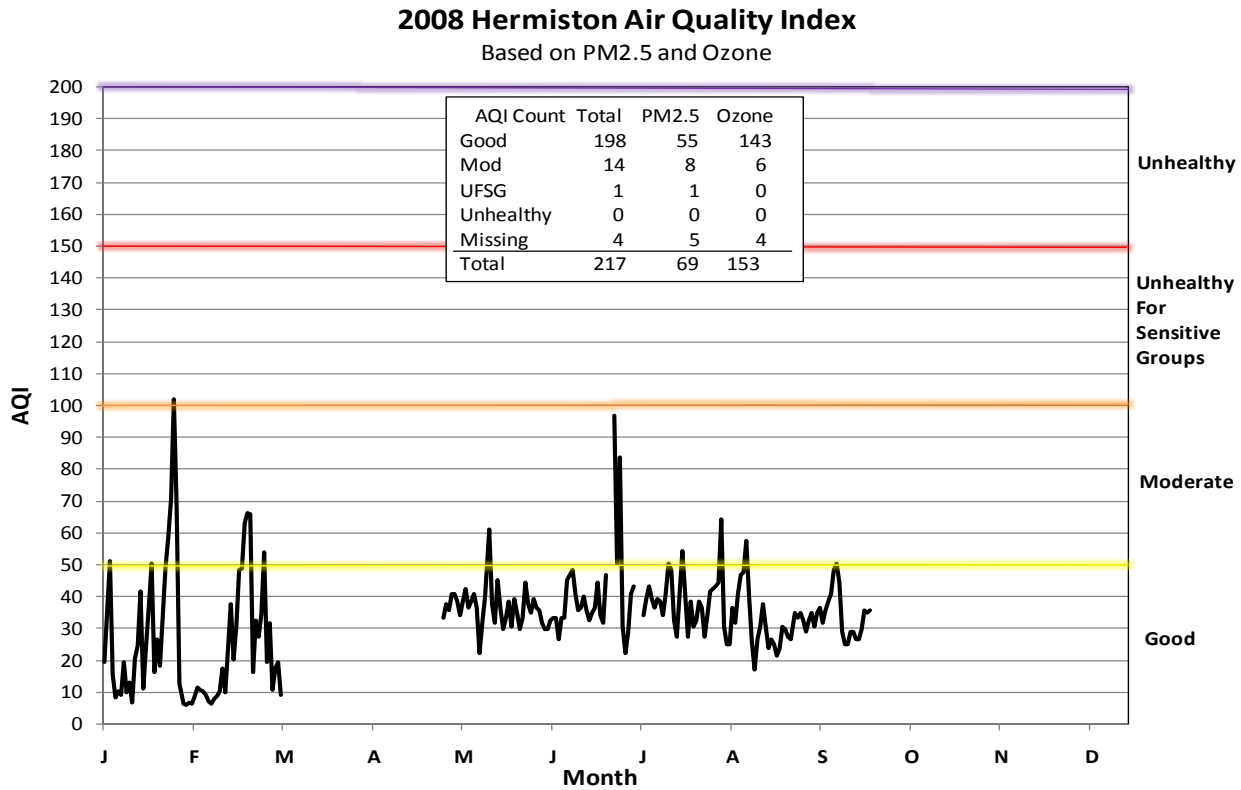


Figure 13. 2008 Hermiston Airport Air Quality Summary

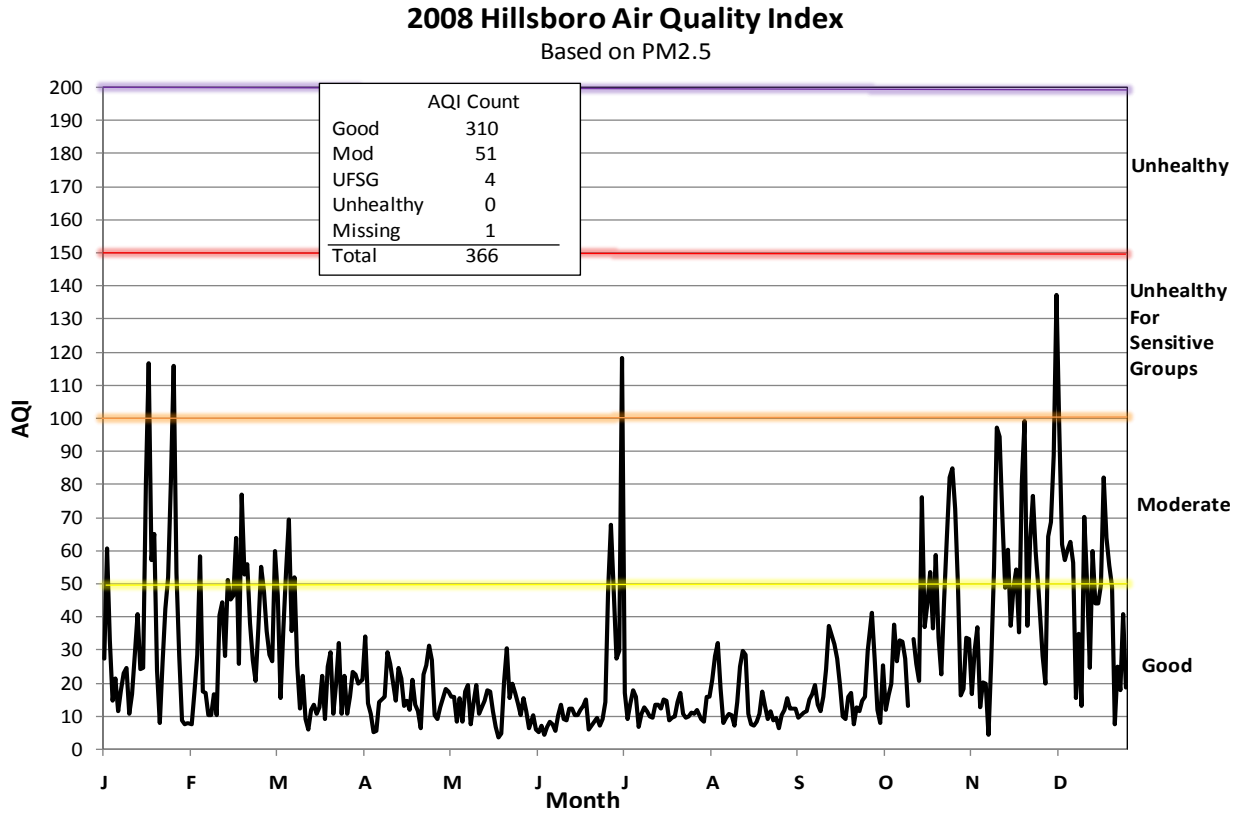


Figure 14. 2008 Hillsboro Air Quality Summary

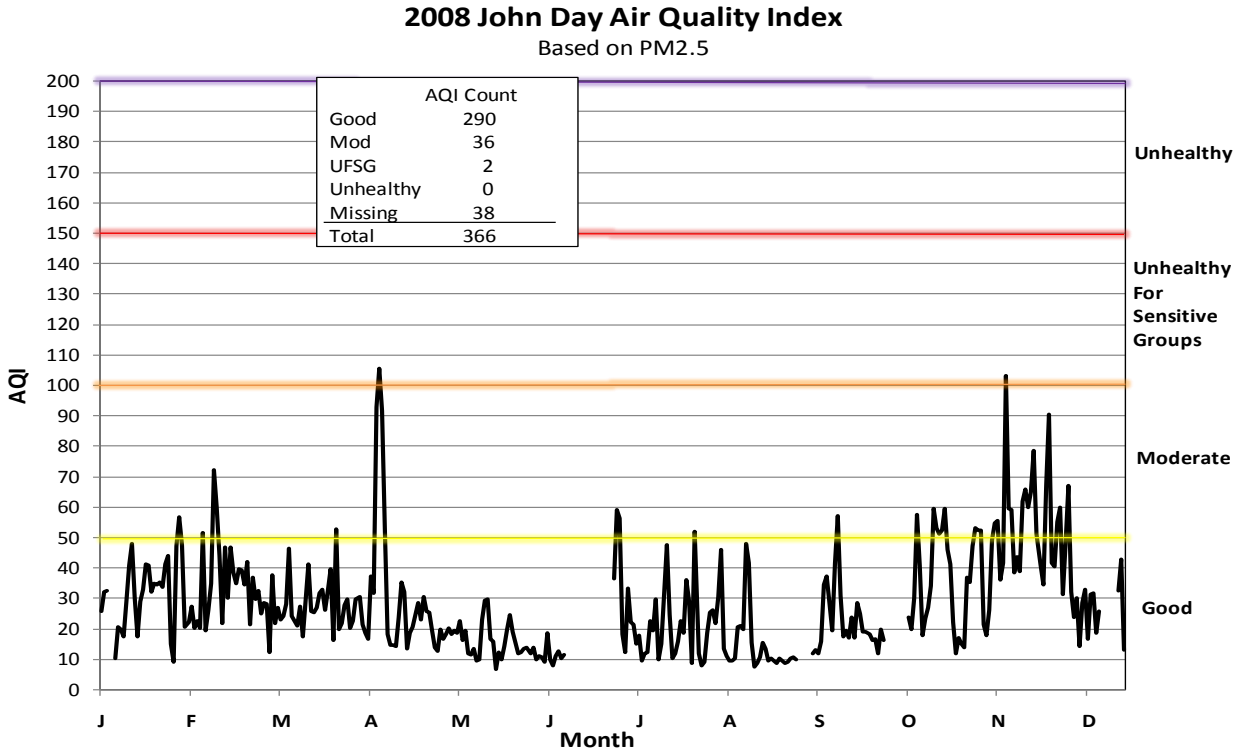


Figure 15. 2008 John Day Air Quality Summary

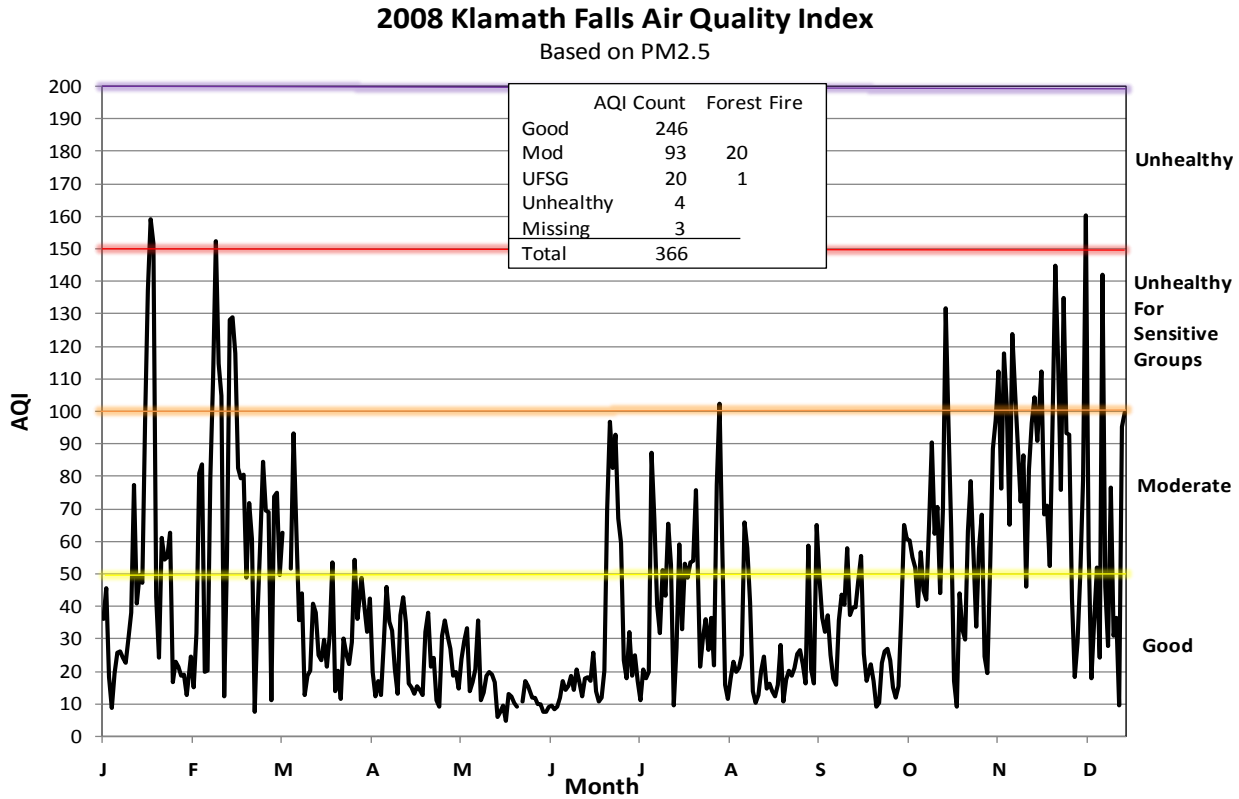


Figure 16. 2008 Klamath Falls Air Quality Summary

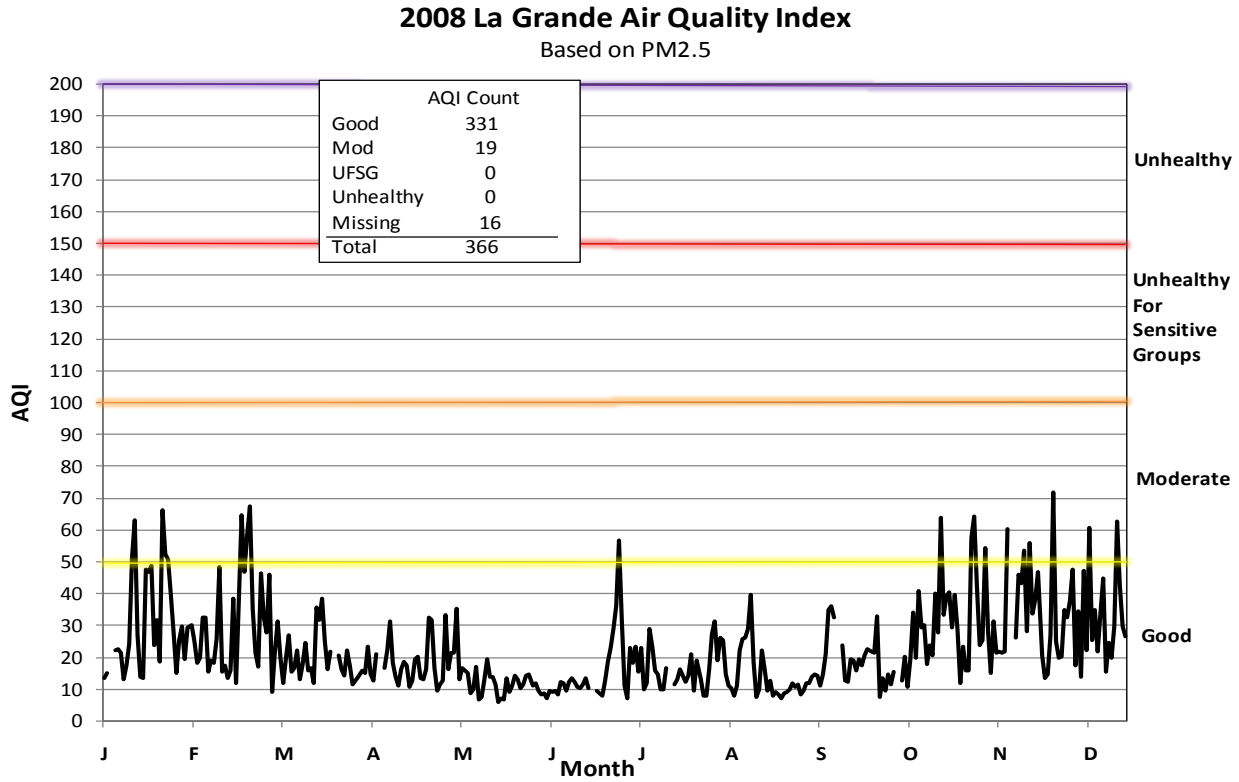


Figure 17. 2008 La Grande Air Quality Summary

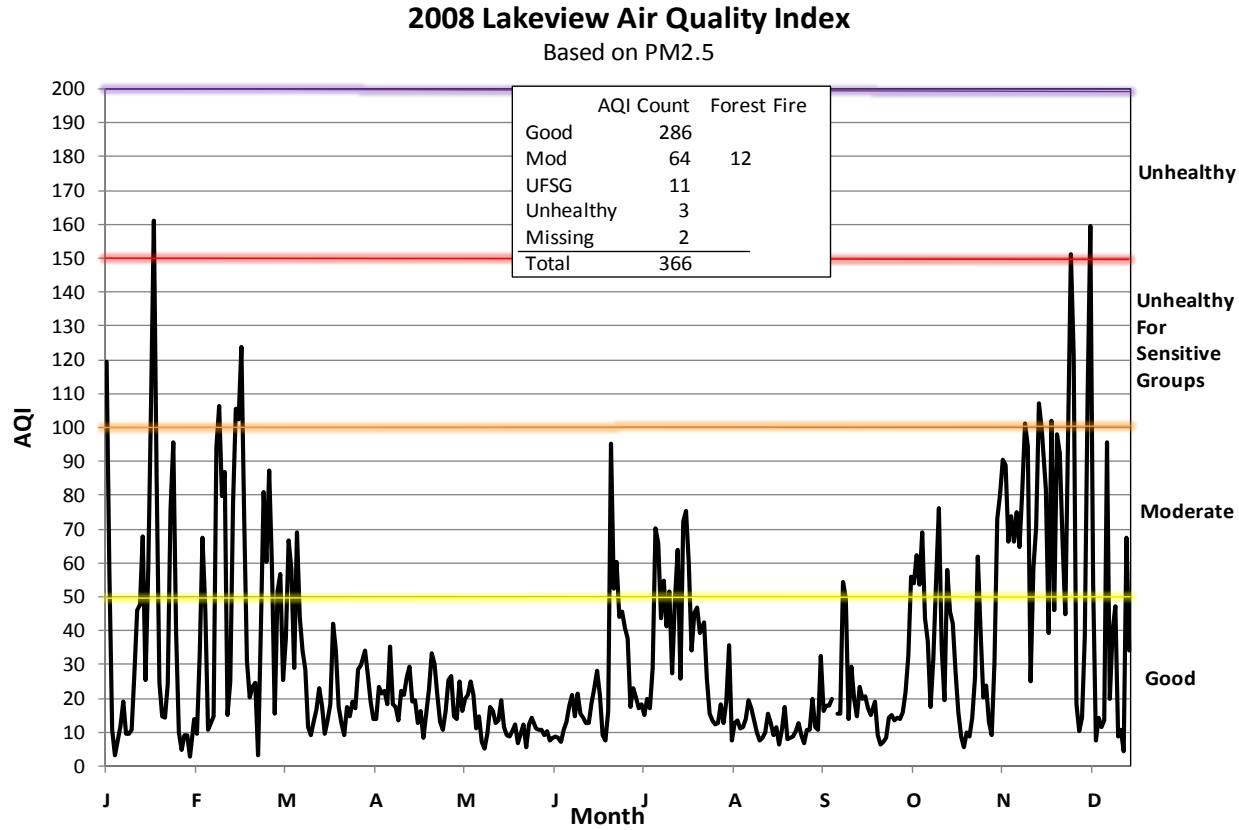


Figure 18. 2008 Lakeview Air Quality Summary Figure 19.

