2003
Oregon Air Quality

Data Summaries

State of Oregon
Department of Environmental Quality

Air Quality Division

www.deq.state.or.us

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Tables and Figures

Glossary of Air Quality Terms used in this report:

AQI – Air Quality Index – Standarized method of reporting air quality, created by EPA

CO – Carbon Monoxide – An odorless, colorless gaseous pollutant

NAAQS – National Ambient Air Quality Standards – Federal air quality standards (Table 3).

NOx – Nitrogen oxides – redish brown gaseous pollutant. Mainly NO, NO_2.

O_3 – Ozone – A gaseous pollutant and a component of smog

$PM_{2.5}$ – Particulate Matter 2.5 micrometers diameter and smaller and can be a variety of materials.

PM_{10} - Particulate Matter 10 micrometers diameter and smaller and can be a variety of materials.

UFSG – Unhealthy For Sensitive Groups – An AQI air quality category.

VOC – Volatile Organic Compounds

$\mu g/m^3$ – Microgram per meters cubed. Air pollutant concentration.

ppm – Parts per million. Air pollutant concentration.

ppb – Parts per billion. Air pollutant concentration.

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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 the whole state meets and maintains national ambient air quality health standards (NAAQS).

The air pollutants of greatest concern in Oregon are:

- ground-level ozone, commonly known as smog
- carbon monoxide (mostly from motor vehicles)
- fine particulate matter (mostly from wood smoke, other combustion sources, cars and dust) known as:
  - PM_{10} (10 micrometers and smaller diameter) and
  - $PM_{2.5}$ (2.5 micrometers and smaller diameter)
- hazardous air pollutants (also called Air Toxics)

Oregon's Air Quality Status

In 2003, Oregon's air quality was impacted by forest fires during August and September and by hot weather west of the Cascades in July. Oregon did not have any major winter cold weather stagnation events. Figures 1 through 17 show the 2003 Air Quality using the Air Quality Index. To better understand the AQI charts, read the Air Quality Index Defined section first.

Air Quality Index Defined

The Air Quality Index (AQI) is an objective way to assess ambient air quality. The AQI is calculated using current monitoring data and then posted under the following descriptors:

- *Good* - pollution is less than half of the National Ambient Air Quality Standard (NAAQS) for any of the pollutants measured.
- *Moderate* - unusually sensitive people should limit prolonged outdoor exertion.
- *Unhealthy for Sensitive Groups (UFSG)* –
  - Ozone - Active children, adults, and people with respiratory disease such as asthma should limit prolonged outdoor exertion.
  - Particulate – People with heart and lung disease, older adults and children should reduce prolong or heavy exertion.
- *Unhealthy* –
  - Ozone - Active children and adults and people with respiratory disease such as asthma should avoid prolonged outdoor exertion. Everyone else, especially children, should limit prolong or heavy exertion.
  - Particulate - People with heart or lung disease, older adults and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.

- *Very Unhealthy* -
    - Ozone - Active children and adults and people with respiratory disease such as asthma should avoid all outdoor exertion. Everyone else, especially children, should limit outdoor exertion.
    - Particulate - People with heart or lung disease, older adults and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.

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 1. The possible actions are:

- 100 AQI - the air quality just meets the NAAQS. Air Stagnation Advisory may be declared by the National Weather Service if a prolonged inversion is forecast.
- 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 reported by the DEQ for various cities in Oregon. Currently Portland, Eugene, Medford, Salem, Bend, and multiple communities in Eastern Oregon are posted by DEQ. The AQI is computed twice daily (at 10 a.m. and 4 p.m.) using monitoring data for the preceding 24-hour period and data from midnight to the current hour (either 10 a.m. or 4 p.m.). Air pollution data from each monitor in an area is reduced to an index value using a mathematical procedure as prescribed by the EPA for national uniformity.

The AQI data is collected and used prior to validation, so there can be differences in indicated air pollution levels from the final data that is used to compare to the standards for legal purposes. In some cases, estimates of pollutant levels are derived from other data—for example, particulate concentrations are estimated from light scattering data.

Note: 2002 is the first year $PM_{2.5}$ was included in calculating the Air Quality Index and it is more protective of health than PM_{10}. Because it is more protective, $PM_{2.5}$ will always have a higher AQI value then PM_{10} and the number of moderate and unhealthy days will be amplified. See Table 1 for more details.

Table 1. Air Quality Index Ranges and Episode Stages for various pollutant concentrations.

AIR QUALITY INDEX, (AQI) **AND EPISODE STAGES**							
Episode Stage	**Within Standard**		**≥ Standard**	**ALERT**	**WARNING**	**EMERGENCY**	**SIGNIFICANT HARM**
API range	0-50	51-100	101-150	151-200	201-300	301-400	401-500p
API Descriptor	***Good***	***Moderate***	***Unhealthy For Sensitive Groups l***	***Unhealthy***	***Very Unhealthy***	***Hazardous***	***Very Hazardous***
$PM_{2.5}$ μg/m^3 (24-hr avg)	0-15.4	15.5-40.4	40.5-65.4	65.5-150.4	150.5-250.4	250.5-350.4	350.5-500.4
PM_{10} μg/m^3 (24-hr avg)	0-54	55-154	155-254	255-354	355-424	425-504	505-604
CO ppm (8-hr avg)	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 avg)	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 avg)	0.000-0.064	0.065-0.084	0.085-0.104	0.105-0.124	0.125-0.374	see 1-hour stnd	see 1-hour stnd
SO_2 ppm (24-hr avg)	0.000-0.034	0.035-0.144	0.145-0.224	0.225-0.304	0.305-0.604	0.605-0.804	0.805-1.004
NO_2 ppm(24-hr avg)	n/a	n/a	n/a	n/a	0.65-1.24	1.25-1.64	1.65-2.04

2003 Oregon Air Quality Indices for Cities with Air Quality Monitors

Figures 1- 17 show the Air Quality Index for larger cities statewide. The charts will indicate which pollutants were used to calculate the AQI and how many days in each health category.