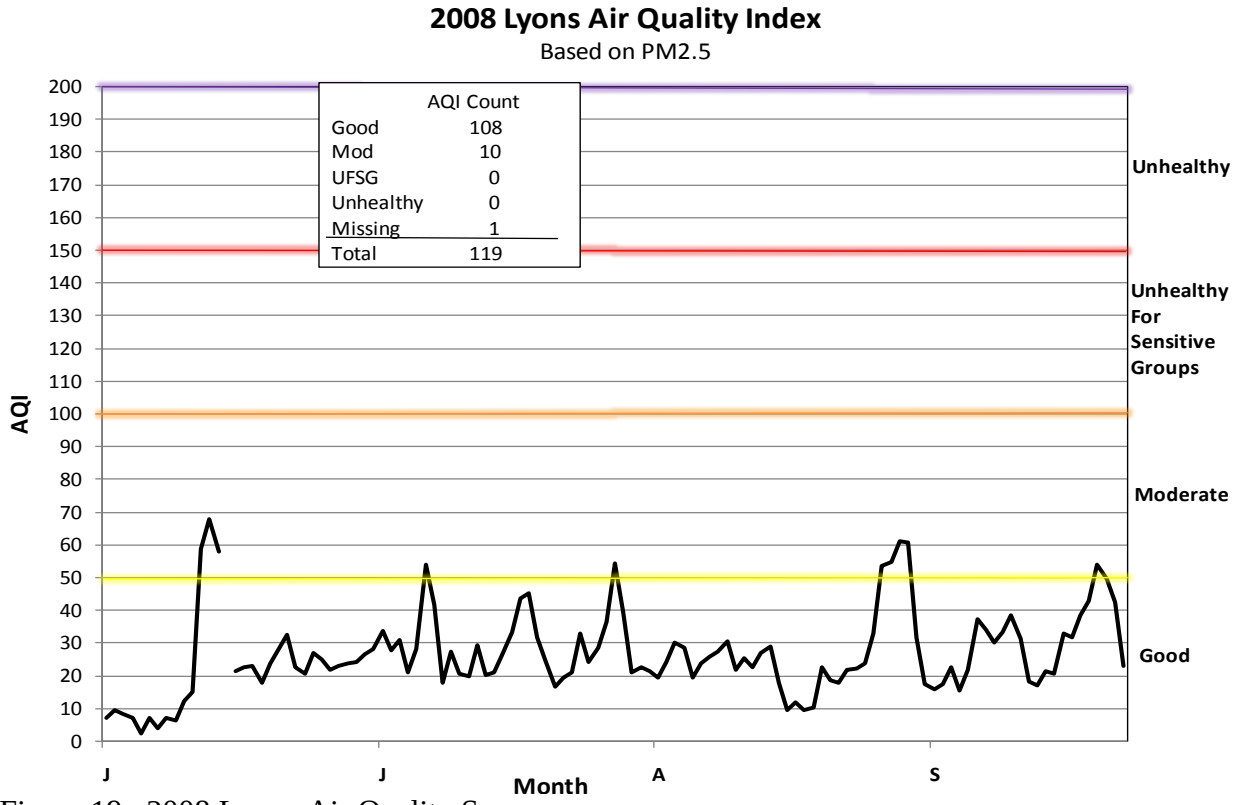


Figure 19. 2008 Lyons Air Quality Summary

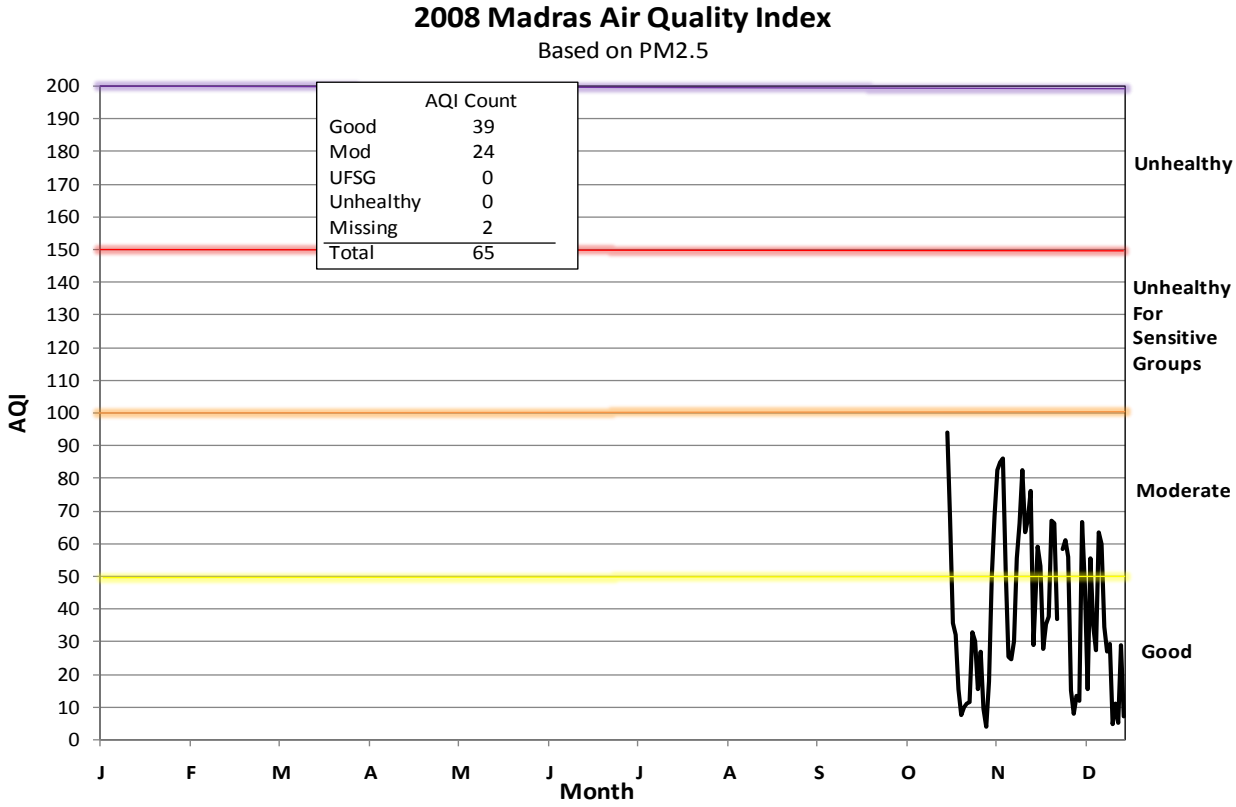


Figure 20. 2008 Madras Air Quality Summary

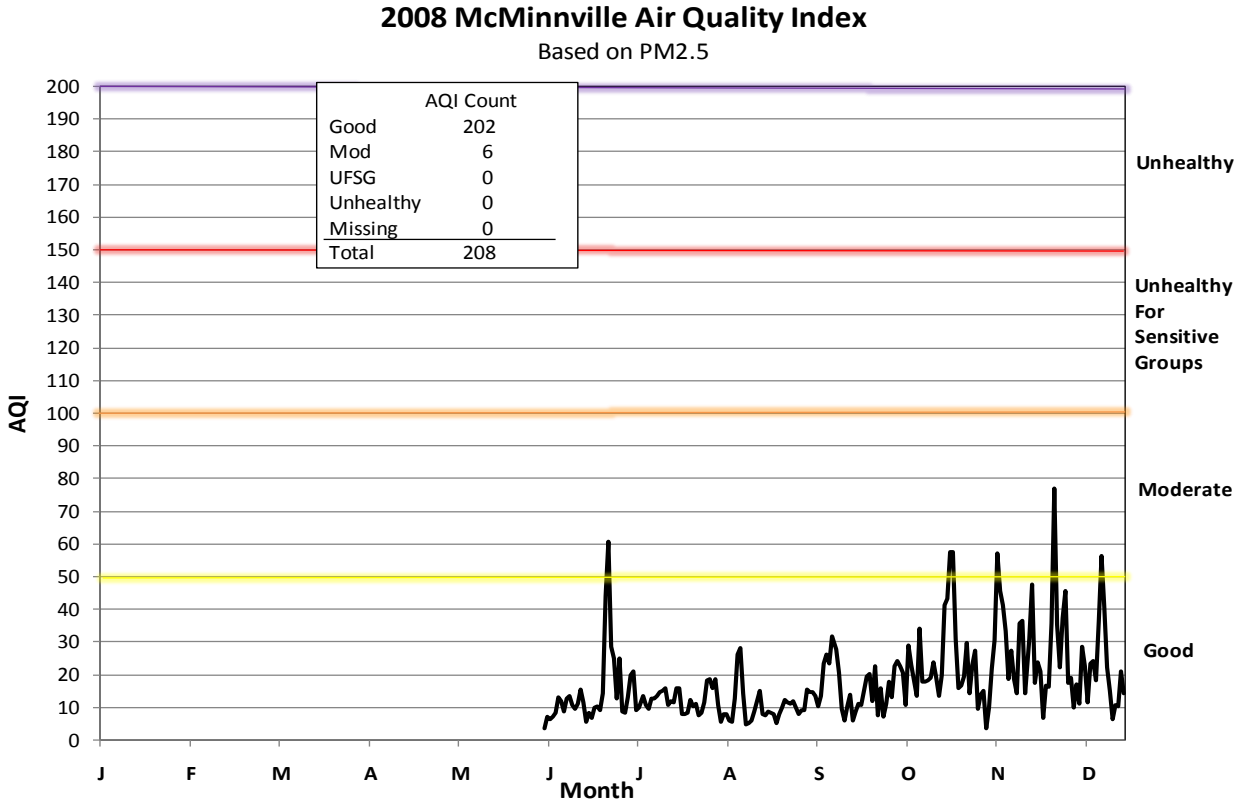


Figure 21. 2008 McMinnville Air Quality Summary

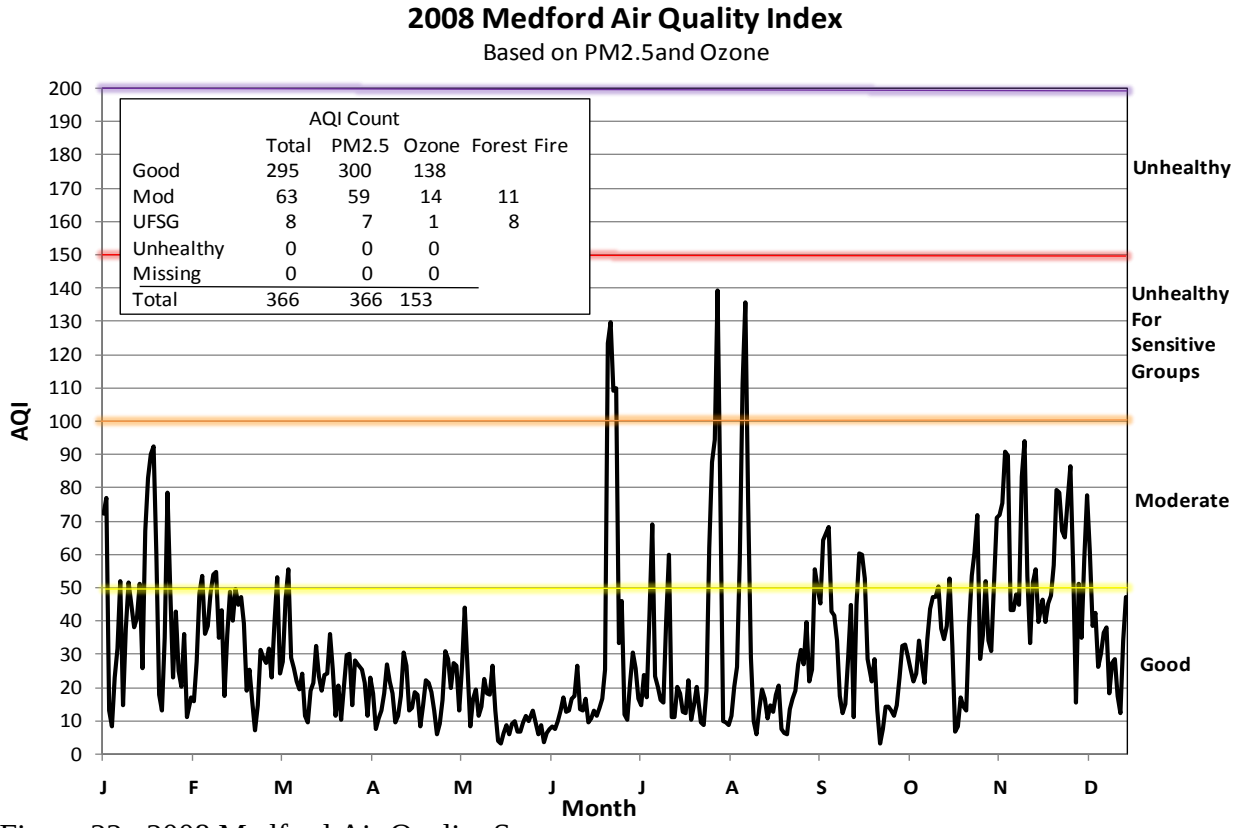


Figure 22. 2008 Medford Air Quality Summary

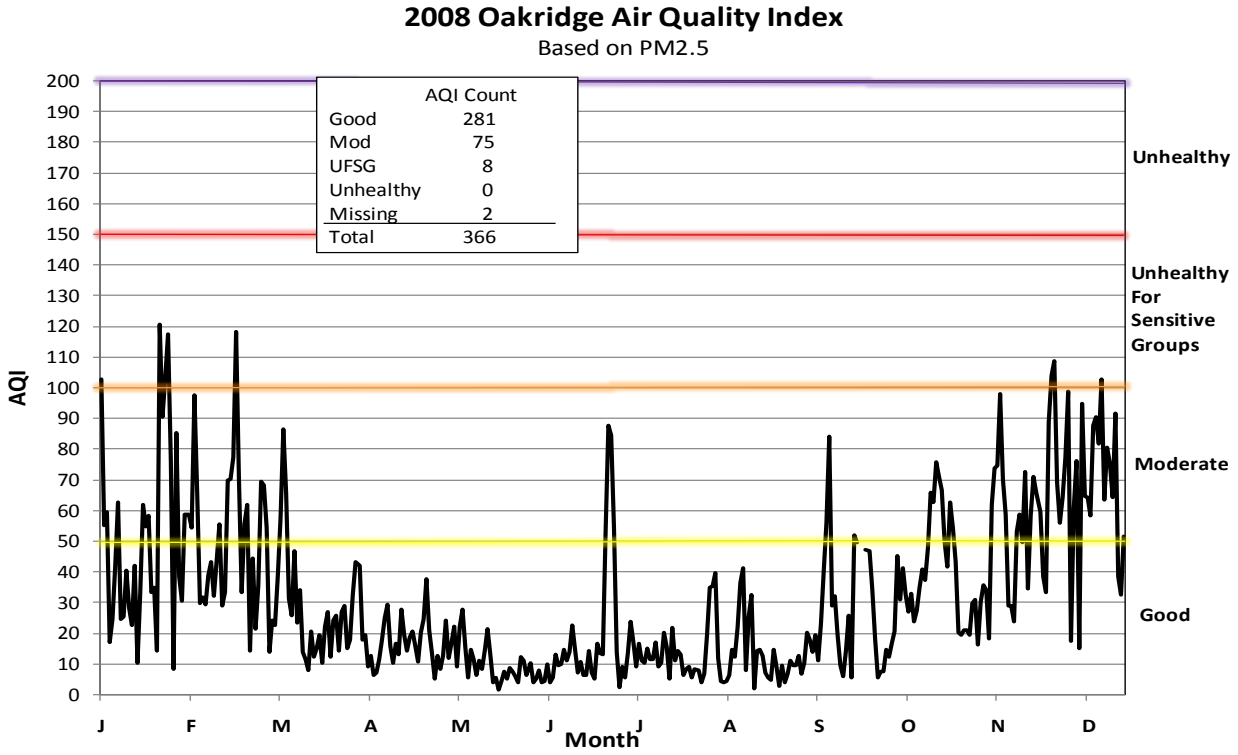


Figure 23. 2008 Oakridge Air Quality Summary

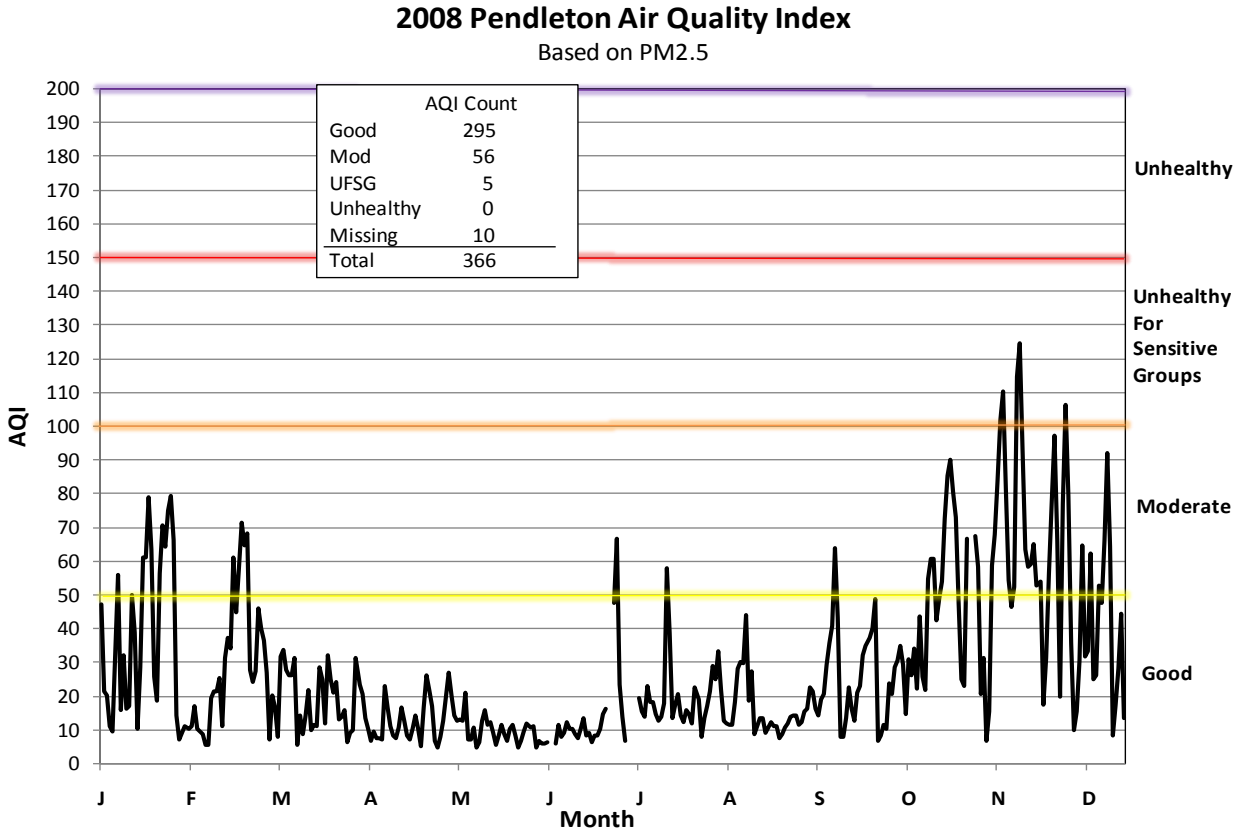


Figure 24. 2008 Pendleton Air Quality Summary

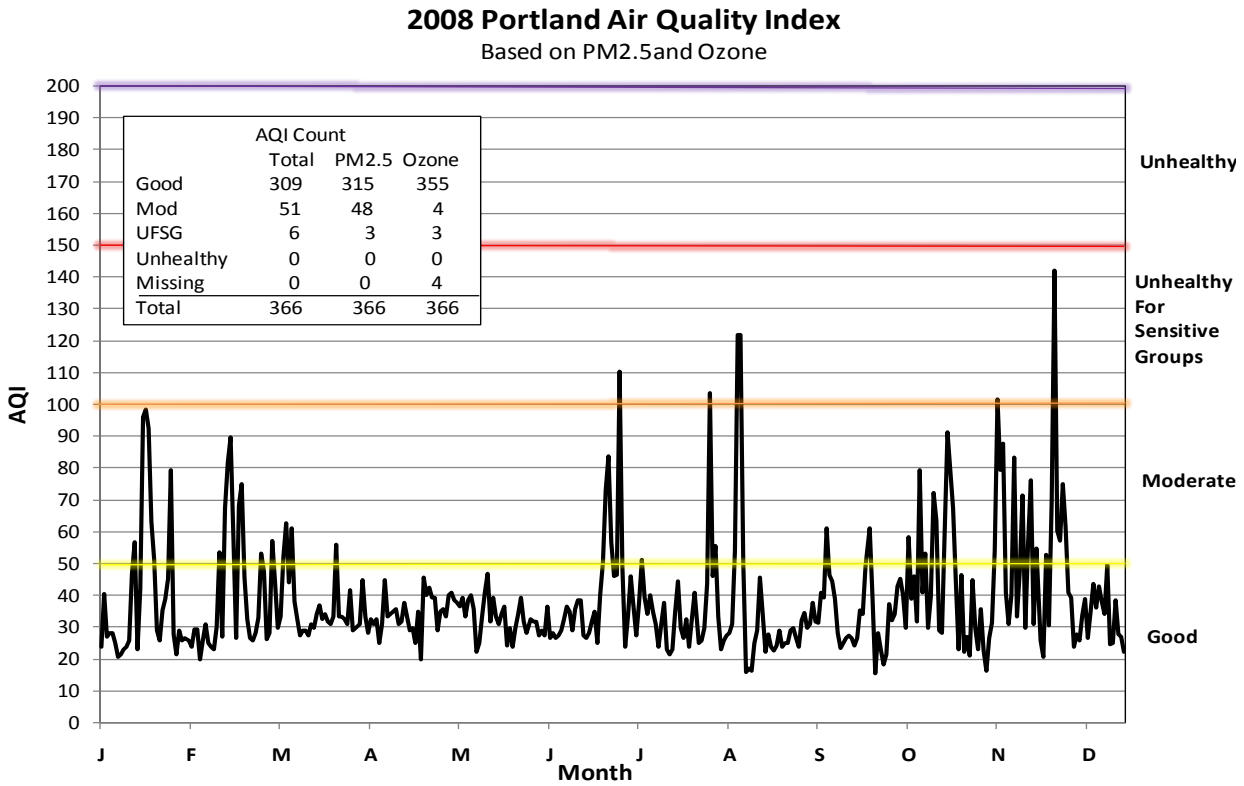


Figure 25. 2008 Portland Air Quality Summary

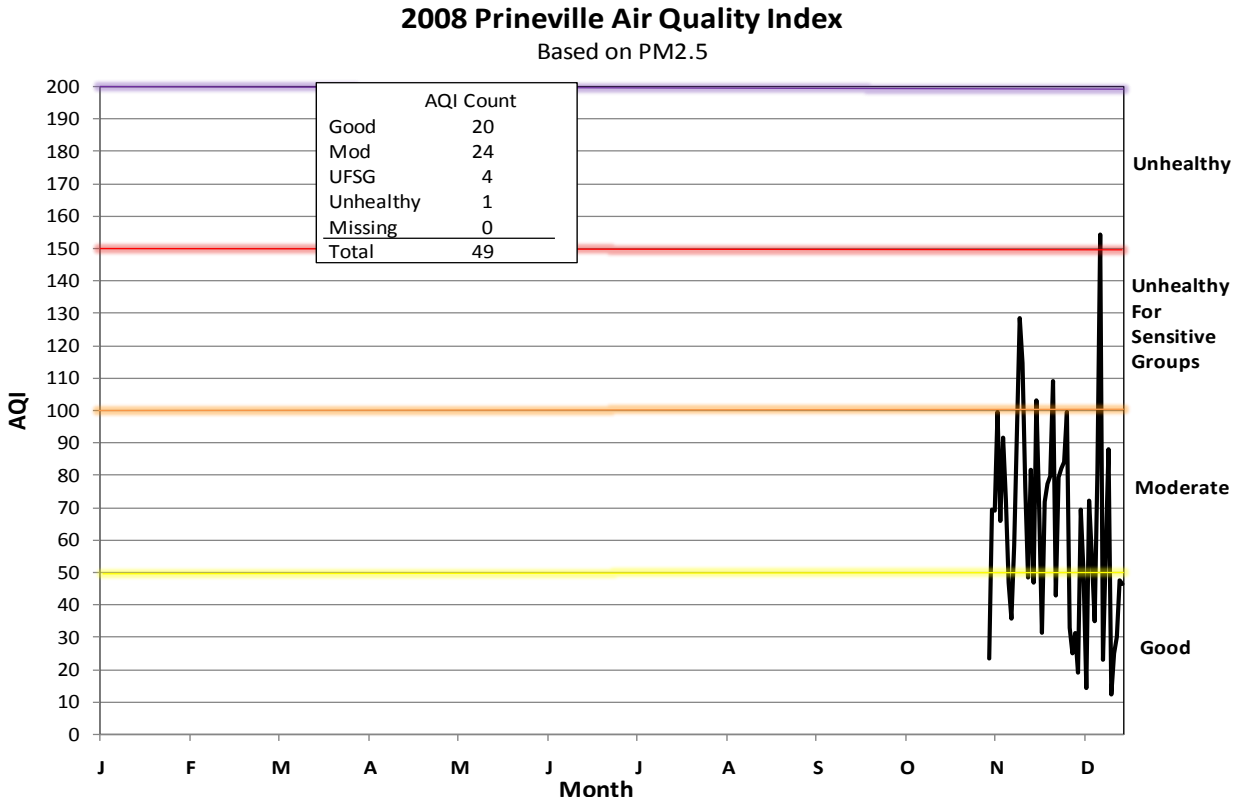


Figure 26. 2008 Prineville Air Quality Summary

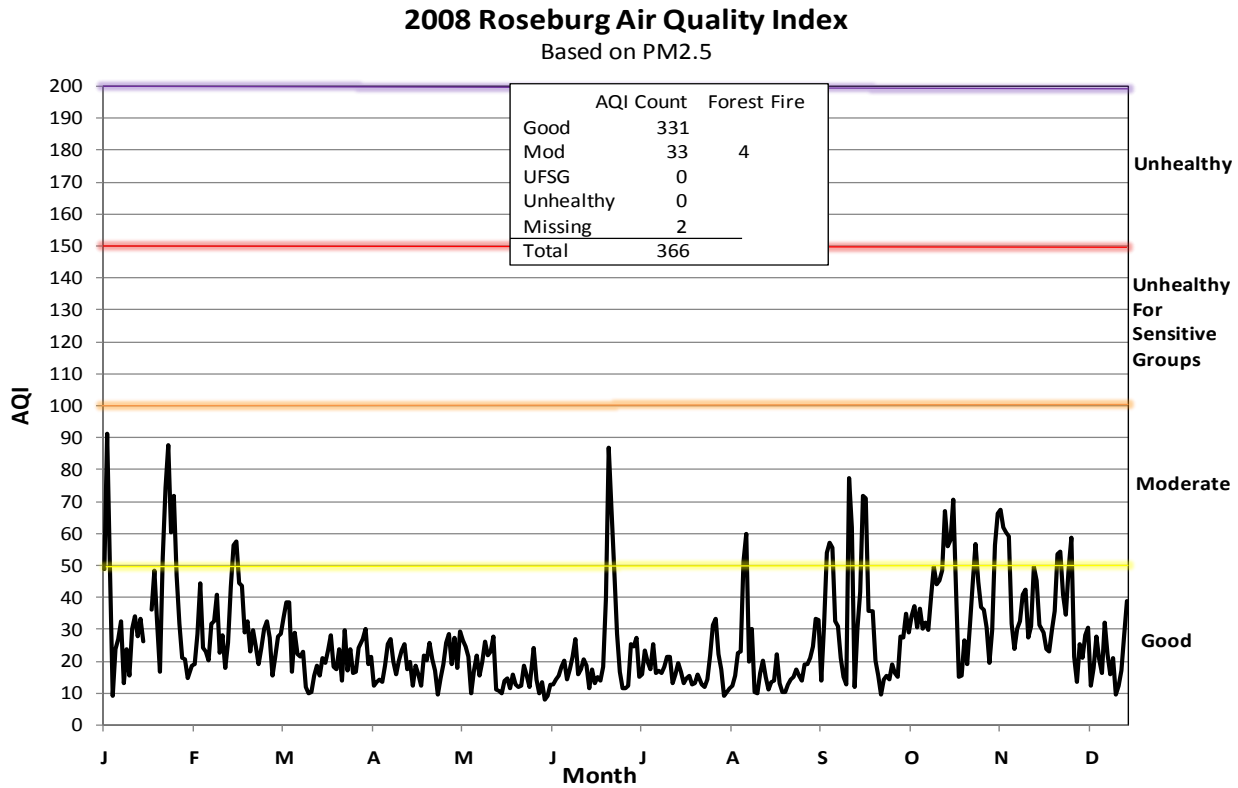


Figure 27. 2008 Roseburg Air Quality Summary

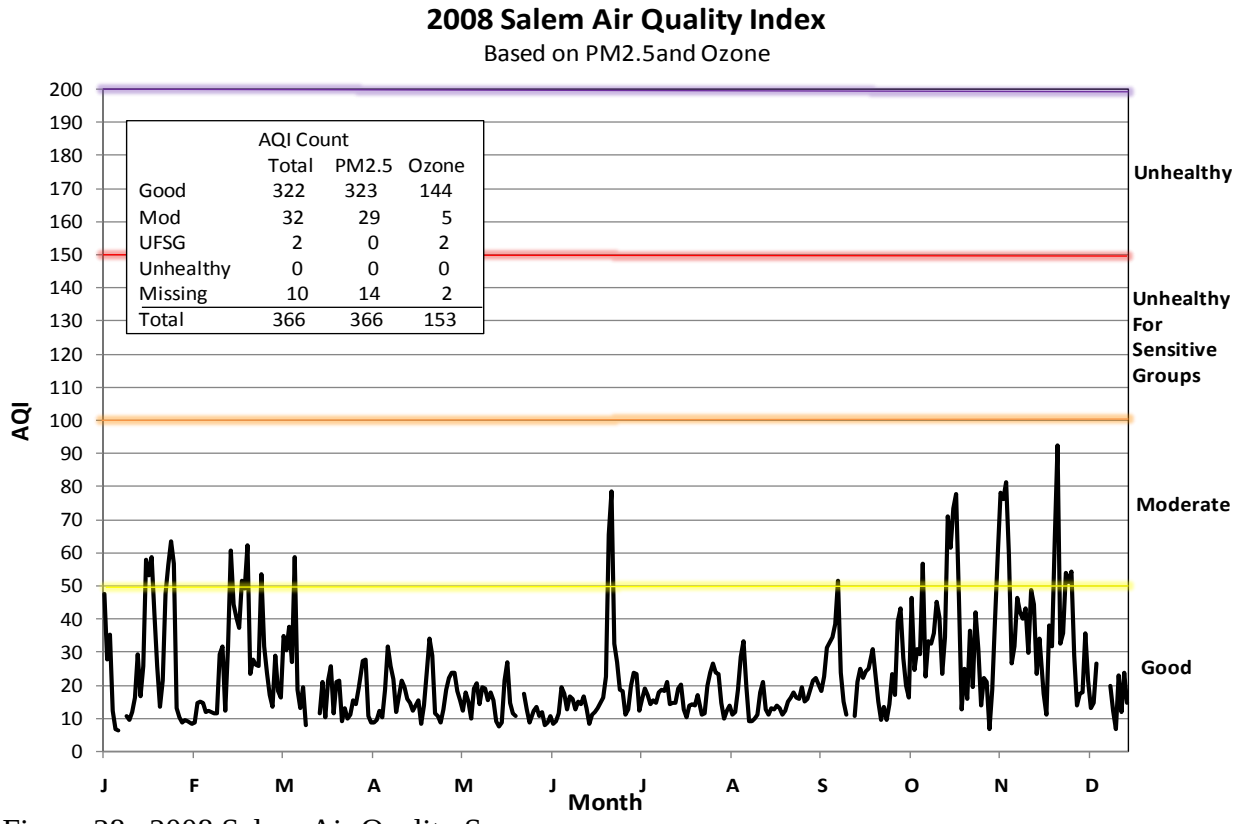


Figure 28. 2008 Salem Air Quality Summary

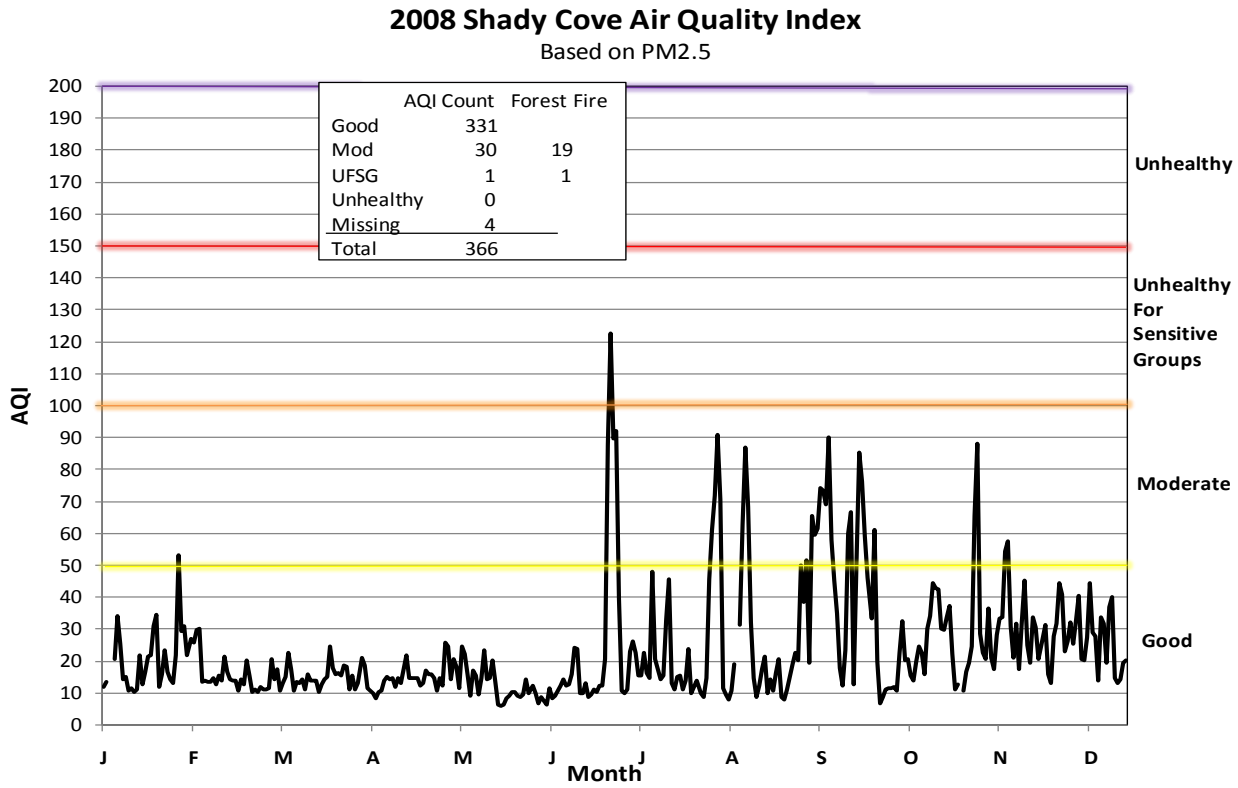


Figure 29. 2008 Shady Cove Air Quality Summary

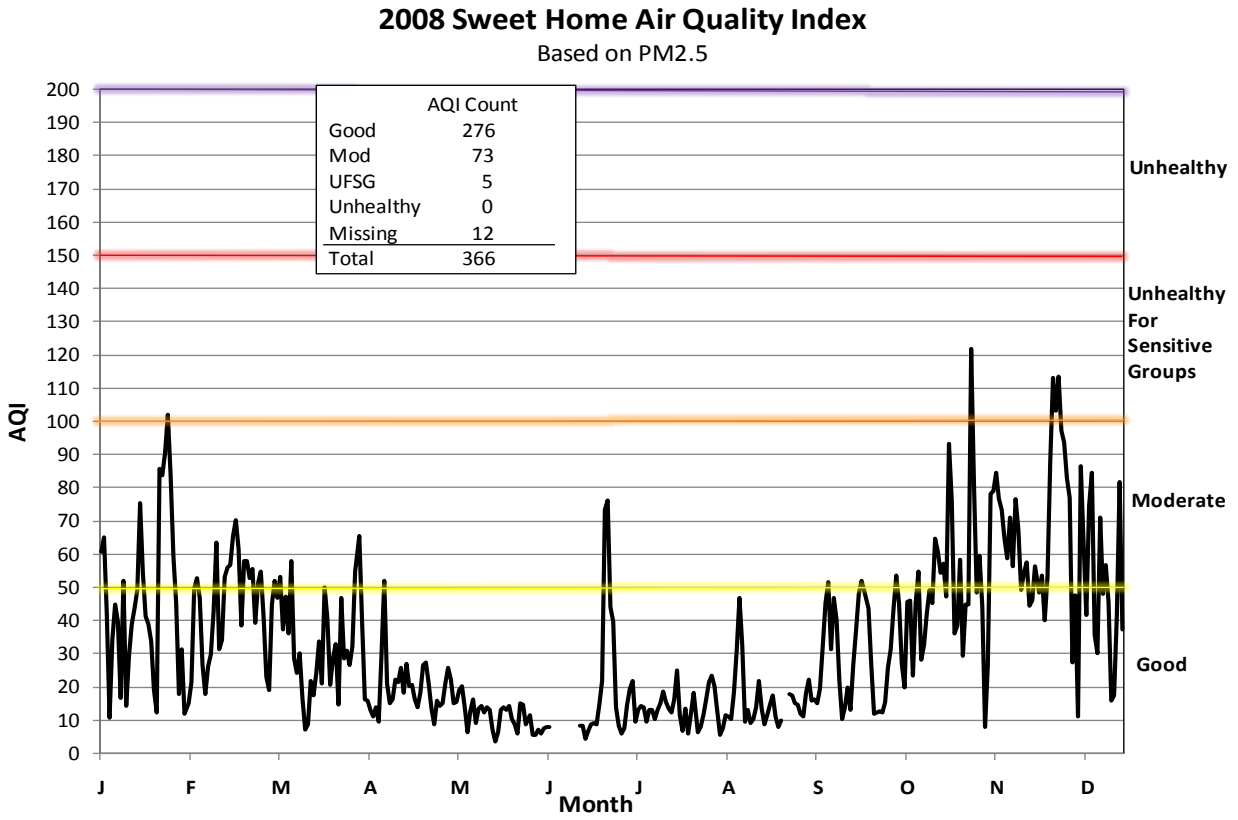


Figure 30. 2008 Sweet Home Air Quality Summary

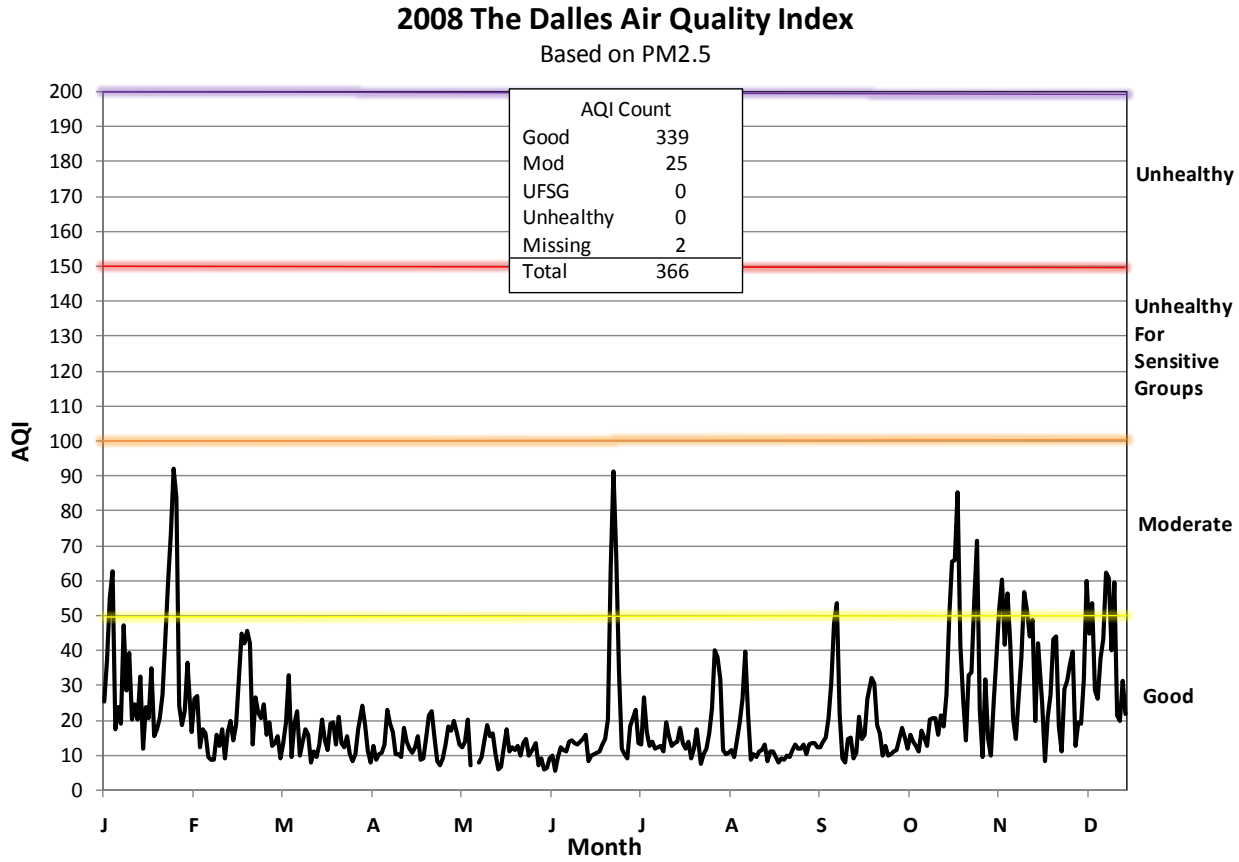


Figure 31. 2008 The Dalles Air Quality Summary

Table 3. Summary of the 2008 daily AQI values.

County	City	Good	Moderate	USG	Unhealthy	Missing	Total
Baker	Baker City	331	34	1	0	0	366
Benton	Corvallis	346	20	0	0	0	366
Crook	Prineville	20	24	4	1	0	49
Deschutes	Bend	350	15	0	0	1	366
Douglas	Roseburg	331	33	0	0	2	366
Grant	John Day	290	36	2	0	38	366
Harney	Burns	284	72	8	1	1	366
Jackson	Medford	295	63	8	0	0	366
Jackson	Shady Cove	331	30	1	0	4	366
Jefferson	Madras	39	24	0	0	2	65
Josephine	Cave Junction	342	15	4	1	4	366
Josephine	Grants Pass	310	54	2	0	0	366
Josephine	Applegate Valley	344	14	3	1	4	366
Klamath	Klamath Falls	246	93	20	4	3	366
Lake	Lakeview	286	64	11	3	2	366
Lane	Cottage Grove	335	26	1	0	4	366
Lane	Eugene/Springfield	316	49	1	0	0	366
Lane	Oakridge	281	75	8	0	2	366
Linn	Albany	328	36	0	0	2	366
Linn	Sweet Home	276	73	5	0	12	366
Marion	Salem	322	32	2	0	10	366
Multnomah, Clackamas	Portland	309	51	6	0	0	366
Umatilla	Hermiston	198	14	1	0	4	217
Umatilla	Pendleton	295	56	5	0	10	366
Union	Cove	335	19	0	0	12	366
Union	La Grande	331	19	0	0	16	366
Wallowa	Enterprise	341	21	0	0	4	366
Wasco	The Dalles	339	25	0	0	2	366
Washington	Beaverton	330	32	1	0	3	366
Washington	Hillsboro	310	51	4	0	1	366
Yamhill	McMinnville	202	6	0	0	0	208

Air Quality Trends

Most areas in the state meet the National Ambient Air Quality Standards (NAAQS) escept Klamath Falls and Oakridge which currently violate the daily $PM_{2.5}$ standard. Lakeview and Burns are also exceeding the PM2.5 standard and may violate it when three years of federal reference data are collected at the end of 2009. Figures 32 and 33 show the reduction in PM_{10} and CO ambient pollution, while Figure 34a illustrates ozone is still near the NAAQS and Figure 34b shows Portland ozone trends relative to population and vehicle miles.
Figures 35a through h show the $PM_{2.5}$ trends for the daily and annual average standard.

PM_{10} Trends

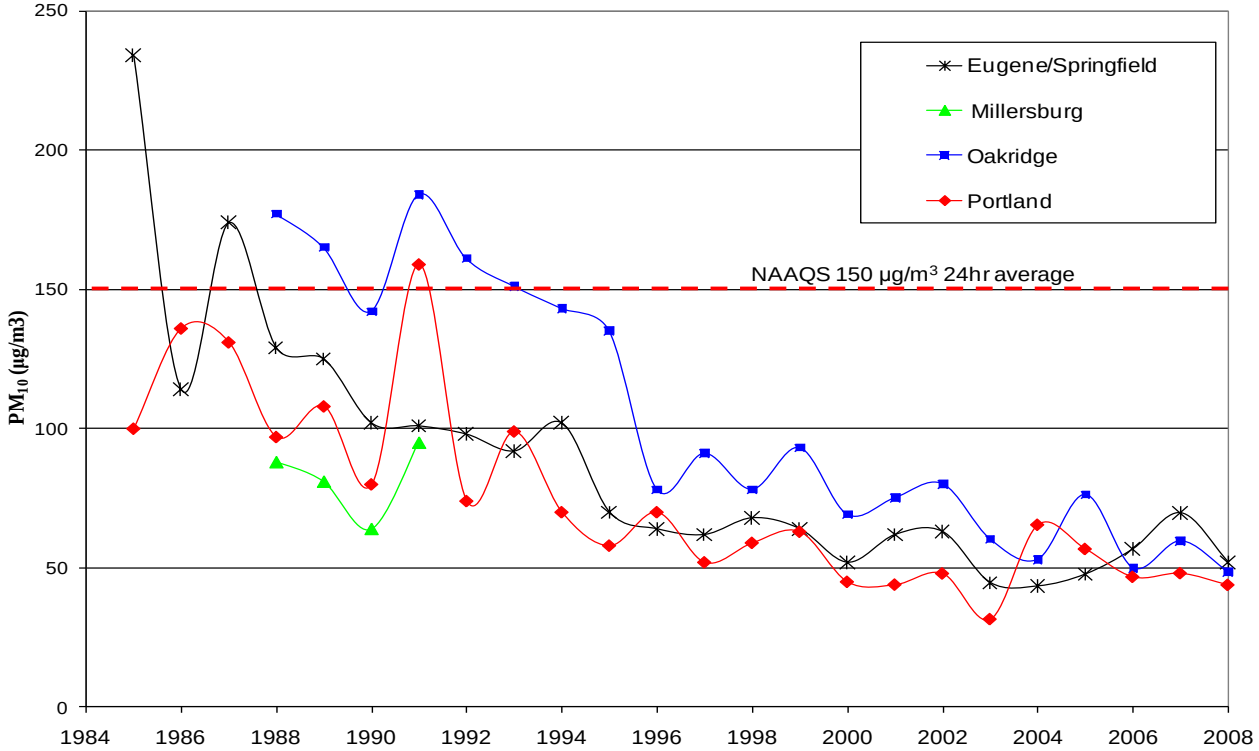


Figure 32a. PM_{10} trend for NW Oregon cities with the 2nd highest annual 24 hour average.

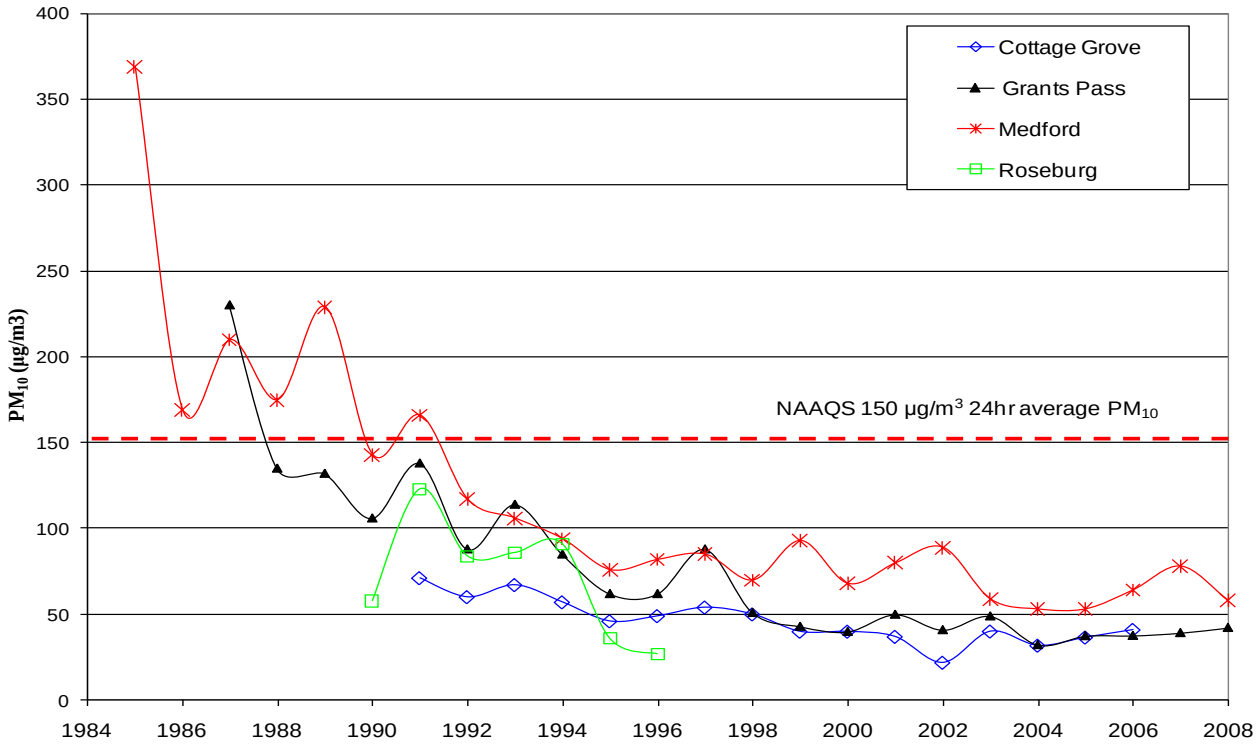


Figure 32b. PM_{10} trend for SW Oregon cities with the 2nd highest annual 24 hour average.

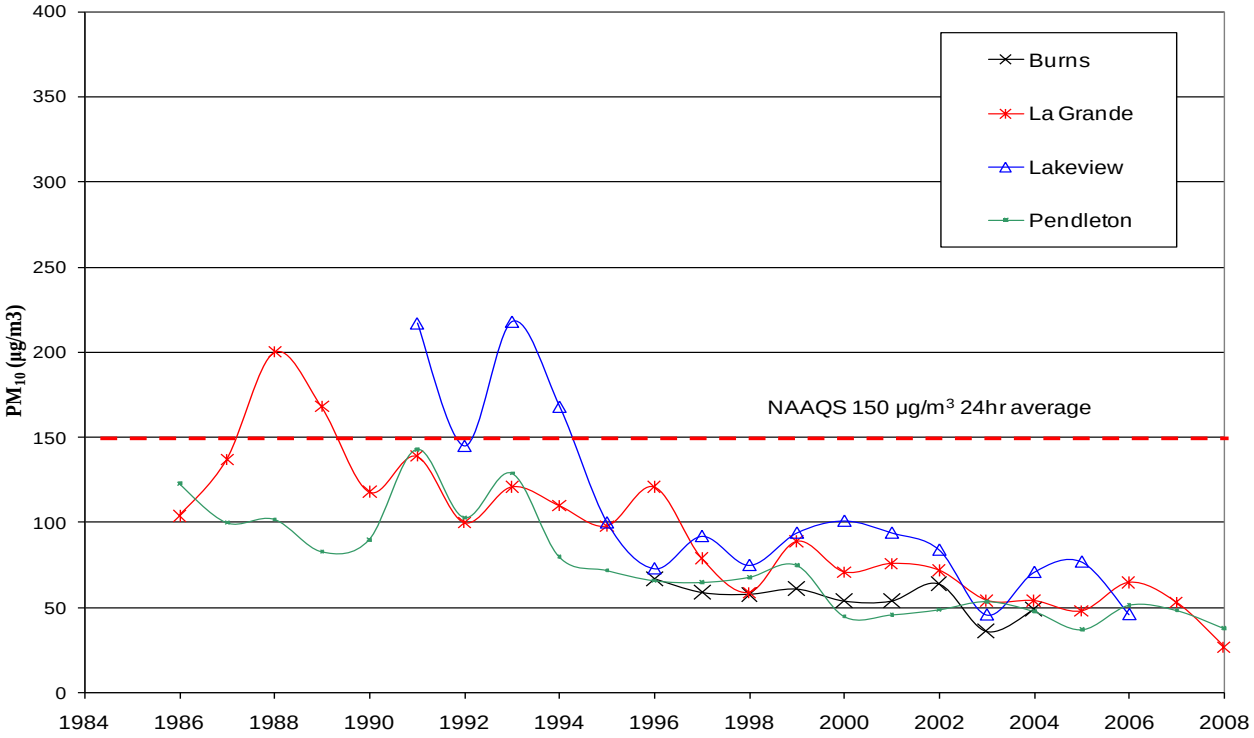


Figure 32c. PM_{10} trend for Eastern Oregon cities with the 2nd highest annual 24 hour average.

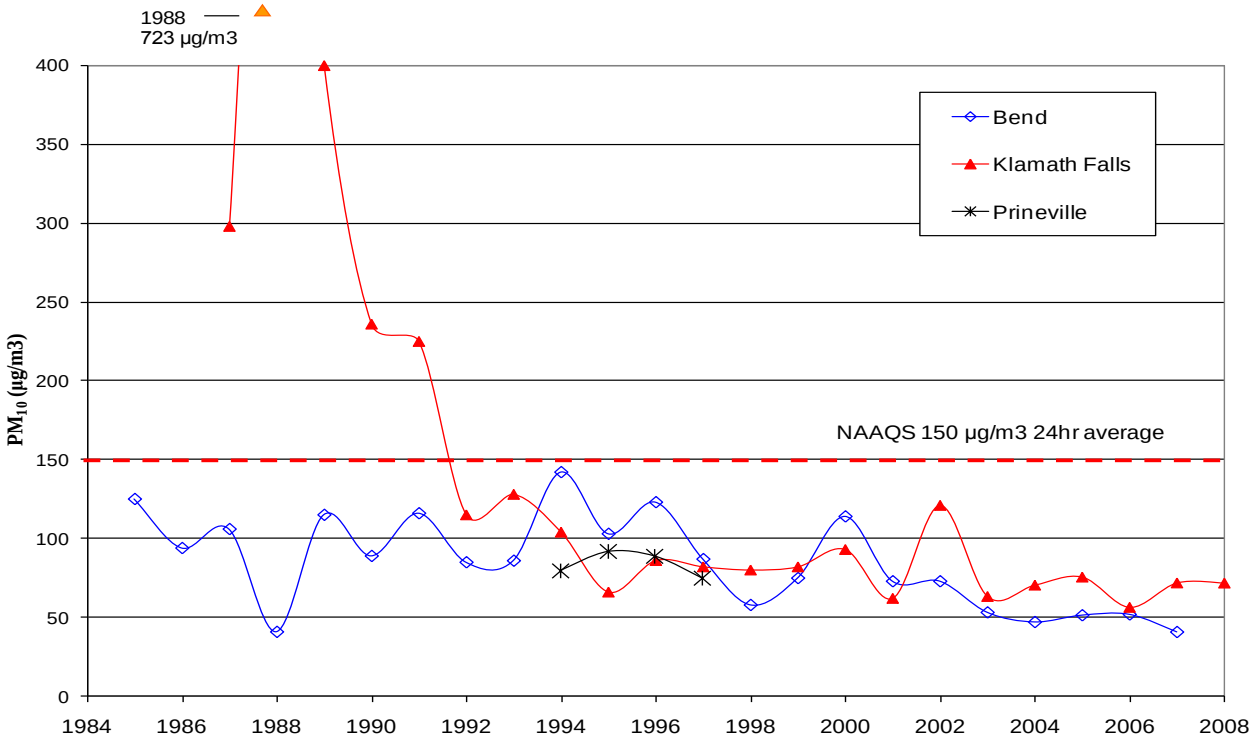


Figure 32d. PM_{10} trend for Central Oregon cities with the 2nd highest annual 24 hour average.

Carbon Monoxide Trends

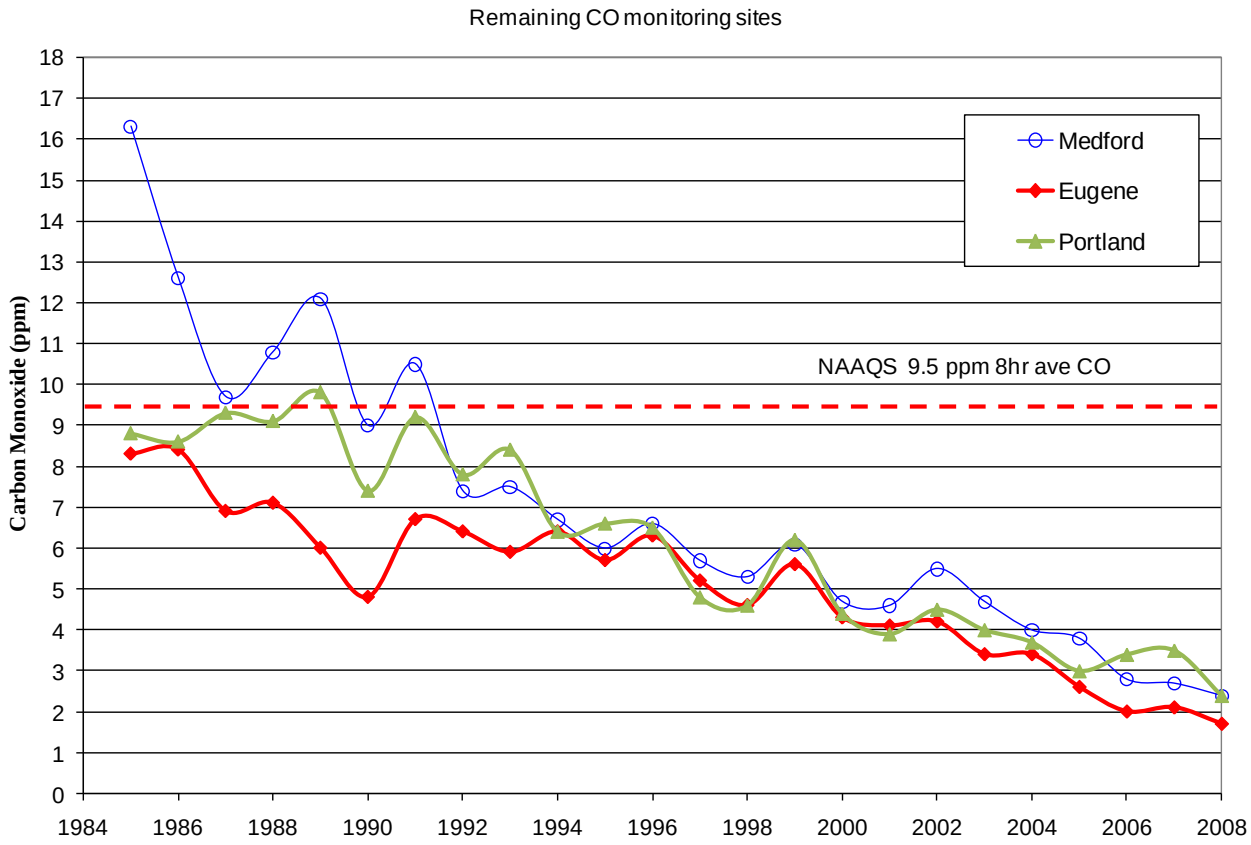


Figure 33. CO trend for Medford, and Portland, and Eugene using second highest annual eight hour average.

Ozone Trends

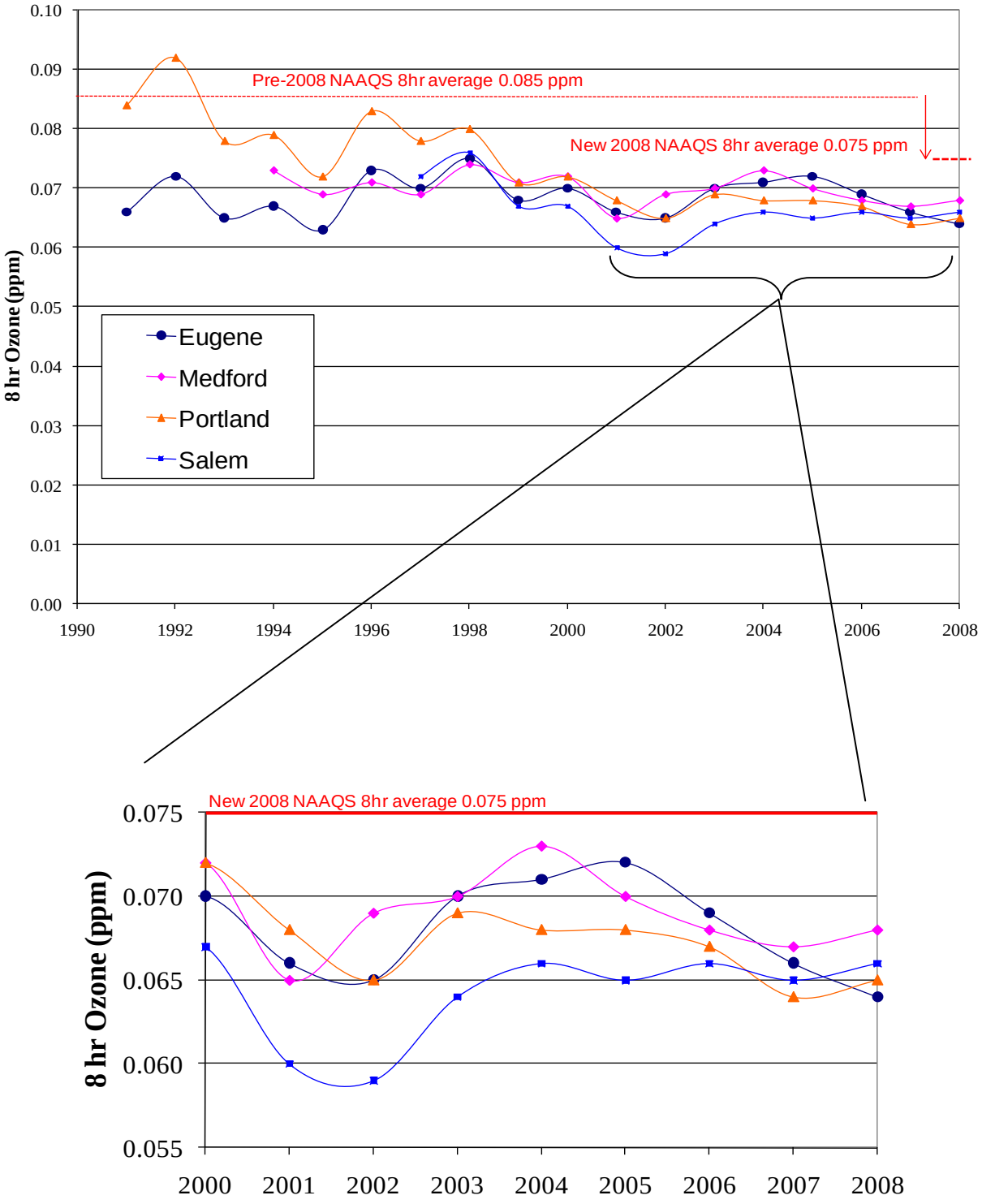
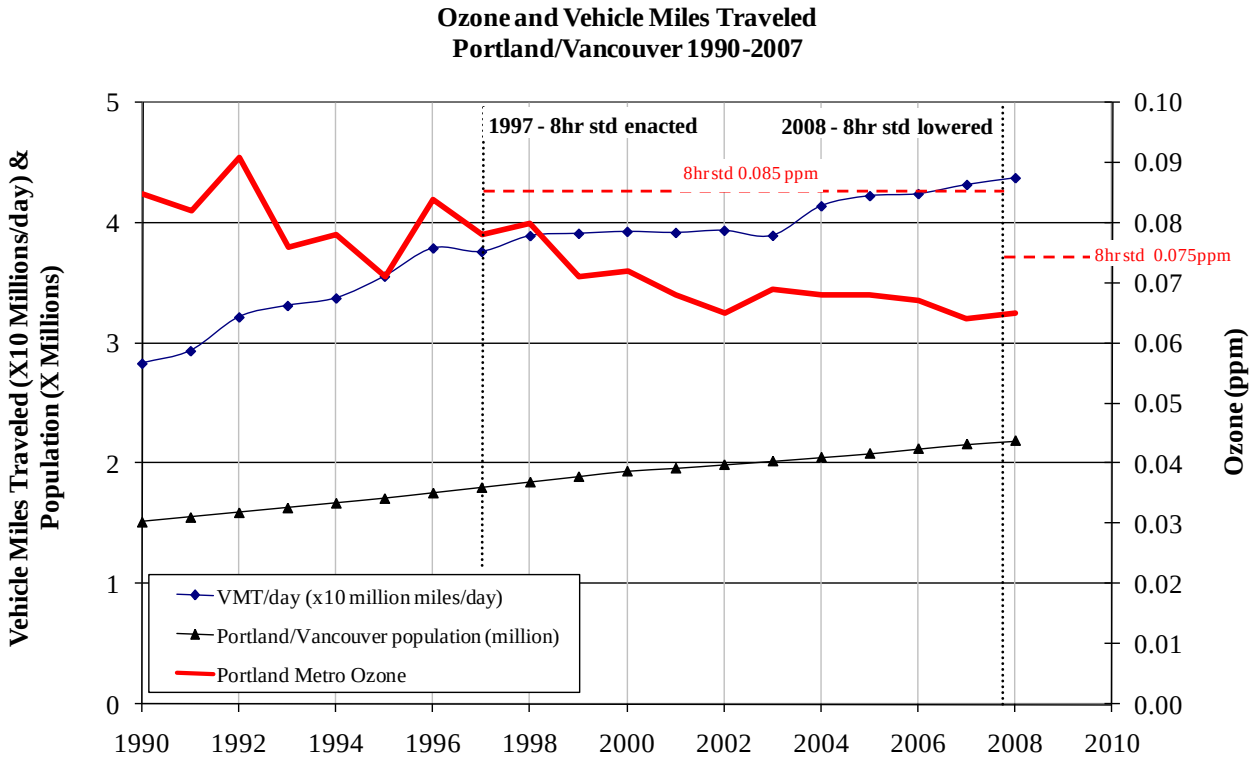


Figure 34a. Ozone trend using the three year average of fourth highest annual eight hour ozone value. In 2008 the eight hour standard was lowered to 0.075 ppm.



Ozone is the 3yr average of the fourth highest 8hr average at the maximum site

Figure 34b. Portland/Vancouver ozone trend using the three year average of fourth highest eight hour ozone value with Vehicle Miles Traveled and Population trends. In 2008 the eight hour standard was lowered to 0.075 ppm.
Population figures are from Portland State University Population Research Center. Vehicle miles traveled are taken from Metro for the Portland/Vancouver area.

$PM_{2.5}$ Trends

Figures 35a through h provide the $PM_{2.5}$ 98th percentile and annual average.

Note: The 98th Percentile is a NAAQS standard and is the 98th percent highest sample day. For example, it is the 4th highest sample day if a site has 200 sample days (200*0.98)=196; 200-196= 4.

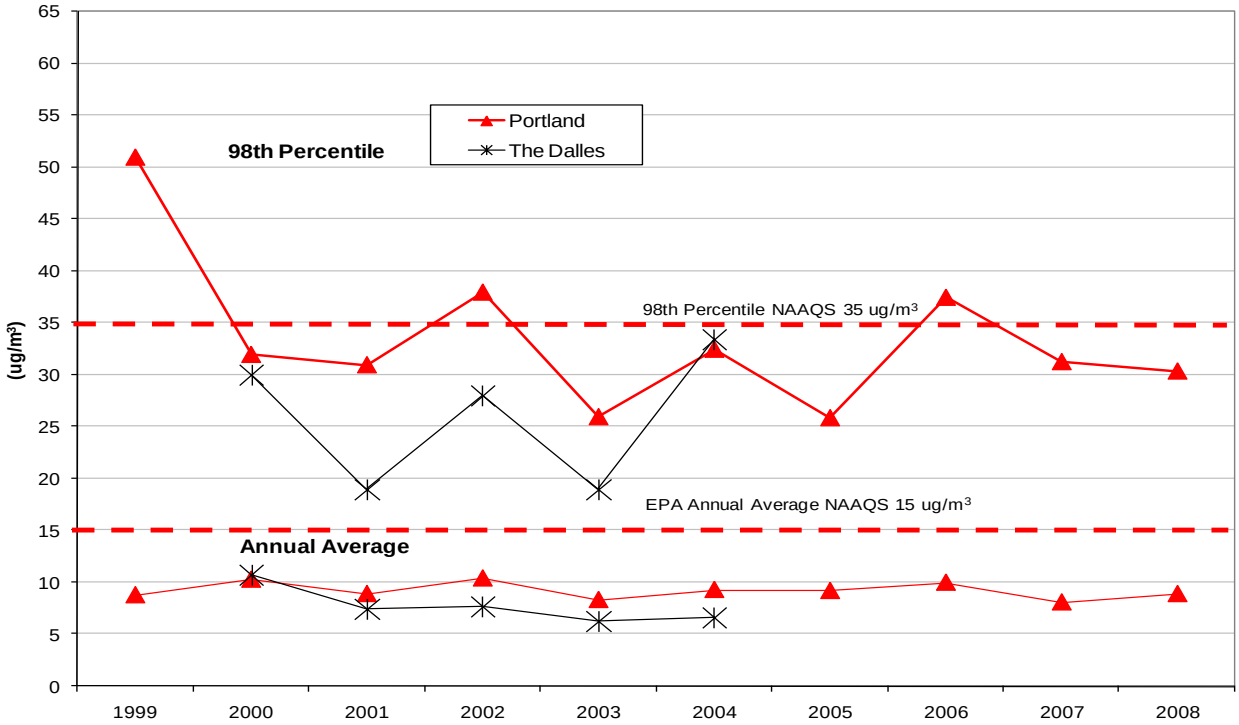


Figure 35a. Portland and The Dalles $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

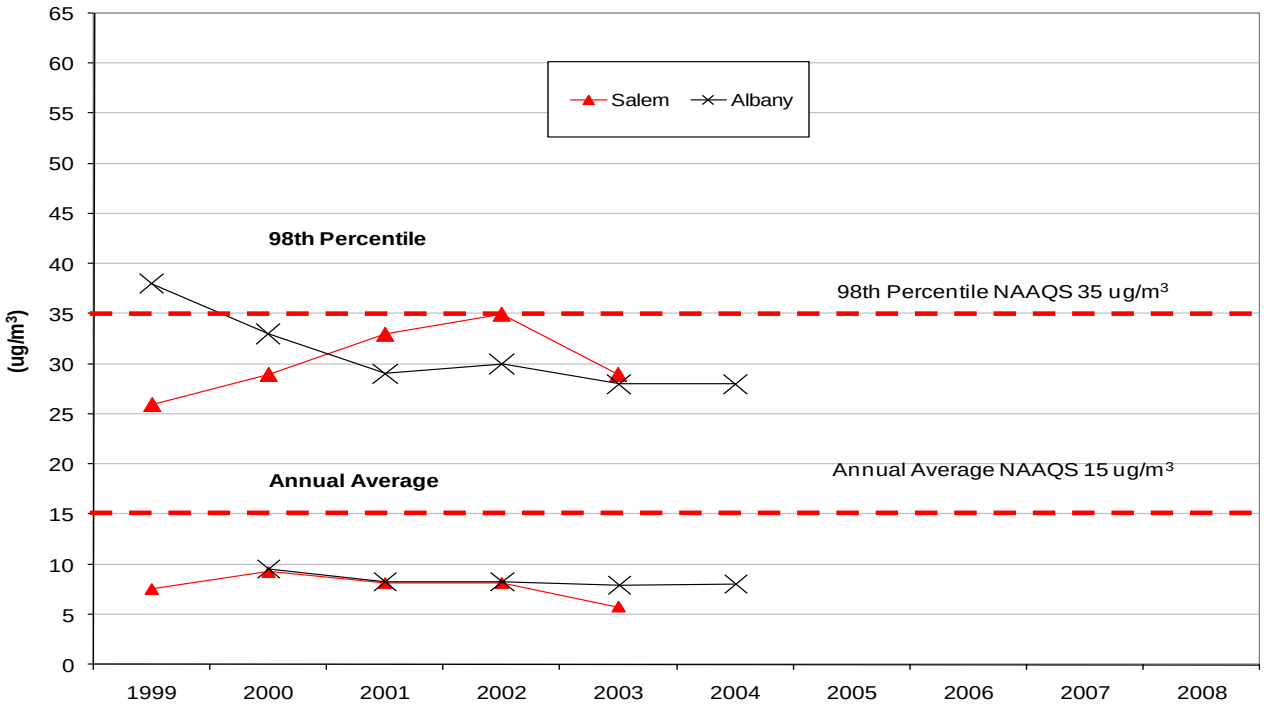


Figure 35b. Salem and Albany $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

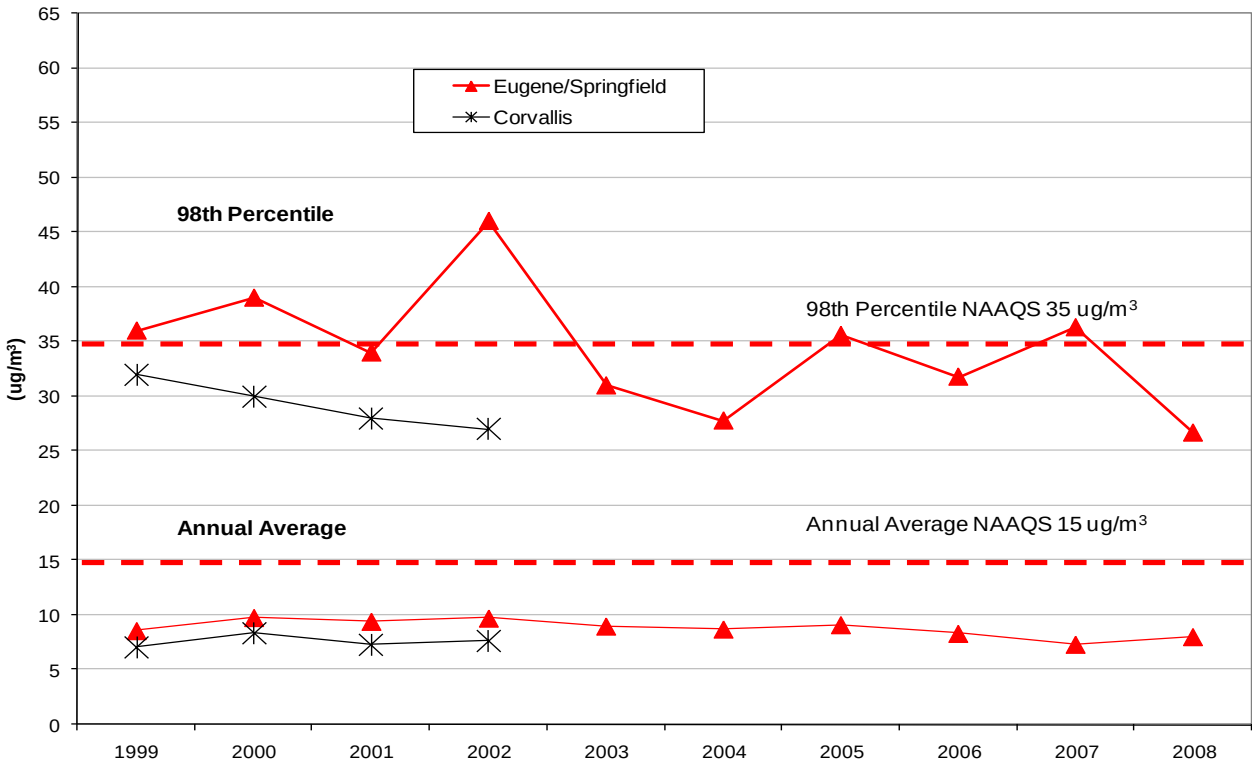


Figure 35c. Eugene and Corvallis $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

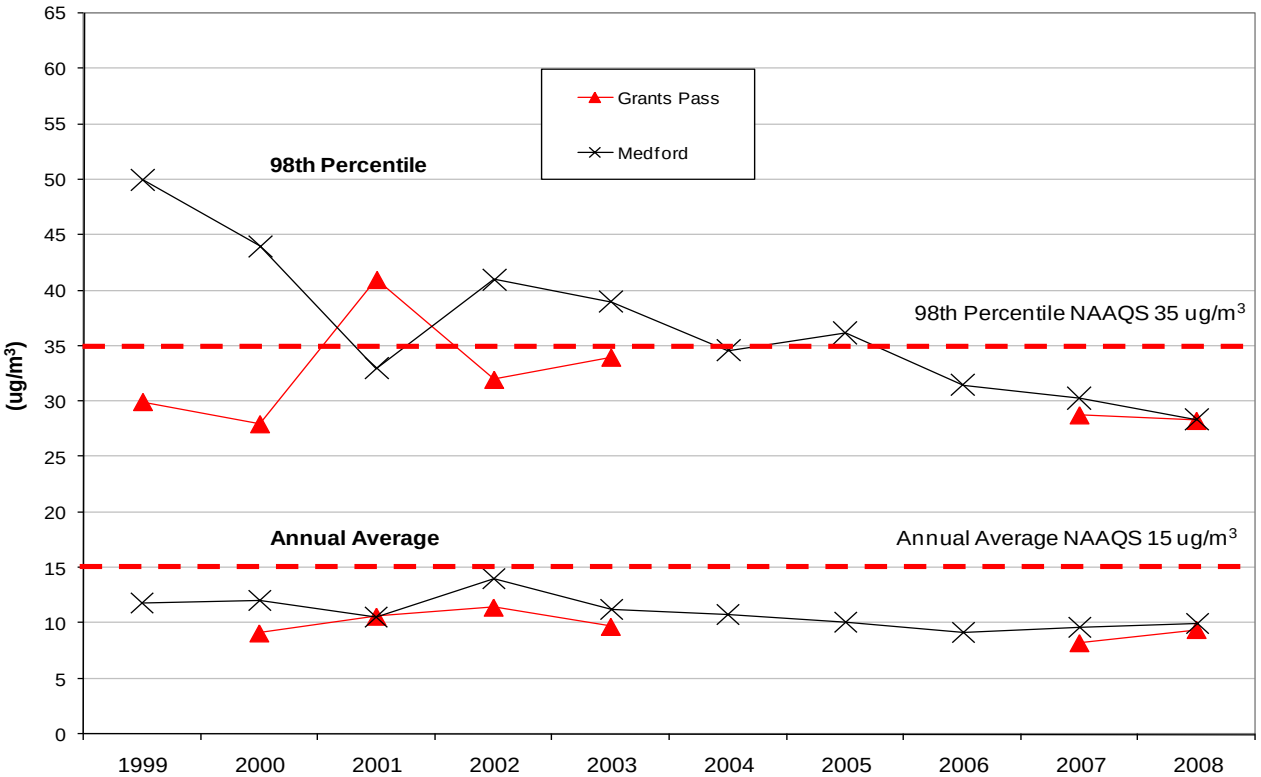


Figure 35d. Grants Pass and Medford $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

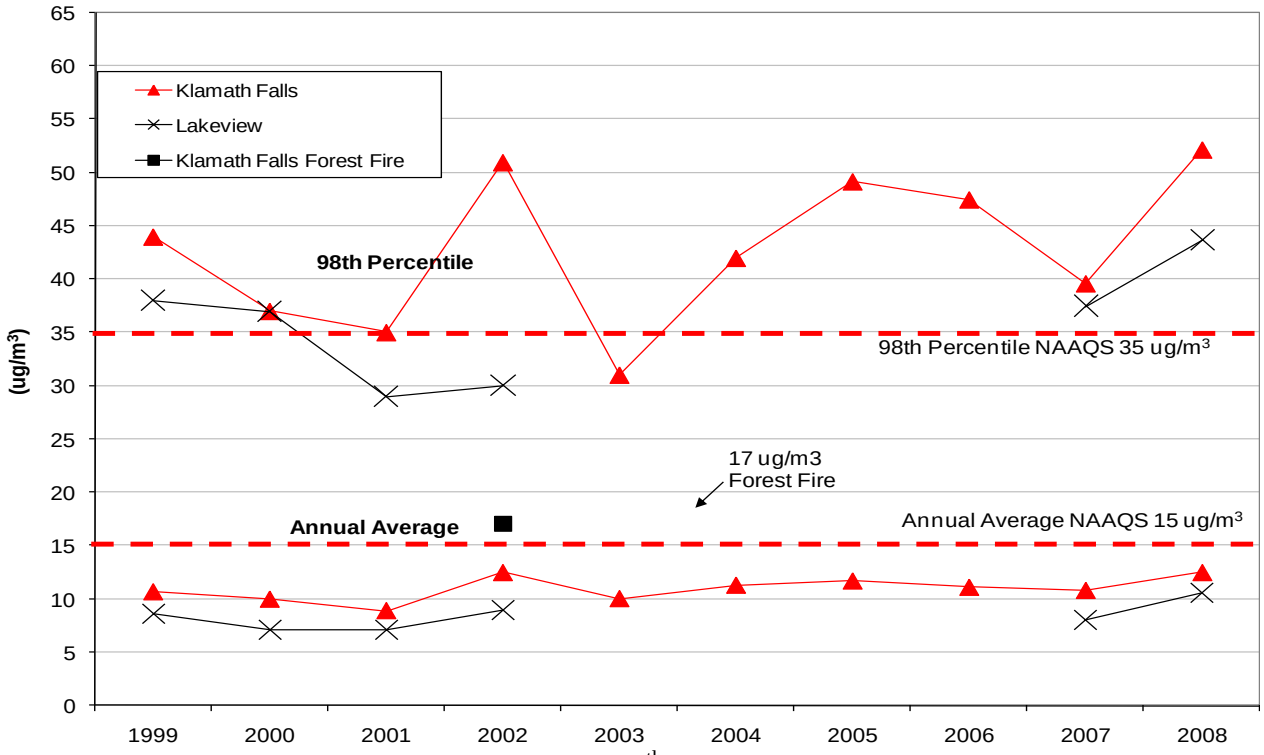


Figure 35e. Klamath Falls and Lakeview $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

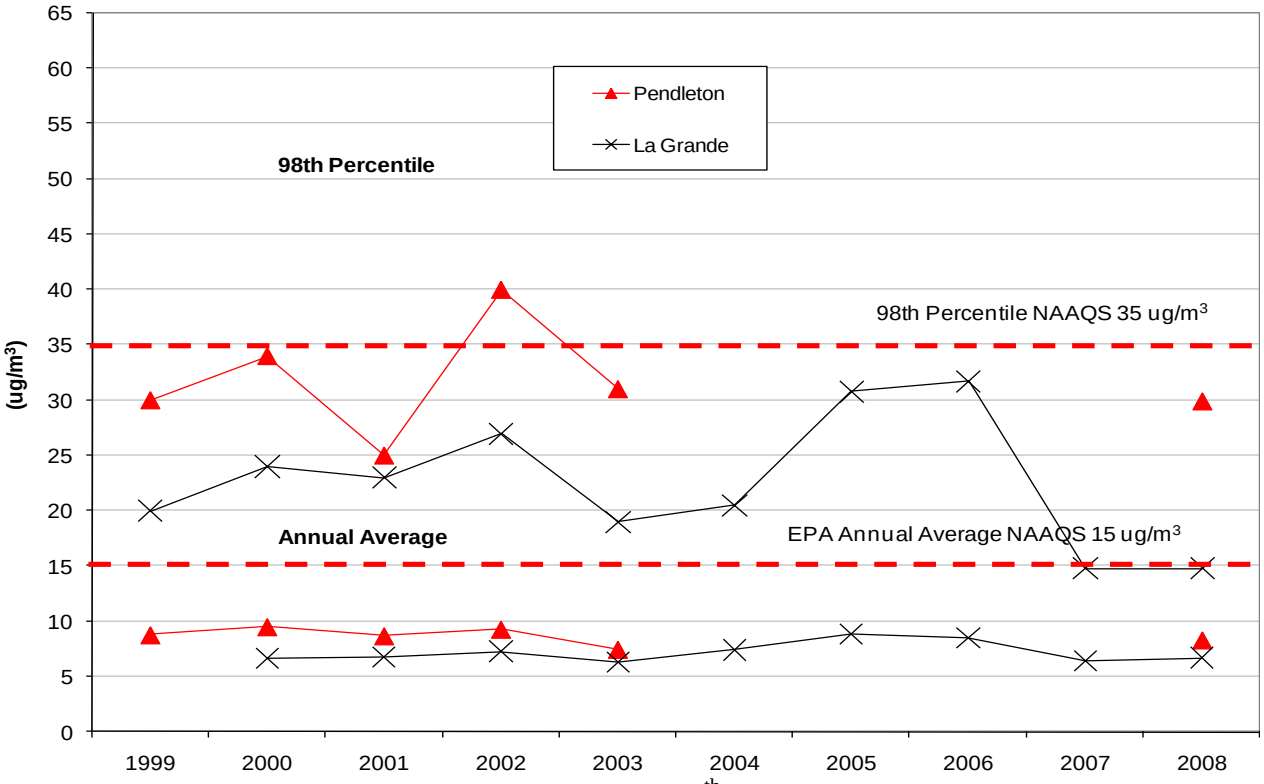


Figure 35f. Pendleton and La Grande Oregon $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

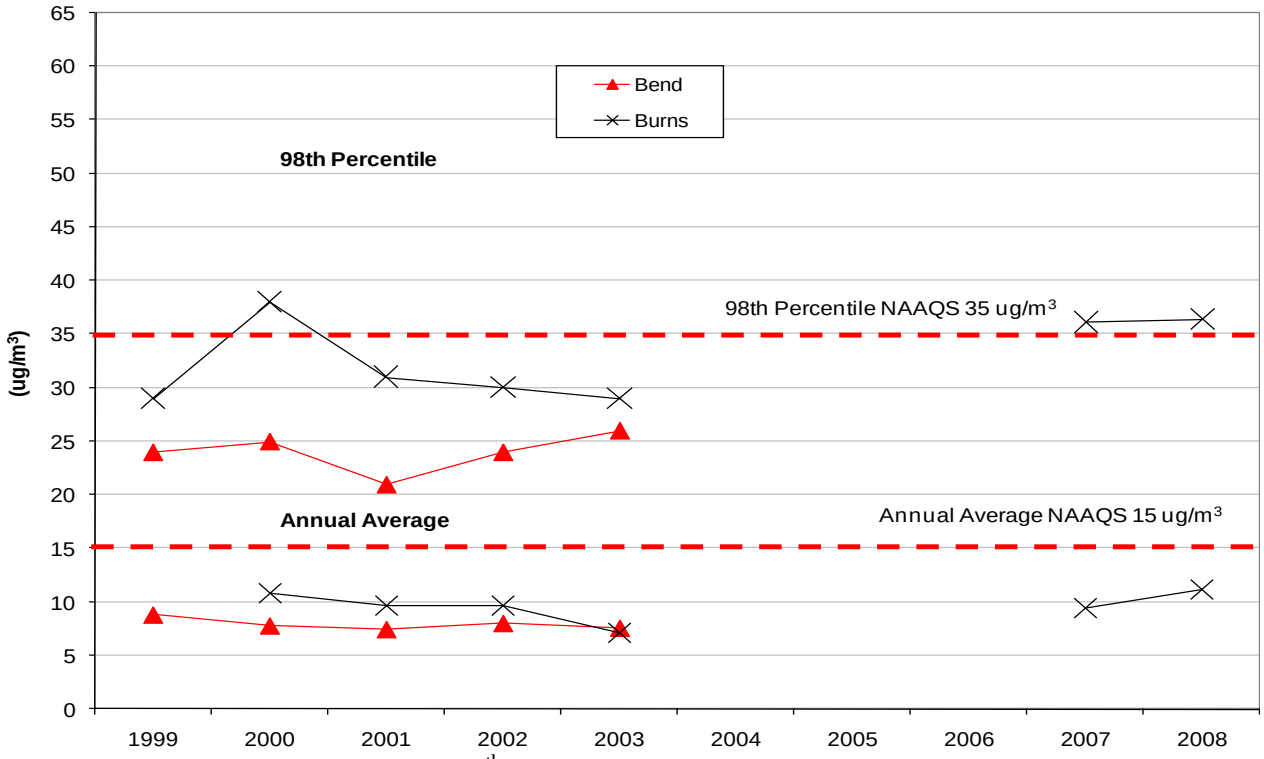


Figure 35g. Bend and Burns $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

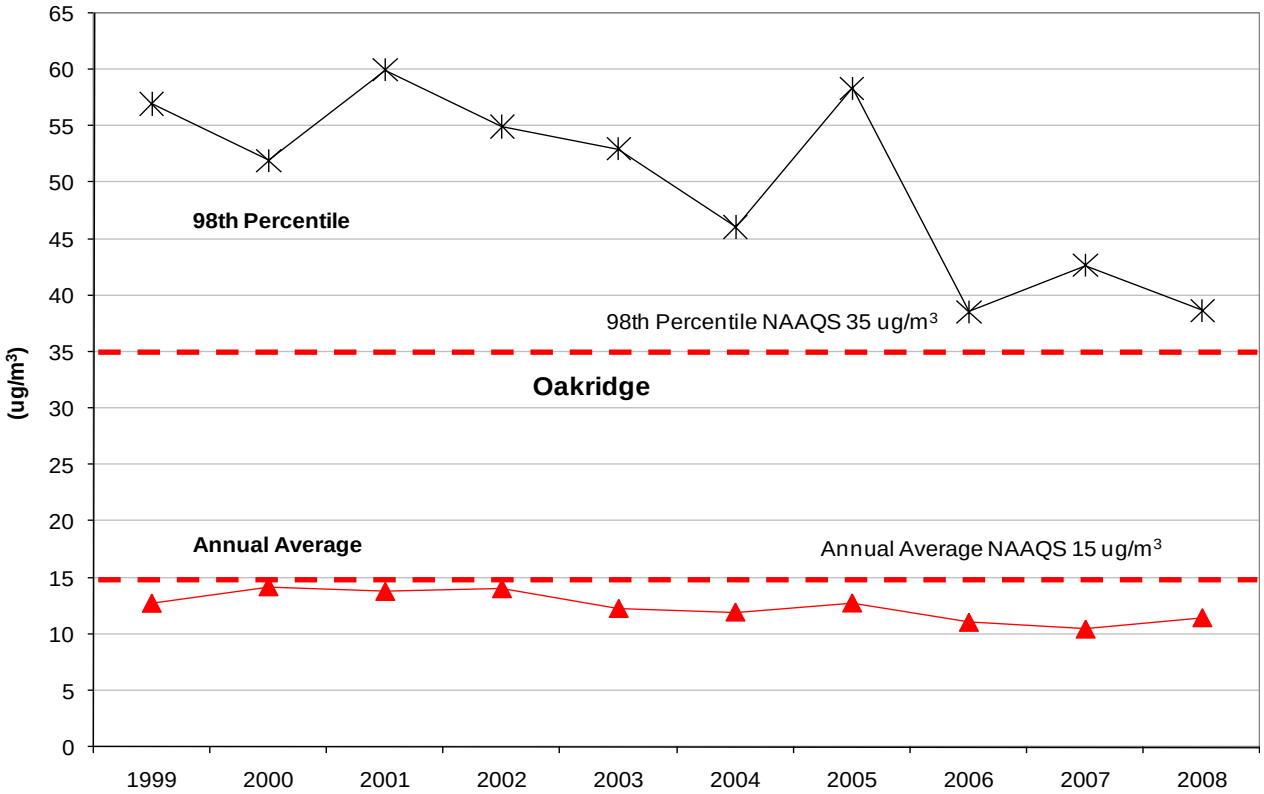


Figure 35h. Oakridge $PM_{2.5}$ 98th Percentile (top) and Annual Average (bottom).

Figure 36 summarizes the 2006 through 2008 three year average $PM_{2.5}$ 98th percentile for Oregon. Klamath Falls and Oakridge are designated non-attainment. Burns and Lakeview are in danger of violating the standard when three years of federal reference method (FRM) data are collected. *FRM monitoring data is the official data used for attainment designation.* Eugene, Portland, Salem, Albany, Cottage Grove, Grants Pass, Medford, Pendleton, and John Day are above 25ug/m3 and are considered areas of concern.

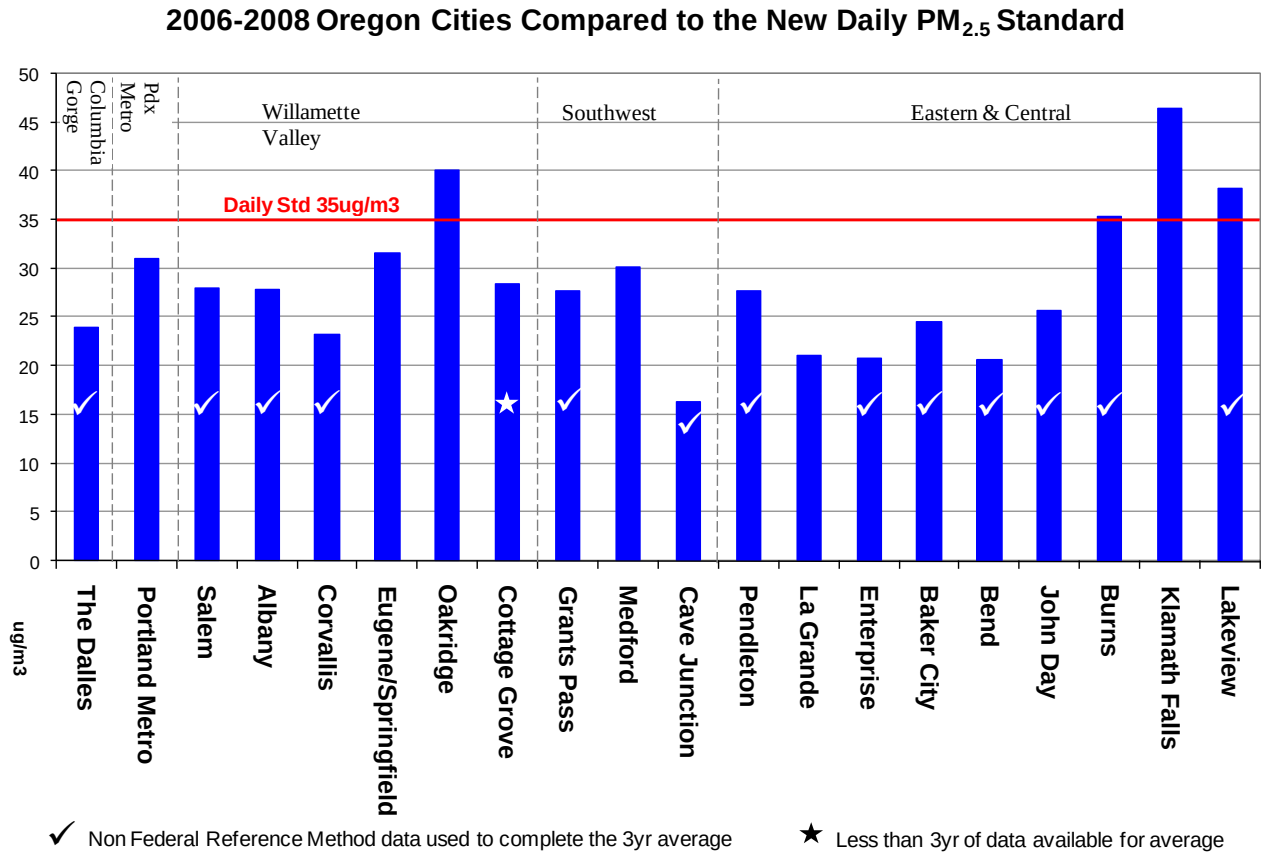


Figure 36. Oregon $PM_{2.5}$ three year average 98th percentile compared to the daily standard of 35ug/m^3.

Oregon DEQ began sampling for air toxics in Portland in 1999, La Grande in 2005, Medford in 2007, and Salem in 2008. The Lane Regional Air Pollution Authority (LRAPA) began sampling for air toxics in Eugene in 2000. Figures 37 through 39 illustrate some trends for the North Portland site for select air toxics. More air toxic information can be found in Appendix H. The values are compared to the Health Benchmark which is the level where an individual has a one in a million chance of getting cancer.