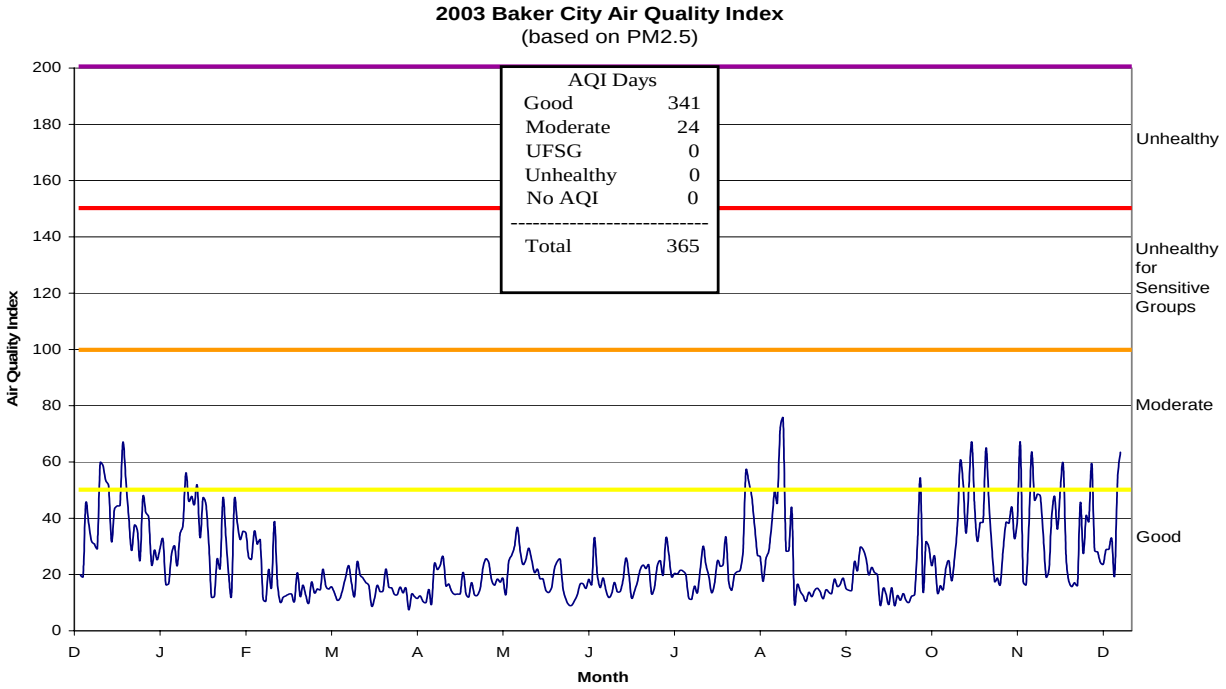

Figure 1. 2003 Baker City Air Quality Summary

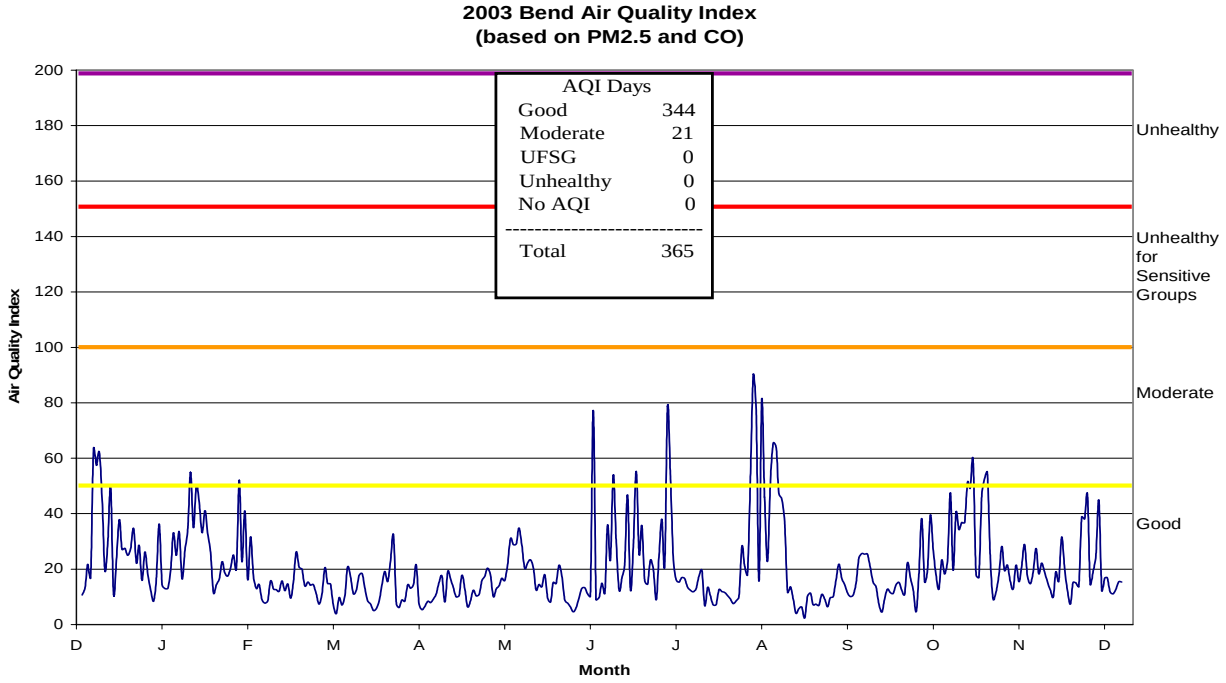

Figure 2. 2003 Bend Air Quality Summary

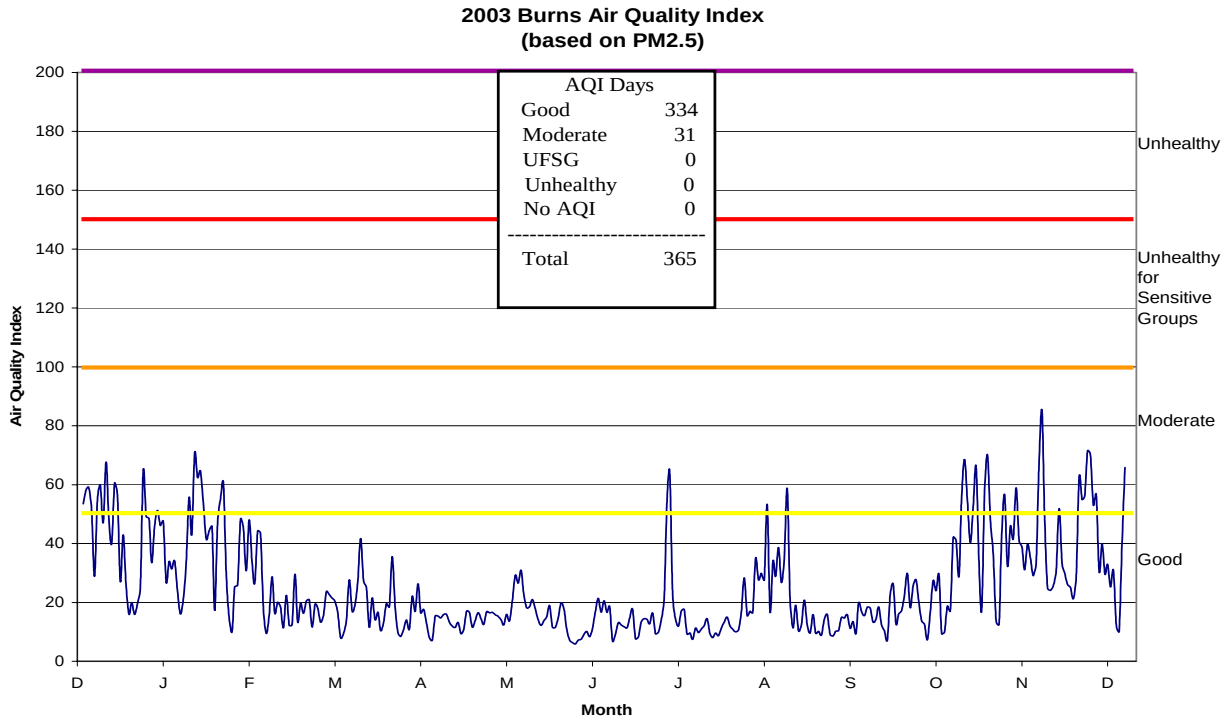

Figure 3. 2003 Burns Air Quality Summary

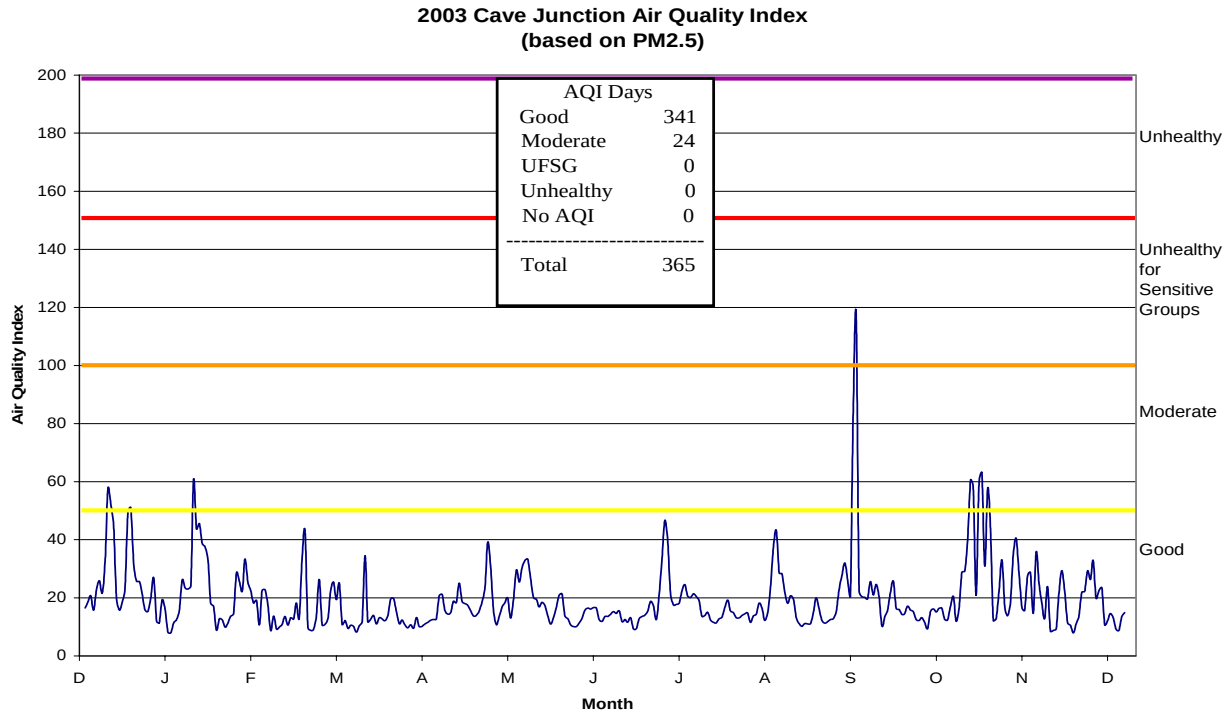

Figure 4. 2003 Cave Junction Air Quality Summary

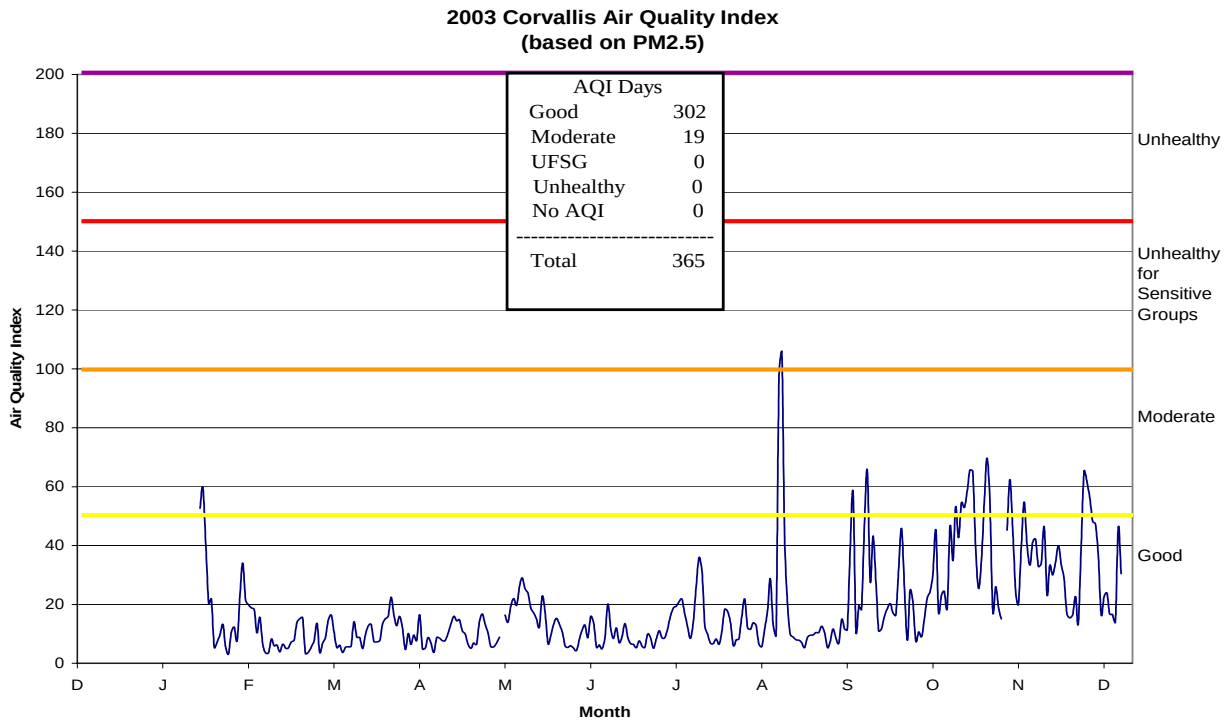

Figure 5. 2003 Corvallis Air Quality Summary

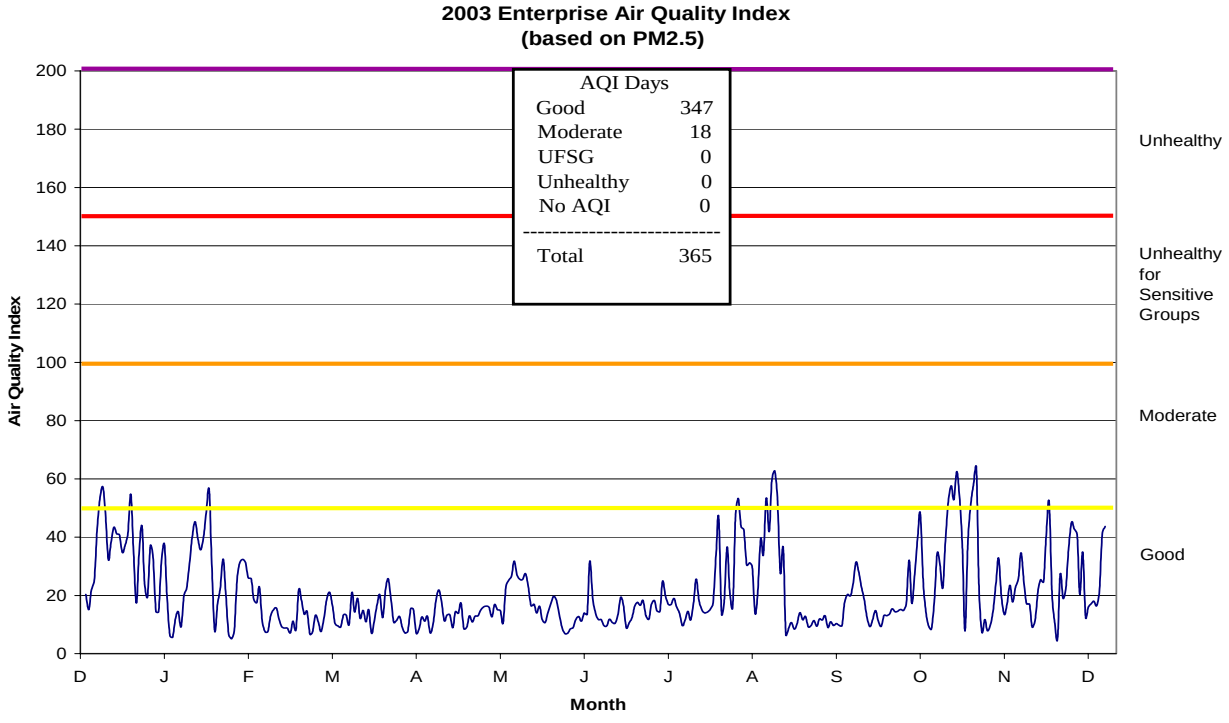

Figure 6. 2003 Enterprise Air Quality Summary

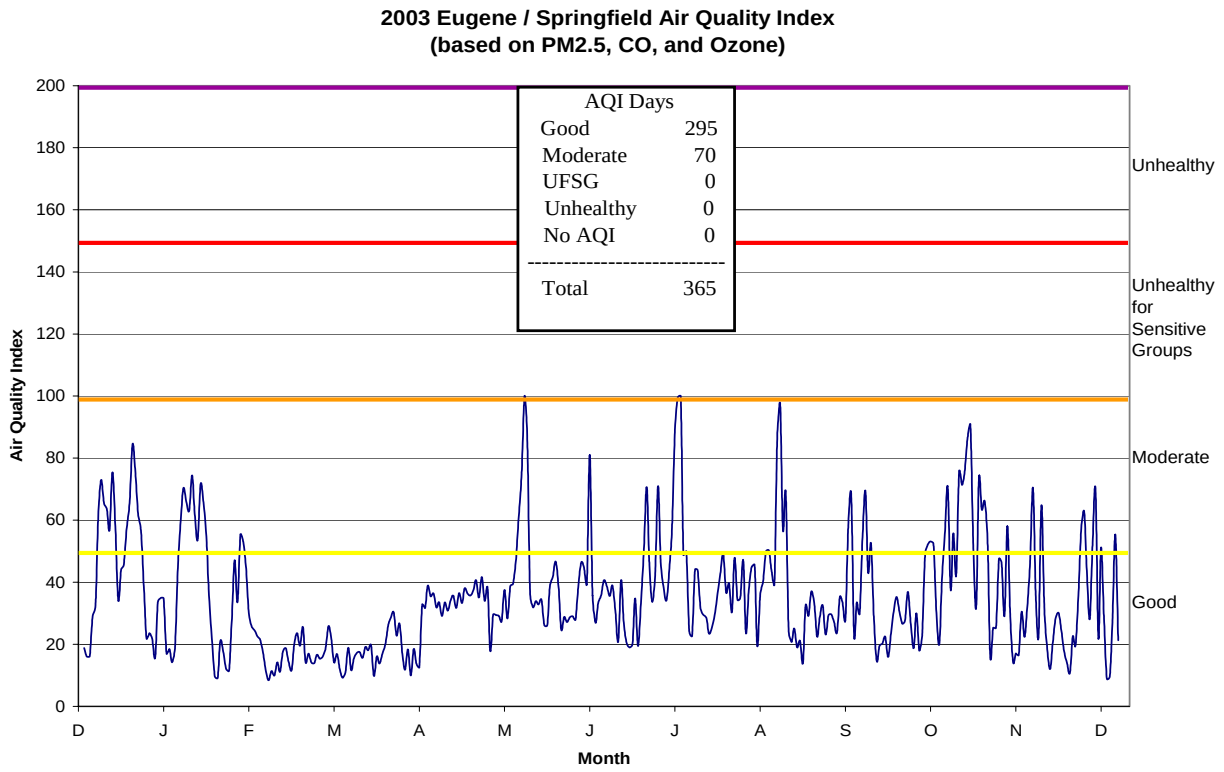

Figure 7. 2003 Eugene/Springfield Quality Summary

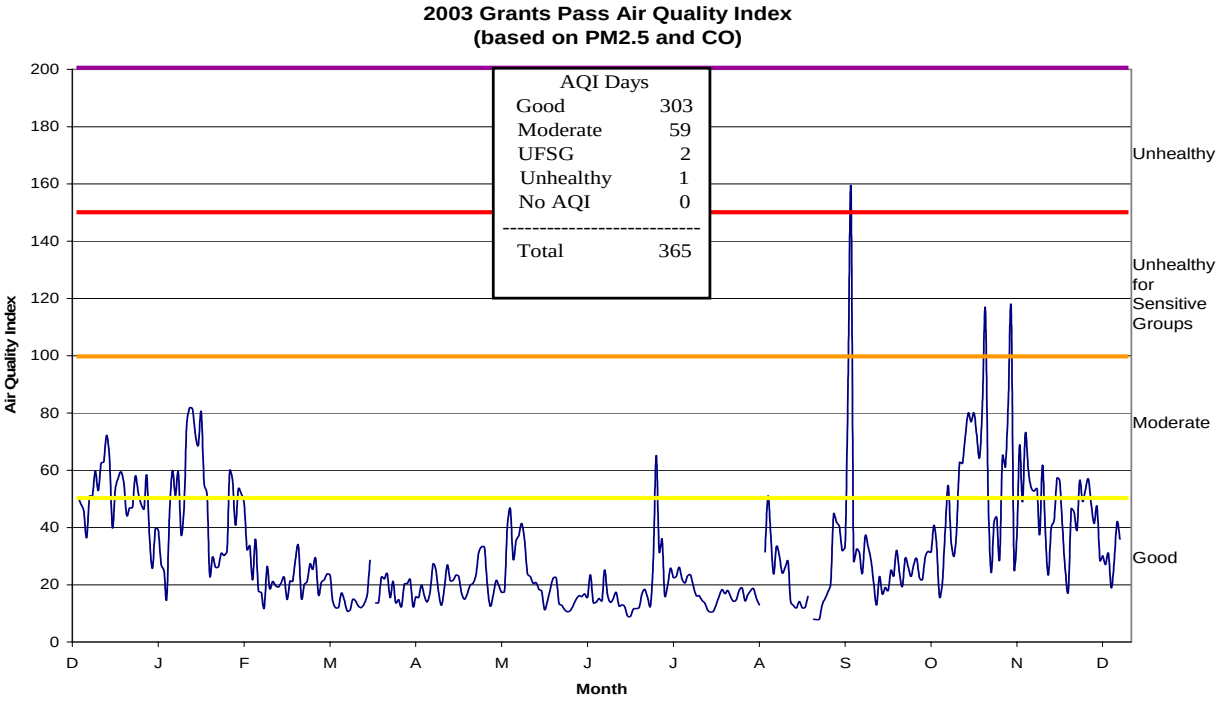

Figure 8. 2003 Grants Pass Air Quality Summary

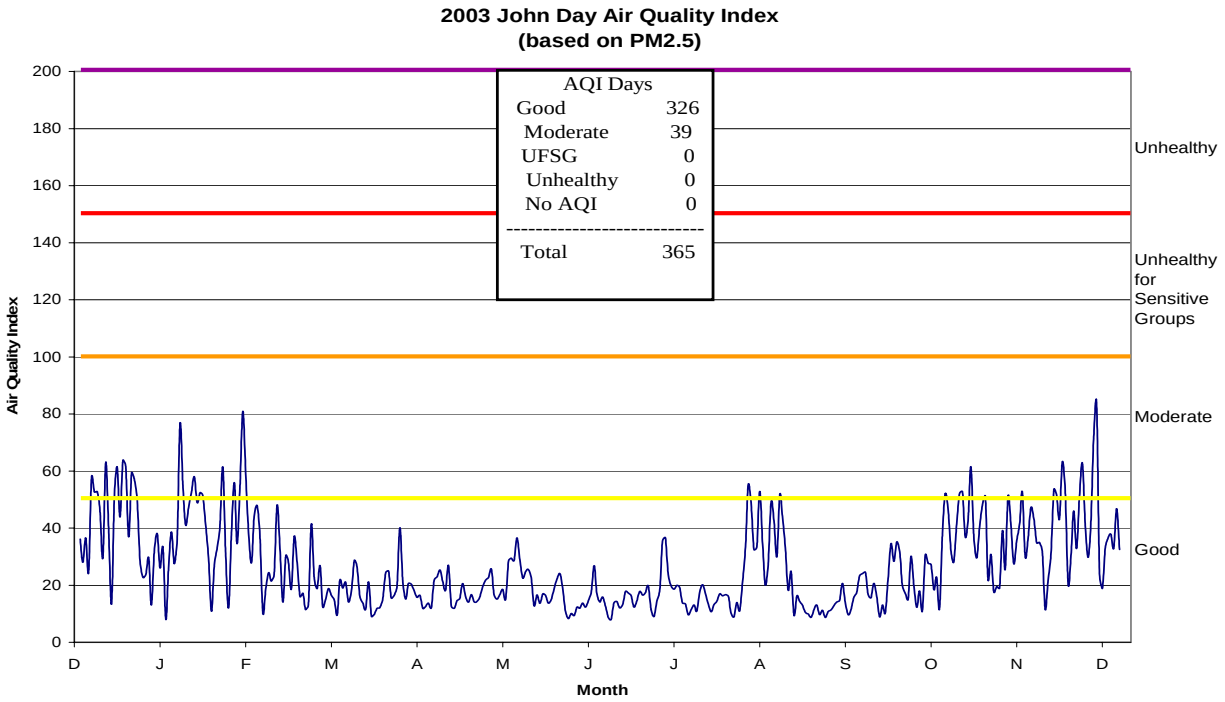

Figure 9. 2003 John Day Air Quality Summary

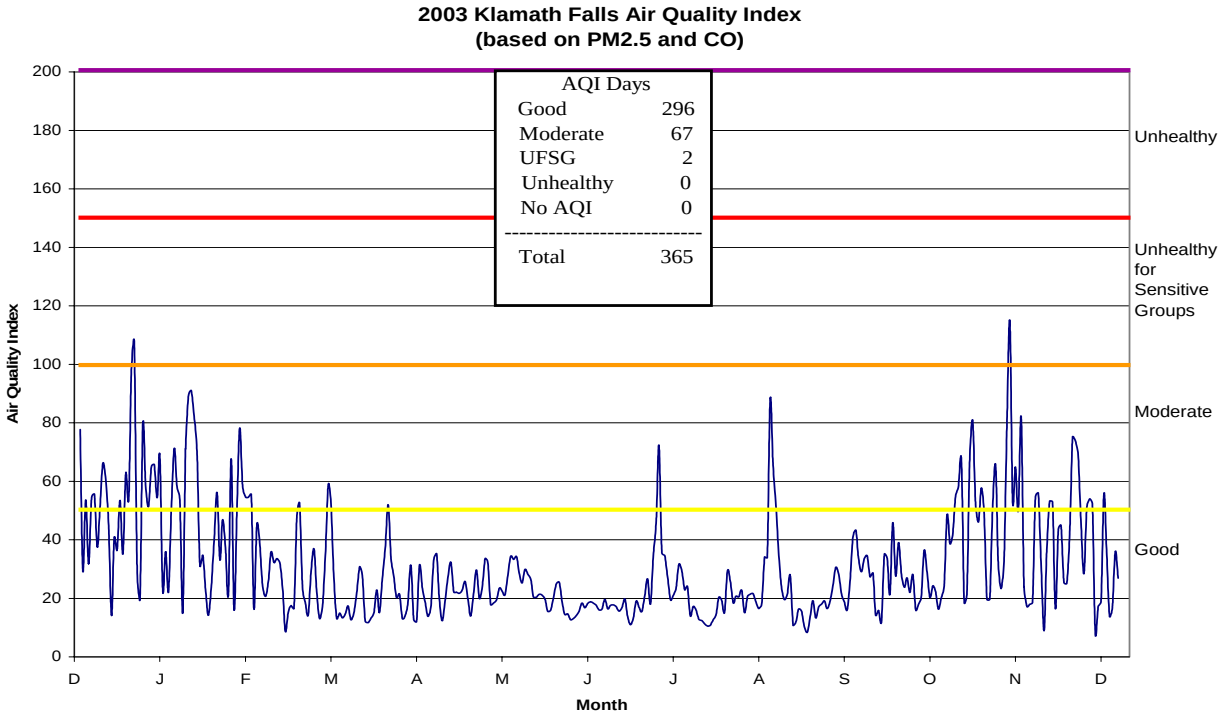

Figure 10. 2003 Klamath Falls Air Quality Summary

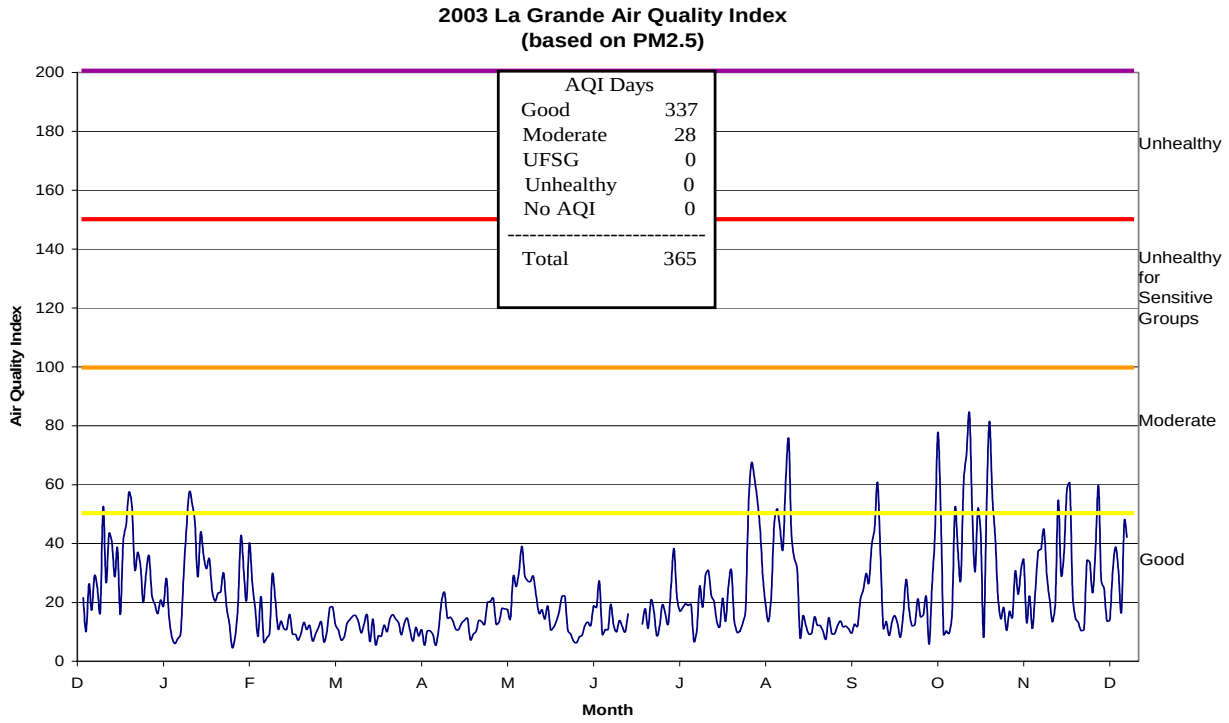

Figure 11. 2003 La Grande Air Quality Summary