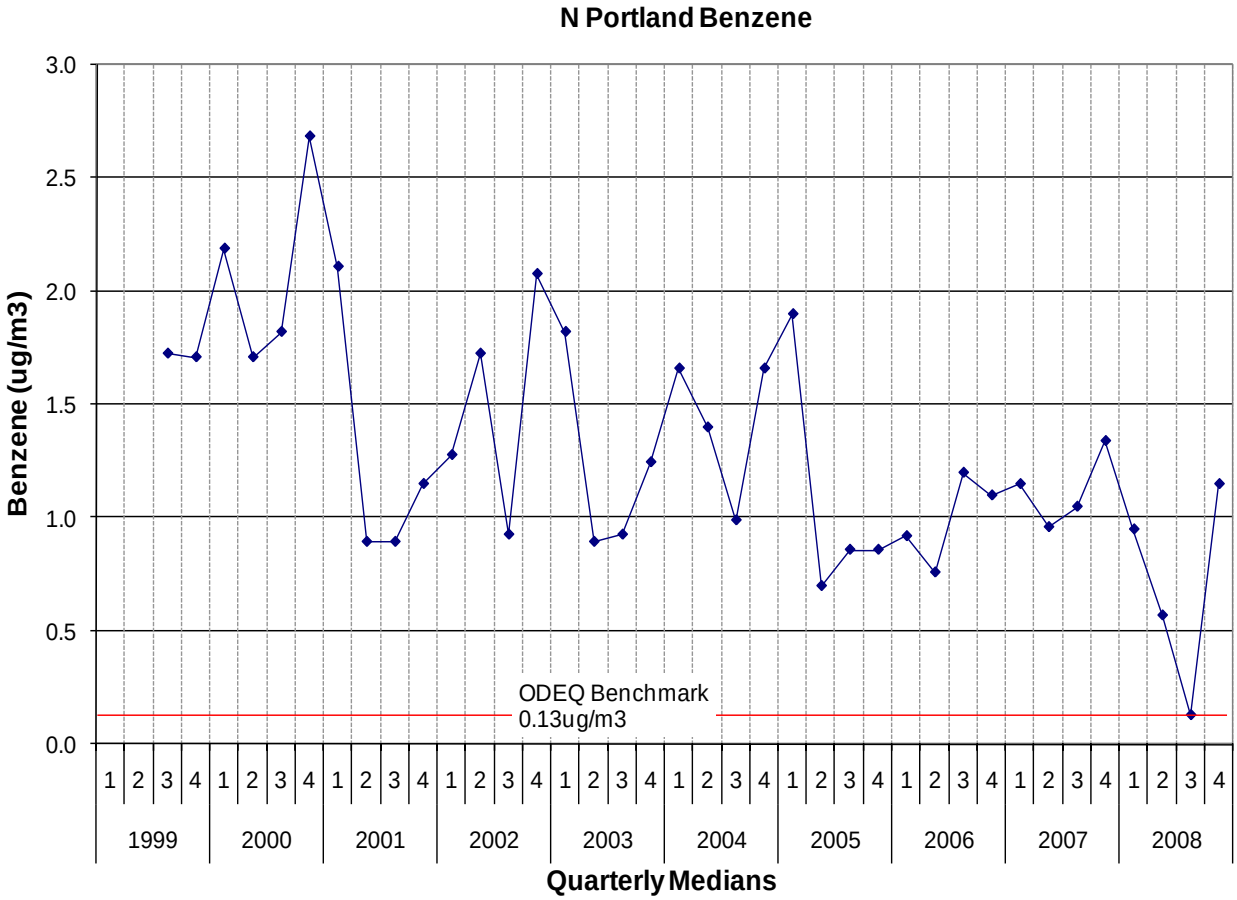


Figure 37. Median quarterly Benzene concentrations in N Portland. (1999-2008)

The Quarters in the x axis are defined as:

Quarter	Months
1	Jan - Mar
2	Apr – Jun
3	Jul – Sep
4	Oct - Dec

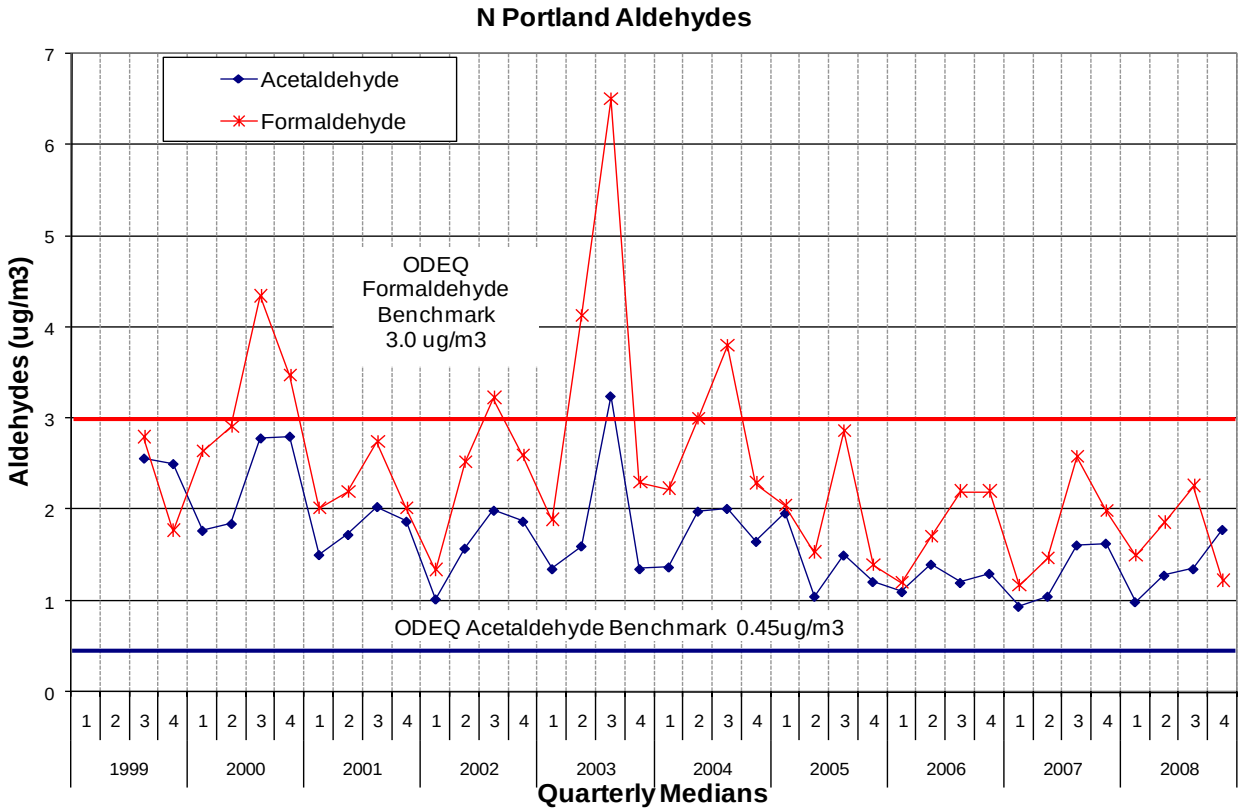


Figure 38. Median quarterly Aldehyde concentrations in N. Portland. (1999-2008)

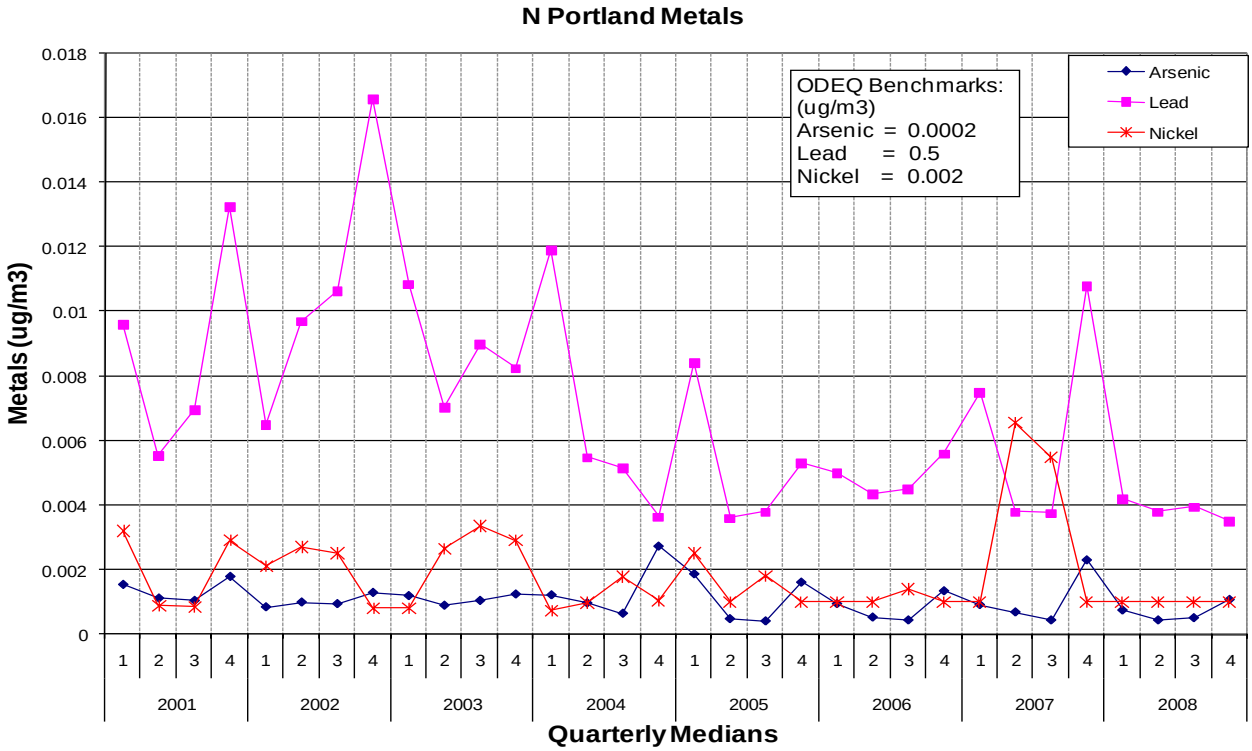


Figure 39. Median quarterly metals concentrations in N. Portland. (2001-2008)

Maintenance and Non-attainment Areas

Oregon hasn't always met the National Ambient Air Quality Standards and initially had several communities designated by the EPA as non-attainment areas. DEQ, local governments, citizens, environmental groups, and industry worked together to improve air quality in these areas and now most of Oregon consistently meets the federal standards. Many of these non-attainment areas have been officially re-designated as maintenance areas while the remaining cities are in the various stages of doing so. Table 4 lists the Oregon maintenance areas while Table 5 shows the remaining non-attainment areas and their re-designation status. Table 6 shows areas that will be designated out of attainment in 2009 because of revised standards. DEQ's web site has current information at http://www.deq.state.or.us/aq/index and select "Maintenance Areas" on the right shortcut bar.

Table 4. Oregon communities with air quality maintenance strategies.
(re-designated as attainment areas)

City	Pollutant	Re-designation Date
Eugene/Springfield	CO	1994
Grants Pass	CO	1999
Portland	CO	1996
Klamath Falls	CO	2001
Medford/Ashland	CO	2001
Klamath Falls	PM_{10}	2002
Grants Pass	PM_{10}	2003
La Grande	PM_{10}	2006
Lakeview	PM_{10}	2006
Medford	PM_{10}	2006
Portland-Vancouver	1 hr O_3	1996
Medford-Ashland	1 hr O_3	1985

Table 5. Remaining non-attainment communities with air quality maintenance strategy development in progress.

City	Pollutant	Redesignation Status
Eugene/Springfield	PM_{10}	NAAQS met, plan in development
Oakridge	PM_{10}	NAAQS met, plan in development
Salem-Keizer	CO	Maintenance Plan waiting for EPA approval

Table 6. Areas violating the $PM_{2.5}$ standard.

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City	Pollutant	Redesignation Status
Klamath Falls	$PM_{2.5}$	Non-attainment in 2009
Oakridge	$PM_{2.5}$	Non-attainment in 2009

Causes of Air Pollution in Oregon

Criteria Pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2, lead, VOC, and CO):

Although industry is a source of some air pollution in Oregon, it accounts for less than 15% of most types of criteria pollutants. Industry emissions are lower because the 1990 Clean Air Act Amendments forced the installation of backend control devices such as bag houses and the development of pollution prevention measures like updating antiquated boilers or using alternative production processes.

Motor vehicles and woodstoves, fireplaces, and open burning are now the primary sources of man made criteria air pollution in Oregon. Emissions from cars contribute to ground level ozone pollution (smog) especially on hot summer days. Woodstoves and fireplaces are a primary source of winter time smoke levels. Other major sources of pollution are from individual actions such as using gas-powered lawn mowers, paints, solvents, aerosol products like hairspray and air fresheners, charcoal barbeques, and outdoor burning. Forest fires also are a major contributor of smoke and the forest service is actively using prescribed burning to reduce the fuel in the forest. The prescribed burning also contributes to smoke but "ideally" at a far lower amount than wild fires. Visit DEQ's web site to learn more about ways to minimize air pollution caused by daily activities.

Air Toxics: EPA designated 188 air toxics in the 1990 Clean Air Act Amendments. EPA identified 33 of these as Urban Air Toxics. DEQ further narrowed down the list using the National Air Toxics Assessment modeling and Portland Air Toxic Assessment to 12 chemicals of concern. They are:

Acetaldehyde	1,3-Butadiene	1,1,2,2, Tetrachloroethane
Acrolein	Chromium and Compounds	Tetrachloroethylene (PERC)
Arsenic and Compounds	Diesel Particulate Matter	Naphthalene
Benzene	Formaldehyde	Polycyclic Organic Matter

Greenhouse Gases:

Greenhouse gases cause global warming and according to the Oregon Department of Energy (DOE) *"The impacts of such changes on Oregon citizens, businesses and environmental values are likely to be extensive and destructive. Coastal and river flooding, snowpack declines, lower summer river flows, impacts to farm and forest productivity, energy cost increases, public health effects, and increased pressures on many fish and wildlife species are some of the effects anticipated by scientists at Oregon and Washington universities*."

DOE has produced a report discussing global climate change in Oregon titled **Oregon Strategy for Greenhouse Gas Reductions**. The report is available online at http://egov.oregon.gov/ENERGY/GBLWRM/Strategy.shtml

The Governor's Climate Change Integration Group released a more recent report in January 2008 called **A Framework for Addressing Rapid Climate Change**. The report is available at: www.oregon.gov/ENERGY/GBLWRM/docs/CCIGReport08Web.pdf

The following graphs and text are from Appendix 1 of the 2008 Climate Change Integration Group report.

In 2004, Oregon's greenhouse gas (GHG) emissions were 67.5 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). That was about one percent of greenhouse gas emissions for the United States as a whole, which were roughly 7.1 billion metric tons CO_2e. Greenhouse gas emissions increased by 12 million metric tons from 1990 levels by 2004, which is a 22 percent increase over Oregon's 1990 greenhouse gas emissions of 55.5 million metric tons of CO_2e. This compares with a 16 percent increase for the United States. Figure 40 shows the change in emissions for different greenhouse gases between 1990 and 2004.

Note: *Carbon dioxide equivalent (CO_2e)" refers to a comparison of the radiative force of different greenhouse gases related to CO_2, based on their global warming potential. It is a way to compare all greenhouse gases on a uniform scale of how much CO_2 would be needed to have the same warming potential as other gases over the same time scale.*

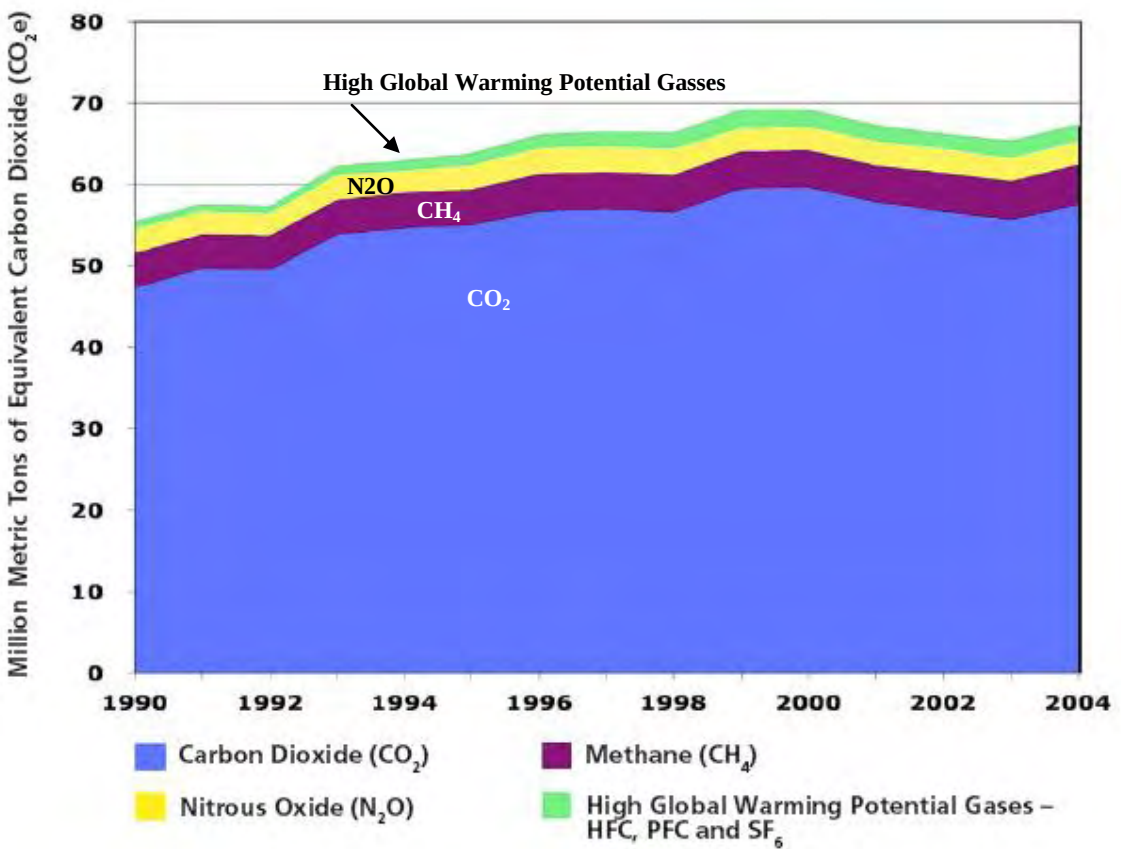


Figure 40. Oregon Green house gas emissions trends between 1990 and 2004.
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

As shown in Figure 41, the vast majority of Oregon's greenhouse gas emissions (86 percent) came from carbon dioxide (CO_2). The primary source of CO_2 pollution came from burning fossil fuels, such as coal at power plants serving the state, gasoline, diesel, and natural gas. There were also emissions from industrial processes, such as the manufacture of cement and from combustion of fossil-fuel derived products in burning municipal and industrial wastes.
In 2004, emissions from methane (CH_4), primarily from cattle and landfills, contributed seven percent of greenhouse gas emissions in Oregon. Nitrous oxide (N_2O) emissions, primarily from agricultural practices, contributed about four percent to greenhouse gas emissions. The "high global warming potential gases" which consist of two classes of gases – hydrofluorocarbons (HFC) and perfluorocarbons (PFC) – and one individual gas – sulfur hexafluoride (SF_6) – accounted for the remaining four percent of emissions.

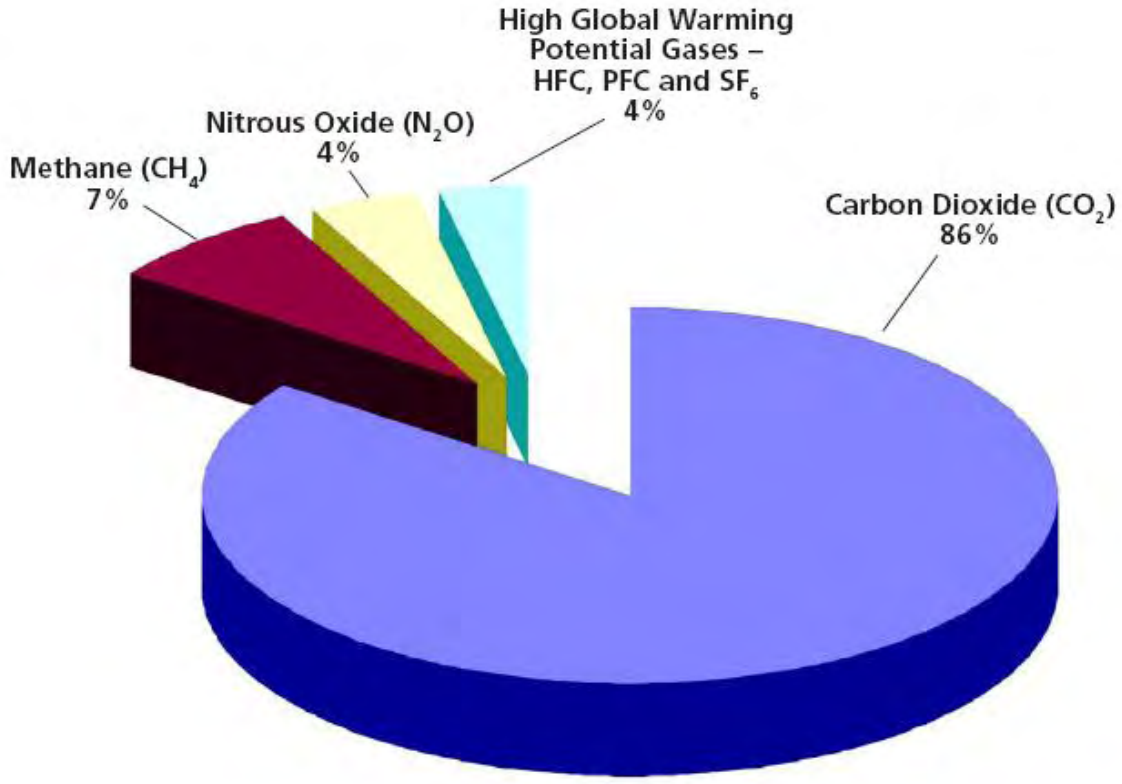


Figure 41. Break down of Greenhouse Gas Emissions in Oregon.
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

Different sectors of Oregon's economy contribute differently to the emission of greenhouse gases. Those contributions have changed over time. Figures 42 and 43 illustrate how key sectors contribute in 1990 and in 2004 based on Oregon's economy. Of particular note is the continuing dominance of the transportation sector as the major source of Oregon's greenhouse gas emissions. The industrial sector is a distant second. Oregon's population growth is reflected in the increase in emissions from the residential sector, and the nation's continuing trend toward service economy jobs is likely one reason for the growth in the commercial sector. Note that the electricity consumption associated with each sector is included in both Figures 42 and 43, but is embedded as part of the sub-totals in each relevant sector.

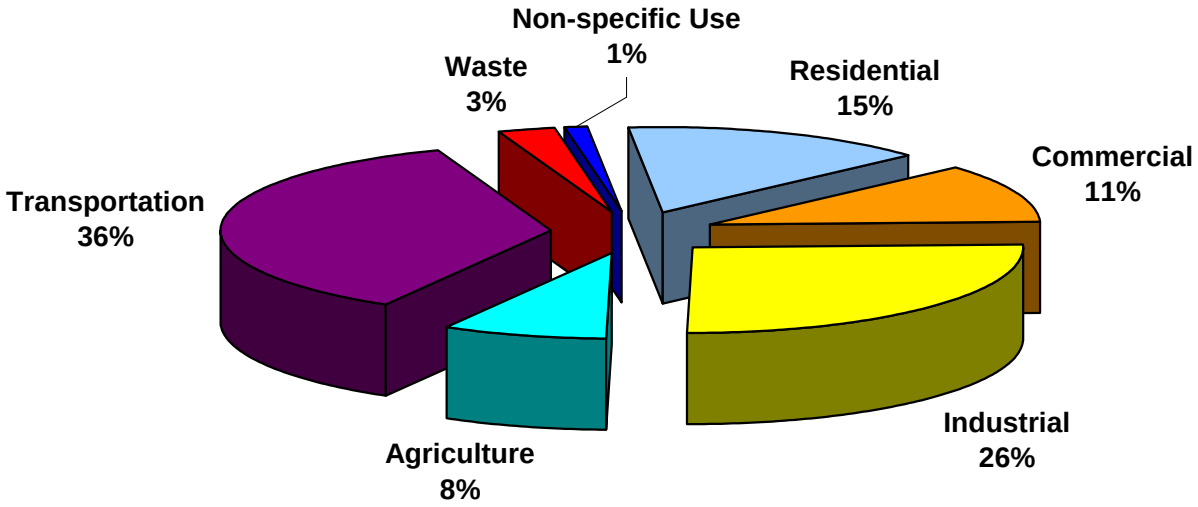


Figure 42. 1990 Sector Contribution. Energy generation is embedded among the sectors.
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

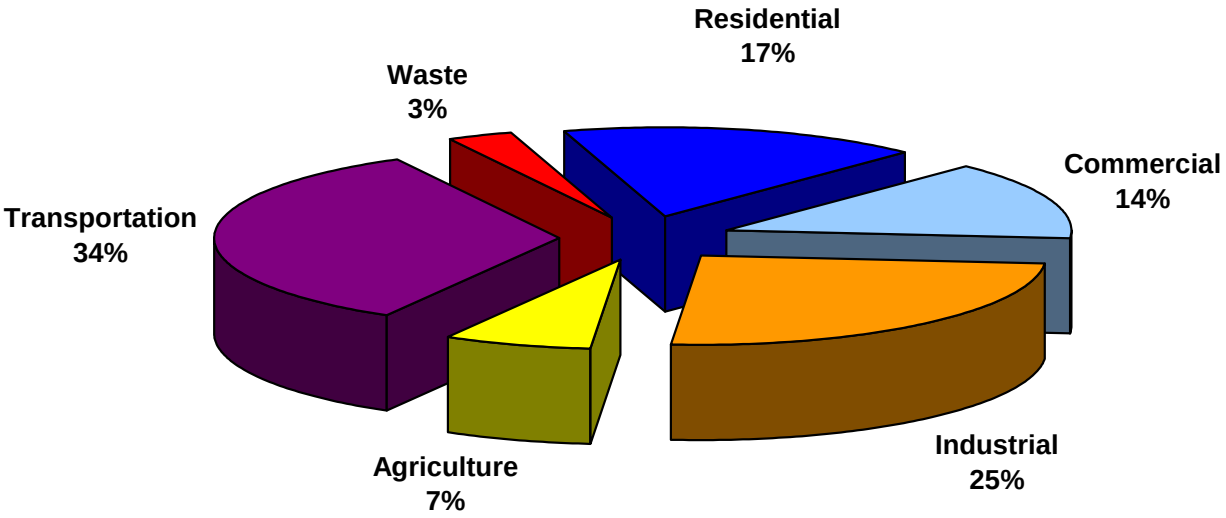


Figure 43. 2004 Sector Contribution. Energy generation is embedded among the sectors.
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

Based on U.S. EPA forecasting tools and previously conducted sector-specific forecasts, the Oregon Department of Energy forecasts that Oregon's greenhouse gas emissions will grow by 30 million metric tons of CO_2e, or 55 percent, in the worst case estimate from 1990 to 2020. That rate assumes no change from current practices (a "business as usual" estimate). In reality, it will probably grow less, although domestic reductions may be offset by increased emissions as production shifts overseas. Table 7 shows the forecast by sources of gases, and contrasts it with historical data. Table 7 also provides a hybrid inventory/forecast estimate for 2005. Figures 44 and 45 illustrate the projected future growth of greenhouse gas emissions. The relative contribution of electricity consumption as compared with the direct combustion of fossil fuels (particularly in the transportation sector) is highlighted in Figure 44. The overall contributions of each type of greenhouse gas through 2020 are plotted in Figure 45.

Table 7. Historical and Forecast Greenhouse Gas Emissions Through 2020 (Consumption Basis)

Gross $MMTCO_2e$	Inventory Data				Forecast Data			
	1990	1995	2000	2004	2005	2010	2015	2020
Carbon Dioxide (CO_2)								
CO_2 from Fossil Fuel Combustion[1]	29.25	32.16	34.48	34.47	33.84 **	35.90	37.96	42.10
CO_2 from Electricity Consumption	16.70	21.27	23.41	21.54	23.85 *	27.01	28.92	31.49
Industrial Processes	1.11	1.19	1.46	1.06	0.98 *	1.21	1.21	1.20
Waste Combustion	0.27	0.31	0.27	0.32	0.36 *	0.31	0.32	0.34
CO_2 Total	47.33	54.93	59.61	57.39	59.03	64.43	68.41	75.13
Methane (CH_4)								
Stationary Combustion	0.10	0.10	0.10	0.14	0.10 **	0.09	0.09	0.09
Mobile Combustion	0.06	0.05	0.04	0.03	0.02 *	0.02	0.02	0.02
Natural Gas and Oil Systems	0.58	0.61	0.64	0.67	0.68 *	0.71	0.74	0.78
Enteric Fermentation	2.00	2.21	2.13	2.20	2.15 *	1.74	1.74	1.73
Manure Management	0.26	0.28	0.31	0.41	0.41 *	0.40	0.40	0.39
Burning of Agricultural Crop Waste	0.00	0.00	0.00	0.00	0.00 *	0.01	0.01	0.01
Waste	1.04	0.93	1.12	1.29	1.26 *	1.65	1.92	2.08
Wastewater	0.20	0.22	0.24	0.25	0.25 *	0.28	0.29	0.31
CH_4 Total	4.23	4.41	4.58	5.01	4.88	4.90	5.22	5.42
Nitrous Oxide (N_2O)								
Stationary Combustion	0.11	0.10	0.10	0.09	0.09 **	0.08	0.07	0.08
Mobile Combustion	0.52	0.62	0.60	0.44	0.44 **	0.32	0.31	0.27
Industrial Processes	0.00	0.00	0.00	0.00	0.00 *	0.00	0.00	0.00
Manure Management	0.11	0.09	0.12	0.16	0.13 *	0.18	0.20	0.23
Agricultural Soil Management	2.06	2.08	1.96	1.99	2.37 *	2.07	2.07	2.08
Burning of Agricultural Crop Waste	0.00	0.00	0.00	0.00	0.00 *	0.01	0.01	0.01
Waste Combustion	0.02	0.02	0.03	0.03	0.03 *	0.03	0.03	0.03
Wastewater	0.00	0.00	0.00	0.00	0.00 *	0.00	0.00	0.00
N_2O Total	2.82	2.92	2.82	2.70	3.07	2.68	2.69	2.70
HFC, PFC, and SF_6								
Industrial Processes	1.04	1.47	2.19	2.26	2.44 *	1.62	2.00	2.41
Total Emissions	**55.42**	**63.72**	**69.19**	**67.36**	**69.42**	**73.63**	**78.32**	**85.66**

* = Inventory data for 2005 ** = Forecast data for 2005 from EPA projection tool (data for 2005 inventory due in 2008)

NOTE: Totals for 1990 through 2004 differ slightly from the detailed inventory (in Table 6) due to rounding differences.

[1] The fossil fuel combustion totals do not count in-state generation of electricity (this is a consumption-based inventory).

From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

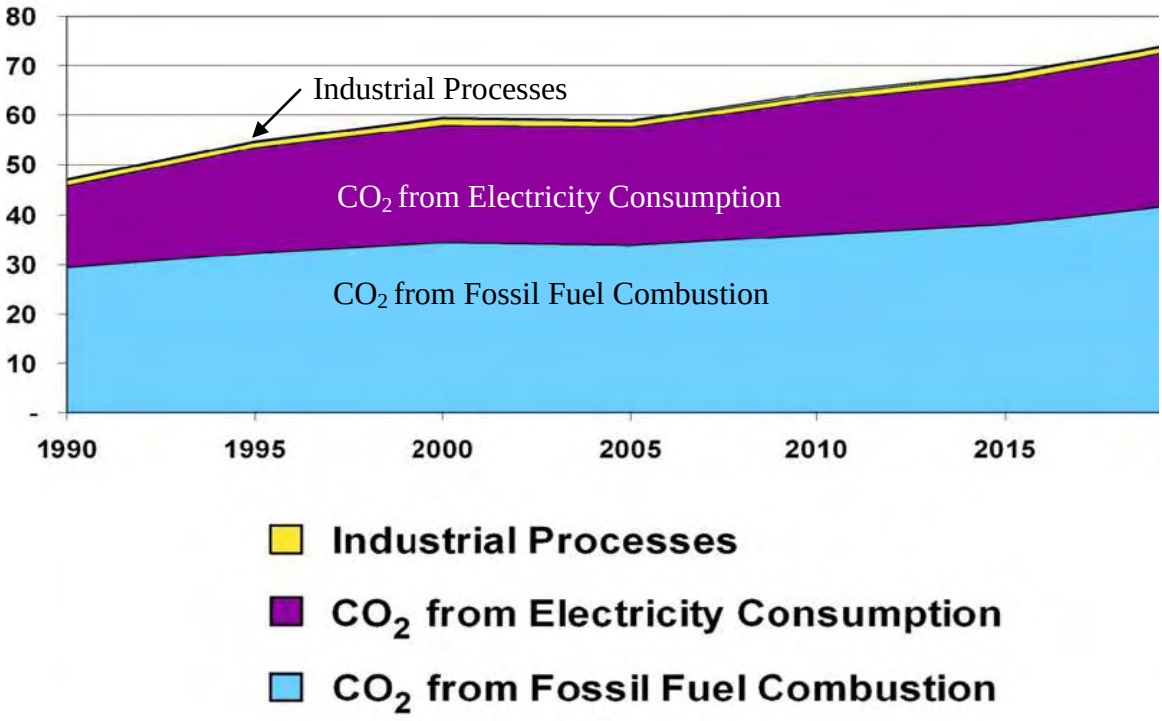


Figure 44. Historical & Projected CO_2 Emissions (Million Metric Tons of CO_2)
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

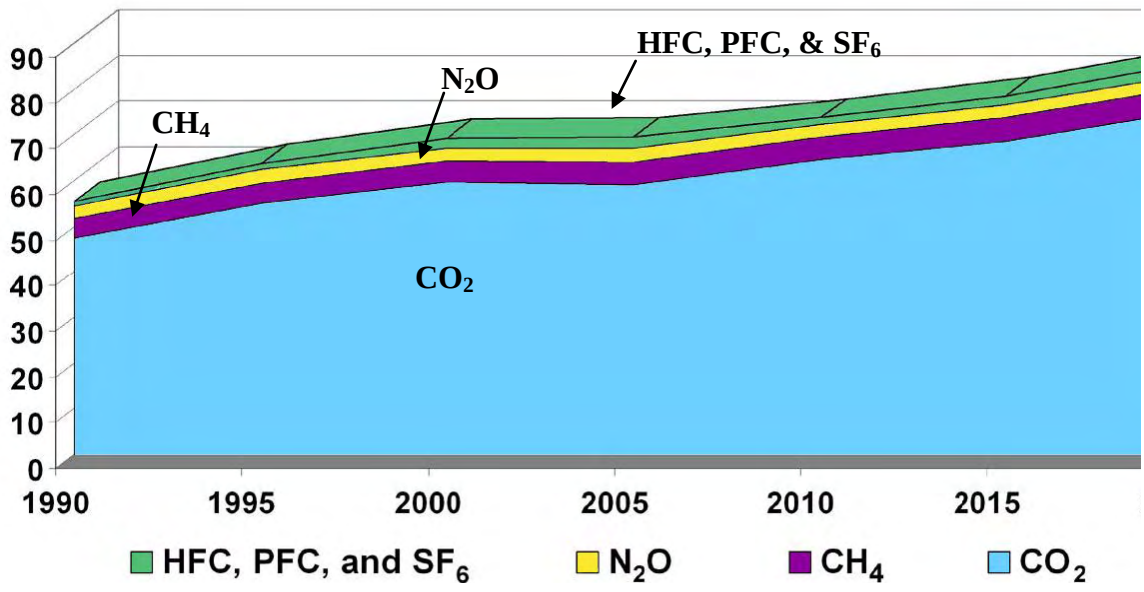


Figure 45. Projected Greenhouse Gas Emissions by Gas through 2020 (MMTC02e)
From the Governor's Climate Change Integration Group report: ***A Framework for Addressing Rapid Climate Change.***

Air Quality Maintenance and Improvement Programs

DEQ works with local communities to identify and prevent or solve air quality problems by:

- planning and implementing air pollution reduction strategies
- issuing and enforcing air pollution control permits for industry
- enforcing environmental regulations
- informing, educating, and involving the public
- measuring air pollutant concentrations

DEQ's Air Quality programs include:

Oregon Low Emission Vehicle	Asbestos	Emission Inventory & Modeling
Vehicle Testing	Wood Burning	Ambient Monitoring
Fuels	Outdoor Burning	Air Quality Index
Industrial Air Permitting	Air Toxics	Wildfire Air Quality Rating
Business Assistance	Visibility	Diary Emission

Oregon Low Emission Vehicle (ORLEV)

Motor vehicles represent one of the largest sources of greenhouse gas emissions in Oregon. Under the federal Clean Air Act, states have two options for controlling emissions from new vehicles: rely on federal emission standards or adopt emission standards developed by California. Oregon adopted the California regulations, which requires that new light and medium-duty passenger vehicles, pick-ups, and SUVs sold in Oregon must meet the low emission vehicle standards.

The Oregon Low Emission Vehicle program requires greenhouse gas reductions, which are not required under federal standards. The program also reduces emissions of smog-forming compounds, CO and toxic air pollutants to levels lower than required by federal regulations.

Vehicle Inspection (VIP)

Vehicle Inspection is one of DEQ's most successful programs in preventing automobile air pollution. The inspection procedure is designed to ensure that emission control systems of cars and trucks are functioning. The Portland Metro area and the Rogue Valley have programs.

Fuels Program

This program's goal is to reduce ground level ozone (smog) and CO that result from the use of gasoline and other fuel blends. The program reduces wintertime CO in the Portland area by adding compounds containing oxygen to the fuel (typically Ethanol).

Vapor recovery programs in the Portland area have reduced the emission of ozone-forming gasoline vapors. Gasoline vapors can be released to the atmosphere when fueling cars and when transferring fuel from tank trucks. Accordion-shaped hoses used at service stations prevent 90 percent of gasoline vapors from escaping during refueling. Tanker trucks and service station tanks have been modified with equipment to eliminate the loss of vapor during transfer. On-board vapor control systems on newer cars prevent vapor loss during operation and storage.

Air Permits for Industry

Approximately 1,400 industrial and commercial Oregon businesses have air permits which regulate the amount of annual air pollution they can emit. Staff members from regional DEQ offices regularly inspect these air pollution sources for compliance with their permit conditions. When businesses are out of compliance, DEQ issues notices of violation and when necessary recommends civil penalties.

An important element of DEQ's permitting program is the Title V (*five*) Air Operating Permit for major industrial sources of air pollution. A major industrial source of air emissions has the potential to emit 100 tons per year of PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, lead, or volatile organic compounds. For emitters of hazardous air pollutants (HAPs), a major source has the potential to emit 10 tons per year of any individual HAP or 25 tons per year of any combination of HAPs. DEQ currently requires less than 100 businesses to have Title V permits for HAPs. Other permitted businesses in the state operate with the Air Contaminant Discharge Permits.

Business Assistance Program (BAP)

The Business Assistant Program provides information and technical assistance on air quality regulation and related environmental issues to small businesses such as dry cleaners, auto-body shops, metal finishers, and printers. The program works with individual business owners and trade groups to inform them about solutions to air quality problems, including ways to reduce the use of toxic chemicals. Program services are free and confidential. This cooperative effort is designed to promote a healthy environment for all Oregonians without causing unnecessary hardship for small business.