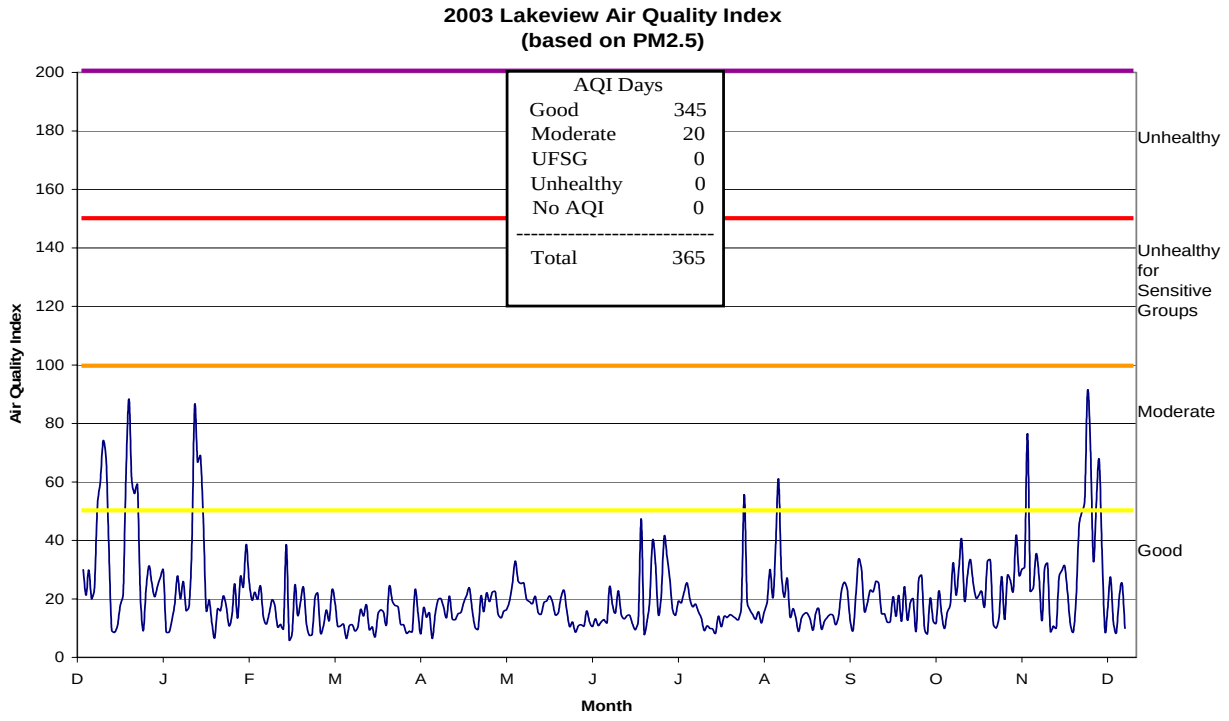

Figure 12. 2003 Lakeview Air Quality Summary

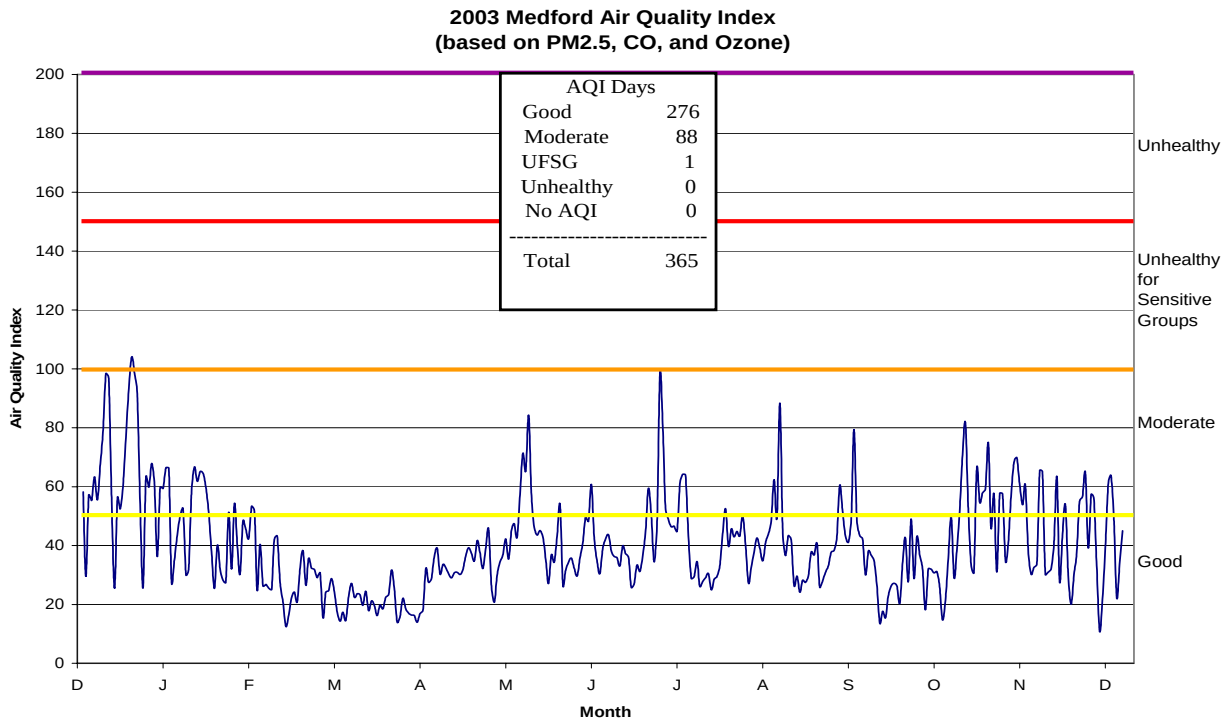

Figure 13. 2003 Medford Air Quality Summary

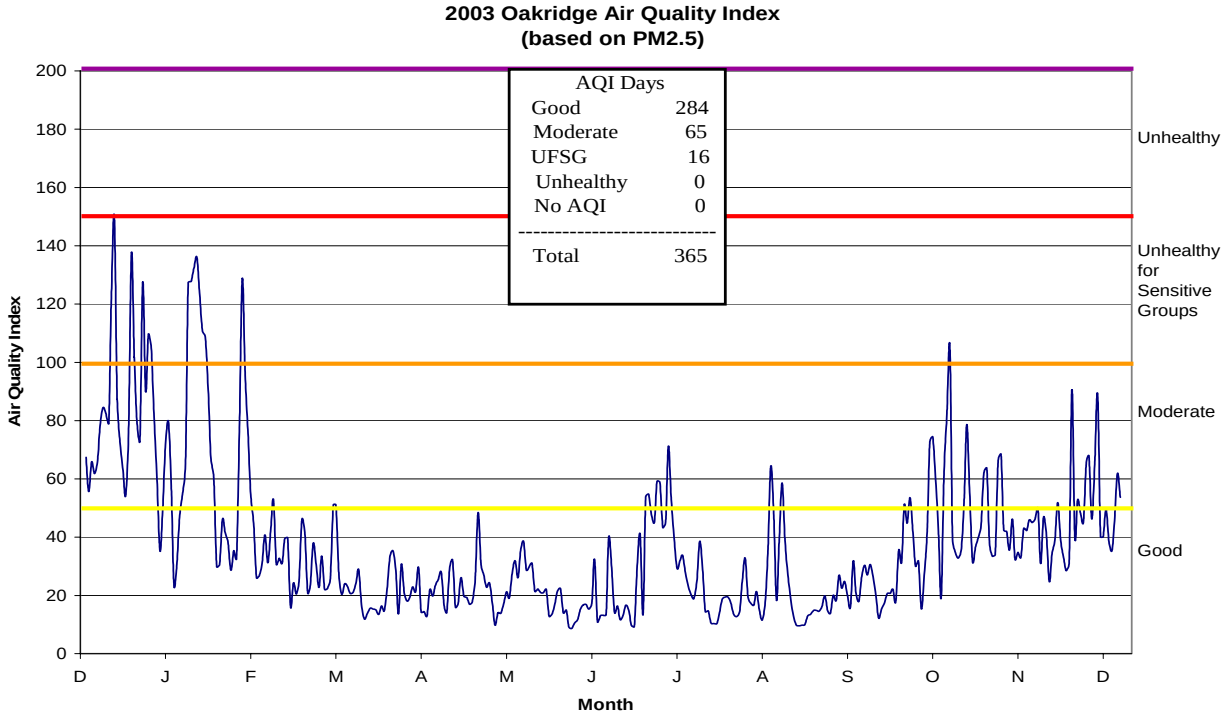

Figure 14. 2003 Oakridge Air Quality Summary

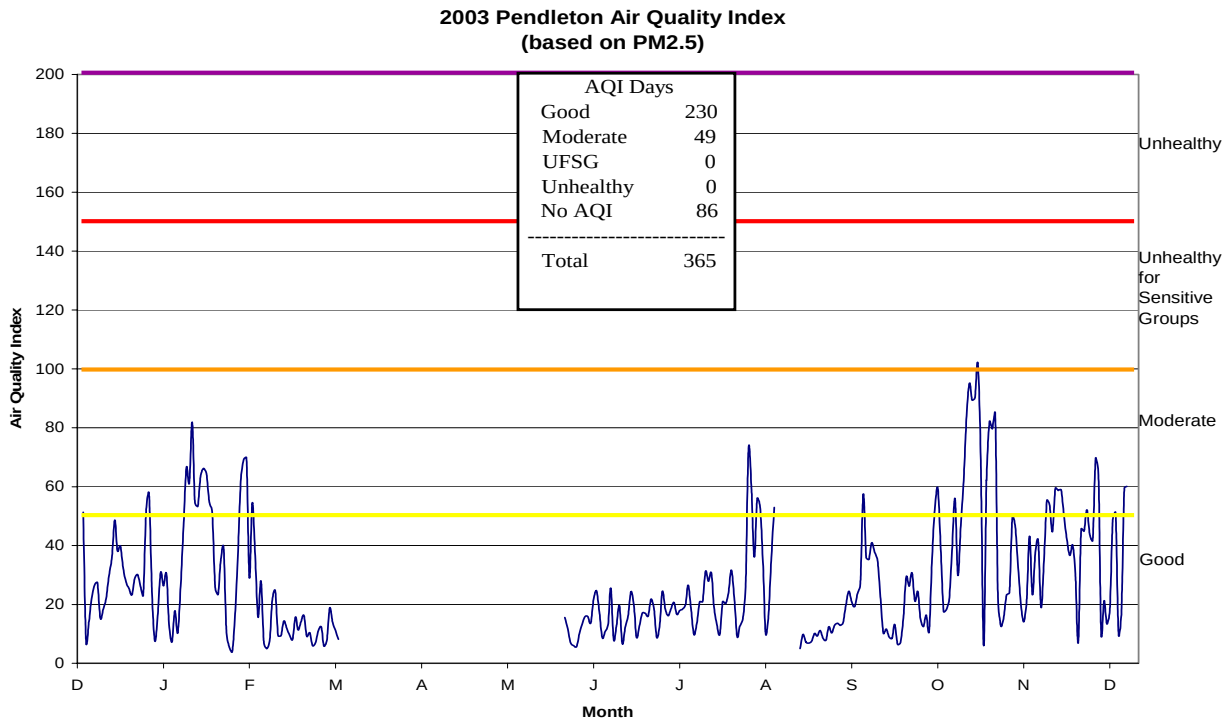

Figure 15. 2003 Pendleton Air Quality Summary

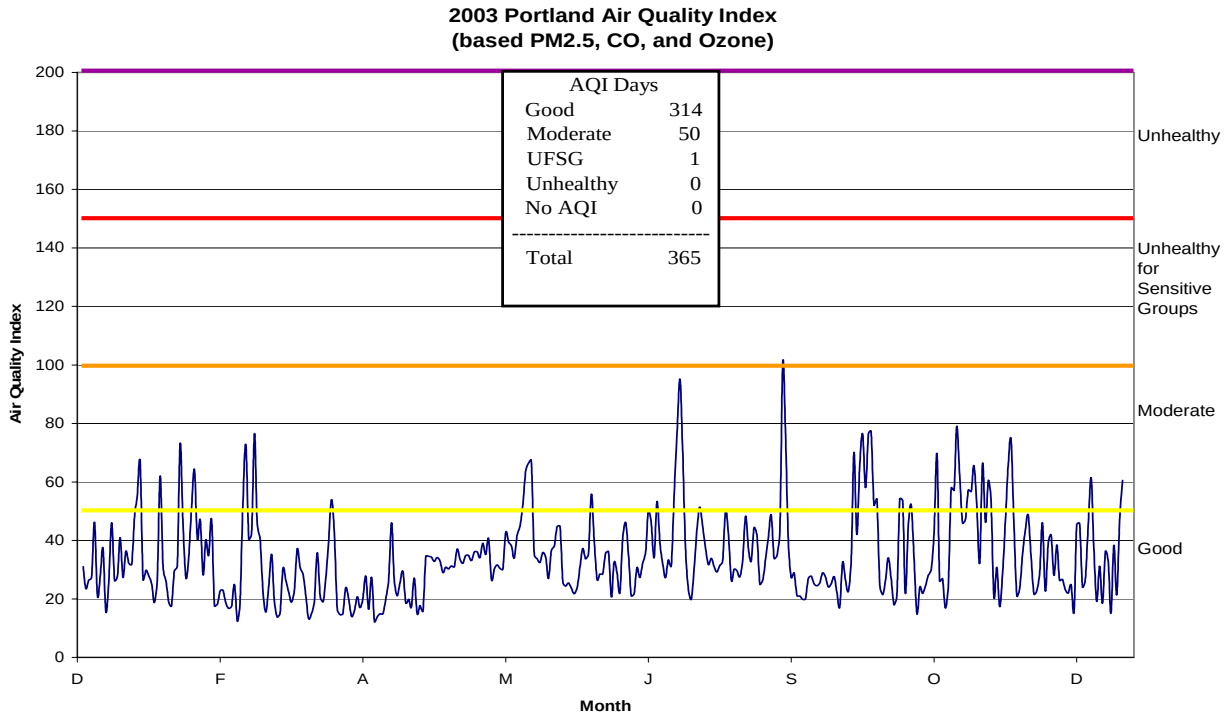

Figure 16. 2003 Portland Air Quality Summary

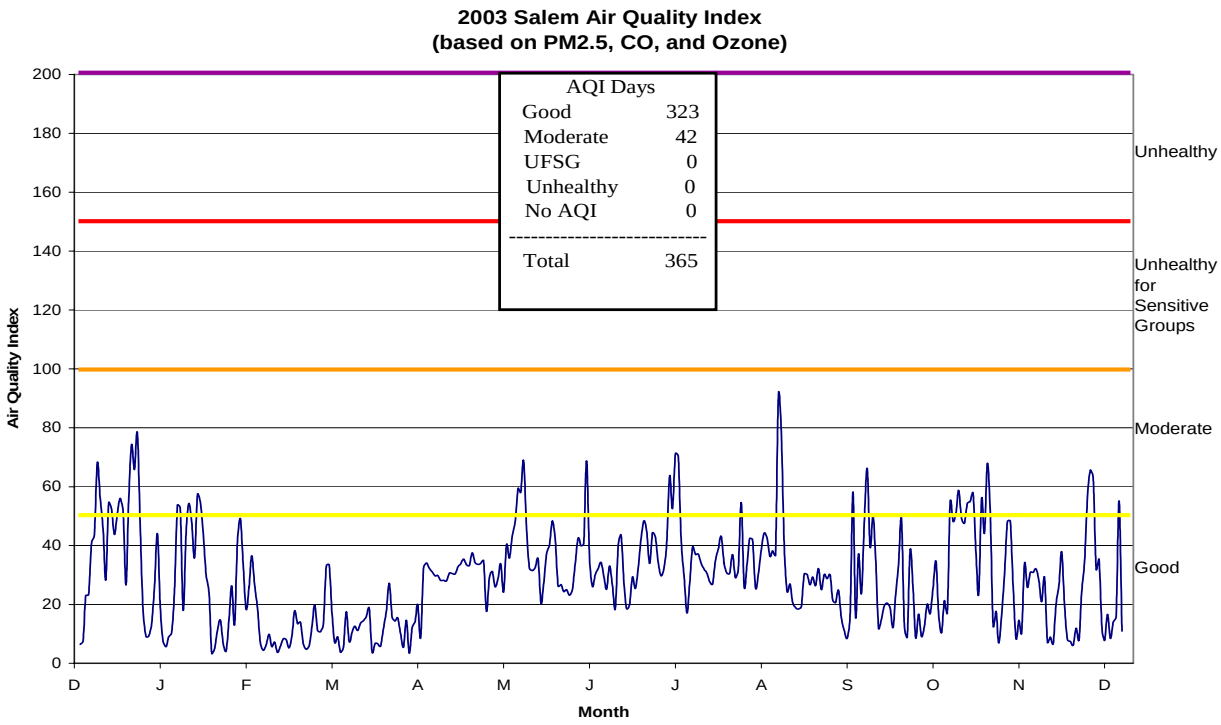

Figure 17. 2003 Salem Air Quality Summary