Asbestos Program

DEQ certifies and licenses asbestos abatement contractors, inspects asbestos abatement projects and enforces laws regarding the proper removal and disposal of asbestos-containing materials. DEQ informs homeowners about the dangers of exposure to asbestos and the best ways to deal with asbestos-containing materials in the home. Visit DEQ's web site for more information.

Wood Burning Program

DEQ's Wood Burning Program works with Oregon communities to solve and prevent air pollution problems caused by residential wood burning. DEQ provides information about burning wood cleanly and helps local counties prepare and implement strategies to reduce wood smoke.

Outdoor Burning

The open-burning program works with local fire districts to educate people about and enforce burning regulations that apply to land clearing, as well as household, agricultural, commercial and construction, industrial and demolition activities.

Air Toxics (Hazardous Air Pollutant) Program

Air Toxics can harm the environment and your health. Most of these substances are classified as volatile organic compounds, aldehydes and ketones, polycyclic organic compounds, and metals. Title III of the 1990 Clean Air Act Amendments requires the U.S. EPA to regulate emissions of 188 Hazardous Air Pollutants.

Many human activities produce air toxics. These include manufacturing, energy production, burning waste or wood, painting, cleaning activities, and driving vehicles. Natural sources can also contribute toxic air emissions, such as radon gas from rocks.

DEQ controls hazardous air pollutants in several ways:

- regulating toxic air pollutant emissions from businesses by the permits described above
- adopting as state rules the federal standards for hazardous air pollutant sources
- implementing programs to reduce Volatile Organic Compound emissions
- monitoring for air toxics as resources allow
- modeling air toxics to estimate population exposure.

EPA regulations also require certain industrial facilities and businesses to have a plan to prevent accidental toxic air pollutant releases, and to minimize their impacts on the surrounding community in a worst case accident scenario.

Visibility

DEQ monitors visibility in federally designated wilderness areas and Crater Lake National Park to determine if visibility is impaired. DEQ develops strategies to improve protection for these areas including managing field and forestry burning practices. Most burning now takes place in spring and fall to preserve summer visibility when most people are enjoying Oregon's scenery.

Emission Inventory and Modeling

The emission inventory group collects information from point (industry), area (e.g. woodstove emissions), mobile (cars, trucks, buses), and off-road mobile (e.g. boats, lawn mowers) and estimates how much CO, NO_2, SO_2, lead, PM, VOCs, and air toxics are emitted in a given year. Greenhouse gas emissions are calculated by the Oregon Department of Energy.

The modeling group uses the emission inventory, meteorology, and ambient monitoring data to estimate pollutant concentrations. DEQ also requires industry to model pollutant impacts before they construct any major production expansion.

Air Quality Monitoring

DEQ's Laboratory Division measures pollutant levels at monitoring sites throughout the state. Monitoring air quality is used to demonstrate attainment with the ambient air quality standards. Monitoring information is also used for wood stove burning advisories, air quality health alerts, forest fire smoke health alerts, the Air Quality Index, the Wildfire Air Quality Rating, air quality forecasting, and EPA’s AIRNow nationwide website.

Air Quality Index (AQI)

Oregonians can get hourly updates of air quality information for about 30 cities in Oregon using the Air Quality Index on DEQ's website http://www.oregon.gov/DEQ or http://www.lrapa.org/ for Lane County. The AQI is updated daily by phone at 1-800-961-6313. AQI for all the states is available on EPA's AIRnow.gov.

Wildfire Air Quality Rating (WAQR)

Like the AQI, the WAQR provides hourly air quality health information. The WAQR was designed to fix a deficiency in the AQI during forest fire smoke inundations. The AQI does not always report forest fire smoke inundations accurately because its particulate health levels are based on 24 hour averages and are designed for measuring normal winter smoke episodes. The WAQR averaging time of one hour can capture the more rapidly shifting plume of smoke that can move into an area quickly.
The WAQR is on DEQ's website http://www.oregon.gov/DEQ/AQ/index.shtml

Dairy Task Force

Until 2008, Oregon law exempted agricultural operations from air quality regulations with the exception of field burning in the Willamette Valley. In the fall of 2005, several environmental and public interest groups petitioned the EPA asserting that Oregon's air quality program was deficient. Their argument was that Oregon statute could not exempt agriculture from regulation if those regulations were necessary to comply with the Clean Air Act.

Senate Bill 235 addressed the inconsistency between state and federal law by allowing the Oregon Environmental Quality Commission (EQC) to regulate agricultural operations to the extent needed under the Clean Air Act. The Bill also established a Task Force on Dairy Air Quality, which studied air pollution emissions from dairy operations.

The Task Force found that dairies may cause problems that include: harming human health; contributing to regional haze; and causing nuisance odors. Under certain circumstances, air emissions from dairy operations might become subject to regulation under the Clean Air Act. Methane, a greenhouse gas, is known to be emitted from dairies. In addition, some dairies may be emitting methanol, a hazardous air pollutant, in quantities above the threshold that requires a major source air permit. Emissions are released from open stall barns, wastewater lagoons, land on which manure is applied, feed piles, and animals.

Getting Involved

DEQ is committed to informing and involving the public in air quality decisions related to rule changes, permit activities and air pollution prevention programs. DEQ wants to hear from and work with citizens on air quality issues that affect them. Air Quality Program phone numbers are listed on the inside of the back cover. DEQ uses advisory committees composed of citizens and technical experts to develop rules. The public has an opportunity to comment on new permits and modifications of existing permits during publicized comment periods. No rules affecting the state's air quality are adopted without public notice and the opportunity to comment. Opportunities to comment are published in newspapers.

Pollutants: Properties and Health and Welfare Effects

EPA has identified pollutants that are hazardous in ambient concentrations and people who are most sensitive to them. In general the pollutants can cause the following health effects:

General Health Effects

People most susceptible to severe health problems from air pollution are:

- Individuals with heart or lung disease
- Individuals with respiratory problems such as asthma or emphysema
- Pregnant women
- Outdoor workers
- Children under age 14 (their lungs are still developing)
- Athletes who exercise vigorously

High air pollution levels can cause immediate health problems:

- Aggravated cardiovascular and respiratory illness
- Added stress to heart and lungs, which must work harder to supply oxygen
- Damaged cells in respiratory system

Long-term exposure to polluted air can have permanent health effects:

- Accelerated aging of the lungs and loss of lung capacity
- Decreased lung function
- Development of diseases such as asthma, bronchitis, emphysema, and possibly cancer
- Shortened life span

The pollutants EPA has identified as hazardous are:

Fine Particulate (PM_{10} and $PM_{2.5}$)

Fine particulate air pollution consists of solid particles or liquid droplets that are less than 10 micrometers in diameter (PM_{10}) or less than 2.5 micrometers in diameter ($PM_{2.5}$) (see diagram on next page).

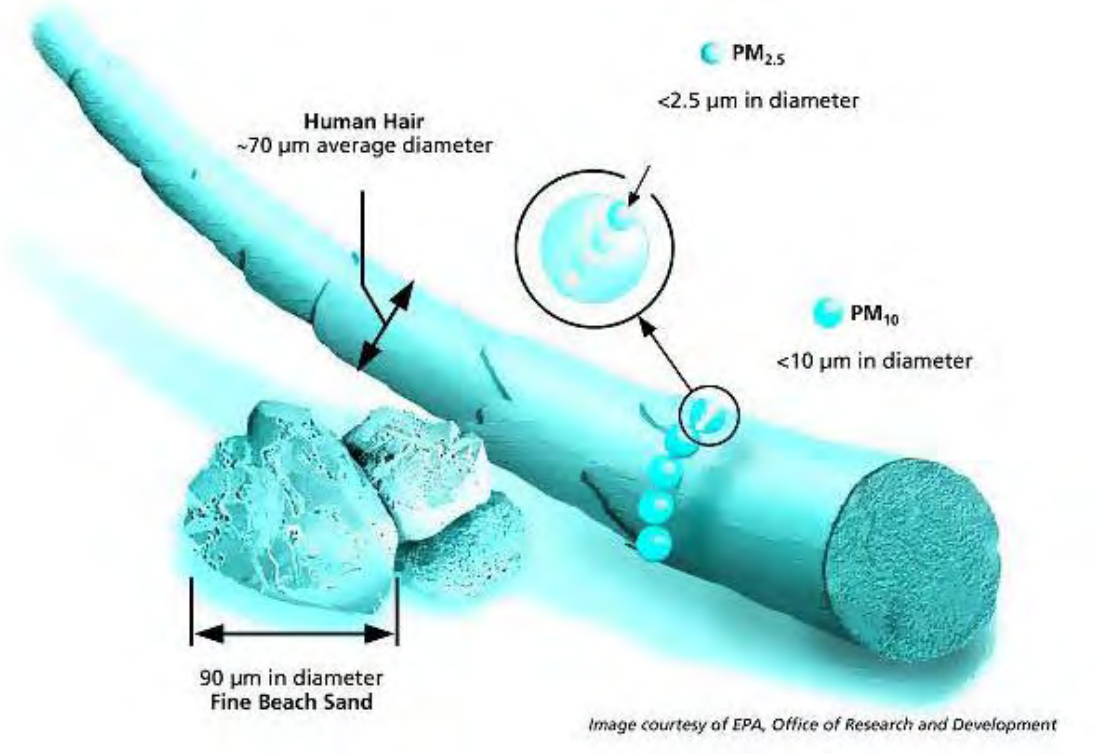
Particles in these size ranges are of great concern because they can be inhaled deeply into the lungs where they can remain for years. The health effects of particulate matter vary with the size, concentration, and chemical composition of the particles. In general, particulate matter causes three kinds of health problems:

- The particles may be inherently toxic because of their chemistry
- The particles may mechanically damage the respiratory system
- The particles may be carriers for adsorbed toxic substances

Relationships have been shown between exposure to high concentrations of particulate matter and increased hospital admissions for respiratory infections, heart disease, bronchitis, asthma, emphysema, and similar diseases. In addition, there may be several potential carcinogens present on particulate matter. Of particular concern are the condensed organic compounds released from low temperature combustion processes (wood stove smoke, for example).

Among the most obvious effects of fine particles are reductions in visibility due to absorption and scattering of light by suspended particles. Almost all smoke particles from residential wood stoves and fireplaces, industrial boilers, field burning, diesel combustion, and other combustion processes can be characterized as fine particulate and most of it is thought to be $PM_{2.5}$. In contrast, only a small fraction of the particles from road dust, agricultural tilling, and wind blown dust are fine particulate.

PM2.5 and PM10 size compared to human hair.



Total Suspended Particulate (TSP)

Pollution made up of particulate less than about 100 micro-meters in diameter is called TSP (100 micrometers is about the diameter of a human hair.) Larger particles tend to settle out of the air quickly and are often more of a nuisance than a health affecting pollution problem. In addition to health problems caused by the fine particulate component of TSP (see PM_{10} & $PM_{2.5}$), it may cause soiling and corrosion of building materials and textiles, damage to vegetation, and toxicity to animals that feed on vegetation covered by toxic particulate matter.

Natural sources of TSP include pollen, wind-blown dust, and smoke from wild fires. Humans create TSP from combustion sources--like motor vehicles, utility and industrial boilers and dryers, wood stoves, open burning, slash burning, and field burning. Other anthropogenic sources include dust from roads, agriculture, construction, and mining.

Sulfur dioxide (SO_2)

Sulfur dioxide is a colorless, pungent gas. In the body it acts as a lung and eye irritant. When SO_2 is inhaled, it causes bronchial constriction which results in breathing difficulty and increased pulse and respiratory rate. People with respiratory diseases like asthma, bronchitis, or emphysema are particularly susceptible to the effects of SO_2.

When particles capable of oxidizing Sulfur dioxide to sulfuric acid are present, the irritant response increases in magnitude by two to three times. When sulfuric acid is inhaled, mucous production increases. This reduces the respiratory system's ability to remove particulate matter, and can lead to more severe respiratory infections, such as pneumonia. Chronic exposure to SO_2 can lead to coughing, shortness of breath, fatigue, and bronchitis.

SO_2 can also damage plants and building materials. The leaves of some vegetables (spinach and lettuce, for example) are damaged by exposure to high levels of SO_2. Sulfur oxides accelerate corrosion of metals and other building materials (limestone, marble, mortar) by forming sulfuric acid on the surface of the material or in the atmosphere. In addition, sulfuric acid and sulfate particles formed in the atmosphere from SO_2 can cause scattering of visible light, thus contributing to haze. These same processes can contribute to acid rain and lead to acidification of lakes and soils.

The major source of SO_2 nationwide is combustion of high sulfur coal. In Oregon, where burning of high sulfur coal is not allowed, diesel, heating oil, and low sulfur coal are the major sources.

Carbon monoxide (CO)

Carbon monoxide is a colorless, odorless gas. In the body, CO binds tightly to hemoglobin (the red pigment in blood which transports oxygen from the lungs to the rest of the body). Once hemoglobin is bound to CO, it can no longer carry oxygen. In this way, CO reduces the oxygen-carrying capacity of the blood and can result in adverse health effects. High concentrations of CO strongly impair the functions of oxygen-dependent tissues, including brain, heart, and muscle. Prolonged exposure to low levels of CO aggravates existing conditions in people with heart disease or circulatory disorders. There is a correlation between CO exposure and increased hospitalization and death among such patients. Even in otherwise healthy adults, carbon monoxide has been linked to increased heart disease, decreased athletic performance, and diminished mental capacity. Carbon monoxide also affects newborn and unborn children. High CO levels have been associated with low birth weights and increased infant mortality.

A major natural source of CO is spontaneous oxidation of naturally occurring methane (swamp gas). The major human-caused source is incomplete combustion of carbon-based fuels, primarily from gasoline-powered motor vehicles. Other important sources are wood stoves and slash burns.

Ozone (O_3)

Ozone (a component of smog) is a pungent, toxic, highly reactive form of oxygen. The eight hour standard protects the public against lower level exposures over a longer time period which has been found to be more detrimental than shorter peak levels. The long term exposure effects cause significant breathing problems, such as loss of lung capacity and increased severity of both childhood and adult asthma.

Ozone causes irritation of the nose, throat, and lungs. Exposure to ozone can cause increased airway resistance and decreased efficiency of the respiratory system. In individuals involved in strenuous physical activity and in people with pre-existing respiratory disease, ozone can cause sore throats, chest pains, coughing, and headaches. Plants can also be affected. Reductions in growth and crop yield have been attributed to ozone. Ozone can affect a variety of materials, resulting in fading of paint and fiber, and accelerated aging and cracking of synthetic rubbers and similar materials. It is also a major contributor to photochemical smog.

Ozone is not emitted directly into the air. It is formed through a series of photochemical (sunlight-requiring) reactions between other pollutants and oxygen (O_2) during hot weather. Most important are Nitrogen oxides and volatile organic compounds. To control ozone pollution, it is necessary to control emissions of these other pollutants. It is primarily caused by chemicals from car and small engine exhaust, and business and industry emissions on hot sunny days.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a reddish-brown gas that is toxic in high concentrations. It is a lung irritant and may be related to chronic pulmonary fibrosis. It is also important in the photochemical reactions leading to the formation of ozone. It can cause indirect damage to materials when it combines with moisture in the air to form nitric acid. The nitric acid can then cause corrosion of metal surfaces and can also contribute to acid rain. In addition, NO_2 absorbs visible light and causes reduced visibility. It has also been linked to suppressed growth rates in some plants.

The major human-caused source of NO_2 is fuel combustion in motor vehicles, utility and industrial boilers. Nitric oxide (NO) is the major Nitrogen oxide produced during the combustion process, but once in the atmosphere, NO is rapidly oxidized to form NO_2.

Volatile Organic Compounds (VOC)

Volatile Organic Compounds are a large family of compounds made up primarily of hydrogen and carbon. These compounds are instrumental in the complex series of reactions leading to the formation of ozone and photochemical smog. Many of these compounds are also air toxics.

The compounds come mainly from motor vehicles, fuel evaporation, the coatings industry, and combustion processes. The EPA and DEQ do not have a standard for VOCs, however, they are still controlled because of their contribution to ozone formation and because many are air toxics.

Air Toxics

Air toxics are generally defined as air pollutants known or suspected to cause serious health problems, like birth defects and cancer. The U.S. EPA regulates 188 air toxics.

Out of these 188 air toxics, EPA selected 33 as the toxics of concern in the air, nationwide. Oregon DEQ identified Acetaldehyde, Acrolein, Arsenic, Benzene, 1,3-Butadiene, Chromium compounds, diesel particulate matter, Formaldehyde, Perchloroethylene (PERC), polycyclic organic matter (POM) compounds, and Nickel. All of these substances, except Acrolein, are known or suspected to cause cancer. Other air toxics in Oregon are believed to be below levels of concern. The DEQ Portland Air Toxics Assessment limited the air toxics of concern excluding Beryllium, Carbon Tetrachloride, Chloroform, Ethylene dibromide, Ethylene dichloride from the EPA's list.

Acetaldehyde

Acetaldehyde forms as a product of incomplete wood combustion, coffee roasting, burning tobacco, and vehicle exhaust fumes. Residential fireplaces and woodstoves are the two largest sources of acetaldehyde.

Health effects from breathing small amounts of acetaldehyde over long periods are uncertain. EPA has classified acetaldehyde as a probable human carcinogen.

Arsenic and Compounds

Arsenic is a natural element in the earth's crust that occurs in two different forms, organic and inorganic. Organic arsenic contains carbon and hydrogen and occurs in plants and animals. Inorganic arsenic typically contains elements such as oxygen, chlorine, and sulfur. Inorganic arsenic is the more harmful of the two.

Inorganic arsenic is ubiquitous in the environment. Volcanoes release it into the air, as does the weathering of arsenic-containing minerals and ores. Commercial and industrial processes like metal smelting and power generation from fossil fuels also release arsenic, as does burning wood treated with arsenic. Inorganic arsenic can settle from the air to the ground. Food is the largest source of inorganic arsenic exposure for most people, primarily due to pesticide use on crops.

Inorganic arsenic is a human poison. High levels (60 parts per million or more) in food or water can be fatal. Arsenic damages many tissues including nerves, stomach and intestines, and skin. Lower levels of exposure to inorganic arsenic may cause nausea, vomiting, and diarrhea, decreased production of red and white blood cells, abnormal heart rhythm, blood vessel and nerve damage. Breathing inorganic arsenic increases the risk of lung cancer. EPA has classified inorganic arsenic as a known human carcinogen.

Benzene

Benzene is widely used in the United States and ranks in the top 20 chemicals for production volume. Benzene is used in the processes that make plastics, resins, and nylon and synthetic fibers. It is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources include volcanoes and forest fires. Other sources are coal, oil, and wood combustion, car/truck exhaust, and evaporation from gas stations and industrial solvents. Tobacco smoke contains benzene and accounts for approximately 50% of our exposure.

Long-term inhalation of benzene causes many disorders including anemia, excessive bleeding, damage to the immune system and genetic damage. On the job exposure to benzene has been shown to produce an increased incidence of leukemia (cancer of the tissues that form white blood cells). EPA has classified benzene as a known human carcinogen.

1,3-Butadiene

1,3-Butadiene is a combustion product found in motor vehicle exhaust, gas, oil, and wood furnaces, and industrial processes. 1,3-Butadiene is also manufactured and used in making plastics.

Studies have shown that long-term inhalation of 1,3-butadiene can result in an increased incidence of cardiovascular diseases, including rheumatic and atherosclerotic heart diseases (hardening of the

arteries) and can cause blood disorders. EPA has classified 1,3-butadiene as a probable human carcinogen.

Chromium and Compounds

Chromium is a geological metal found in rocks, soil, volcanic dust and gases, plants, and animals.

Chromium metal is used mainly for making steel and other alloys. Chromium compounds are also used to manufacture dyes and pigments, and in leather and wood preservation. Manufacturing, chrome plating, or burning fossil fuels can release chromium to the air. Chromium particles can settle from the air and persist in soil.

Chromium occurs in several forms, one of which is chromium VI. Long-term inhalation of chromium VI causes respiratory tract damage. Studies suggest that exposure to chromium VI may result in complications during pregnancy and childbirth. Inhalation of chromium VI can also increase the risk of lung cancer. EPA has classified chromium VI as a known human carcinogen. The most common form of chromium, chromium III, is not known to cause cancer and is less toxic.

Formaldehyde

Formaldehyde is a common combustion product, produced by human activities but also occurs naturally. The highest levels can occur indoors and tobacco smoke is an important source. Major outdoor sources are power plants, manufacturing facilities, incinerators and car exhaust.

Chronic exposure to inhaled formaldehyde is associated with respiratory symptoms and eye, nose, and throat irritation. Increased incidences of menstrual disorders and pregnancy problems have been observed in women workers using urea-formaldehyde resins. Studies of workers have shown significant associations between exposure to formaldehyde and increased incidence of lung and nasal cancer. EPA considers formaldehyde to be a probable human carcinogen.

Nickel and Compounds

Nickel is a very abundant element. In the environment it is usually combined with oxygen (nickel oxides) or sulfur (nickel sulfides). Nickel is a hard silvery white metal that is combined with other metals to form mixtures called alloys.

Nickel is used to make metal coins and jewelry and in industry for making many metal items. It is also used for electroplating baths, batteries, spark plugs and machinery parts. Since so many consumer products contain nickel it is released when municipal garbage is incinerated.

Respiratory effects, including chronic bronchitis and reduced lung function, have been observed in workers who breathe large amounts of nickel. Nickel may also cause reactions in sensitive skin upon contact. Some people react if they consume nickel in food or water, or react if they breathe it. EPA has classified several forms of nickel as known or probable human carcinogens.

Perchloroethylene

Perchloroethylene, also called Perc or tetrachloroethene is most well known as a dry-cleaning fluid. It is also used in textile processing, chemical manufacturing, as a degreasing agent in metalworking, and as a solvent.

Exposure to high levels of perchloroethylene can cause acute human health effects. These effects include central nervous system damage, kidney dysfunction, and severe respiratory irritation. Long term, low level exposures can cause neurological impairment, and severe liver and kidney damage. EPA has classified perchloroethylene as a possible human carcinogen.

Polycyclic Organic Matter (POM)

The term Polycyclic Organic Matter defines a class of compounds that includes the polynuclear aromatic hydrocarbons (PAHs). These compounds exist either as gases or particulates in the air.

Combustion is the primary source of most POMs. Air emissions sources include vehicle exhaust, forest fires, residential wood and backyard burning, agricultural burning, and asphalting roads.

Information about short and long-term human health impacts is limited. Long-term exposure to one form of POM, benzo(a)pyrene, has resulted in dermatitis, eye irritation, and reduced fertility. Cancer is the major concern from long-term exposure based on animal research. EPA has classified most POM compounds as probable human carcinogens.

Lead (Pb)

Lead is a toxic heavy metal, abundant in the earth's crust. Air borne lead particles are of sufficiently small size (less than 0.7 microns) that they can penetrate deep within the lungs and ultimately be absorbed in the blood. High concentrations of lead in the blood can cause severe and permanent brain damage, especially in children. Lower levels have vague, non-specific symptoms, including headaches, malaise, stomach pains, irritability, and pallor. Damage can be caused to heart, kidney, liver, and nerve and blood tissues.

Noise Pollution

Noise control standards have been adopted in Oregon to protect the public from the known adverse health effects of noise, as well as protecting public welfare. Budget cuts eliminated the DEQ noise program and enforcement of the standards is now the responsibility of local enforcement officials.

Noise has often been treated as merely a nuisance, however, studies have shown that noise has a definite effect on public health and welfare. Exposure to loud noises can result in hearing loss or tinnitus. Exposure of pregnant women to high noise levels has been linked to low birth weights and hearing loss in infants. Noise has also been linked to high blood pressure and, in the elderly, to heart attack and stroke. Noise contributes to irritability and stress.

Visibility

Visibility impairment may be caused by meteorological effects (clouds, rain), man-made pollution (open burning, industry), and natural pollution (wildfire, dust storms). The Department monitors visibility conditions in selected Oregon Class I (or pristine) areas during the summer months. Information from the monitoring is used to determine the extent of man-made visibility impairment, and to evaluate the effectiveness of the Department's Visibility Program.

National Ambient Air Quality Standards (NAAQS)

The NAAQS were adopted by Oregon to protect the public health. The EPA has established primary NAAQS to protect public health and secondary NAAQS to protect public welfare. Table 8 shows the primary NAAQS standards for the criteria pollutants.

Table 8. Ambient Air Quality Standards - 2008

Pollutant	**Averaging Time**	**National Ambient Air Quality Standard (NAAQS) Violation Determination[1]**	**Federal Standard (NAAQS) Exceedance Level**	**State Standard Exceedance Level**
Carbon monoxide	1-hour	Not to be exceeded more than once/year.	35 ppm	35 ppm
	8-hour	Not to be exceeded more than once/year.	9 ppm	9 ppm
Pre2008 Lead	Calendar Quarter	Quarterly arithmetic mean	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
2008 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	0.053 ppm	0.053 ppm
Ozone 2008	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration.	0.075 ppm	0.075 ppm
$PM_{2.5}$	24 hour	98th percentile of the 24-hour values determined for each year. 3-year average of the 98^{th} percentile values.	35 $\mu g/m^3$	35 $\mu g/m^3$
	Annual Average	3-year average of the annual arithmetic mean	15 $\mu g/m^3$	15 $\mu g/m^3$
PM_{10}	24 hour	The expected number of days per calendar year with a 24-hour average concentrations above 150 $\mu g/m^3$ is equal to or less than 1 over a 3-year period.	150 $\mu g/m^3$	150 $\mu g/m^3$
Sulfur dioxide	Annual Arithmetic Mean	Not to be exceeded more than once per calendar year.	0.03 ppm	0.02 ppm
	24 hour	Not to be exceeded more than once per calendar year.	0.14 ppm	0.10 ppm
	3 hour	Not to be exceeded more than once per calendar year.	N/A	0.50 ppm

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

Exceedances vs. Violation

Violations consist of one or more exceedances of the NAAQS as discussed in Table 8. Exceedances occur when the NAAQS is surpassed.

1999-2008 NAAQS Exceedances.

Tables 9 through 12 summarize Oregon's NAAQS exceedances from 1999 to 2008 for PM_{10}, Carbon monoxide and Ozone. $PM_{2.5}$ is not run daily and comparison to the daily max is determined by the 98th percentile.

Table 9a. $PM_{2.5}$: 98th Percentile – Eastern Oregon

Year	Bend	Burns	Klamath Falls	La Grande	Lakeview	Pendleton	The Dalles
1999	24	-	44	20	38	30	-
2000	25	38	37	24	37	34	30
2001	21	31	35	23	29	25	19
2002	24	30	51	27	30	40	28
2003	26	36	31	19	-	-	19
2004	-	-	42	21	-	-	33
2005	-	-	49	31	-	-	-
New Daily Standard of 35ug/m3 (old standard was 65ug/m3)							
2006	-	-	**48**	32	-	-	-
2007	-	**36**	**40**	15	**38**	-	-
2008	-	**36**	**52**	15	**44**	30	-

Table 9b. $PM_{2.5}$: 98th Percentile – Western Oregon

Year	Albany	Beaverton	Corvallis	Cottage Grove	Eugene/ Springfield	Grants Pass	Hillsboro	Medford	Oakridge	Portland	Salem
1999	-	29	32	-	36	-	-	49	57	27	26
2000	33	28	30	-	39	28	32	40	52	27	29
2001	29	24	28	-	34	41	31	32	60	25	33
2002	30	28	27	-	46	32	38	41	55	28	35
2003	28	18	-	-	31	34	23	32	53	23	-
2004	31	30	-	-	28	-	-	35	46	33	-
2005	-	-	-	-	36	-	-	36	58	26	-
New Daily Standard of 35ug/m3 (old standard was 65ug/m3)											
2006	-	-	-	-	32	-	-	26	**39**	**38**	-
2007	-	-	-	**39**	**36**	29	31	30	**43**	29	-
2008	-	-	-	18	27	27	30	28	**39**	27	-

Table 10a. PM_{10}: Number of Exceedances – Eastern Oregon

Year	Bend	Burns	Klamath Falls	La Grande	Lakeview	Pendleton
1999	0	0	0	0	0	0
2000	1	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	2⚐	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	0	-	0	0	-	0
2008	-	-	0	0	-	0

⚐ The flagged exceedances were caused by the July and August, 2002 forest fires.

Table 10b. PM_{10}: Number of Exceedances – Western Oregon

Year	Cottage Grove	Eugene /Springfield	Grants Pass	Medford	Oakridge	Portland
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	-	0	0	0	0	0
2008	-	0	0	0	0	0

Table 12. Carbon monoxide: Number of Exceedances

Year	Bend	Eugene	Grants Pass	Klamath Falls	Medford	Portland	Salem
1999	0	0	0	0	1	0	0
2000	0	0	0	0	1	0	0
2001	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0
2006	-	0	-	-	0	0	-
2007	-	0	-	-	0	0	-
2008	-	0	-	-	0	0	-

Table 13. Ozone: Number of Exceedances. (Eight Hour Average)

Year	Bend	Eugene	Medford	Portland	Salem	Hermiston
1999	-	0	0	0	0	-
2000	-	0	0	0	0	-
2001	-	0	0	0	0	-
2002	-	0	0	**1**	0	-
2003	-	0	0	0	0	-
2004	-	0	0	0	0	-
2005	-	0	0	0	0	-
2006	-	0	0	**1**	**1**	-
2007	-	0	0	0	0	0
Standard lowered from 0.085 to 0.075ppm						
2008	0*	0	1	**3**	2	0

Appendix 1

Air Quality Data Summaries for 1999 through 2008

The following pages present ambient air quality data summaries for the past 10 years.

DEQ's Air Quality Surveillance Network collects data throughout the state for a number of pollutants and meteorological parameters. DEQ uses air sampling methods designated by the U.S. EPA as Federal Reference Methods to judge attainment with the NAAQS. The following air quality data summaries for particulate and gaseous pollutants are summarized for comparison to the federal standards. If Oregon has more stringent standards than the NAAQS, compliance with state standards means compliance with federal. The following notes apply to the summary tabulation:

Appendix 1 -A&B. Particulate (PM_{10} and $PM_{2.5}$)

A. For 2008 - PM_{10} is sampled every sixth day.
B. The annual average is determined by averaging the quarterly means.
C. The PM_{10} max daily sample is determined by taking the highest 24 hour sample for the year.
D. The PM_{10} second highest daily sample is determined by taking the second highest value for the year.
E. The $PM_{2.5}$ max daily sample is determined by taking the highest 24 hour sample for the year.
F. The $PM_{2.5}$ 98^{th} percentile is determined by multiplying the number of days sampled by 0.98.

Appendix 1-C. Carbon Monoxide (CO)

A. Portland, Eugene, and Medford have year round sites.
B. Max one hour CO average is determined by taking the highest one hour average for the year.
C. Max eight hour CO average is determined by calculating a rolling average (across midnight).
D. Second highest eight hour average CO is determined from the data in C. Only one max per CO episode is used to count to the second highest.

Appendix 1-D. Ozone (O_3)

A. All sites sample from May 1^{st} to Sept 30^{th} except Portland SE Lafayette which samples year round.
B. Max one hour average ozone value is determined by taking the highest one hour average for the year.
C. Max eight hour ozone average is determined by calculating a rolling average (across midnight).
D. Fourth highest eight hour average is determined from the data in C. Only one max per day is used to count to the fourth highest.
E. Three year average of the fourth highest eight hour ozone is calculated by averaging the current fourth highest value determined in D with the respective values calculated for the previous two years.

Appendix 1-E. Oxides of Nitrogen (NOx) and Hydrocarbons (HC)

A. Sampling occurs from May to Sept until 2008, then year round.
B. Only NO_2 has a NAAQS standard.
C. The max one hour average NO_2 is determined by taking the highest one hour average for the year.
D. The max one hour average NO is determined by taking the highest one hour average for the year.
E. Hydrocarbon data is collected for ozone modeling but not included here.

Appendix 1-F. Sulfur Dioxide (SO_2)

A. Sampling is done year around.
B. The maximum three hour average is calculated (must have three consecutive hours)
C. The maximum 24 hour daily average is calculated (must have $\geq$ 18hrs/day)
D. The annual average is calculated

Appendix 1-G. Light Scattering ($PM_{2.5}$ estimate)

A. No air quality standards have been adopted. Light scattering is used as a $PM_{2.5}$ concentration surrogate. It is used for the Air Quality Index, the Wildfire Air Quality Rating, EPA AIRNow (EPA's air quality current conditions web page), Portland $PM_{2.5}$ forecast, woodstove advisories, air stagnation health alerts, field burning calls, forest health (prescribed burning) calls, and forest fire smoke health alerts.
B. The annual average is determined by taking the arithmetic mean of all the one hour averages.
C. The one hour max is determined by taking the highest one hour average for the year.
D. The 24 hour max is determined by averaging the one hour averages from midnight to midnight.

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

A. Ambient air toxic levels are compared to bench mark levels of one in a million chance of cancer. The EPA has pared the 188 HAPS down to 32 National Air Toxics Assessment (NATA) air toxics that are most common and hazardous in urban areas. Oregon has been identified as having levels above the bench mark for 14 NATA compounds. The NATA toxics DEQ monitors are averaged.
B. The annual averages are determined by taking the arithmetic mean of all the one hour averages. Where the values are below the minimum detection limit (MDL), the MDL is halved prior to inclusion in the average.

Appendix 1-I. Visibility (Light Scattering)

A. No air quality standards have been adopted. Light scattering measures visibility of scenic areas.
B. One hour averages were determined for 9 A.M. to 9 P.M. PST from July 1 to September 15.
C. The one hour averages were counted when the visibility was in the perceptible range (0.60 to 0.79 BScat), the moderate range (0.80 to 1.29 BScat), and the heavy range (>1.30 BScat).

Lead (Pb) DEQ discontinued TSP lead sampling in 2001. See air toxics for lead.

II. Other Data: Supplemental Air Monitoring Studies and Data

A. This section provides a summary of the monitoring data DEQ uses for compliance and public notification purposes. The reports, studies, and data indicated are available by request from DEQ.

DEQ Air Monitoring Methods

Appendix 1-A&B. Fine Particulate Matter (PM_{10} and $PM_{2.5}$)

High-Volume Sampler: Some PM_{10} samples were collected with high volume samplers which draw air through a size-separating inlet then a pre-weighed quartz filter at about 40 cubic feet per minute. After 24 hours of sampling, the filter is removed and reweighed. The difference between the starting and the ending weight is expressed as micrograms of fine particulate per cubic meter of air sampled. This is an EPA Federal Reference Method.

Medium-Volume Sampler: PM_{10} samples are collected with DEQ designed medium volume samplers which draw air through size-separating inlets at four cubic feet per minute. The samplers collects particles on two separate filters simultaneously (quartz and Teflon), allowing for chemical analysis. The difference between the starting and the ending weight is expressed as micrograms of fine particulate per cubic meter of air sampled. This is an EPA Federal Equivalency Method.

Federal Reference Method (FRM) samplers: PM_{10} and $PM_{2.5}$ samples are collected with the FRM samplers which draw air through a size-separating inlet then a pre-weighed fiber filter at about 16.7 liters per minute. After 24 hours of sampling, the filter is removed and reweighed. The difference between the starting and the ending weight is expressed as micrograms of fine particulate per cubic meter of air sampled. This is an EPA Federal Reference Method.

Appendix 1-C. Carbon Monoxide: Nondispersive Infrared (NDIR)

Infrared energy from a lamp is passed through a cell containing the gas sample to be analyzed and simultaneously through a reference cell containing a non-absorbing gas. Carbon monoxide in the sample absorbs some of the energy, creating an out-of-balance condition in the detector. The imbalance is proportional to the amount of carbon monoxide in the sample air and is electronically amplified and recorded. This is an EPA Federal Reference Method.

Appendix 1-D. Ozone: Ultraviolet Photometry:

The air sample enters a chamber with an ultraviolet lamp at one end and detector at the other. The ozone in the sample stream absorbs the ultraviolet light at a specific wavelength. The amount absorbed is proportional to the amount of ozone in the air stream. The detector then sends an amplified signal to the recorder. This is an EPA Federal Reference Method.

Appendix 1-E. Oxides of Nitrogen: Chemiluminescent Detection

The air sample is continuously pumped into two paths within the analyzer, one leading through a converter to reduce Nitrogen dioxide (NO_2) to Nitric oxide (NO); the other bypasses the converter. Both samples reach reaction chambers where the nitric oxide is detected by its chemiluminescent (light emitting) reaction with ozone. The light emissions are detected by photomultiplier tubes, amplified, and recorded. This is an EPA Federal Reference Method.

Appendix 1-F. Sulfur Dioxide: Ultraviolet Fluorescence Spectrometer

The UV fluorescence method operates on the principle that when the SO_2 molecules contained in the sample gas are excited by ultraviolet radiation they emit a characteristic fluorescence in the range of 220- 240 nm. This fluorescence is measured and the SO_2 concentration is obtained from changes in the intensity of the fluorescence. This is an EPA Federal Reference Method.

Appendix 1-G & I. Light Scattering: Nephelometer

The nephelometer measures a common property of small particles in the air; the ability to scatter light and cause visibility reduction. The instrument measures the scattering coefficient (BScat) of the sample by drawing air into the detection chamber where it is illuminated by a pulsed-flash lamp. The scattered light is measured over a range of angles by means of a photomultiplier tube. This signal is averaged, amplified, and recorded. The amount of light scattered is roughly proportional to the fine particle mass concentration and to observed visibility.

Appendix 1-H. Air Toxics:

Aldehydes/ketones - Ambient air is drawn through a carbonyl cartridge at one liter/minute for 24 hour then solid phase extracted and analyzed with by High Pressure Liquid Chromatography.

Volatile Organic Carbons – Ambient air is drawn into an evacuated canister during preprogram cycle times at about 50cc/minute for 24 hours. The sample is analyzed using Gas Chromatography/Mass Spectroscopy.

Poly Organic Carbons - Ambient air is drawn through a quartz filter then through polyurethane foam/XAD sandwich at eight cubic feet per minute for 24 hours. The sample is Soxhlet extracted from the filter and foam and analyzed using Chromatography/Mass Spectroscopy.

Metals - A PM_{10} or $PM_{2.5}$ sample is collected by a High Volume sampler on a quartz for 24 hours then the filter is analyzed using inductively coupled plasma mass spectrometry (ICP-MS).

Diesel Particulate – Using an Aethalometer, Ambient air is drawn through a glass filter tape and measured with an Ultraviolet/Visible lamp and photodiode detector every five minutes. The five minute measurements are compiled for an hourly average. Black Carbon is measured and used as a surrogate for diesel particulate.

These are EPA Federal Reference Methods.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	Years	SAMPLE Days	ARITHMETIC MEAN	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Albany	2000	115	8.7	44 (11/17)	33 (01/28)
Calapooia Middle Sch. (ACS)	2001	120	8.2	37 (11/09)	29 (11/12)
830 SE 24th	2002	119	8.2	39 (11/28)	30 (12/01)
DEQ# 21886 EPA# 410430009	2003	111	8.0	31 (01/09)	28 (02/08)
	2004	95	8.0	35 (11/11)	31 (01/10)
Bend					
8th & Newport (BEN)	1999	145	8.5	27 (12/27)	24 (03/07)
DEQ# 10099 EPA # 410170113	2000	351	7.3	40 (11/16)	25 (11/20)
✶Moved to PumpStation 3/02/01	2001	46	✶	21 (01/08)	21 (01/08)
Pump Station (BPS)	2001	286	7.2	42 (11/03)	21 (08/15)
35 Portland Rd	2002	321	8.0	31 (12/09)	24 (11/28)
DEQ# 24172 EPA # 410170120	2003	87	7.6	27 (08/25)	26 (06/29)
Burns	2000	44	9.3	38 (12/08)	38 (12/08)
267 E Madison St. (BMS)	2001	60	9.1	39 (01/31)	31 (11/15)
DEQ# 10105 EPA # 410250002	2002	54	9.7	36 (11/16)	30 (01/08)
	2007	58	9.5	37 (11/08)	36 (12/14)
	2008	54	11.2	41 (01/25)	36 (11/20)
Corvallis	1999	109	7.1	41 (11/05)	32 (01/03)
Corvallis Intermed Sch (CIS)	2000	120	7.8	38 (11/17)	30 (11/20)
1310 NW Circle Blvd.	2001	116	7.3	33 (11/09)	28 (01/28)
DEQ# 20478 EPA # 410030013	2002	116	7.6	30 (11/28)	27 (11/25)
Cottage Grove					
Harrison School	2007	59	8.9	42 (01/30)	39 (02/05)
DEQ# 18515 EPA # 410399002					
City Shops					
DEQ# 31004 EPA # 410399004	2008⚑	119	7.1	32 (01/25)	21 (01/22)
⚑ ***forest fire data included***	2008✶	118	7.9	32 (01/25)	18 (10/30)
✶ ***forest fire flagged data removed***					

⚑ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Eugene	1999	347	8.6	53 (12/26)	36 (12/22)
Amazon Park (EAP)	2000	342	9.4	59 (11/18)	39 (12/26)
499 E 29TH	2001	361	9.4	51 (11/09)	34 (01/02)
DEQ# 18524 EPA # 410390060	2002	345	9.7	56 (11/27)	46 (11/03)
	2003	120	9.5	40 (01/18)	31 (11/08)
	2004	121	8.7	38 (01/13)	28 (12/20)
	2005	122	9.1	40 (01/16)	36 (02/03)
	2006	123	8.4	43 (12/08)	32 (12/07)
	2007	119	7.3	43 (02/05)	36 (02/02)
⚐ *forest fire data included*	2008⚐	345	7.8	40 (01/24)	29 (01/22)
✶ *forest fire flagged data removed*	2008✶	343	7.6	40 (01/24)	27 (12/10)
Eugene Key Bank (EKB)					
450 Pacific Hwy 99 N	2008⚐	117	8.3	32 (06/29)	25 (10/27)
DEQ# 18522 EPA# 410390058	2008✶	116	8.0	31 (01/25)	24 (02/15)
⚐ *forest fire data included*					
✶ *forest fire flagged data removed*					
Saginaw	1999	115	6.8	25 (10/30)	21 (11/02)
Delight School (SAG)	2000	114	6.7	21 (11/17)	19 (11/14)
79980 Delight Valley School Rd	2001	119	7.0	27 (11/12)	17 (10/04)
DEQ# 18315 EPA # 410391007	2002	121	6.7	22 (11/13)	18 (03/03)
	2003	59	6.2	17 (11/05)	16 (02/08)
	2004	60	6.0	14 (11/23)	13 (02/21)
	2005	61	6.8	25 (01/16)	18 (02/03)
Grants Pass					
Sewage Treatment Plant (GPS)					
1200 SW Greenwood Ave.	2000	117	8.8	35 (11/11)	28 (11/17)
DEQ# 18508 EPA # 410330107	2001	116	10.6	55 (11/12)	41 (01/07)
*Moved to GPP 7/02,	2002	63	*	32 (02/16)	29 (02/10)
GPS & GPP combined					
Grants Pass Parkside Sch (GPP)	2002⚐	52	11.5*	39 (11/19)	32 (02/16)
DEQ# 28859 EPA # 410330114	2003	85	9.7	46 (11/23)	34 (02/08)
	2007	58	8.2	32 (02/05)	29 (01/30)
⚐ *forest fire data included*	2008⚐	56	9.4	34 (06/29)	28 (01/01)
✶ *forest fire flagged data removed*	2008✶	54	8.5	28 (01/01)	27 (01/19)

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Hermiston					
Municipal Airport (HMA)	2007*	98	*	28(11/08)	23(11/23)
DEQ# 31000 EPA # 410591003					
*Started 2/07 – not a complete year					
Pump Station (HPS)					
DEQ# 24735 EPA # 410591002	2007*	104	*	32 (11/08)	24 (12/23)
*Started 3/07 – not a complete year					
Klamath Falls	1999	149	10.5	52 (01/06)	44 (12/30)
Peterson School (KFP)	2000	346	9.6	63 (12/07)	37 (11/19)
4856 Clinton St.	2001	322	8.9	40 (12/12)	35 (11/12)
DEQ# 10118 EPA # 410350004	2002⚐	339	17.1	155(08/02)	93 (08/19)
	2002✶	*314*	*12.5*	*66 (12/02)*	*51 (01/31)*
	2003	115	10.0	54 (11/23)	31 (12/17)
	2004	105	11.3	51 (12/02)	42 (11/11)
	2005	109	11.7	51 (01/19)	49 (01/22)
	2006	112	11.1	53 (12/31)	48 (01/23)
	2007	116	10.8	56 (01/18)	40 (11/23)
⚐ ***forest fire data included***	2008⚐	118	13.0	74 (12/17)	52 (12/23)
✶ ***forest fire flagged data removed***	2008✶	113	12.5	74 (12/17)	52 (12/23)
La Grande					
Willow Street (LWS)	1999	39	✶	18 (01/06)	✶
DEQ# 10148 EPA # 410610006					
✶Moved to LTI –9/99					
3rd & I Street (LTI)	1999	97	7.7*	20 (12/29)	20 (12/23)
DEQ# 21638 EPA # 410610117	2000	327	6.5	36 (08/16)	24 (11/22)
*Averaged with LWS	2001	337	6.7	34 (01/06)	23 (11/07)
✶Moved to LAS –12/03	2002	333	7.3	43 (12/05)	27 (01/28)
	2003	104	✶	25 (11/05)	18 (09/03)
Ash Street (LAS)	2003	7	6.3*	19 (12/11)	19 (12/11)
DEQ# 26448 EPA # 410610119	2004	102	7.4	26 (01/16)	21 (02/21)
* averaged with LTI	2005	107	8.8	41 (12/12)	31 (12/15)
⚐ ***forest fire data included***	2006⚐	54	9.3	35 (09/08)	34 (12/19)
✶ ***forest fire flagged data removed***	*2006✶*	53	8.6	34 (12/19)	32 (09/26)
	2007	60	6.4	24 (01/24)	15 (09/15)
	2008	59	6.7	19 (12/20)	15 (11/20)

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Ladd Marsh-Foothills Rd (LLM)	2000	47	6.7	39 (08/16)	39 (08/16)
DEQ# 10147 EPA # 410619103	2001	51	4.7	16 (01/19)	14 (08/17)
Discontinued 12/02	2002	57	5.2	24 (12/04)	14 (07/13)
Lakeview	1999	156	8.6	60 (01/06)	38 (12/29)
Center and M Street (LCM)	2000	320	7.3	51 (12/29)	37 (12/07)
DEQ# 10123 EPA # 410370001	2001	351	7.2	37 (01/31)	29 (01/18)
⚐ *forest fire data included*	2002⚐	347	9.0	78 (07/31)	40 (08/19)
✶ *forest fire flagged data removed*	*2002✶*	*339*	*8.0*	*41 (02/04)*	*30 (08/01)*
*Discontinued 10/03	2003	51	*	29 (01/09)	*
	2007	86	8.1	44 (01/24)	38 (01/18)
	2008⚐	118	11.2	72 (12/17)	44 (12/11)
	2008✶	114	10.6	72 (12/17)	44 (12/11)
Grange Hall (LGH)	2000	58	2.7	8 (08/22)	7 (06/29)
DEQ# 10122 EPA # 410370003	2001	61	3.0	12 (09/10)	11 (08/11)
⚐ *forest fire data included*	2002⚐	60	5.3	57 (07/31)	46 (07/25)
✶ *forest fire flagged data removed*	*2002✶*	*58*	*3.9*	*21 (07/19)*	*19 (08/06)*
Lebanon	2003	70	*	34 (09/02)	NA
Fire Station (LFS)	2004	29	*	12 (09/03)	NA
DEQ# 18331 EPA # 410411004	2005	71	*	11 (09/27)	NA
*Summer Field Burning Site only	2006	67	*	22 (09/02)	NA

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Medford	1999	220	6.4	20 (01/06)	18 (12/29)
Dodge Road (MDR)	2000	120	5.6	23 (11/23)	19 (01/07)
4035 Dodge Road	2001	117	5.2	16 (11/18)	13 (01/07)
DEQ# 10106 EPA # 410291001	2002⚐	110	8.9	69 (07/28)	50 (08/09)
⚐ ***forest fire data included***	*2002✶*	*103*	*6.7*	*29 (08/15)*	*23 (08/24)*
✶ ***forest fire flagged data removed***	2003	60	5.2	17 (08/31)	15 (01/09)
	2004	61	5.9	22 (12/05)	19 (11/17)
	2005	60	5.2	13 (11/18)	12 (11/24)
	2006	51	5.5	17 (12/07)	14 (11/01)
	2007	57	5.0	17 (11/14)	13 (02/05)
	2008⚐	55	5.9	41 (06/29)	26 (11/08)
	2008✶	52	4.4	26 (11/08)	9 (10/27)
Grant & Belmont (MGB)	1999	316	11.8	63 (12/25)	49 (12/28)
902 Grant Ave.	2000	347	11.4	56 (12/09)	40 (12/28)
DEQ# 20448 EPA # 410290133	2001	347	10.6	45 (01/06)	32 (11/09)
⚐ ***forest fire data included***	2002⚐	348	14.0	64 (07/29)	45 (11/21)
✶ ***forest fire flagged data removed***	*2002✶*	*328*	*12.4*	*60 (11/15)*	*41 (12/05)*
	2003	116	11.1	45 (01/09)	32 (11/14)
	2004	119	10.8	38 (12/05)	35 (11/29)
	2005	116	10.1	50 (11/21)	36 (12/15)
**Errata: 98percentile for 2006 is*	2006	102	10.0	45 (11/10)	32 (12/19)*
32 not 26ug/m3as previously shown	2007	231	9.7	38 (01/27)	30 (11/16)
	2008⚐	351	10.0	51 (08/07)	33 (08/06)
	2008✶	333	8.8	33 (11/25)	28 (01/17)
Welch & Jackson (MWJ)	2000	331	11.4	52 (12/29)	44 (07/04)
711 Welch St.	2001	356	10.2	46 (01/06)	33 (01/16)
DEQ# 10113 EPA # 410292129	2002⚐	348	13.8	64 (11/15)	48 (08/12)
⚐ ***forest fire data included***	*2002✶*	*327*	*12.1*	*64 (11/15)*	*38 (11/26)*
✶ ***forest fire flagged data removed***	2003	121	11.3	47 (01/18)	39 (11/14)

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary (µg/m^3)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Provolt BLM Seed Orch (PSO)	2003	51	7.4*	22 (01/16)	*
DEQ# 18432 EPA # na	2004	53	6.7*	22 (02/21)	*
Oakridge	1999	317	13.1	72 (12/27)	57 (12/28)
Willamette Cntr. (OAK)	2000	362	13.1	74 (01/29)	52 (02/07)
47674 School St.	2001	355	13.8	96 (01/07)	60 (01/27)
DEQ# 18733 EPA # 410392013	2002	353	14.1	80 (11/01)	55 (03/02)
	2003	362	12.3	69 (01/11)	53 (02/25)
	2004	362	12.0	69 (02/12)	46 (02/21)
	2005	237	12.8	73 (12/15)	58 (02/03)
	2006	118	11.1	47 (12/07)	39 (02/22)
	2007	118	10.5	53 (02/02)	43 (01/24)
	2008	182	11.5	44 (01/22)	39 (12/06)
Pendleton	1999	113	8.4	33 (12/21)	30 (12/22)
McKay Creek Park (PMC)	2000	327	8.9	42 (11/19)	34 (11/14)
3745 SW Marshall Place	2001	302	8.7	40 (11/27)	25 (08/15)
DEQ# 10146 EPA # 410590121	2002	308	9.3	52 (11/04)	40 (11/26)
**Incomplete 1st Quarter data set*	2007	6	*7.8	*29 (11/08)	*22 (10/27)
	2008	119	8.3	34 (11/23)	30 (10/30)
Portland Area	1999	266	7.4	41 (01/01)	29 (10/30)
Beaverton Highland Park Sch (BHP)	2000	117	8.6	42 (11/23)	28 (12/08)
	2001	119	7.6	29 (11/09)	24 (10/28)
3745 SW Marshall Place	2002	116	7.9	56 (12/01)	28 (10/26)
DEQ# 20481 EPA # 410670111	2003	59	6.7	23 (01/21)	18 (03/04)
	2004	58	9.0	35 (01/10)	30 (11/11)
Hillsboro (HFO)	2000	111	9.7	38 (12/05)	32 (10/15)
15th & Oak St.	2001	117	8.9	47 (11/09)	31 (01/28)
DEQ# 21639 EPA # 410671003	2002	111	10.5	66 (12/01)	38 (07/04)
	2003	110	8.3	38 (01/21)	23 (12/20)
Hillsboro (HHF)					
Hare Field	2007	57	8.2	34 (11/26)	31 (02/05)
DEQ# 31967 EPA # 410670004	2008	65	8.9	32 (12/05)	30 (01/16)

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
N.E. Portland (PNR)	2000	353	9.5	46 (07/04)	29 (10/31)
24 N. Emerson (N. Roselawn)	2001	351	8.8	50 (09/19)	23 (01/12)
DEQ# 21889 EPA # 410510246	2002	350	8.5	36 (11/15)	26 (10/26)
	2003	117	8.1	28 (10/27)	21 (09/03)
	2004	125	8.8	34 (11/08)	28 (11/11)
	2005	119	8.8	49 (02/03)	25 (02/09)
	2006	120	7.8	28 (10/26)	19 (10/14)
	2007	86	7.4	24 (01/18)	21 (02/05)
	2008	121	7.7	27 (10/30)	25 (11/17)
N.W. Portland (PNW)	1999	333	8.5	35 (01/10)	22 (12/31)
1706 NW 24th St.	2000	336	9.2	36 (11/12)	28 (02/18)
(Forest Heights PO)	2001	359	8.3	30 (12/07)	22 (01/10)
DEQ# 18399 EPA # 410510244	2002	348	7.9	32 (11/15)	23 (11/26)
S.E. Portland (SEL)	1999	331	8.8	71 (01/05)	27 (12/14)
5824 SE Lafayette	2000	351	9.6	104 (07/04)	27 (12/19)
DEQ# 10139 EPA # 410510080	2001	347	8.6	35 (12/07)	25 (01/31)
	2002	348	8.4	45 (12/01)	28 (10/25)
	2003	114	8.2	26 (10/27)	23 (09/03)
	2004	115	9.3	47 (11/08)	33 (11/11)
	2005	116	9.2	34 (02/03)	26 (02/12)
	2006	56	9.8	39 (01/23)	38 (10/26)
	2007	116	8.1	40 (01/21)	29 (01/24)
	2008	118	8.4	34 (01/16)	27 (12/15)
Sauvie Island (SIS)	1999	220	6.5	34 (01/05)	23 (01/04)
Social Security Beach	2000	118	7.0	19 (11/17)	18 (11/20)
DEQ# 14152 EPA # 410090004	2001	116	6.2	20 (11/12)	13 (03/23)
	2002	118	6.4	24 (12/01)	18 (11/28)
	2003	57	5.6	14 (03/04)	13 (02/08)
	2004	54	6.9	21 (11/23)	19 (11/11)
Salem	1999	113	7.5	38 (11/05)	26 (10/30)
Salem General Hospital (SGH)	2000	121	8.9	33 (11/20)	29 (12/08)
867 Medical Center Drive	2001	122	8.2	49 (11/09)	33 (01/16)
DEQ# 20480 EPA # 410470040	2002	117	8.2	39 (11/04)	35 (12/01)

⚐ Forest Fire Impact.

APPENDIX 1A
$PM_{2.5}$ Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Between Salem & Portland					
North Marion (NMH)	1999	151	*	30 (01/04)	18 (01/06)
20167 Grimm Rd. NE Aurora					
DEQ# 20479 EPA # 410470109					
* moved to Butteville 7/99					
Butteville -Schultz Road (MBC)	1999	48	6.7*	37 (10/30)	37 (10/30)
DEQ# 21251 EPA # 410470110	2000	119	7.1	29 (12/08)	24 (10/27)
*Butteville & N Marion High	2001	120	6.7	28 (11/09)	18 (11/12)
combined for annual average.	2002	121	6.6	28 (12/01)	21 (01/11)
Springfield	2000	352	8.8	37 (11/18)	29 (10/25)
Springfield High Sch. (SHS)	2001	349	8.6	52 (12/06)	27 (11/08)
875 N 7th	2002	364	8.2	35 (11/28)	26 (11/02)
DEQ# 18734 EPA # 410391061	2003	120	7.8	28 (11/08)	23 (11/14)
Springfield City Hall (SCH)	2004	51	7.8	21 (11/11)	21 (11/05)
255 N 5th	2005	61	8.0	32 (01/16)	25 (02/03)
DEQ# 18538 EPA# 410391009	2006	61	7.4	30 (11/01)	28 (12/07)
⚐ *forest fire data included*	2007	59	6.8	39 (02/05)	18 (01/30)
✶ *forest fire flagged data removed*	2008⚐	61	6.9	32 (06/29)	24 (01/25)
	2008✶	60	6.4	24 (01/25)	18 (10/27)
The Dalles	2000	53	9.9	36 (11/20)	30 (01/07)
Cherry Heights (TDC)	2001	61	7.4	42 (11/09)	19 (11/03)
1112 Cherry Heights Rd	2002	59	7.7	30 (11/04)	28 (11/03)
DEQ# 21252 EPA # 410650007	2003	52	6.6	22 (11/07)	19 (02/08)
	2004	54	7.7	36 (11/11)	33 (01/10)
White City - Post Office (WPO)					
751 Crater Lk Hwy	2005	103	9.1	32 (11/21)	24 (12/15)
DEQ# 10107 EPA# 410294001	2006	103	9.0	48 (11/10)	23 (12/31)

⚐ Forest Fire Impact.

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Bend						
8th & Newport (BEN)	1999	146	0	27.1	94 (01/04)	75 (01/05)
794 NW Newport	2000	149	1	27.4	159 (02/07)	114 (01/28)
DEQ# 10099 EPA# 410170113	2001	50	0	*	71 (02/14)	70 (01/01)
* Moved to BPS 3/01						
Pump Station (BPS)	2001	114	0	18.5	112 (11/09)	73 (01/01)
35 Portland Ave	2002	114	0	21.5	76 (02/04)	73 (10/29)
DEQ# 24172 EPA# 410170120	2003	61	0	19.9	59 (10/30)	53 (02/08)
	2004	54	0	15.7	65 (02/09)	47 (12/17)
	2005	59	0	17.6	62 (02/03)	52 (02/27)
	2006	53	0	17.3	60 (12/07)	52 (12/19)
	2007	54	0	17.3	68 (01/24)	41 (01/12)
Burns (BMS)	1998	170	0	24.7	81 (04/29)	58 (01/20)
267 E Madison Street	1999	144	0	25.2	62 (01/29)	61 (01/09)
DEQ# 10105 EPA# 410250002	2000	145	0	21.9	54 (12/08)	54 (02/07)
*Annual data incomplete	2001	116	0	20.8	64 (01/22)	54 (01/31)
	2002	107	0	24.1	136 (11/16)	64 (07/13)
	2003	56	0	17.4	38 (01/09)	36 (11/23)
	2004	55	0	18.4	52 (05/03)	49 (02/15)
	2005	30	0	*	*	*
	2006	32	0	*	*	*
Cottage Grove	1998	58	0	17.3	51 (09/02)	50 (04/29)
Harrison School	1999	60	0	18.5	48 (10/21)	40 (11/02)
S. 10th	2000	62	0	19.1	42 (11/28)	40 (11/23)
DEQ# 18515 EPA# 410399002	2001	61	0	17.0	42 (12/27)	37 (11/09)
	2002	59	0	19.2	56 (11/04)	53 (03/03)
	2003	59	0	15.6	43 (02/25)	40 (02/07)
	2004	58	0	14.0	38 (08/19)	32 (08/13)
	2005	61	0	14.9	38 (12/18)	37 (01/22)
	2006	61	0	14.8	42 (11/01)	41 (02/10)

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Eugene	1999	60	0	18.3	45 (10/21)	43 (11/02)
Lane Comm College (LCC)	2000	60	0	18.7	48 (11/20)	47 (12/26)
1059 Willamette	2001	60	0	18.2	51 (11/09)	35 (09/10)
DEQ# 18320 EPA# 410390013	2002	60	0	16.1	46 (08/12)	45 (09/11)
	2003	58	0	14.5	32 (09/24)	29 (09/30)
	2004	56	0	13.9	36 (08/13)	35 (08/19)
	2005	62	0	15.4	42 (09/07)	40 (02/03)
	2006	61	0	14.4	44 (12/07)	38 (07/22)
	2007	59	0	13.3	65 (02/05)	39 (08/28)
	2008	61	0	13.1	42 (09/15)	38 (06/29)
Key Bank (EKB)	1999	231	0	19.6	77 (10/22)	64 (10/21)
450 Pacific Hwy 99 N	2000	195	0	19.3	73 (03/30)	50 (11/22)
DEQ# 18522 EPA# 410390058	2001	193	0	20.4	66 (11/09)	62 (11/10)
	2002	204	0	19.1	67 (02/14)	63 (11/02)
	2003	144	0	19.1	45 (08/19)	45 (02/07)
	2004	118	0	18.7	64 (02/12)	44 (11/05)
	2005	119	0	18.1	51 (09/07)	48 (12/09)
	2006	122	0	20.2	69 (08/18)	57 (11/01)
	2007	118	0	16.2	78 (02/05)	70 (02/02)
	2008	120	0	17.6	56 (09/15)	53 (01/25)
Amazon Park (EAP)	1999	58	0	17.0	55 (12/26)	42 (10/21)
499 E 29th	2000	60	0	17.4	55 (11/20)	52 (12/26)
DEQ# 18524 EPA# 410390060	2001	61	0	17.9	60 (11/09)	35 (10/04)
	2006	32	0	14.8	41 (11/01)	35 (09/02)
	2007	44	0	16.5	63 (02/05)	38 (08/28)
	2008	58	0	14.5	47 (09/15)	41 (01/25)

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Grants Pass						
Corner lot						
720 NE 11th	1999	146	0	18.5	43 (11/11)	41 (10/21)
DEQ# 10116 EPA# 410330113						
Sewage Treatment Plant (GPS)	1999	51	0	18.8	43 (10/21)	43 (06/11)
1200 SW Greenwood Ave.	2000	107	0	15.8	40 (11/21)	40 (12/27)
DEQ# 18508 EPA# 410330107	2001	144	0	15.7	55 (11/12)	50 (11/09)
* Moved to GPP 7/02	2002	76	0	*	41 (03/30)	37 (01/17)
Grants Pass Parkside Sch (GPP)	2002⚐	40	0	18.9*	45 (11/09)	44 (08/12)
DEQ# 28859 EPA # 410330114	2003	87	0	13.7	56 (11/14)	49 (11/23)
** GPS & GPP combined*	2004	76	0	16.4	36 (02/12)	32 (02/21)
	2005	57	0	16.4	48 (07/27)	38 (02/03)
	2006	59	0	15.7	39 (12/31)	38 (11/19)
⚐ ***forest fire impacted***	2007	55	0	13.5	41 (02/05)	39 (01/30)
	2008	57	0	15.2	49 (09/15)	42 (06/29)
Hermiston						
Pump Station (HPS)	2001	124	0	23.0	55 (10/04)	52 (05/19)
DEQ# 24735 EPA# na						
Klamath Falls	1999	151	0	21.3	84 (01/05)	82 (01/06)
Peterson School (KFP)	2000	146	0	19.3	94 (12/06)	93 (12/07)
4856 Clinton St	2001	146	0	18.3	82 (01/03)	62 (01/04)
DEQ# 10118 EPA# 410350004	2002⚐	151	0	28.5	145 (07/31)	121 (08/18)
	2003	87	0	20.6	110 (03/13)	63 (11/23)
	2004	81	0	22.1	76 (01/13)	70 (01/22)
	2005	59	0	21.7	85 (01/22)	76 (12/12)
⚐ ***forest fire impacted***	2006	60	0	20.3	71 (12/31)	56 (07/04)
	2007	58	0	22.2	89 (01/18)	72 (01/24)
	2008	55	0	20.7	77 (02/12)	72 (02/18)
Miller Island						
1211 Miller Is	1999	30	0	*	34 (03/19)	34 (05/24)
DEQ# 10120 EPA# 410350013						
Wocus Marsh						
10500 Hwy 140	1999	153	0	16.6	48 (10/21)	46 (10/12)
DEQ# 10121 EPA# 410350014						

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
La Grande						
Ladd Marsh (LLM)	1999	124	0	12.9	64 (09/15)	46 (09/30)
Foothills Road						
DEQ# 10147 EPA# 410619103						
Willow Street (LWS)	1999	132	0	23.1	96 (01/05)	89 (01/04)
1601 N Willow	2000	133	0	22.2	87 (01/18)	71 (12/05)
DEQ# 10148 EPA# 410610006	2001	142	0	20.7	82 (01/06)	76 (02/03)
	2002	110	0	22.0	90 (01/28)	72 (01/29)
	2003	81	0	20.5	57 (02/11)	54 (10/27)
	2004	74	0	23.6	61 (12/23)	54 (02/09)
	2005	61	0	22.3	50 (02/03)	48 (11/18)
Ash Street (LAS)	2006	58	0	27.5	87 (07/22)	76 (08/27)
DEQ# 26448 EPA # 410610119	2007	59	0	21.0	150 (05/12)	53 (08/16)
	2008	51	0	14.5	29 (07/11)	29 (09/15)
Lakeview	1999	142	0	22.5	95 (01/05)	94 (01/04)
Center & M (LCM)	2000	153	0	18.5	106 (12/29)	101 (12/28)
DEQ# 10123 EPA# 410370001	2001	86	0	✶	94 (01/03)	94 (01/04)
✶No data for Oct – Dec, 2001	2002⚐	117	0	22.3	104 (07/31)	84 (02/04)
	2003	87	0	17.4	49 (02/11)	46 (01/09)
⚐ ***forest fire impacted***	2004	74	0	19.4	71 (01/22)	71 (01/14)
	2005	59	0	18.1	78 (01/22)	77 (12/06)
	2006	57	0	14.8	61 (12/19)	46 (06/10)
Lakeview Grange Hall (LGH)						
DEQ# 10122 EPA# 410370003	1999	140	0	9.4	30 (07/11)	30 (08/04)
336 N "L" Street						
DEQ# 10124 EPA# 410376002	1999	59	0	35.6	111 (01/06)	91 (09/09)

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Medford						
Jackson Cnty Courthouse (MCO)	1999	60	0	24.1	80 (12/26)	76 (01/06)
DEQ# 10110 EPA# 410293001						
Welch & Jackson (MWJ)	1999	152	0	27.3	98 (01/04)	93 (01/05)
DEQ# 10113 EPA # 410292129	2000	151	0	23.1	72 (11/18)	68 (11/20)
	2001	140	0	21.8	64 (01/03)	63 (01/04)
⚐ ***forest fire impacted***	2002⚐	119	0	25.0	80 (07/31)	73 (08/12)
	2003	78	0	21.4	58 (11/14)	57 (01/18)
	2004	77	0	23.2	52 (01/22)	49 (11/17)
	2005	60	0	22.1	52 (02/03)	51 (11/18)
	2006	61	0	20.2	65 (12/07)	62 (11/01)
	2007	67	0	22.0	94 (02/05)	78 (01/24)
	2008⚐	61	0	18.6	53 (08/16)	46 (01/19)
Dodge Road (MDR)	1999	147	0	13.8	55 (09/30)	33 (10/03)
4035 Dodge Road	2000	145	0	11.2	29 (10/24)	29 (12/31)
DEQ# 10106 EPA # 410291001	2001	148	0	10.5	23 (01/06)	21 (01/04)
⚐ ***forest fire impacted***	2002⚐	113	0	15.2	66 (08/18)	63 (08/12)
	2003	90	0	9.0	30 (08/31)	27 (10/03)
	2004	71	0	13.5	28 (11/17)	25 (08/19)
Grant and Belmont (MGB)						
902 Grant Ave.	2008⚐	60	0	16.6	59 (06/29)	58 (08/16)
DEQ# 20448 EPA # 410290133						
⚐ ***forest fire impacted***						
Oakridge	1999	230	0	18.8	102 (10/11)	93 (12/27)
Willamette Center Trailer (OAK)	2000	207	0	19.4	85 (01/29)	69 (12/06)
DEQ# 18733 EPA# 410392013	2001	207	0	18.7	104 (01/07)	75 (12/27)
	2002	208	0	21.0	89 (11/01)	80 (02/13)
	2003	147	0	17.5	73 (01/11)	60 (02/08)
	2004	117	0	18.0	80 (02/12)	53 (01/13)
	2005	115	0	18.0	83 (12/15)	76 (02/18)
	2006	110	0	16.4	56 (12/07)	50 (02/10)
	2007	114	0	14.5	60 (02/02)	60 (01/30)
	2008	109	0	16.7	52 (02/18)	48 (01/25)

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Pendleton						
State Office Bldg (PSO)						
700 SE Emigrant	1999	55	0	28.9	81 (05/30)	75 (10/21)
DEQ# 10145 EPA# 410590002						
✶Sampling halted 8/96-6/97						
McKay Creek (PMC)	1999	137	1	24.7	107 (02/06)	56 (10/21)
3745 SW Marshall	2000	136	0	17.5	47 (11/20)	45 (11/18)
DEQ# 10146 EPA # 410590121	2001	144	0	19.0	51 (02/01)	46 (10/04)
	2002	103	0	19.8	52 (10/26)	49 (10/17)
	2003	55	0	19.8	65 (10/30)	54 (09/30)
	2004	54	0	20.7	64 (04/27)	48 (01/10)
	2005	60	0	18.8	42 (02/27)	37 (10/25)
	2006	59	0	21.2	60 (09/02)	56 (07/04)
**Incomplete 1st Quarter data set*	2007	43	0	*22.3	*56 (08/16)	*49 (11/08)
	2008	59	0	16.6	39 (01/25)	38 (09/15)
Portland						
Carus (SPR)						
13575 Spangler Rd	1999	59	0	14.9	34 (9/21)†	32 (10/21)
DEQ# 10093 EPA# 410050004						
Central Fire Station (CFS)						
55 SW Ash	1999	56	0	22.9	65 (10/21)	45 (09/21)
DEQ# 10136 EPA# 410510015	2000	12	0	✶	51 (02/18)	36 (03/01)
✶Discontinued 03/00						
SE Lafayette (SEL)	1999	130	0	15.5	75 (01/05)	63 (01/04)
5824 SE Lafayette	2000	150	0	16.6	52 (02/18)	45 (07/05)
DEQ# 10139 EPA# 410510080	2001	183	0	15.4	45 (02/01)	44 (12/07)
	2002	116	0	14.5	48 (01/15)	35 (10/26)
	2003	57	0	13.2	27 (09/06)	25 (09/30)
	2004	59	0	17.1	47 (11/05)	42 (11/11)
	2005	56	0	17.2	44 (02/03)	38 (12/12)
	2006	5	-	-	-	-
- Not enough sampling days	2007	90	0	13.4	46 (01/24)	40 (11/02)
	2008	120	0	14.3	45 (01/16)	44 (02/15)
Roosevelt High						
6941 N Central	1999	59	0	19.4	48 (10/21)	43 (01/06)
DEQ# 10135 EPA# 410510003						

APPENDIX 1B
PM_{10} Summary ($\mu g/m^3$)

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS >150	ARITHMETIC MEAN	24-HOUR AVERAGES	
					MAXIMUM (date)	2ND HIGHEST (date)
Transcon Terminal (TTT)	1999	51	0	26.8	49 (03/19)	49 (09/21)
3182 NW 26th	2000	58	0	23.0	48 (02/18)	42 (04/12)
DEQ# 10140 EPA# 410510009	2001	60	0	19.8	45 (10/04)	43 (02/12)
	2002	59	0	20.0	86 (11/04)	67 (11/16)
	2003	57	0	17.5	33 (09/30)	32 (10/06)
	2004	64	0	25.2	125 (01/22)	66 (01/16)
	2005	59	0	24.2	101 (02/03)	57 (12/12)
	2006	59	0	21.3	48 (10/26)	47 (12/19)
	2007	58	0	20.7	81 (01/24)	48 (10/09)
	2008	60	0	20.1	49 (03/07)	43 (01/25)
N.E. Portland (PNR)	2004	58	0	18.6	44 (11/05)	40 (11/11)
24 N. Emerson (N. Roselawn)	2005	61	0	16.0	73 (02/03)	37 (02/09)
DEQ# 21889 EPA # 410510246	2006	77	0	14.3	43 (01/23)	43 (10/26)
	2007	72	0	13.5	36 (11/02)	32 (07/11)
	2008	56	0	13.7	34 (06/29)	31 (09/11)
Springfield	1999	60	0	19.4	55 (09/21)	54 (10/21)
City Hall (SCH)	2000	60	0	19.6	55 (08/22)	45 (11/20)
255 N 5th	2001	60	0	17.0	43 (11/09)	38 (09/10)
DEQ# 18538 EPA# 410391009	2002	60	0	16.5	52 (11/16)	51 (09/11)
	2003	56	0	14.8	39 (09/24)	34 (10/30)
White City	1999	144	0	31.6	89 (01/05)	84 (01/04)
Post Office (WPO)	2000	151	0	28.4	73 (11/20)	67 (03/31)
751 Crater Lk Hwy	2001	149	0	27.3	89 (01/02)	80 (01/03)
DEQ# 10107 EPA# 410294001	2002⚐	118	0	32.0	90 (08/12)	89 (07/31)
	2003	83	0	22.9	68 (01/09)	59 (11/14)
⚐ ***forest fire impacted***	2004	72	0	27.5	58 (08/13)	53 (03/16)
	2005	60	0	24.5	70 (02/03)	53 (02/15)
	2006	56	0	23.7	90 (11/01)	64 (02/10)
	2007	59	0	24.1	93 (02/05)	69 (01/24)
	2008	60	0	20.5	58 (06/29)	54 (09/15)

APPENDIX 1C
Carbon Monoxide Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	Oct-Apr Average	1-HOUR AVERAGES		TIMES** >9ppm	8-HOUR AVERAGES	
			MAXIMUM	2ND HIGH		MAXIMUM (date)	2ND HIGHEST (date)
Bend	1999	1.35	9.0	7.7	0	4.8 (12/28)	4.8 (12/27)
934 NE 3rd (BCO)	2000	1.45	8.2	7.9	0	4.4 (01/21)	4.2 (11/22)
DEQ# 10098 EPA# 410170002	2001	1.08	9.7	7.8	0	4.5 (12/28)	3.1 (12/10)
	2002	1.06	7.5	6.7	0	3.9 (12/09)	3.5 (01/02)
	2003	0.80	6.2	5.2	0	2.9 (12/19)	2.9 (01/07)
	2004	0.78	7.4	7.3	0	5.3 (01/08)	3.3 (01/13)
	2005	0.74	6.7	6.4	0	3.0 (12/19)	2.5 (11/30)
Eugene	1999	1.14	7.5	6.9	0	5.0 (01/04)	4.0 (01/05)
Lane Comm Coll. (LCC)	2000	1.25	6.0	5.7	0	3.6 (11/22)	3.5 (11/16)
1059 Willamette	2001	1.20	5.7	5.3	0	3.6 (11/09)	3.6 (01/10)
DEQ# 18320 EPA# 410390013	2002	1.06	5.1	4.6	0	3.3 (11/05)	2.9 (11/06)
	2003	0.93	5.4	3.7	0	3.4 (12/04)	2.8 (01/17)
	2004	0.87	7.7	6.8	0	3.1 (01/09)	2.6 (02/12)
	2005	0.73	4.1	3.8	0	2.5 (12/19)	2.3 (12/20)
	2006	0.66	4.3	3.3	0	2.1 (01/24)	2.0 (11/01)
	2007	0.64	3.2	3.1	0	2.2 (02/02)	2.1 (02/06)
	2008	0.53	2.4	2.2	0	1.7 (01/23)	1.7 (12/05)
Eugene	1999	1.27	8.0	7.8	0	6.1 (01/04)	5.6 (01/05)
Sacred Heart Hosp (SHH)	2000	1.32	7.8	6.6	0	4.4 (11/17)	4.3 (11/16)
12555 Hilyard	2001	1.30	6.1	5.5	0	4.2 (11/08)	4.1 (01/10)
DEQ# 18735 EPA# 410392062	2002	1.20	6.7	5.6	0	4.3 (10/15)	4.2 (11/04)
	2003	0.99	5.9	5.4	0	3.4 (12/04)	3.4 (01/17)
	2004	0.92	6.4	5.9	0	3.6 (01/09)	3.4 (02/12)
	2005	0.74	5.3	4.9	0	2.8 (02/11)	2.7 (12/10)
Grants Pass	1999	1.61	8.5	7.9	0	4.9 (11/11)	4.6 (01/07)
Wing Bldg (GPW)	2000	1.50	8.4	6.6	0	4.5 (11/21)	4.3 (12/27)
215 SE 6th	2001	1.53	7.7	7.7	0	5.5 (01/05)	4.7 (11/09)
DEQ # 10114 EPA # 410330006	2002	1.45	7.4	6.4	0	4.6 (11/27)	4.5 (11/05)
	2003	1.30	7.0	6.7	0	3.9 (01/06)	3.9 (01/07)
	2004	1.17	5.4	5.3	0	4.0 (11/03)	3.5 (12/08)
	2005	1.11	4.4	4.1	0	3.9 (03/22)	3.0 (12/21)
Klamath Falls	1999	1.20	7.7	7.3	0	4.7 (01/05)	4.5 (12/20)
2306 Hope St (KFH)	2000	1.23	6.7	6.7	0	4.6 (12/07)	4.5 (12/06)
DEQ # 10119 EPA # 41035006	2001	0.92	6.3	5.9	0	3.9 (01/05)	3.5 (01/04)
	2002	1.05	7.5	6.3	0	5.2 (10/22)	3.9 (12/03)
	2003	0.88	4.9	4.8	0	3.2 (01/24)	2.9 (12/03)
	2004	0.79	4.9	4.7	0	3.3 (12/03)	3.0 (12/16)

*Parts per million
**Non-overlapping 8-hour averages which exceed 9 ppm when rounded to nearest whole ppm.