Air Quality Trends

All areas in the state now meet the NAAQS. Figures 18 and 19 illustrate the reduction in PM_{10} and CO ambient pollution, while Figure 20 indicates ozone is still near the NAAQS.

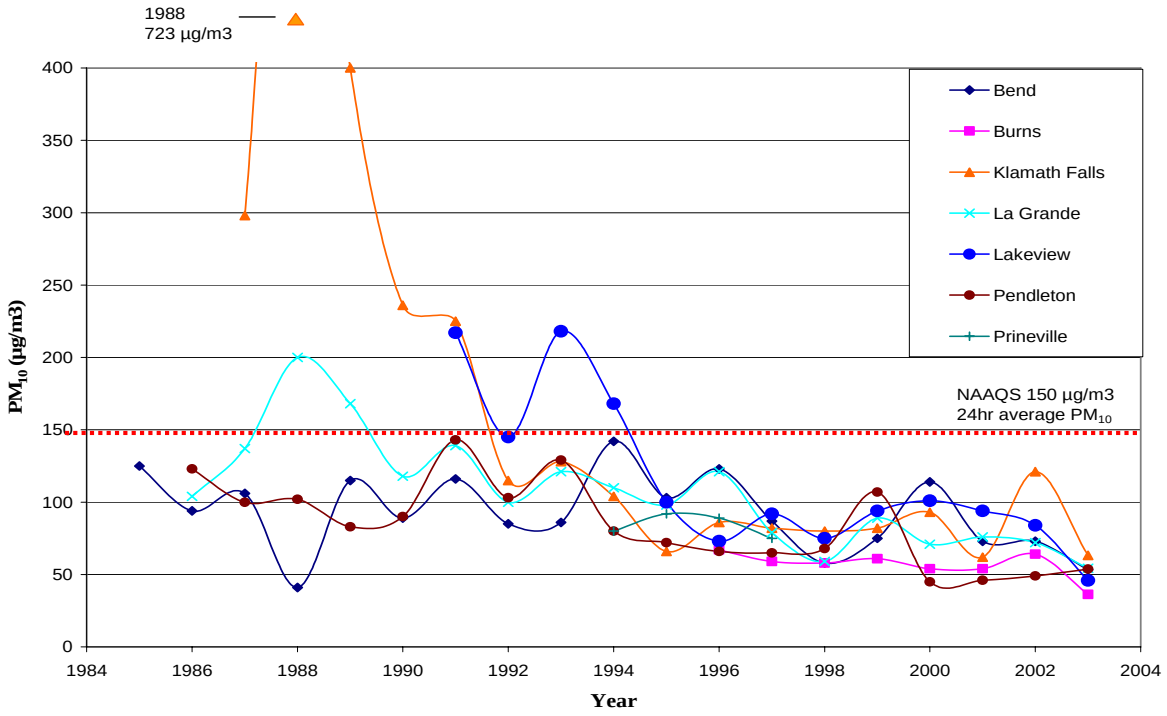

Figure 18a. PM_{10} trend for Eastern Oregon cities using the second highest 24 hour average.

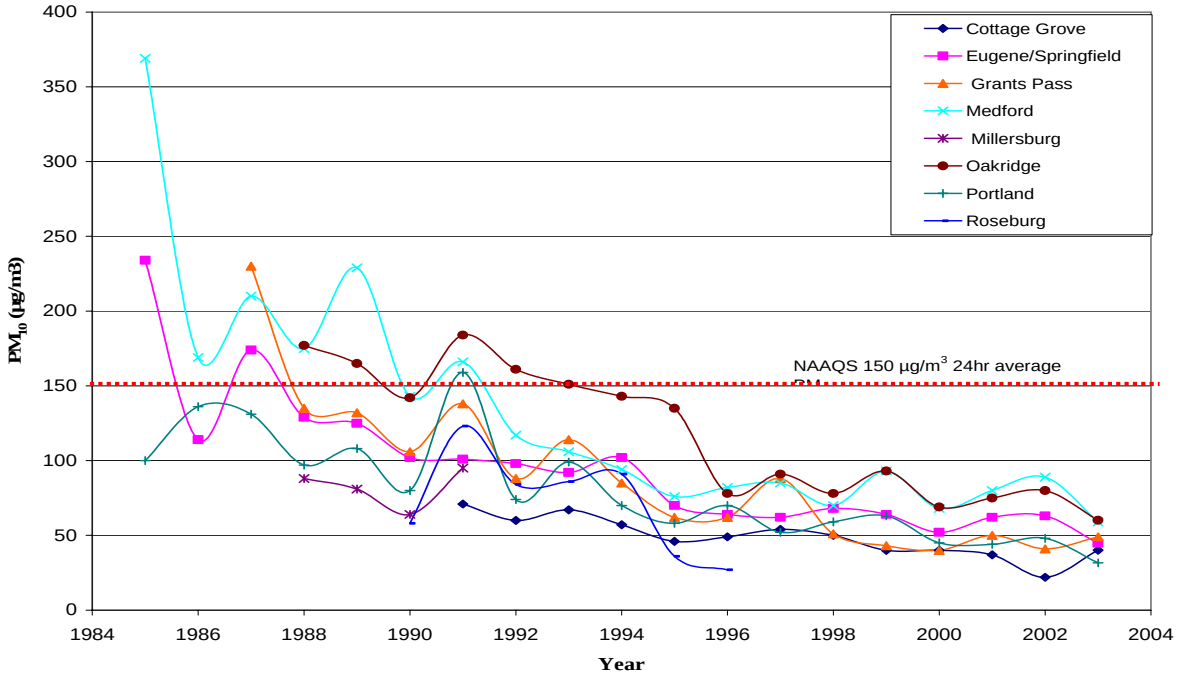

Figure 18b. PM_{10} trend for Western Oregon cities using the second highest 24 hour average.