APPENDIX 1C
Carbon Monoxide Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	Oct-Apr Average	1-HOUR AVERAGES		TIMES** >9ppm	8-HOUR AVERAGES	
			MAXIMUM	2ND HIGH		MAXIMUM (date)	2ND HIGHEST (date)
Medford	1999	1.82	18.7	18.5	1	10.6 (06/19)	5.7 (01/04)
Brophy Building (MBB)	2000	1.65	24.8	18.8	1	9.9 (06/17)	4.0 (01/07)
10 N Central	2001	1.53	9.9	8.3	0	4.3 (01/03)	4.0 (01/05)
DEQ # 10111 EPA # 410290009	2002	1.45	8.5	8.3	0	4.4 (12/06)	4.1 (11/27)
	2003	1.41	8.8	6.1	0	4.1 (01/10)	4.0 (01/08)
	2004	1.27	7.5	6.1	0	3.2 (12/04)	3.1 (01/22)
Medford	1999	1.71	11.3	10.4	0	6.8 (01/05)	6.1 (12/23)
Rogue Valley Mall (MRM)	2000	1.57	8.4	8.2	0	4.8 (12/26)	4.7 (12/28)
1502 N Riverside	2001	1.34	8.6	7.3	0	4.8 (01/05)	4.6 (11/09)
DEQ # 10112 EPA # 410290018	2002	1.41	8.9	8.7	0	5.9 (11/27)	5.5 (11/20)
	2003	1.29	7.0	6.4	0	5.0 (01/19)	4.7 (01/08)
	2004	1.25	6.1	5.6	0	4.0 (12/19)	4.0 (01/12)
	2005	1.14	6.4	6.2	0	4.4 (12/16)	3.8 (11/18)
	2006	0.94	4.7	4.7	0	2.9 (01/06)	2.8 (01/25)
	2007	0.85	4.7	4.1	0	3.1 (02/06)	2.7 (01/19)
	2008	0.74	3.6	3.5	0	2.6 (01/18)	2.4 (12/06)
Portland							
4th & Alder (PFA)	1999	1.23	11.6	9.8	0	7.5 (01/05)	5.5 (10/22)
DEQ # 10137 EPA # 410510078	2000	1.14	9.3	8.4	0	5.4 (11/17)	4.0 (04/11)
✶Site discontinued 04/02	2001	1.04	6.3	5.9	0	3.6 (08/09)	3.5 (05/31)
SE Lafayette (SEL)	1999	0.70	7.4	7.2	0	5.3 (01/04)	4.4 (01/10)
5824 SE Lafayette	2000	0.59	6.3	5.0	0	4.1 (02/08)	3.8 (11/02)
DEQ # 10139 EPA # 410510080	2001	0.65	3.9	3.9	0	3.3 (02/13)	3.2 (03/01)
	2002	0.68	6.1	4.4	0	3.1 (11/15)	2.9 (11/14)
	2003	0.65	3.7	3.6	0	3.4 (03/30)	3.1 (03/02)
	2004	0.64	4.9	4.7	0	4.0 (11/08)	3.7 (11/06)
	2005	0.60	3.2	3.1	0	2.6 (11/08)	2.5 (03/08)
	2006	0.47	3.8	3.4	0	2.9 (02/16)	2.7 (02/20)
	2007	0.46	4.1	3.5	0	3.1 (01/25)	2.7 (02/03)
	2008	0.44	3.4	3.3	0	3.1 (12/06)	2.4 (11/18)

*Parts per million
**Non-overlapping 8-hour averages which exceed 9 ppm when rounded to nearest whole ppm.

APPENDIX 1C
Carbon Monoxide Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	Oct-Apr Average	1-HOUR AVERAGES		TIMES** >9ppm	8-HOUR AVERAGES	
			MAXIMUM	2ND HIGH		MAXIMUM (date)	2ND HIGHEST (date)
Portland (continued)							
Old Postal Bldg (PPB)	1999	1.54	12.6	10.4	0	7.3 (01/05)	6.2 (10/21)
510 SW 3rd	2000	1.43	6.3	6.0	0	3.7 (02/18)	3.6 (01/25)
DEQ # 10141 EPA # 410510087	2001	1.21	5.4	4.9	0	3.4 (02/01)	3.4 (02/14)
	2002	1.09	7.1	5.1	0	3.4 (10/17)	3.1 (10/27)
	2003	1.10	5.1	5.0	0	3.4 (12/05)	3.3 (09/03)
	2004	0.97	14.4	8.6	0	3.8 (03/17)	3.2 (03/08)
	2005	0.82	4.5	4.1	0	2.7 (02/03)	2.3 (12/21)
	2006	0.85	10.6	9.4	0	3.6 (10/11)	3.4 (07/10)
	2007	0.82	4.1	3.7	0	2.9 (08/29)	2.5 (01/23)
	2008	0.62	7.2	2.9	0	2.2 (12/06)	2.0 (11/17)
82nd & Division (PED)	1999	1.26	9.0	8.8	0	5.9 (01/10)	5.7 (01/04)
DEQ# 10142 EPA# 410510243	2000	1.34	6.2	5.6	0	5.3 (11/12)	4.4 (01/06)
	2001	1.19	6.0	5.3	0	4.2 (03/01)	3.9 (02/28)
	2002	1.20	7.1	5.4	0	4.5 (11/15)	4.5 (11/14)
	2003	1.10	5.9	5.2	0	4.0 (02/04)	4.0 (03/29)
	2004	1.02	5.3	5.1	0	4.5 (11/08)	3.9 (11/06)
	2005	0.97	4.5	4.5	0	3.2 (02/03)	3.1 (03/09)
Salem (SML)	1999	1.29	7.7	7.7	0	5.9 (01/05)	5.9 (12/23)
Market & Lancaster	2000	1.41	8.5	8.4	0	5.5 (11/16)	5.4 (01/18)
1685 Lancaster NE	2001	1.19	7.5	7.2	0	6.0 (11/09)	5.1 (11/10)
DEQ# 10131 EPA# 410470039	2002	1.18	7.6	7.3	0	5.6 (11/26)	5.2 (11/03)
*AM and PM on same day but	2003	0.94	7.1	6.9	0	5.2 (01/07)	4.9 (01/07)*
not same 8 hr average.	2004	1.00	5.6	5.4	0	4.2 (11/06)	3.8 (11/05)
	2005	0.97	7.5	6.1	0	4.9 (11/06)	3.7 (11/23)

*Parts per million
**Non-overlapping 8-hour averages which exceed 9 ppm when rounded to nearest whole ppm.

APPENDIX 1D
Ozone Summary (ppm)

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >Std**	3 YEAR AVG OF 4TH HIGH
Eugene Area	1999	0.020	0.071 (07/11)	0	0.062 (07/11)	0.056 (07/11)	0	0.061
Amazon Park (EAP)	2000	0.018	0.056 (06/26)	0	0.050 (06/27)	0.047 (07/16)	0	0.058
DEQ# 18524 EPA# 410390060	2001	0.022	0.090 (08/09)	0	0.074 (08/09)	0.061 (05/26)	0	0.054
	2002	0.023	0.092 (07/10)	0	0.070 (08/13)	0.067 (08/12)	0	0.058
	2003	0.023	0.088 (06/05)	0	0.076 (06/05)	0.071 (07/29)	0	0.066
	2004	0.021	0.082 (07/23)	0	0.069 (07/23)	0.064 (08/13)	0	0.067
	2005	0.020	0.092 (07/27)	0	0.077 (07/27)	0.064 (07/18)	0	0.066
	2006	0.024	0.098 (06/25)	0	0.084 (06/26)	0.076 (07/21)	0	0.068
	2007	0.022	0.092 (07/10)	0	0.079 (07/10)	0.059 (08/01)	0	0.066
	2008	0.022	0.081 (08/16)	0	0.067 (07/12)	0.059 (07/08)	0	0.064
Saginaw (SAG)	1999	0.022	0.086 (09/21)	0	0.071 (07/11)	0.068 (09/21)	0	0.075
79980 Delight Valley	2000	0.022	0.084 (06/20)	0	0.072 (06/28)	0.064 (08/08)	0	0.068
School Road	2001	0.021	0.086 (08/09)	0	0.075 (08/09)	0.066 (07/09)	0	0.070
DEQ# 18315 EPA# 410391007	2002	0.022	0.079 (07/09)	0	0.074 (08/13)	0.065 (07/10)	0	0.066
	2003	0.025	0.098 (09/02)	0	0.084 (07/30)	0.079 (07/28)	0	0.065
	2004	0.020	0.085 (07/23)	0	0.076 (07/23)	0.068 (08/13)	0	0.070
	2005	0.020	0.099 (07/27)	0	0.084 (07/27)	0.071 (07/18)	0	0.070
	2006	0.022	0.099 (07/21)	0	0.074 (06/26)	0.070 (08/19)	0	0.072
	2007	0.020	0.083 (08/29)	0	0.064 (05/31)	0.060 (05/30)	0	0.069
	2008	0.022	0.080 (08/14)	0	0.068 (07/14)	0.059 (08/16)	0	0.063

*Parts per million

**The 8 hr standard is the 3-year average of the 4th highest value.
Standard dropped from 0.085 to 0.075 in 2008.

APPENDIX 1D
Ozone Summary (ppm)

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >Std**	3 YEAR AVG OF 4TH HIGH
Medford Area	1999	0.035	0.078 (08/26)	0	0.066 (09/22)	0.065 (08/17)	0	0.071
Talent (TAL)	2000	0.034	0.080 (08/03)	0	0.070 (08/03)	0.067 (06/29)	0	0.072
7112 Rapp Lane	2001	0.033	0.090 (07/03)	0	0.076 (07/03)	0.064 (09/22)	0	0.065
DEQ# 10109 EPA# 410290201	2002	0.035	0.102 (08/14)	0	0.083 (08/15)	0.076 (07/31)	0	0.069
	2003	0.037	0.095 (06/06)	0	0.079 (09/02)	0.072 (06/04)	0	0.070
	2004	0.033	0.095 (08/13)	0	0.076 (08/13)	0.069 (08/11)	0	0.072
	2005	0.033	0.097 (07/27)	0	0.076 (07/27)	0.068 (08/04)	0	0.070
	2006	0.036	0.100 (06/26)	0	0.079 (07/20)	0.068 (07/26)	0	0.068
	2007	0.031	0.083 (07/10)	0	0.067 (08/01)	0.066 (08/02)	0	0.067
	2008	0.034	0.094 (08/15)	0	0.076 (08/15)	0.070 (07/08)	1	0.068
Salem Area	1999	0.023	0.083 (09/21)	0	0.074 (07/09)	0.065 (07/10)	0	0.067
Cascade Jr High (CJH)	2000	0.020	0.075 (07/30)	0	0.064 (07/30)	0.059 (06/26)	0	0.067
10226 Marion Rd. SE	2001	0.021	0.087 (08/09)	0	0.068 (07/03)	0.057 (08/12)	0	0.060
Turner	2002	0.023	0.097 (07/10)	0	0.072 (07/12)	0.063 (08/13)	0	0.059
DEQ# 10130 EPA# 410470004	2003	0.028	0.096 (09/04)	0	0.080 (09/03)	0.072 (07/30)	0	0.064
	2004	0.021	0.086 (08/11)	0	0.068 (08/11)	0.062 (07/24)	0	0.065
	2005	0.023	0.100 (08/04)	0	0.080 (08/04)	0.063 (05/27)	0	0.065
	2006	0.027	0.101 (07/21)	0	0.087 (07/21)	0.075 (06/25)	1	0.066
	2007	0.023	0.074 (09/11)	0	0.066 (07/10)	0.057 (06/02)	0	0.065
	2008	0.023	0.116 (08/15)	0	0.085 (08/15)	0.066 (08/05)	2	0.066

*Parts per million
**The 8 hr standard is the 3-year average of the 4th highest value.
Standard dropped from 0.085 to 0.075 in 2008.

APPENDIX 1D
Ozone Summary (ppm)

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >Std**	3 YEAR AVG OF 4TH HIGH
Portland Area	1999	0.028	0.102 (07/10)	0	0.080 (07/09)	0.072 (07/28)	0	0.071
Carus (SPR)	2000	0.025	0.086 (06/28)	0	0.071 (06/03)	0.065 (07/30)	0	0.072
13575 Spangler Road	2001	0.025	0.099 (08/09)	0	0.080 (08/09)	0.069 (06/20)	0	0.068
Canby	2002	0.025	0.101 (07/22)	0	0.085 (07/10)	0.063 (07/21)	1	0.065
DEQ# 10093 EPA# 410050004	2003	0.029	0.097 (07/29)	0	0.084 (09/03)	0.075 (07/28)	0	0.069
	2004	0.025	0.105 (07/24)	0	0.084 (07/24)	0.067 (08/11)	0	0.068
	2005	0.025	0.093 (08/04)	0	0.079 (08/04)	0.064 (07/27)	0	0.068
	2006	0.029	0.127 (07/21)	1	0.106 (07/21)	0.072 (06/26)	1	0.067
	2007	0.024	0.082 (05/30)	0	0.070 (05/30)	0.058 (06/02)	0	0.064
	2008	0.027	0.107 (08/15)	0	0.084 (08/15)	0.066 (06/30)	3	0.065
Milwaukie High Sch (MHS) 11300 SE 23rd DEQ# 10095 EPA# 410052001	1999	0.015	0.080 (06/14)	0	0.054 (07/09)	0.051 (05/23)	0	0.055
Milwaukie (MSJ)	2000	0.018	0.085 (06/04)	0	0.068 (06/04)	0.056 (08/23)	0	0.056
St. Johns Church	2001	0.018	0.082 (08/10)	0	0.066 (08/10)	0.059 (08/12)	0	0.055
DEQ# 23306 EPA# 410052002	2002	0.020	0.116 (07/22)	0	0.082 (07/22)	0.063 (08/13)	0	0.059
Site moved to Sherwood in 2008	2003	0.021	0.091 (06/07)	0	0.068 (06/06)	0.061 (07/28)	0	0.061
	2004	0.017	0.094 (07/24)	0	0.077 (07/24)	0.054 (08/15)	0	0.059
	2005	0.016	0.083 (05/27)	0	0.063 (05/27)	0.050 (08/14)	0	0.055
	2006	0.022	0.091 (07/21)	0	0.071 (06/26)	0.068 (06/25)	0	0.057
	2007	0.020	0.102 (07/11)	0	0.062 (07/11)	0.056 (05/30)	0	0.058
Sherwood (SLR) DEQ#31009 EPA#410671004 *****Site started Aug 2008	2008*	-	0.087 (08/16)	0	0.073 (08/16)*	0.053(08/23)*	0	

*Parts per million

**The 8 hr standard is the 3-year average of the 4th highest value.
Standard dropped from 0.085 to 0.075 in 2008.

APPENDIX 1D
Ozone Summary (ppm)

STATION LOCATION AND NUMBER	Year	SUMMER AVERAGE	1-HOUR MAXIMUM (date)	# OF DAYS >0.125 ppm	8-HOUR AVERAGE MAXIMUM	4TH HIGHEST 8-HOUR AVERAGE	# OF DAYS >Std**	3 YEAR AVG OF 4TH HIGH
SE Lafayette (SEL)	2003	*	0.098 (07/10)	0	0.068 (07/29)	0.060 (08/14)	0	-
5824 SE Lafayette	2004	0.020	0.087 (08/09)	0	0.072 (07/24)	0.056 (08/15)	0	-
DEQ# 10139 EPA# 410510080	2005	0.017	0.084 (05/27)	0	0.062 (05/27)	0.051 (07/21)	0	0.055
* Sampling started 07/03	2006	0.023	0.098 (07/21)	0	0.079 (07/21)	0.064 (06/25)	0	0.057
	2007	0.021	0.096 (07/11)	0	0.060 (07/11)	0.056 (07/10)	0	0.057
	2008	0.021	0.083 (08/15)	0	0.072 (08/15)	0.060 (08/05)	0	0.060
Sauvie Island (SIS)	1999	0.021	0.070 (07/09)	0	0.056 (07/09)	0.049 (09/22)	0	0.056
Social Security Beach	2000	0.022	0.080 (06/04)	0	0.066 (06/27)	0.054 (06/03)	0	0.056
DEQ# 14152 EPA# 410090004	2001	0.025	0.089 (08/10)	0	0.068 (08/10)	0.056 (05/10)	0	0.053
	2002	0.025	0.084 (07/10)	0	0.067 (08/13)	0.061 (06/12)	0	0.057
	2003	0.025	0.088 (09/03)	0	0.073 (09/03)	0.069 (07/28)	0	0.062
	2004	0.023	0.074 (07/24)	0	0.061 (07/23)	0.058 (07/22)	0	0.062
	2005	0.023	0.080 (08/04)	0	0.065 (08/04)	0.055 (08/14)	0	0.060
	2006	0.025	0.089 (07/21)	0	0.075 (07/21)	0.063 (06/25)	0	0.058
	2007	0.022	0.086 (07/11)	0	0.064 (07/10)	0.056 (05/30)	0	0.058
	2008	0.022	0.080 (08/15)	0	0.065 (08/15))	0.059 (06/28)	0	0.059
Hermiston Municipal Airport (HMA)	2007*	0.031	0.082 (04/05)	0	0.069 (06/02)	0.066 (06/03)	0	-
DEQ # 31000 EPA # 4100591003	2008	0.028	0.081 (07/01)	0	0.074 (07/01)	0.064 (08/08)	0	-
* Operated Feb thru Dec								
Mt. Hood Wilderness								
DEQ # 10094 EPA # 410050102	2005	0.034	0.085 (08/04)	0	0.077 (08/05)	0.063 (08/26)	0	-
Mt. Jefferson Wilderness	2001	0.034	0.068 (08/10)	0	0.061 (07/04)	0.057 (08/14)	0	-
DEQ # 10125 EPA # 410430103	2002	0.035	0.082 (07/21)	0	0.068 (08/15)	0.067 (08/14)	0	-

*Parts per million
**The 8 hr standard is the 3-year average of the 4th highest value.
Standard dropped from 0.085 to 0.075 in 2008.

APPENDIX 1E
Oxides of Nitrogen Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	ANNUAL ARITHMETIC MEAN	MAXIMUM 1 HOUR AVERAGE
NITROGEN DIOXIDE			
Portland			
SE Lafayette at 58th	1999[a]	-	0.074 (09/21)
(SEL)	2000[a]	-	0.067 (06/03)
DEQ # 10139	2001[a]	-	0.052 (05/31)
EPA # 410510080	2002[a]	-	0.046 (05/24)
	2003[a]	-	0.061 (09/02)
	2004[a]	-	0.040 (06/16)
	2005[a]	-	0.057 (08/25)
	2006[a]	-	0.060 (09/02)
	2007[a]	-	0.053 (08/29)
	2008	0.011	0.062 (09/16)
Hermiston			
Municipal Airport HMA	2007[a]	0.008[b]	0.047 (09/01)
DEQ # 31000			
EPA # 410591003			
NITRIC OXIDE			
Portland			
SE Lafayette at 58th	1999[a]	-	0.173 (09/29)
(SEL)	2000[a]	-	0.232 (09/27)
DEQ # 10139	2001[a]	-	0.165 (09/28)
EPA # 410510080	2002[a]	-	0.165 (09/18)
	2003[a]	-	0.116 (05/01)
	2004[a]	-	0.134 (09/10)
	2005[a]	-	0.125 (09/22)
	2006[a]	-	0.212 (09/28)
	2007[a]	-	0.229 (12/13)
	2008	0.010	0.235 (01/16)
Hermiston			
Municipal Airport HMA	2007[a]	0.011[b]	0.100 (11/02)
DEQ # 31000			
EPA # 410591003			

*Parts per million

a Summer data only

b Annual average from Mar 2007 to Feb 2008

APPENDIX 1F
Sulfur Dioxide Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	NUMBER of DAYS	3 HOUR AVER. MAXIMUM	24 HOUR AVER. MAXIMUM	ANNUAL AVERAGE
SULFUR DIOXIDE					
Portland					
SE Lafayette at 58th					
(SEL)	2005	317	0.018	0.007	*
DEQ # 10139	2006	363	0.016	0.008	0.0015
EPA # 410510080	2007	365	0.010	0.005	0.0013
*Started 2/05	2008	330	0.007	0.004	0.0010
Toledo					
Sewage Treatment Plant	2004	140	0.029*	0.012*	0.002
DEQ # 30937					
*Sampled from 1/1/05 to 5/19/05					
TOTAL REDUCED SULFUR					
Toledo					
Sewage Treatment Plant	2004	182	0.165*	0.054*	0.006
DEQ # 30937					
*Sampled from 7/3/05 to 12/31/05					
Hermiston					
Municipal Airport	2007/08	364	0.007	0.002	0.001
DEQ # 31000 EPA#410591003					
*Sampled from Mar 07 to Feb 08					

ppm = Parts per million

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Albany	2004	✶	7.1 (11/20)	2.7 (11/11)
Calapooia School (ACS)	2005	0.66	8.3 (12/13)	4.0 (12/11)
830 SE 24th	2006	0.58	12.1 (05/20)	2.0 (02/06)
DEQ# 21886 EPA# 410430009	2007	0.63	6.5 (11/23)	2.9 (01/15)
✶Started 05/04	2008	0.59	6.3 (01/23)	2.1 (12/06)
Applegate Valley	1999	0.54	4.2 (10/04)	3.1 (10/22)
Provolt Seed Orchard (PSO)	2000	0.51	3.4 (12/01)	2.0 (11/19)
DEQ# 18432 EPA# 410330011	2001	0.51	6.0 (11/11)	3.1 (11/11)
	2002	0.60	16.6 (08/05)	4.2 (08/05)
	2003	0.55	8.4 (07/22)	3.1 (09/28)
	2004	0.50	3.3 (10/28)	1.5 (11/10)
	2005	0.51	6.6 (08/26)	2.0 (08/26)
	2006	0.47	5.3 (07/02)	1.5 (11/12)
	2007	0.44	3.8 (11/27)	1.5 (10/29)
	2008	0.53	7.4 (06/29)	4.4 (08/17)
Bend				
Kenwood School (BKS)	1999	0.48	4.9 (01/03)	1.4 (01/03)
701 NW Newport	2000	0.52	4.9 (07/04)	2.3 (11/16)
DEQ# 10097 EPA# 410170003	2001	0.46	4.6 (11/18)	3.5 (01/06)
✶Discontinued 06/02	2002	✶	5.0 (01/01)	1.6 (01/01)
Pump Station (BPS)	2002	-	4.2 (11/03)	1.2 (11/27)
35 Portland Road	2003	0.52	10.2 (06/29)	2.2 (08/24)
DEQ# 24172 EPA# 410170120	2004	0.44	6.9 (04/11)	1.6 (11/10)
	2005	0.51	6.5 (10/18)	2.0 (11/08)
	2006	0.51	9.1 (07/28)	1.9 (09/03)
	2007	0.44	8.0 (09/02)	1.7 (09/03)
	2008	0.46	4.9 (08/18)	2.5 (07/02)
Baker City	1999	0.50	5.3 (12/22)	2.4 (12/25)
US Forest Service (BCT)	2000	0.60	6.0 (01/02)	2.1 (08/17)
10th Street	2001	0.64	7.1 (02/19)	2.7 (02/03)
DEQ #10088 EPA# 410010003	2002	0.67	6.1 (07/13)	2.4 (12/04)
	2003	0.82	7.2 (11/09)	2.9 (11/09)
	2004	0.64	7.2 (11/09)	2.9 (11/09)
	2005	0.61	7.6 (10/19)	3.2 (10/25)
US Forest Service (BFS)	2006	0.59	5.4 (11/17)	2.4 (09/07)
3285 11th St	2007	0.60	4.6 (11/23)	1.7 (01/08)
DEQ #32758 EPA# 410010004	2008	0.65	6.1 (11/07)	2.4 (11/07)

STATION LOCATION ANNUAL 1-HOUR AVERAGES 24-HOUR AVERAGE

* Reported as Scattering Coefficient (ßscat)

[a] Seasonal data only

⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

AND NUMBER	YEAR	AVERAGE	MAXIMUM (date)	MAXIMUM (date)
Burns (BMS)	1999*	1.02	11.4 (10/29)	2.7 (01/09)
267 E Madison St.	2000*	0.95	9.2 (01/01)	2.5 (01/05)
DEQ# 10105 EPA# 410250002	2001*	0.81	8.1 (01/27)	2.6 (12/28)
*Oct - March	2002	0.70	10.4 (07/18)	4.2 (17/17)
	2003	0.57	8.7 (11/13)	2.1 (12/02)
	2004	0.55	21.9 (05/02)	3.9 (05/02)
	2005	0.66	6.9 (12/24)	2.6 (12/21)
	2006	0.69	14.3 (10/13)	4.0 (10/13)
	2007	0.70	22.8 (07/12)	5.1 (07/12)
	2008	0.78	11.7 (11/18)	3.8 (01/18)
Union High School	1999*	0.38	2.6 (07/08)	1.2 (07/08)
DEQ# 10105 EPA# 410250002	2000*	0.34	5.1 (08/06)	1.4 (08/29)
*April - Sept	2001*	0.36	4.3 (08/14)	1.6 (08/14)
Canby	1999	0.41	4.3 (01/08)	0.9 (10/30)
Carus (SPR)	2000	0.48	3.4 (10/24)	1.7 (11/19)
13575 Spangler Rd	2001	0.47	5.3 (08/21)	1.9 (11/11)
DEQ# 10093 EPA# 410050004	2002	0.45	4.1 (11/15)	2.3 (11/15)
	2003	0.47	3.6 (02/14)	1.6 (09/03)
	2004	0.48	5.3 (05/11)	2.5 (11/07)
	2005*	-	2.1 (10/12)	1.7 (02/26)
	2006*	-	1.7 (09/01)	0.9 (09/02)
* Jan through Oct only	2007*	-	1.4 (07/04)	0.5 (07/11)
* Summer only	2008	-	1.5 (07/01)	1.1 (07/01)
Cave Junction-Illinois Valley	1999	0.50	5.2 (10/23)	3.7 (10/22)
Illinois Valley Airport (IVA)	2000	0.43	12.7 (11/01)	3.8 (11/01)
DEQ# 21068 EPA# 410330010	2001	0.44	3.8 (11/05)	1.7 (11/11)
	2002	0.78	39.7 (08/03)	1.8 (12/01)
	2003	0.45	7.3 (09/27)	3.3 (09/28)
	2004	0.45	9.9 (11/05)	2.1 (11/23)
	2005	0.49	5.2 (12/11)	2.2 (12/11)
	2006	0.44	5.4 (12/06)	2.3 (12/06)
	2007	0.41	4.5 (01/24)	1.2 (01/24)
	2008	0.51	11.0 (08/17)	4.8 (06/29)

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Corvallis (CCB)	2003	-	5.6 (09/02)	2.5 (09/03)
Intermediate School	2004	0.43	7.3 (07/04)	2.1 (11/11)
DEQ# 20478 EPA# 410030013	2005	0.49	5.2 (12/11)	2.2 (12/11)
	2006	0.47	6.2 (08/25)	1.8 (12/05)
	2007	0.52	4.5 (11/25)	2.3 (02/05)
	2008	0.50	3.8 (06/30)	1.8 (06/30)
Crater Lake (CLM)	2006	*	36.2 (08/21)	8.4 (08/23)
DEQ# 25634 EPA# 410351002	2007	*	3.5 (07/15)	1.4 (07/15)
* Summer only	2008	*	13.0 (09/23)	2.4 (09/23)
Enterprise (EFS)	1999	✶	3.2 (11/05)	1.6 (12/04)
Forest Service Station	2000	0.55	12.7 (08/29)	4.3 (08/29)
DEQ# 10162 EPA# 410630001	2001	0.51	4.5 (02/18)	2.1 (01/24)
✶Started 03/99	2002	0.53	5.1 (09/23)	1.6 (10/26)
	2003	0.48	3.5 (01/05)	1.5 (11/15)
	2004	0.49	4.6 (01/14)	1.7 (01/14)
	2005	0.51	4.4 (12/12)	2.2 (12/12)
	2006	0.50	6.9 (10/30)	2.9 (09/08)
	2007	0.52	7.5 (07/16)	3.2 (07/17)
	2008	0.50	3.7 (01/01)	1.7 (01/23)
Eugene	1999	0.45	2.8 (01/05)	1.4 (12/30)
Lane Comm College (LCC)	2000	0.49	3.2 (11/18)	2.0 (11/19)
1059 Willamette	2001	0.47	2.9 (11/11)	2.0 (11/11)
DEQ# 18320 EPA# 410390013	2002	0.47	5.8 (08/19)	1.5 (11/29)
	2003	0.48	2.9 (09/02)	1.5 (09/03)
	2004	0.45	2.2 (02/11)	1.8 (11/07)
	2005	0.45	2.3 (01/02)	1.4 (01/16)
	2006	0.43	3.0 (12/03)	1.6 (12/08)
	2007	0.42	2.9 (11/23)	1.8 (02/05)
	2008	0.46	3.1 (06/30)	2.1 (06/29)
Amazon Park (EAP)	2001	0.55	4.4 (11/08)	2.2 (11/10)
499 E 29th	2002	0.56	5.8 (08/19)	2.3 (11/28)
DEQ# 18524 EPA # 410390060	2003	0.51	4.3 (01/12)	1.8 (09/03)
	2004	0.49	3.2 (01/12)	2.1 (11/07)
	2005	0.55	6.4 (07/04)	2.6 (12/11)
	2006	0.49	4.2 (01/25)	1.9 (12/03)
	2007	0.48	4.0 (01/01)	2.2 (11/24)
	2008	0.52	4.5 (12/17)	2.4 (06/29)

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Grants Pass				
Sewage Treatment Plant (GPS)	1999	0.72	7.8 (07/04)	2.4 (10/22)
1200 SW Greenwood	2000	0.71	6.6 (11/21)	3.5 (11/12)
DEQ# 18508 EPA# 410330107	2001	0.75	10.3 (11/11)	6.7 (11/11)
✶Discontinued - 7/02	2002	✶	8.7 (02/06)	3.3 (02/06)
Parkside Sch (GPP)	2002⚐	0.76*	11.6 (07/31)	3.3 (11/14)
DEQ# 28859 EPA # 410330114	2003	0.70	10.6 (07/22)	5.3 (09/28)
✶Started 7/02,	2004	0.55	4.7 (04/11)	2.6 (11/10)
** GPS&GPP avg together*	2005	0.61	4.7 (01/05)	1.9 (02/12)
	2006	0.71	6.8 (11/14)	2.5 (11/19)
	2007	0.68	4.6 (01/27)	2.3 (11/25)
	2008	0.73	8.3 (05/11)	3.1 (08/17)
Hermiston				
Municipal Airport (HMA)	2007	0.45	4.6 (09/01)	1.5 (10/29)
DEQ# 31000 EPA# 410591003				
John Day	2004	0.64	6.7 (02/22)	2.8 (12/22)
Blue Mtn. School (JBM)	2005	0.60	9.5 (01/12)	2.5 (12/13)
DEQ# 10103 EPA# 410230001	2006	0.59	8.6 (11/28)	2.1 (12/17)
	2007	0.63	20.5 (03/03)	5.4 (07/16)
	2008	0.62	14.8 (04/08)	2.4 (04/09)
Klamath Falls	1999	0.73	2.9 (01/10)	2.6 (01/09)
Petersen School (KFP)	2000	0.60	7.4 (11/17)	2.9 (12/07)
4856 Clinton St	2001	0.51	6.5 (12/12)	2.3 (12/12)
DEQ# 10118 EPA# 410350004	2002⚐	1.20	32.8 (08/01)	13.4 (08/02)
	2003	0.64	7.3 (1/19)	2.9 (11/23)
	2004	0.53	5.5 (01/03)	4.1 (12/03)
	2005	0.72	11.1 (07/29)	3.1 (01/12)
	2006	0.78	9.3 (12/02)	3.6 (10/28)
	2007	0.83	12.0 (12/22)	3.4 (12/21)
	2008	0.91	13.0 (10/30)	4.1 (01/18)

* Reported as Scattering Coefficient (ßscat)

[a] Seasonal data only

⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
La Grande				
Willow St (LWS)				
1601 N Willow	1999	*	6.3 (03/18)	2.3 (01/04)
DEQ# 10148 EPA# 410610006				
3rd and I Street (LTI)	1999	-	3.0 (12/31)	1.8 (12/25)
DEQ# 21638 EPA# 410610117	2000	0.52	14.5 (08/16)	2.7 (08/16)
	2001	0.50	3.4 (01/30)	2.1 (01/06)
*Moved from LWS to LTI 9/99	2002	0.53	5.5 (07/26)	2.7 (12/05)
	2003	0.52	3.6 (11/05)	2.1 (11/06)
Ash Street (LAS)	2003	-	3.3 (12/10)	1.3 (12/11)
DEQ# 26448 EPA# 410610119	2004	0.51	4.1 (10/26)	2.4 (11/10)
* Moved from LTI to LAS 12/03	2005	0.62	14.0 (08/12)	3.5 (08/12)
* Prescribed burn near La Grande	2006	0.69	19.0 (09/27)*	6.7 (09/27)*
	2007	0.50	13.9 (01/19)	1.9 (12/23)
	2008	0.52	9.0 (12/05)	1.6 (12/05)
Lakeview	1999	0.69	8.0 (12/23)	3.3 (12/23)
Center & M St (LCM)	2000	0.73	7.9 (12/30)	3.3 (12/04)
DEQ# 10123 EPA# 410370001	2001	0.53	6.1 (12/08)	2.4 (12/08)
	2002⚐	0.73	14.0 (08/02)	6.1 (07/31)
	2003	0.51	8.9 (12/18)	2.5 (12/18)
	2004	0.47	7.1 (01/17)	2.3 (01/12)
	2005	0.62	12.7 (12/15)	3.8 (12/15)
	2006	0.56	8.2 (12/06)	3.3 (12/05)
	2007	0.58	10.6 (01/24)	2.9 (01/23)
	2008	0.77	11.5 (12/10)	5.0 (01/18)
Medford	2000	0.82	7.3 (07/12)	3.5 (12/09)
Grant & Belmont (MGB)	2001	0.75	5.4 (01/07)	2.7 (01/06)
DEQ # 20448 EPA # 410290133	2002⚐	1.01	29.7 (07/31)	5.1 (07/29)
* Moved from MBR to MGB 10/99	2003	0.77	12.7 (07/22)	2.8 (01/18)
	2004	0.62	4.1 (07/04)	2.7 (12/04)
	2005	0.72	6.2 (11/22)	3.5 (11/23)
	2006	0.68	5.2 (12/23)	3.0 (12/07)
	2007	0.71	11.3 (07/04)	2.4 (01/19)
	2008	0.76	11.7 (06/29)	4.2 (08/07)

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Mt. Hood				
Multopor (MUL)	2006	*	26.5 (08/18)	4.0 (08/18)
DEQ # 10094 EPA # 410050102	2007	*	14.6 (08/11)	2.0 (08/11)
*Summer Only	2008	*	1.7 (09/18)	0.7 (09/26)
Mt. Jefferson				
Big Lake (BIG)	2006	*	11.7 (07/31)	3.7 (07/31)
DEQ # 10125 EPA # 410430103	2007	*	39.0 (09/03)	9.9 (09/03)
*Summer Only	2008	*	4.4 (09/17)	1.2 (09/28)
Oakridge	1999	0.70	8.0 (01/30)	3.2 (12/27)
Willamette Center (OAK)	2000	0.71	8.0 (01/31)	3.2 (01/29)
Trailer Park	2001	0.78	8.9 (01/06)	4.4 (01/07)
DEQ # 18733 EPA # 410392013	2002	0.81	10.7 (02/15)	3.7 (11/01)
	2003	0.71	8.4 (07/25)	3.2 (01/11)
	2004	0.58	6.9 (01/13)	3.1 (02/12)
	2005	0.73	7.3 (02/16)	2.9 (12/15)
	2006	0.60	5.9 (02/11)	2.4 (12/08)
	2007	0.61	7.7 (01/28)	2.6 (01/28)
	2008	0.73	7.4 (12/04)	2.3 (06/30)
Pendleton	1999	0.65	5.8 (12/31)	1.9 (01/02)
McKay Creek (PMC)	2000	0.82	5.5 (01/01)	2.4 (11/19)
3745 SW Marshall	2001	0.92	5.5 (11/04)	2.6 (11/27)
DEQ # 10146 EPA # 410590121	2002	0.92	5.8 (02/06)	2.4 (11/04)
	2003	0.67	5.4 (11/09)	2.6 (11/09)
	2004	0.57	9.7 (07/04)	3.5 (11/10)
	2005	0.64	8.8 (07/04)	3.1 (12/11)
	2006	0.58	7.2 (07/04)	1.9 (09/03)
	2007	0.59	12.8 (10/26)	3.8 (10/26)
	2008	0.63	6.5 (12/07)	2.8 (11/24)

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Portland				
Central Fire Station (CFS)	1999	0.56	6.3 (01/05)	4.0 (01/05)
55 SW Ash	2000	0.60	3.1 (11/11)	2.1 (11/12)
DEQ # 10136 EPA # 410510015	2001	0.53	2.6 (02/01)	1.5 (12/07)
Beaverton Highland Park (BHP)	2004	*	6.1 (11/07)	4.1 (11/07)
3745 SW Marshall Place	2005	0.61	7.5 (07/04)	2.7 (12/13)
DEQ# 20481 EPA # 410670111	2006	0.56	5.6 (07/04)	2.8 (12/18)
*Started 4/04	2007	0.62	4.9 (02/03)	3.0 (02/03)
	2008	0.61	14.0 (07/04)	2.7 (12/06)
Hillsboro (HHF)	2005	0.72	7.9 (12/14)	3.5 (12/12)
Hare Field – 1149 NE Grant St.	2006	0.64	8.3 (02/20)	3.4 (02/20)
DEQ# 31967 EPA # 410670004	2007	0.71	9.6 (01/01)	4.1 (11/25)
	2008	0.68	30.3 (07/04)	3.2 (12/06)
N.E.Portland (PNR)	2002	0.54	3.7 (07/04)	1.8 (11/15)
24 N Emerson (N. Roselawn)	2003	0.49	4.2 (08/15)	1.3 (10/01)
DEQ# 21889 EPA# 410510246	2004	0.56	3.4 (07/04)	2.3 (11/07)
	2005	0.62	4.2 (07/04)	2.4 (02/03)
	2006	0.52	4.7 (12/17)	2.4 (12/18)
	2007	0.57	3.3 (12/13)	2.2 (12/13)
	2008	0.56	6.9 (07/04)	2.2 (12/06)
SE Lafayette (SEL)	1999	0.62	7.3 (01/24)	3.8 (01/05)
5824 SE Lafayette	2000	0.64	9.8 (07/04)	3.3 (11/12)
DEQ # 10139 EPA # 410510080	2001	0.58	5.1 (02/13)	2.0 (12/07)
	2002	0.59	6.4 (11/15)	2.6 (11/15)
	2003	0.57	4.1 (11/03)	1.7 (11/03)
	2004	0.56	4.3 (10/24)	1.4 (10/28)
	2005	0.60	5.1 (01/23)	2.1 (01/24)
	2006	0.57	6.4 (10/28)	2.5 (02/20)
	2007	0.62	6.2 (01/01)	3.2 (02/03)
	2008	0.64	14.8 (07/04)	2.9 (12/06)