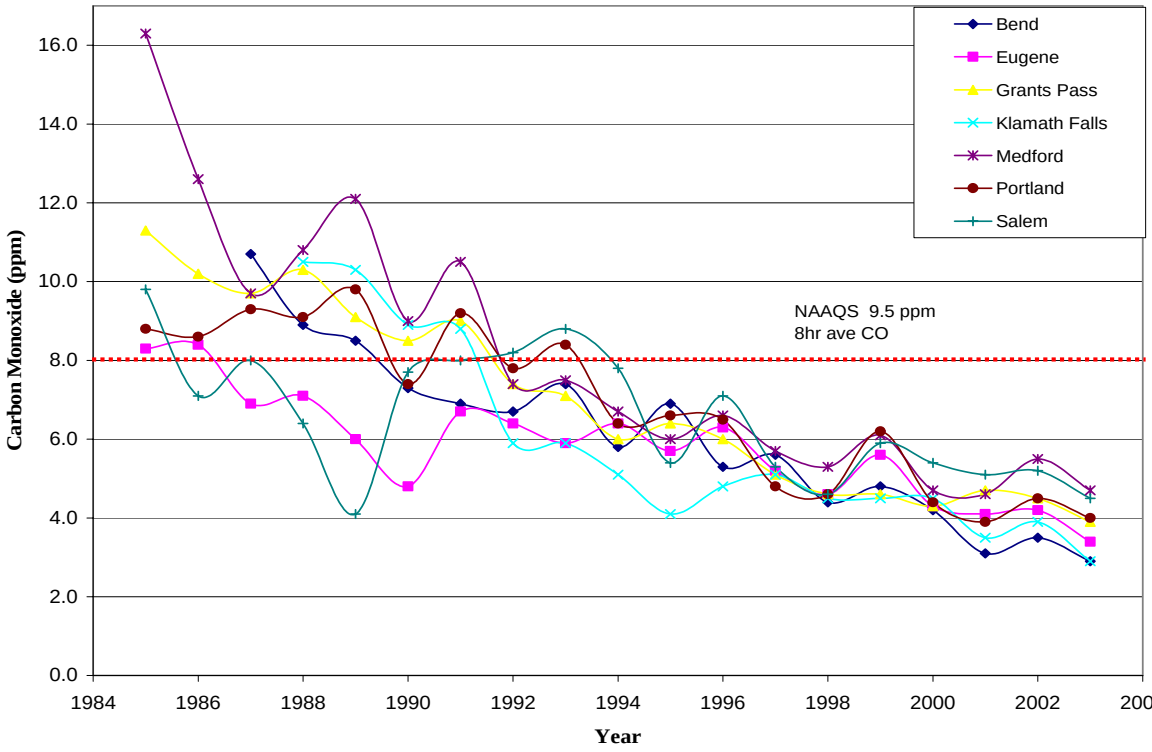

Figure 19. Carbon monoxide trend for Oregon cities using second highest eight hour average.

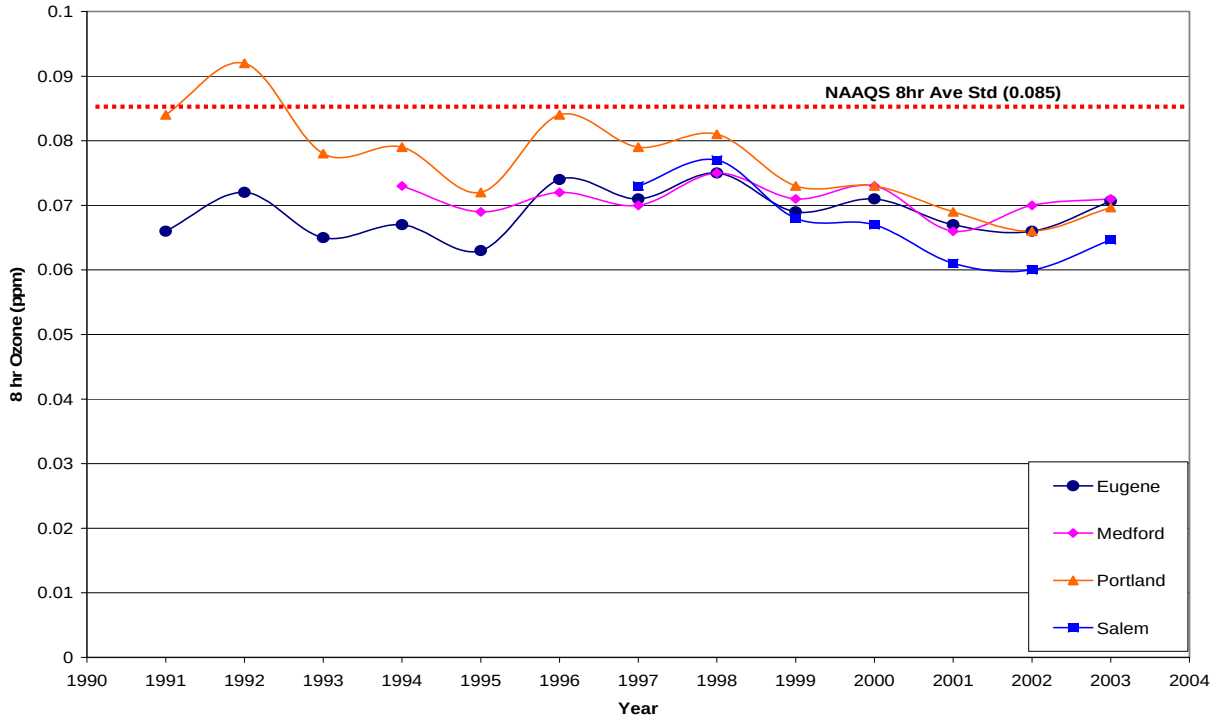

Figure 20. Ozone trend using the three year average of fourth highest eight hour ozone value.

Figures 21a and b provide the annual average $PM_{2.5}$ and Figures 22a and b summarize the 98th percentile 24 hr average for Oregon cities.

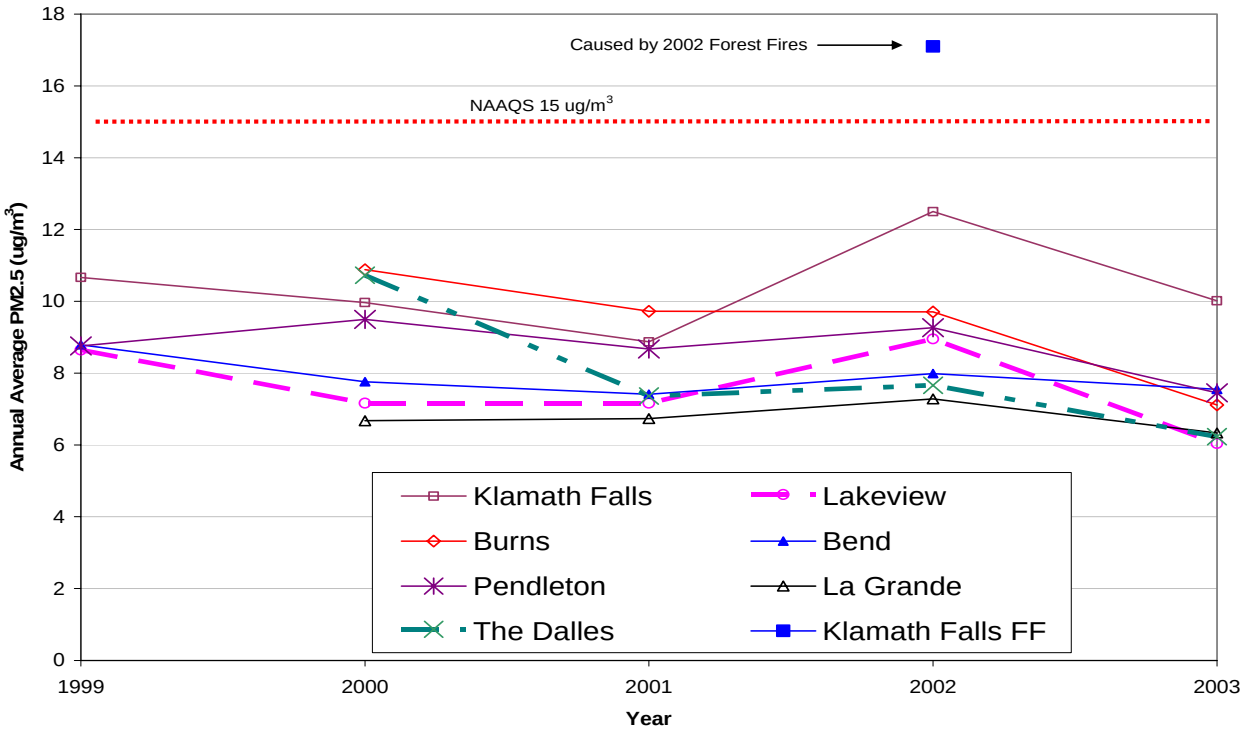

Figure 21a. Central and Eastern Oregon $PM_{2.5}$ Annual Average

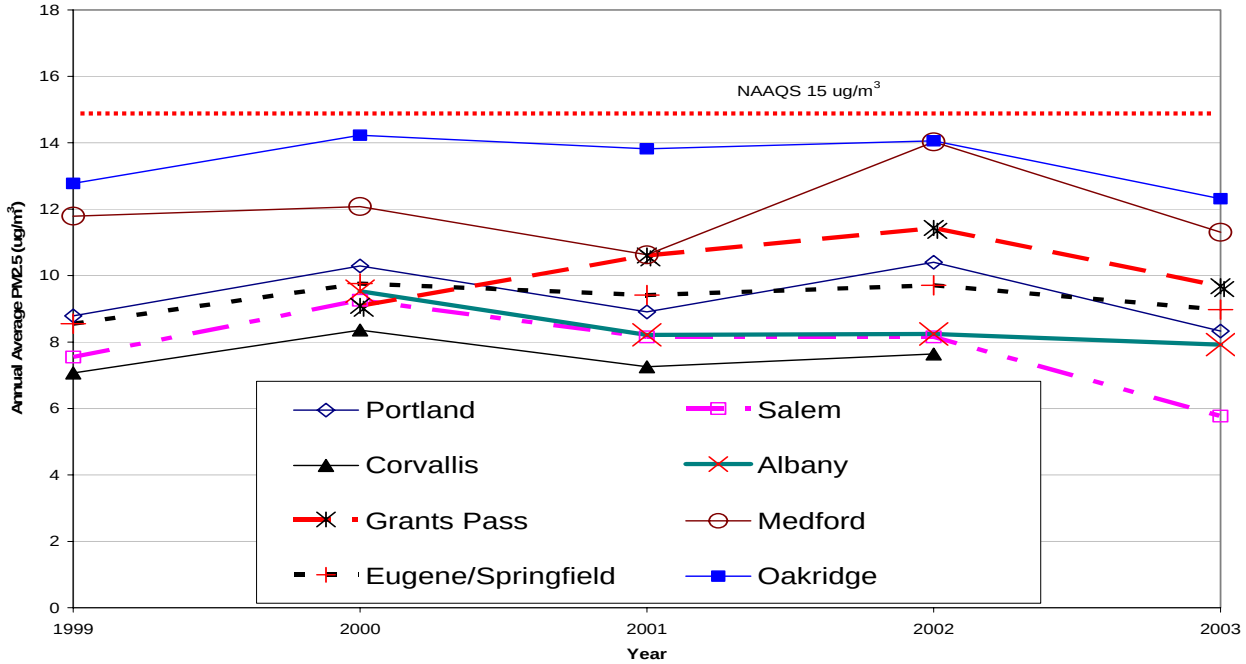

Figure 21b. Western Oregon $PM_{2.5}$ Annual Average

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.

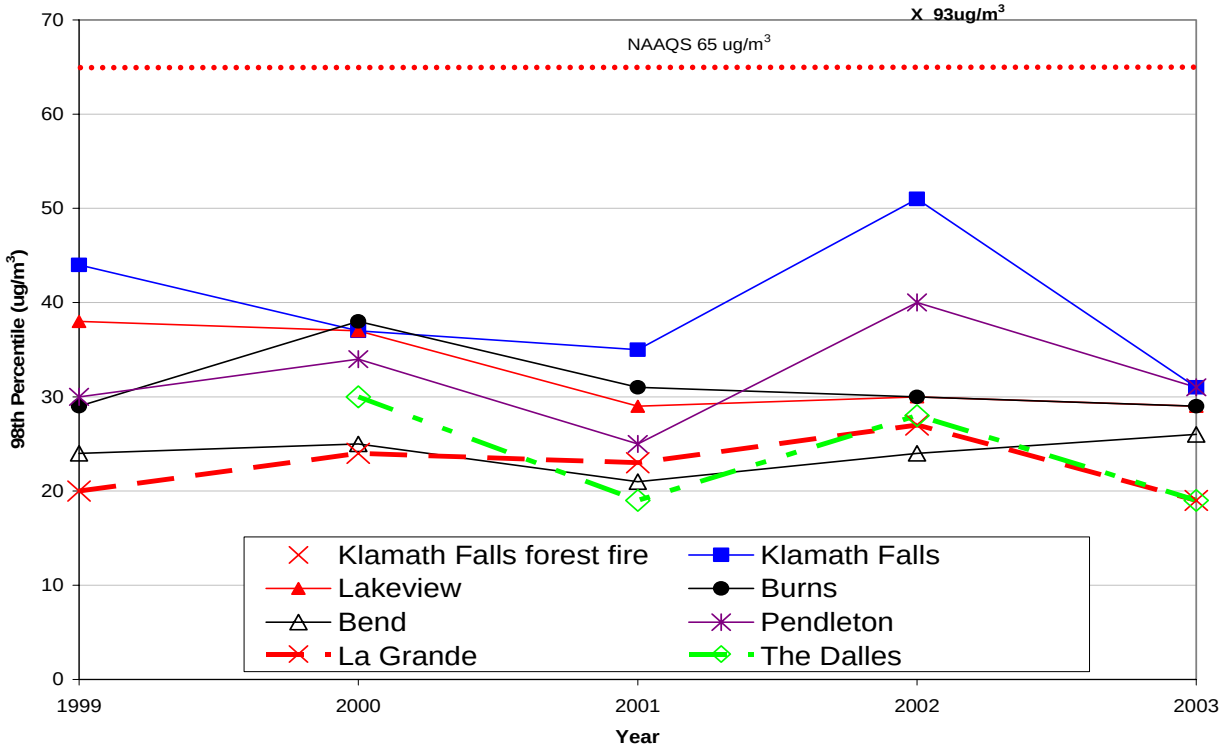

Figure 22a. Eastern and Central Oregon $PM_{2.5}$ 98th percentile

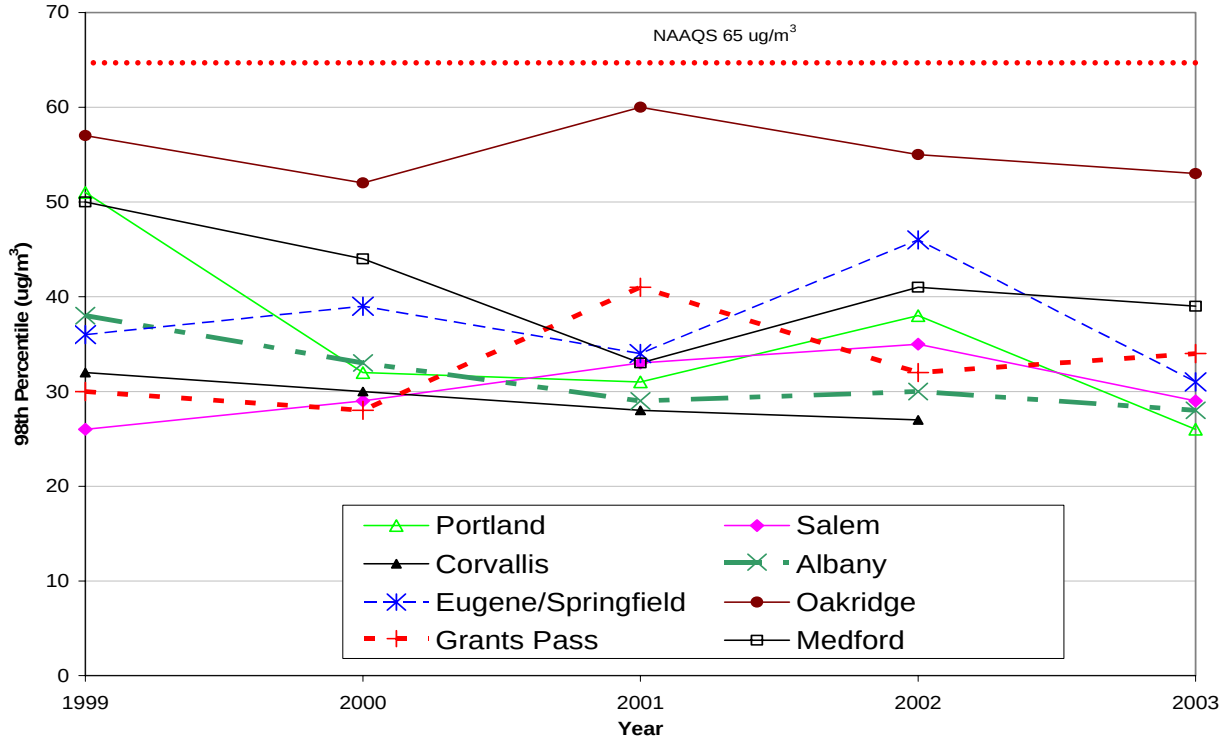

Figure 22b. Western Oregon $PM_{2.5}$ 98th percentile

Oregon DEQ began sampling for air toxics in Portland in 1999, La Grande in 2004. The Lane Regional Air Pollution Authority began sampling for air toxics in Eugene in 2000. Figures 23 through 25 illustrate some trends for the Portland sites for select air toxics. More air toxic information can be found in Appendix G.

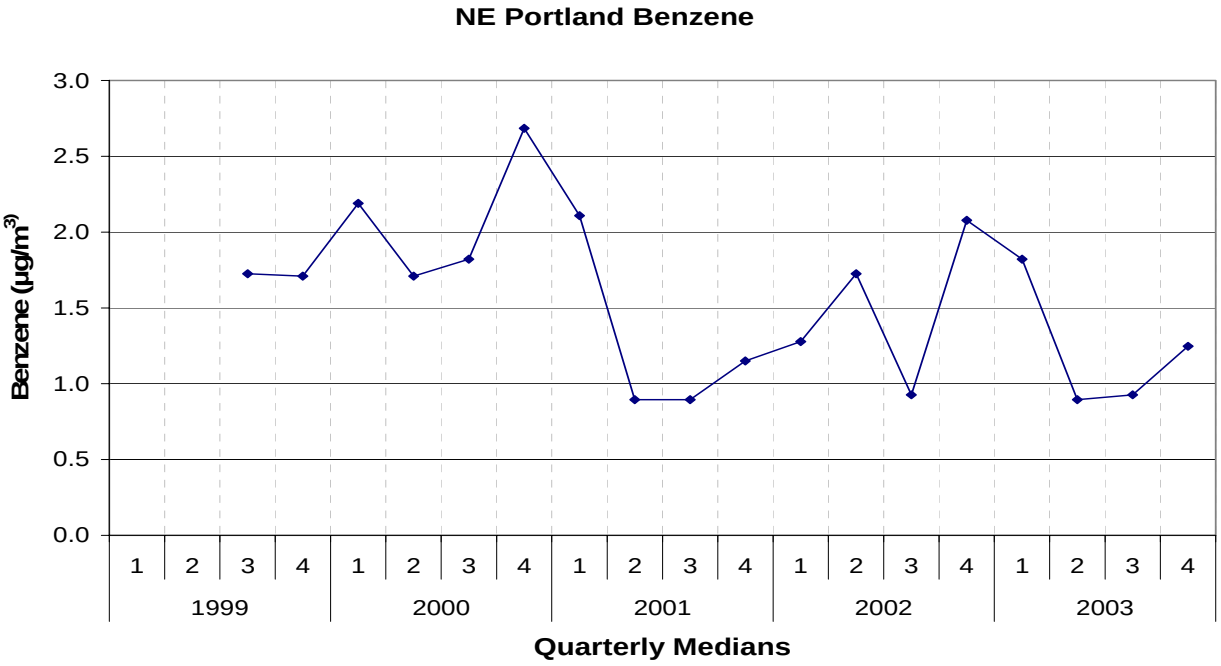

Figure 23. Median quarterly Benzene concentrations in NE Portland. (1999-2003)

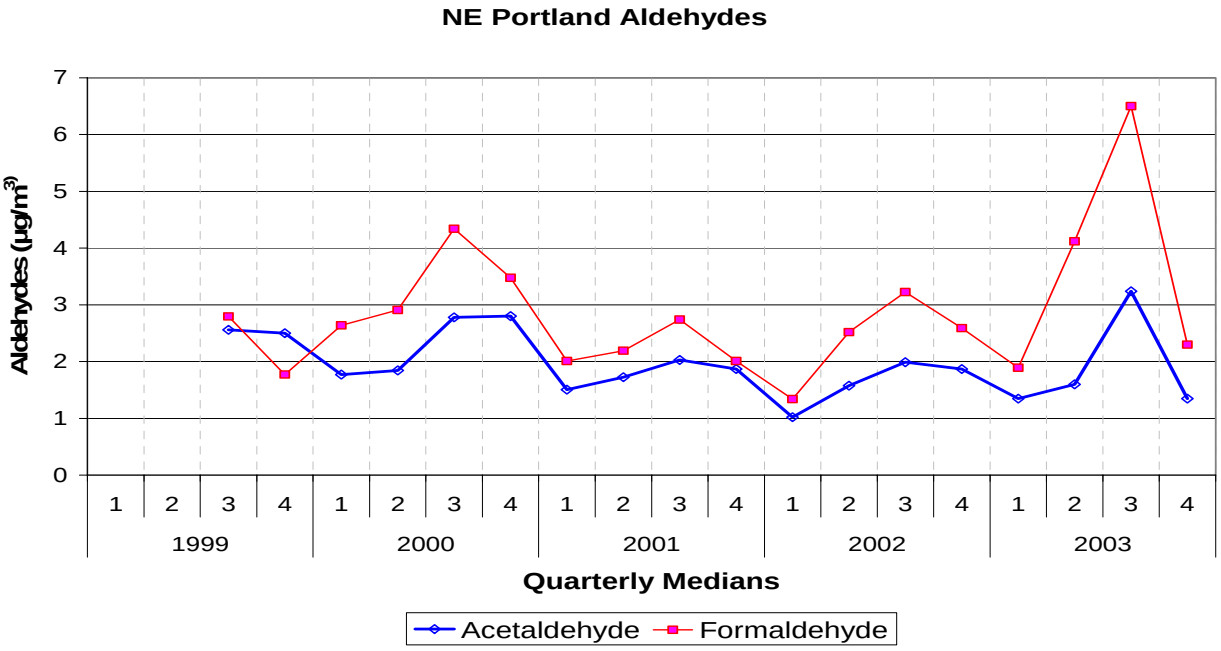

Figure 24. Median quarterly Aldehyde concentrations in NE Portland. (1999-2003)