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Sauvie Island (SIS)	2000 [a]	-	1.9 (08/04)	1.0 (08/04)
Social Security Beach	2001 [a]	-	1.8 (08/12)	1.2 (08/12)
DEQ # 14152 EPA # 410090004	2002 [a]	-	1.2 (07/23)	0.9 (08/13)
	2003 [a]	-	1.6 (09/30)	1.0 (09/03)
	2004 *		3.5 (09/23)	1.8 (11/22)
	2005**	-	2.4 (12/13)	1.8 (12/12)
*May Thru Dec monitoring only	2006	0.48	2.7 (12/18)	1.5 (02/21)
**No Feb thru Apr monitoring	2007	0.52	3.7 (12/14)	2.1 (01/17)
	2008	0.50	2.3 (07/05)	1.7 (01/17)
Sweet Home				
Fire Department (SFD)	2007	0.69	8.4 (05/06)	2.4 (02/05)
DEQ # 31001 EPA # 410432002	2008	0.74	10.0 (11/07)	2.6 (11/07)
Riddle				
1ST and Main St.	2005	✶	3.4 (12/16)	1.8 (11/09)
DEQ # 32590 EPA # 410190003	2006	✶	3.8 (01/05)	1.6 (01/05)
✶Operated 10/05 to 04/06				
Roseburg (RGV)				
777 NW Garden Valley Blvd.	2005	✶	3.8 (09/26)	1.5 (11/09)
DEQ # 32529 EPA # 410190002	2006	0.55	4.4 (01/05)	2.1 (12/08)
✶Started 8/05	2007	0.53	3.0 (01/30)	1.9 (02/03)
	2008	0.56	4.4 (09/23)	2.3 (06/29)
Salem				
Market/Lancaster (SML)	1999	0.60	6.6 (01/05)	3.4 (01/05)
1685 Lancaster NE	2000	0.72	8.5 (11/18)	4.0 (11/16)
DEQ # 10131 EPA # 410470039	2001	0.61	7.4 (11/08)	3.4 (11/10)
General Hospital (SGH)				
867 Medical Center Dr	2002	0.62*	4.3 (11/06)	2.7 (11/06)
DEQ# 20480 EPA# 410470040	2003	0.54	3.3 (01/07)	1.8 (01/21)
*Started 05/02, Ended 11/04	2004	0.52	3.1 (01/09)	2.5 (11/07)
State Hospital (SSH)	2005	0.59	5.7 (12/11)	2.8 (10/27)
23rd NE and D St.	2006	0.53	5.1 (12/03)	2.1 (12/08)
DEQ# 31929 EPA# 410470041	2007	0.52	4.3 (10/16)	2.5 (02/04)
	2008	0.55	5.8 (10/28)	2.0 (12/06)

* Reported as Scattering Coefficient (ßscat)

[a] Seasonal data only

⚐ Forest Fire Smoke Impact

APPENDIX 1G
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Ruch (RAR)	1999	*	5.0 (11/16)	2.6 (10/04)
Fire Station	2000	0.47	4.7 (12/14)	1.7 (11/17)
DEQ # 21067 EPA #	2001	0.47	9.1 (08/12)	2.0 (08/12)
*Started 6/99, Discontinued 7/05	2002	0.65	15.7 (08/05)	4.3 (08/05)
	2003	0.54	6.8 (02/24)	2.1 (01/16)
	2004	0.50	6.3 (03/17)	2.7 (03/17)
	2005	*	1.7 (02/03)	5.4 (02/03)
Shady Cove	2001	*	3.6 (08/14)	1.0 (12/10)
37 School House Lane (SCS)	2002	0.94	31.1 (08/01)	14.4 (08/01)
DEQ# 25161 EPA#410290019	2003	0.47	4.9 (11/19)	2.3 (11/19)
*Started 3/01	2004	0.55	15.9 (08/21)	4.3 (08/21)
*Jan thru March data invalid	2005*	-	4.5 (11/04)	1.2 (11/05)
	2006	0.47	5.3 (02/25)	2.3 (11/10)
	2007	0.47	7.8 (12/01)	2.7 (11/15)
	2008	0.57	6.2 (08/07)	3.5 (06/30)
Springfield	1999	0.51	4.4 (01/05)	1.6 (10/22)
City Hall (SCH)	2000	0.53	3.5 (11/18)	2.0 (11/20)
255 North 5th St	2001	0.51	2.8 (11/11)	2.1 (11/11)
DEQ # 18538 EPA # 410391009	2002	0.51	3.5 (08/19)	1.5 (11/29)
	2003	0.49	3.1 (09/02)	1.7 (09/03)
	2004	0.47	4.1 (09/09)	1.5 (11/10)
	2005	0.49	3.4 (12/09)	1.5 (01/16)
	2006	0.45	2.6 (12/16)	1.5 (12/08)
	2007	0.43	3.1 (02/05)	1.7 (02/05)
	2008	0.46	3.3 (06/30)	2.1 (06/29)
The Dalles	2004	*	3.8 (11/07)	2.8 (11/10)
Cherry Heights (TDC)	2005	0.53	3.0 (01/18)	2.3 (01/18)
1112 Cherry Heights Rd	2006	0.52	5.9 (11/03)	3.9 (11/04)
DEQ# 21252 EPA # 410650007	2007	0.56	3.3 (11/16)	2.1 (02/06)
*Started 6/04	2008	0.51	3.4 (01/27)	2.1 (01/26)
White City				
Post Office (WPO)	2005	0.67	5.0 (11/22)	2.0 (11/21)
751 Crater Lk Hwy	2006	0.62	5.1 (11/10)	3.1 (11/10)
DEQ# 10107 EPA# 410294001				

* Reported as Scattering Coefficient (ßscat)
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1H
Air Toxics (ug/m^3)

Pollutant (µg/m^3)		Acetaldehyde		Formaldehyde		Benzene		1,3-butadiene		Perchloro ethylene		Arsenic 1999, 2000 – PM$_{2.5}$ 2001-2004 – TSP		Chromium (VI) TSP		Lead 1999, 2000 – PM$_{2.5}$ 2001-2004 – TSP 2005 – 2007 PM$_{10}$		Nickel 1999, 2000 – PM$_{2.5}$ 2001-2004 – TSP	
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
Portland	99-00	**51**	**2.5**	**51**	**3.2**	**48**	**2.1**	29	<0.2	**49**	**<0.7**	56	<0.0025	--	--	*56*	*0.0194*	53	<0.0016
NE Portland (PNR)	2001	**60**	**2.1**	**60**	**2.6**	**59**	**1.5**	**59**	**<0.2**	**59**	**<0.7**	57	<0.001	--	--	**53**	**0.0098**	**57**	**<0.0008**
N Roselawn	2002	**62**	**1.9**	**62**	**2.8**	**61**	**1.6**	**61**	**<0.2**	**61**	**<0.7**	**61**	**<0.001**	**61**	**0.00026**	51	0.0124	**61**	**<0.0008**
24 N Emerson	2003	**57**	**2.0**	**57**	**4.2**	**58**	**1.5**	**58**	**<0.2**	***58***	**<0.7**	**54**	**<0.001**	--	--	**48**	**0.0093**	54	**<0.0008**
	2004	**59**	**1.7**	**59**	**2.9**	**58**	***1.6***	**59**	**<0.2**	**59**	**<0.5**	**56**	**0.0018**	--	--	**56**	**0.0088**	**56**	*0.0021*
	2005	**55**	**1.5**	**58**	**2.2**	*****	*	**59**	**<0.2**	**59**	**<0.7**	**59**	**0.0017**	**49**	**<0.000042**	**59**	**0.0012**	**59**	**<0.0008**
	2006	**57**	**1.5**	**54**	**1.9**	**56**	***1.2***	**61**	**<0.2**	**61**	**<0.7**	**35**	**0.0014**	--	--	**45**	**0.0068**	**61**	**<0.001**
	2007	**53**	**1.4**	**52**	**2.0**	**56**	***1.2***	**57**	**<0.4**	**57**	**<0.7**	**56**	**0.0014**	--	--	**57**	**0.0074**	**53**	**<0.001**
	2008	**45**	***1.4***	**52**	***1.9***	**49**	***0.8***	**50**	**<0.2**	**50**	**<0.7**	**55**	**0.0011**	**27**	**<0.000035**	**56**	***0.0050***	**56**	***0.0017***
NW Portland (PNW)	99-00	**59**	**2.1**	**59**	**2.4**	**57**	**1.8**	30	<0.2	**55**	**2.0**	27	<0.0022	--	--	*26*	*0.0064*	*26*	*0.0040*
Forest Heights P.O.	2001	**56**	**1.9**	**56**	**2.8**	**58**	**1.5**	**58**	**<0.2**	**58**	**2.3**	--	--	--	--	--	--	--	--
1706 NW 24th	2003	**28**	**0.7**	**28**	**1.9**	**26**	**1.3**	**26**	**<0.2**	**26**	***2.6***	--	--	28	0.00018	--	--	--	--
	2004	**43**	**1.7**	**52**	**2.7**	***58***	***1.5***	**58**	**<0.2**	**58**	**<0.5**	44	0.0011	--	--	44	0.0070	*44*	*0.0037*
	2005	**55**	**1.7**	**56**	**2.4**	*****	*	**54**	**<0.2**	**54**	**<0.7**	**59**	**0.0009**	**49**	**<0.000042**	**59**	***0.0066***	**59**	***0.0034***
SE Portland (SEL)	99-00	**54**	**2.0**	**54**	**2.7**	**51**	**2.6**	27	<0.2	**51**	**<0.7**	36	<0.002	--	--	36	<0.005	36	<0.005
5824 SE Lafayette	2003	23	1.3	23	2.3	*23*	*1.3*	23	<0.2	23	<0.5	--	--	--	--	--	--	--	--
	2004	**56**	**1.4**	**56**	**2.4**	**52**	**1.5**	**52**	**<0.2**	**52**	**<0.5**	**50**	**0.0016**	--	--	**50**	**0.006**	**50**	***0.001***
	2005	**55**	**1.6**	**57**	**2.2**	*54*	*1.6*	**56**	**<0.2**	**56**	**<0.7**	**60**	**0.0013**	**46**	**<0.000042**	**60**	**0.0057**	**60**	**0.001**

1. Values in italics when some but not all measurements are less than the minimum detection level of the analysis method.

2. Bolded values have >75% data completion. Non-bolded values have <75%data completion.

3. The Health Benchmark is the concentration in which an individual has a one in a million chance of getting cancer.

* Not enough valid days for average

Air Toxics H

APPENDIX 1H
Air Toxics (ug/m^3)

Pollutant ($\mu g/m^3$)		**Acetaldehyde**		**Formaldehyde**		**Benzene**		**1,3-butadiene**		**Perchloro ethylene**		**Arsenic 1999, 2000 – $PM_{2.5}$ 2001-2004 – TSP**		**Chromium (VI) TSP**		**Lead 1999, 2000 – $PM_{2.5}$ 2001-2004 – TSP**		**Nickel 1999, 2000 – $PM_{2.5}$ 2001-2004 – TSP**	
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
Beaverton (BHP)	99-00	**56**	**1.9**	**56**	**1.9**	**53**	**1.4**	**30**	**<0.2**	**53**	**<0.7**	25	0.0016	--	--	*25*	*0.0035*	25	0.0013
3745 SW Marshall Place	2005	**48**	**1.3**	**52**	**1.6**	*	*	**49**	**<0.2**	**49**	**<0.7**	**55**	**0.0011**	**49**	**<0.000042**	**55**	*0.0025*	**55**	**<0.0001**
SW Portland (PKC) SW Kelly & Curry	2005	**49**	**1.5**	**52**	**2.2**	*	*	**49**	**<0.2**	**49**	**<0.7**	**57**	**0.0011**	**50**	**<0.000042**	**57**	***0.0059***	**57**	**<0.0001**
Vancouver (VKT) Kauffman & W 27th	2005	**52**	**1.5**	**53**	**2.0**	*	*	**48**	**<0.2**	**48**	**<0.7**	**55**	**0.0011**	**49**	**<0.000042**	**55**	***0.004***	**55**	**<0.0001**
SW Portland (CFS) Central Fire, 55 SW Ash	99-00	**58**	**2.3**	**58**	**2.8**	**55**	**1.85**	**28**	<0.2	**55**	<0.7	12	<0.0021	--	--	12	0.0064	*12*	*0.0022*
Sauvie Island Background site	4/07-3/08	**52**	***0.6***	**45**	***1.2***	49	<0.3	**52**	**<0.2**	**52**	**<0.7**	**57**	***0.0008***	--	--	**57**	***0.0027***	**57**	***0.0011***
Salem State Hospital *(started in July)	*2008	**22**	1.4	**24**	2.0	**24**	*1.4*	**25**	<0.2	**20**	*<0.3*	**29**	0.0007	**19**	<0.000035	**29**	0.003	**29**	*<0.001*

1. Values in italics when some but not all measurements are less than the minimum detection level of the analysis method.

2. Bolded values have >75% data completion. Non-bolded values have <75%data completion.

3. The Health Benchmark is the concentration in which an individual has a one in a million chance of getting cancer.

* Not enough valid days for average

Air Toxics H

APPENDIX 1H
Air Toxics (ug/m^3)

Pollutant (µg/m^3)		Acetaldehyde		Formaldehyde		Benzene		1,3-butadiene		Perchloro ethylene		Arsenic 1999, 2000 – PM$_{2.5}$ 2001-2008 – PM$_{10}$		Chromium (VI) TSP		Lead 1999, 2000 – PM$_{2.5}$ 2001-2008 – PM$_{10}$		Nickel 1999, 2000 – PM$_{2.5}$ 2001-2008 – PM$_{10}$	
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
Eugene	2002	**60**	**1.6**	**60**	**2.5**	**58**	**1.6**	**58**	**<0.2**	**58**	**<0.7**	**58**	**<0.002**	--	--	**58**	**<0.0036**	**58**	**<0.002**
Amazon Park (EAP)	2003	**52**	**1.4**	**52**	**4.3**	**45**	**1.1**	**45**	**<0.2**	**45**	**<0.7**	**53**	**<0.002**	--	--	**53**	**0.0037**	**53**	**<0.0018**
	2004	**57**	**1.3**	**57**	**2.8**	**57**	***1.4***	**57**	**<0.2**	**57**	**<0.5**	**44**	**0.0007**	--	--	44	***0.0026***	**44**	**<0.0004**
	2005	**27**	**1.5**	**28**	**1.9**	**28**	*1.6*	**28**	**<0.2**	**28**	**<0.7**	**31**	*0.0007*	--	--	**31**	*0.0022*	**31**	**<0.0002**
	2006	**27**	**1.4**	**27**	**1.8**	**28**	*1.0*	**28**	**<0.2**	**28**	**<0.7**	**30**	*0.0008*	--	--	**30**	**<0.001**	**30**	**<0.001**
	2007	**38**	**1.6**	**33**	**1.5**	**39**	***1.1***	**41**	**<0.4**	**41**	**<0.7**	**45**	***0.0006***	--	--	**45**	**<0.001**	**45**	**<0.001**
	2008	**50**	**1.2**	**54**	**1.5**	**47**	***1.7***	**52**	**<0.2**	**47**	**<0.3**	**58**	***0.0006***	--	--	**58**	***0.002***	**58**	**<0.001**
La Grande	2004	**51**	**1.7**	**51**	**3.2**	**50**	***0.6***	**50**	**<0.2**	**50**	**<0.5**	**47**	**0.00033**	--	--	**47**	***0.0015***	**47**	**<0.0004**
Ash St. (LAS)	2005	**52**	**1.8**	**56**	**2.6**	**55**	**<0.3**	**55**	**<0.2**	**55**	**<0.7**	**60**	*0.00033*	--	--	**60**	*0.0015*	**60**	**<0.0001**
	2006	**53**	**1.8**	**52**	**2.7**	**57**	**<0.3**	**58**	**<0.2**	**58**	**<0.7**	**58**	*0.00023*	50	<0.00004	**58**	*0.0030*	**58**	**<0.001**
	2007	**53**	**1.4**	**52**	**2.1**	**53**	***0.8***	**54**	**<0.4**	**54**	**<0.7**	**60**	***0.00019***	**77**	**<0.00004**	**60**	**<0.001**	**60**	**<0.001**
	2008	**48**	**1.3**	**51**	**1.7**	**50**	***0.6***	**54**	**<0.4**	**54**	**<0.7**	**51**	***0.00021***	**20**	**<0.00004**	**51**	***0.0011***	**51**	**<0.001**
Medford																			
Grant & Belmont	2008	**48**	**1.8**	**53**	**2.4**	**50**	***1.3***	**55**	**<0.2**	**55**	***0.5***	**54**	**0.00054**	--	--	**54**	***0.002***	**54**	**<0.001**
Dodge Road (Background) *(started in April)	*2008	**35**	1.4	**40**	1.8	**38**	*0.2*	**44**	<0.2	**44**	*0.5*	**37**	*0.00028*	--	--	**37**	*0.0013*	**37**	<0.001
ODEQ Benchmarks			**0.45**		**3.0**		**0.13**		**0.03**				**0.0002**		**0.00008**		**0.5**		**0.002**
EPA Benchmarks			**0.45**		**0.077**		**0.13**		**0.033**		**0.17**		**0.00023**		**0.000083**		**0.083**		**0.0021**

1. Values in italics when some but not all measurements are less than the minimum detection level of the analysis method.

2. Bolded values have >75% data completion. Non-bolded values have <75%data completion.

3. The Health Benchmark is the concentration in which an individual has a one in a million chance of getting cancer.

* Not enough valid days for average

Air Toxics H

APPENDIX 1I
Frequency of Visibility Impairment
9 AM - 9 PM, July 1 - September 15 (Visibility Protection Period)

IMPAIRMENT (From man made or natural sources)		PERCEPTIBLE 0.60-0.79 Bscat		MODERATE 0.80-1.29 Bscat		HEAVY >1.30 Bscat		All >0.60Bscat
Site	Year	Hours	%[1]	Hours	%[1]	Hours	%[1]	%[1]
Mt. Hood Wilderness	1999	97	9	28	3	5	1	11
Multopor	2000	52	3	22	1	7	0	4
DEQ# 10094	2001	92	16	15	3	4	1	19
EPA# 410050102	2002	30	3	10	1	1	0	5
	2003	52	5	53	5	31	3	14
	2004	39	4	28	3	3	0	8
	2005	2	0	1	0	0	0	0
	2006	72	6	58	5	32	3	14
	2007	22	2	7	1	10	1	4
	2008	0	0	3	0.4	9	1	2
Mt. Jefferson	1999	133	9	105	7	25	2	2
Big Lake	2000	116	6	30	2	3	0	5
DEQ# 10125	2001	62	7	38	4	8	1	12
EPA# 410430103	2002[2]	92	10	76	8	50	5	23
Monitor evacuated due to fire.[3]	2003[3]	46	8	19	3	31	5	16
	2004	100	11	43	5	13	1	17
	2005	59	6	32	3	8	1	10
	2006	136	14	139	14	83	8	36
	2007	101	10	51	5	26	3	18
	2008	25	4	39	6	49	7	16
Crater Lake National	1999	131	7	27	2	21	1	10
Park	2000	8	0	6	0	2	0	1
Rim Village	2001	46	6	24	3	7	1	9
DEQ# 10117	2002[2]	55	6	65	7	374	39	51
EPA# 410351001	2003	41	5	19	2	24	3	10
	2004	31	4	23	3	16	2	8
	2005	12	1	10	1	1	0	3
	2006	110	12	70	8	142	15	35
	2007	19	2	16	2	7	1	4
	2008	131	15	85	9	59	7	30
Eagle Cap Wilderness	2003	63	12	95	18	27	5	36
Mt. Harris	2004	44	5	41	4	1	0	9
DEQ 30722 EPA 410610118	2005	29	3	21	2	11	1	6
Mt. Fanny	2007	84	8	64	6	46	4	18
DEQ 31002 EPA 410610121	2008	6	1	24	5	12	2	8

1 Percent of impaired hours
2 Forest Fire Smoke Impact
3 B&B Complex fire forced the removal of the monitor on 8/22 to end of season.

APPENDIX 2
Oregon Ambient Air Monitoring Network

Appendix 2

Oregon Air Quality Surveillance Network

The following tables and sampling location maps describe the Air Quality Surveillance Networks operational during 2008. Appendix 2A lists all of the ambient air quality sampling locations in the Oregon Surveillance Network. Map 1 shows all the Oregon Ambient Air Monitoring Location, EPA visibility sites (IMPROVE), and the National Atmospheric Deposition Sites. Map 2 shows monitoring in the Portland Metro Area.

The following abbreviations are used in the network location tables and maps:

SO_2	Sulfur dioxide
CO	Carbon monoxide
NO_2	Nitrogen dioxide
O_3	Ozone
VIS/PMest	Visibility/PM2.5 estimate (continuous particulate monitor)
HAPS	Air Toxics (Hazardous Air Pollutants)
PM_{10}	Fine particulate (10 micron)
$PM_{2.5}$	Fine particulate (2.5 micron)
$PM_{2.5}$ Spec	PM2.5 chemically speciation
WS/WD	Wind direction and speed
Temp	Temperature
DT	Delta temperature (inversion indicator)
BP	Barometric pressure
RH	Relative humidity
SR	Solar radiation
IMPROVE	EPA visibility program
NADP	National Atmospheric Deposition Program

APPENDIX 2
Oregon Ambient Air Monitoring Network

City	Address	Site Code	DEQ#	SO_2	CO	NO_2	O_3	VIS/ PM est	HAPS	PM_{10}	$PM_{2.5}$	$PM_{2.5}$ Spec	WS/ WD	Temp	DT	BP	RH	SR
Albany	Calapooia School	ACS	21886					X										
Bend	Deschutes Mkt. Rd.	BPN	10101										X [2]	X [2]				
	Bend Pump Station	BPS	24172					X			X					X [2]		
	Road Department	BRD	31007				X[1]						X[1]	X[1]		X[1]		
Burns	E Madison St.	BMS	10105					X			X							
Corvallis	Intermediate School	CCB	20478					X										
CottageGrove	City Shops	CGC	31004					X			X[1]							
Cove	City Hall	CCH	31003					X					X					
Eugene	Lane Community College	LCC	18320		X			X		X								
	Pacific Hwy99N	EKB	18522							X	X[1]							
	E 29th Amazon Park	EAP	18524				X	X	X	X	X	X						
(Saginaw)	Delight Vly Sch Rd	SAG	18315				X											
Grants Pass	Parkside School	GPP	28859					X		X[2]	X		X	X		X		
Hermiston	Municipal Airport	HMA	31000	X[2]		X[2]	X	X[2]			X[2]		X	X				
	Pump Station	HPS	24735								X[2]							
Klamath Falls	Peterson School	KFP	10118					X		X	X	X	X	X	X	X		
	Background Site	KFB	31015					X[1]					X[1]					
La Grande	Ash Street	LAS	26448					X	X		X		X	X	X	X	X	
Lakeview	Center & M Streets	LCM	10123					X			X		X	X		X		
Madras	Westside School	MWS	31006					X[1]										
McMinnville	Newby School	MNS	31005					X[1]										
Medford	Rogue Valley Mall	MRM	10112		X													
	Welch & Jackson	MWJ	10113							X								
	Grant and Belmont	MGB	20448					X	X[1]	X[1]	X	X						
	7112 Rapp Rd Talent	TAL	10109				X											
	1440 Rossanley Drive	MTV	10108										X	X	X	X	X	X
	4035 Dodge Road	MDR	10106						X[1]	X[1]	X							

1. Started monitoring in 2008
2. Stopped monitoring in 2008

APPENDIX 2
Oregon Ambient Air Monitoring Network

City	Address	Site Code	DEQ#	SO_2	CO	NO_2	O_3	VIS/PM est	HAPS	PM_{10}	$PM_{2.5}$	$PM_{2.5}$ Spec	WS/WD	Temp	DT	BP	RH	SR
Oakridge	47674 School Street	OAK	18733					X		X	X		X					
Pendleton	3745 SW Marshall Pl	PMC	10146					X		X	X		X	X		X		
Portland	SW Miller - KPTV tower	KPTV	10132											X	X			
	5824 SE Lafayette	SEL	10139	X	X	X	X	X		X	X	X	X	X	X	X	X	X
	3182 NW 26th - Transcon	TTT	10140							X								
	510SW Third Street	PPB	10141		X													
	N Roselawn	PNR	21889					X	X		X							
	Jefferson High School	PJH	25606										X					
(Beaverton)	Highland Prk School	BHP	20481					X										
(Carus)	Spangler Road	SPR	10093				X	X					X	X				
(Hillsboro)	1149 NE Grant St.	HHF	31967					X			X							
(Sauvie Is)	Rt 1 Box 442	SIS	14152				X	X	X[2]				X	X				
Sherwood	17180 SW Lasich Lane	SLR	31009				X[1]						X[1]	X[1]				
Prineville	SE Court St.	PDP	31008					X[1]					X[1]					
Roseburg	777 NW Garden Valley Blvd	RGV	32529					X										
Salem	Salem State Hospital	SSH	31929					X	X[1]	X[1]								
(Turner)	Cascade Jr. High,	CJH	10130				X						X	X				
Springfield	City Hall	SCH	18538					X			X		X					
Sweet Home	Fire Dept	SFD	31001					X			X							
The Dalles	Cherry Heights	TDC	21252					X										
White City	751 Crater Lake Hwy	WPO	10107							X								

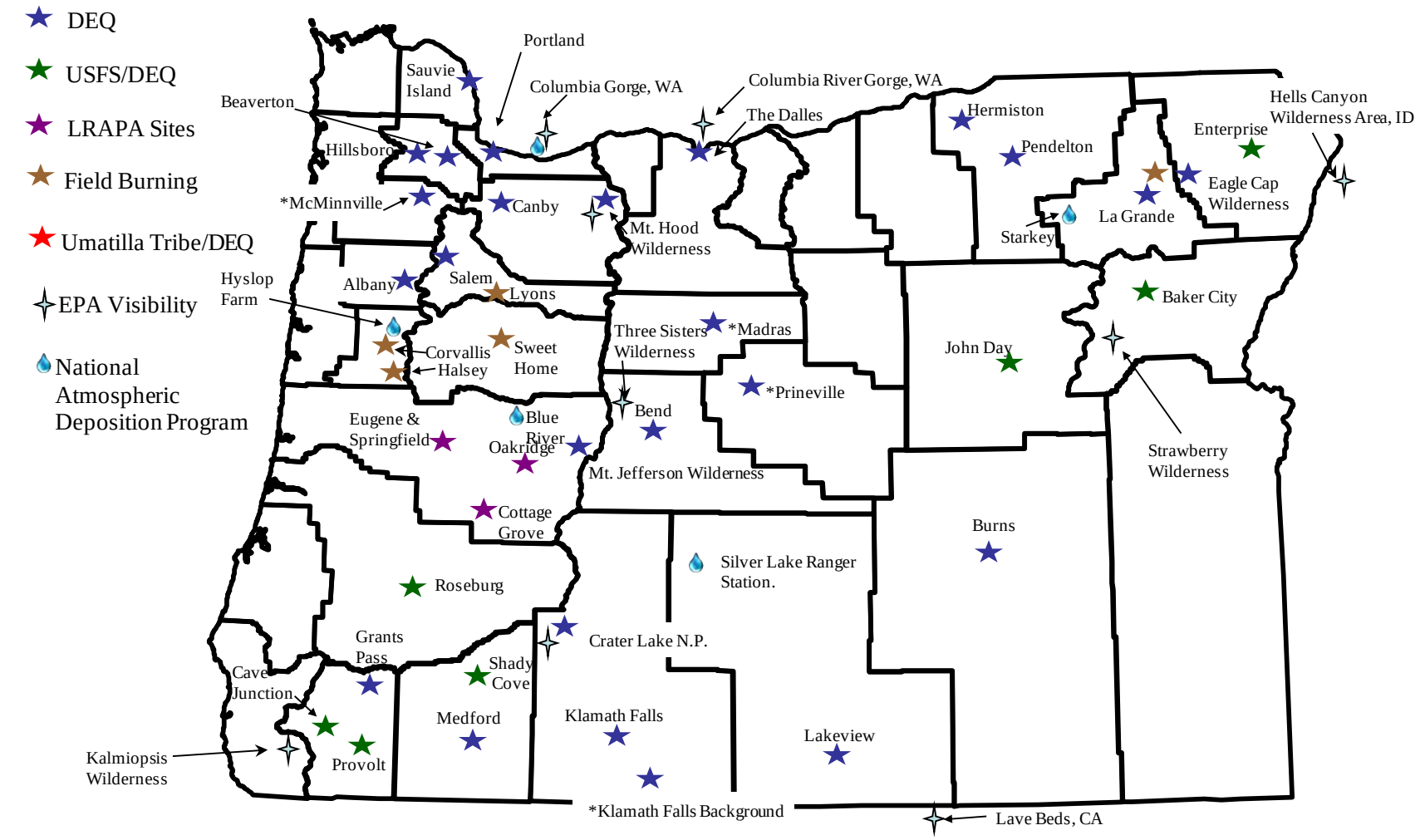
1. Started monitoring in 2008
2. Stopped monitoring in 2008

APPENDIX 2
Oregon Ambient Air Monitoring Network

Region	Location	DEQ # / IMPROVE CODE	Neph	IMPROVE	$PM_{2.5}$	O_3	WS/WD
Visibility Sites							
Crater Lake NP	Diamond Peak	10117 / CRLA	X	X			X
Eagle Cap Wild.	Mt. Fanny	31002	X				X
Eagle Cap Wild.	Strawberry Mt.	STAR		X			
Kalmiopsis Wild.	Kalmiopsis	KALM		X			
Mt Hood Wild.	Multopor	10094 / MOHO	X	X		X	X
Mt Jefferson Wild.	Big Lake	10125	X				X
Three Sisters Wild.	Three Sisters	THIS		X			
Forest Health Sites							
Wallolla-Whitman NF	Baker City	10088	X				
Malheur & Ochoco NF	Burns	10105	X				
Wallolla-Whitman NF	Enterprise	10162	X				
Siskiyou NF	Grants Pass	28859	X				
Siskiyou NF	Illinois Valley	21068	X				
Malheur NF	John Day	10103	X				
Winema, Fremont NF	Klamath Falls	10118	X				
Siskiyou NF	Provolt	18432	X				
	Roseburg	32529	X				
Rogue River NF	Shady Cove	25161	X				
Ag Burning Sites							
Willamette Valley	Carus, Spangler Road	10093	X				X
Willamette Valley	Corvallis	20478	X				
Willamette Valley	Halsey/Water Bureau	10128					X
NE Oregon	Cove	31003	X				X
Willamette Valley	Lyons/Marilynn School	10126	X				
Willamette Valley	Salem State Hosp.	31929	X				
Willamette Valley	Sweet Home	31001	X		X		

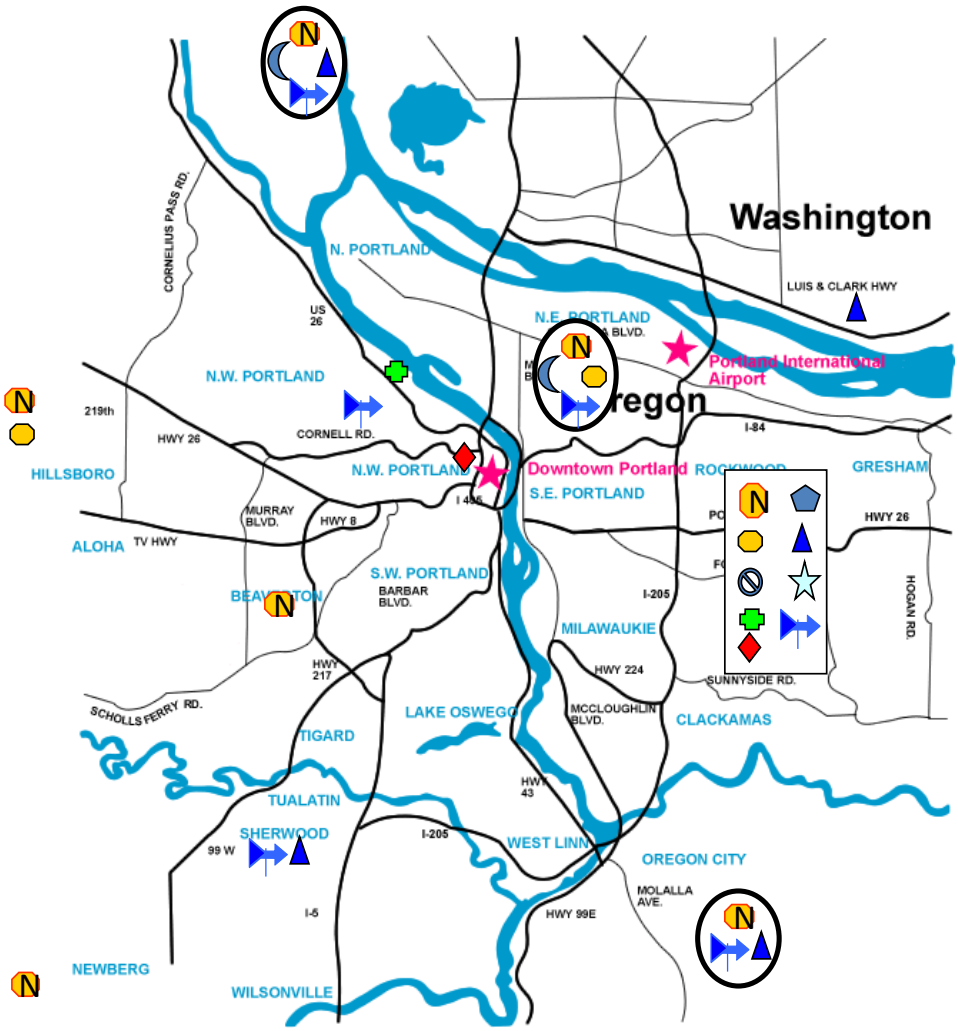
1. Started monitoring in 2008
2. Stopped monitoring in 2008

2008 Oregon Air Quality Surveillance Network



* New sites in 2008

2008 Portland Metro Ambient Air Monitoring Site



$PM_{2.5}$ Estimate

$PM_{2.5}$

Carbon monoxide

PM_{10}

Ozone

Air Toxics

Nitrogen dioxide

Meteorology

Sulfur dioxide

$PM_{2.5}$ Speciation

Appendix 3

Quality Assurance

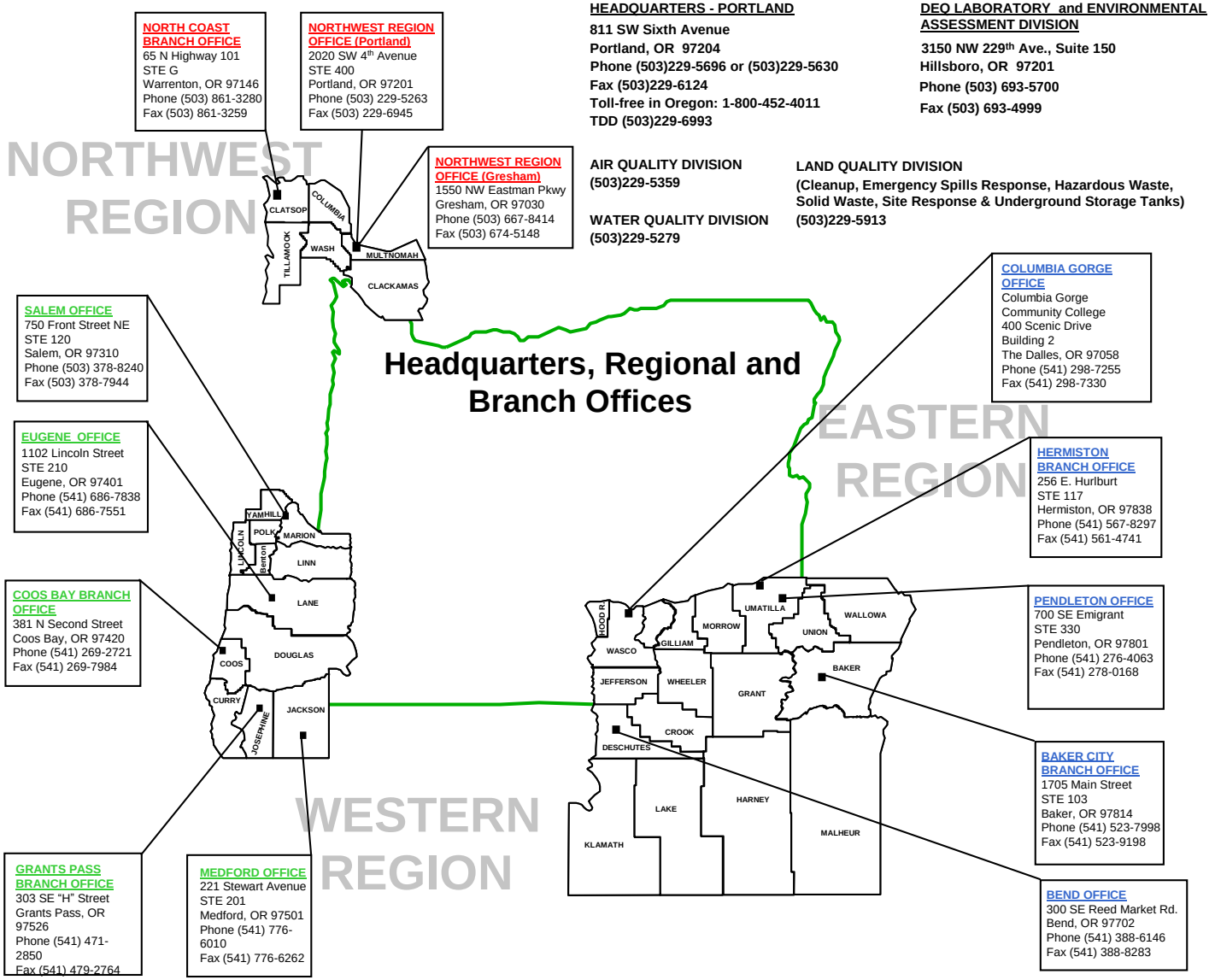
It is a policy of DEQ that all data used by the Department will be of sufficient quality to support the regulatory decisions based upon them. The minimum quality assurance requirements set by EPA are consistently met or exceeded by DEQ.
The continued assurance of data quality requires carrying out the 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 data base which is 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. Each month a system audit is conducted 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. These assessments are reported 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.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Complaints - Contact the DEQ Regional Office nearest you. See map (page 1) for locations and phone numbers.

Open Burning - Contact the DEQ Regional Office nearest you. See map (page 1) for locations and phone numbers.

Title V Permits and ACDP Permits - Contact the DEQ Regional Office nearest you. See map (page 1) for locations and phone numbers.

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…..……503-667-8414 extension 55022

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