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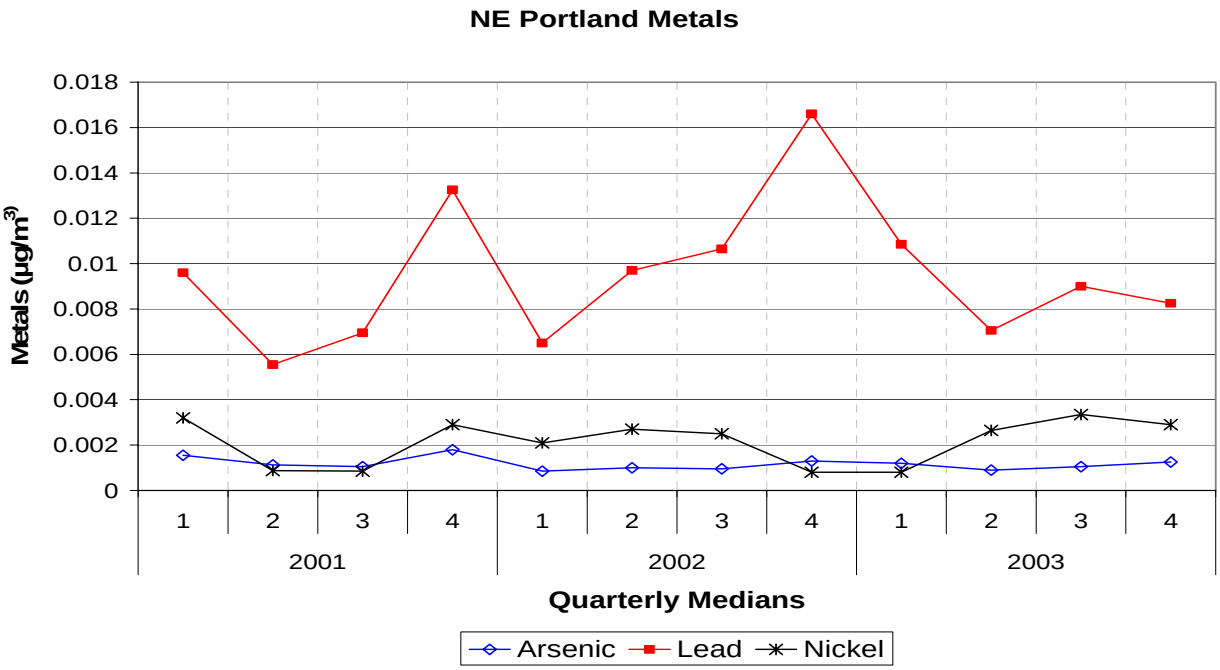


Figure 25. Median quarterly Metals concentrations in NE Portland. (2001-2003)

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 all 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 2 lists the Oregon maintenance areas while Table 3 shows the remaining non-attainment areas and redesignation status. EPA has not designated $PM_{2.5}$ attainment areas yet, but the 1999-2003 data indicates all areas in Oregon will be in attainment.

Table 2. Oregon communities with air quality maintenance strategies.
(redesignated as attainment areas)

City	Pollutant	Redesignation Date
Eugene/Springfield	Carbon Monoxide	1994
Grants Pass	Carbon Monoxide	1999
Portland	Carbon Monoxide	1996
Klamath Falls	Carbon Monoxide	2001
Medford	Carbon Monoxide	2001
Portland-Vancouver	1 hr Ozone	1996
Medford-Ashland	1 hr Ozone	1985

Table 3. Remaining non-attainment communities with air quality maintenance strategy development in progress.

City	Pollutant	Redesignation Status
Salem-Keizer	Carbon Monoxide	NAAQS met
Eugene/Springfield	PM_{10}	NAAQS met, plan in development
Grants Pass	PM_{10}	NAAQS met, plan in development
Klamath Falls	PM_{10}	NAAQS met, plan in development
La Grande	PM_{10}	NAAQS met
Lakeveiw	PM_{10}	NAAQS met
Medford-Ashland	PM_{10}	NAAQS met, plan in development
Oakridge	PM_{10}	NAAQS met, plan in development

Causes of Air Pollution in Oregon

Although industry is a source of some air pollution in Oregon, it accounts for less than ten percent of the emissions. Industry has reduced it's contribution because the 1990 Clean Air Act Amendments required EPA and DEQ to tighten pollution emission requirements resulting in the installation of backend control devices such as baghouses and pollution prevention measures like updating antiquated boilers or using alternative production processes.

Motor vehicles are now the number one source of air pollution in Oregon. Although each individual car or truck contributes relatively small amounts to pollution totals, the substantial number of vehicles makes their total contribution larger than any other single source. Emissions from cars contribute to ground level ozone (smog) pollution especially on hot summer days. Smog is a problem in the Portland, Eugene, Salem and Medford areas. Emissions from cars also cause carbon monoxide pollution which is most elevated during cold stagnant conditions in winter.

Other major sources of pollution are from individual actions such as using wood stoves, gas-powered lawn mowers, motor boats, paints, solvents, aerosol products like hairspray and air fresheners, and outdoor burning. Visit DEQ's web site to learn more about ways to minimize air pollution caused by daily activities.

Emission Inventory

A 1999 Oregon criteria pollutants emission inventory is summarized in Figures 26 through 35.

Emission inventory pollutants include: CO - Carbon Monoxide, PM_{10} - Particulate Matter 10 micrometers and smaller, NOx - Nitrogen Oxides, SO_2 - Sulfur Dioxide, Lead, VOC - Volatile Organic Compounds (ozone precursor, along with NO_2). Ozone is not easily estimated because it is a secondary pollutant.

Source Categories Include: Point (industry), Area (woodstove, open burning, forest fires, lawn mowers, commercial, etc…), Non-road Mobile (boats, heavy construction, trains, etc…), Mobile (cars, trucks, and buses).

Table 4. Oregon's Estimated Emissions by Source and Pollutant.

	Source Categories (tons/yr)				
Pollutant	Point	Area	Nonroad	Onroad	Total
CO	60,560	654,030	406,553	1,015,657	2,136,801
NOx	28,895	25,252	71,654	137,945	263,746
lead	8	11	0	0	19
PM_{10}	14,337	86,062	9,073	3,367	112,839
SO_2	26,037	6,383	11,039	3,893	47,353
VOC	21,013	256,421	82,818	96,206	456,458

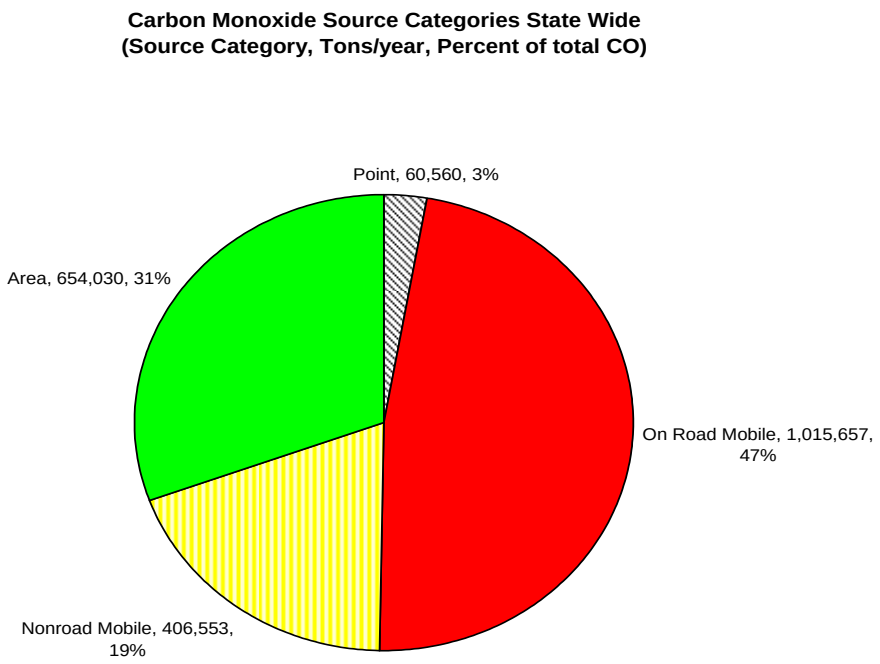


Figure 26. 1999 Oregon Carbon Monoxide estimated emissions by source category.

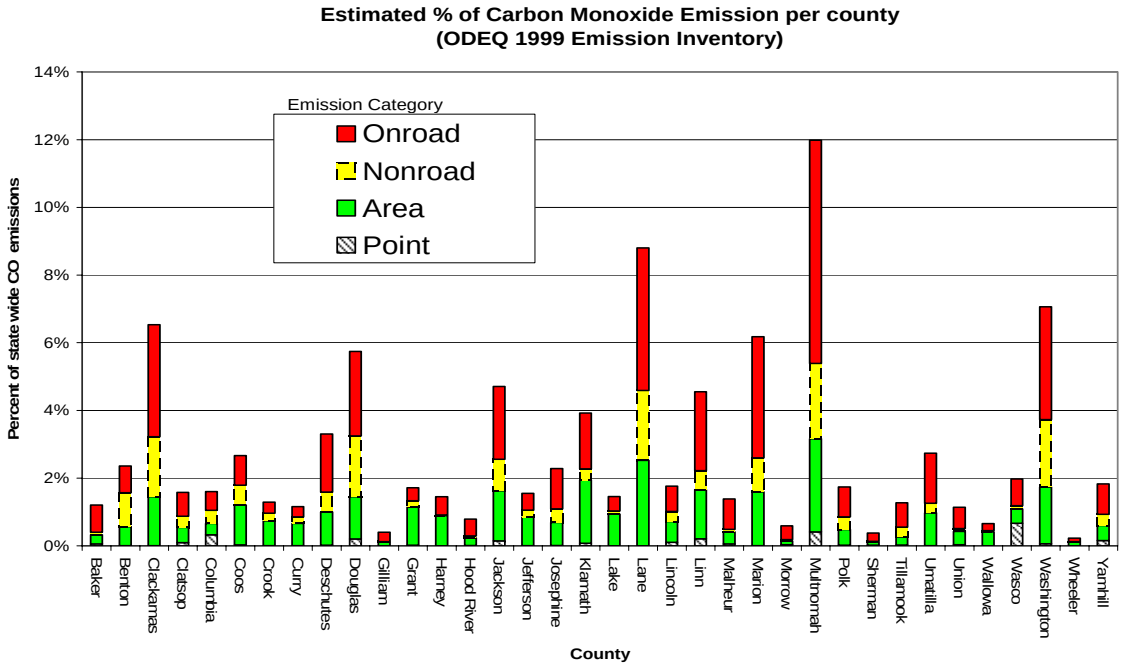


Figure 27. 1999 Oregon Carbon Monoxide estimated emissions by source category by county.

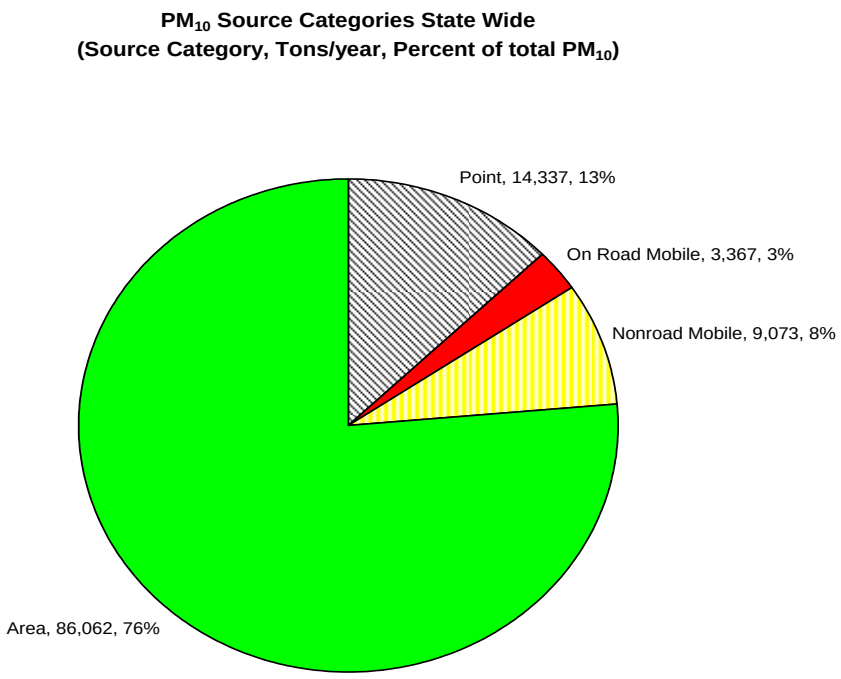


Figure 28. 1999 Oregon PM_{10} estimated emissions by source category.

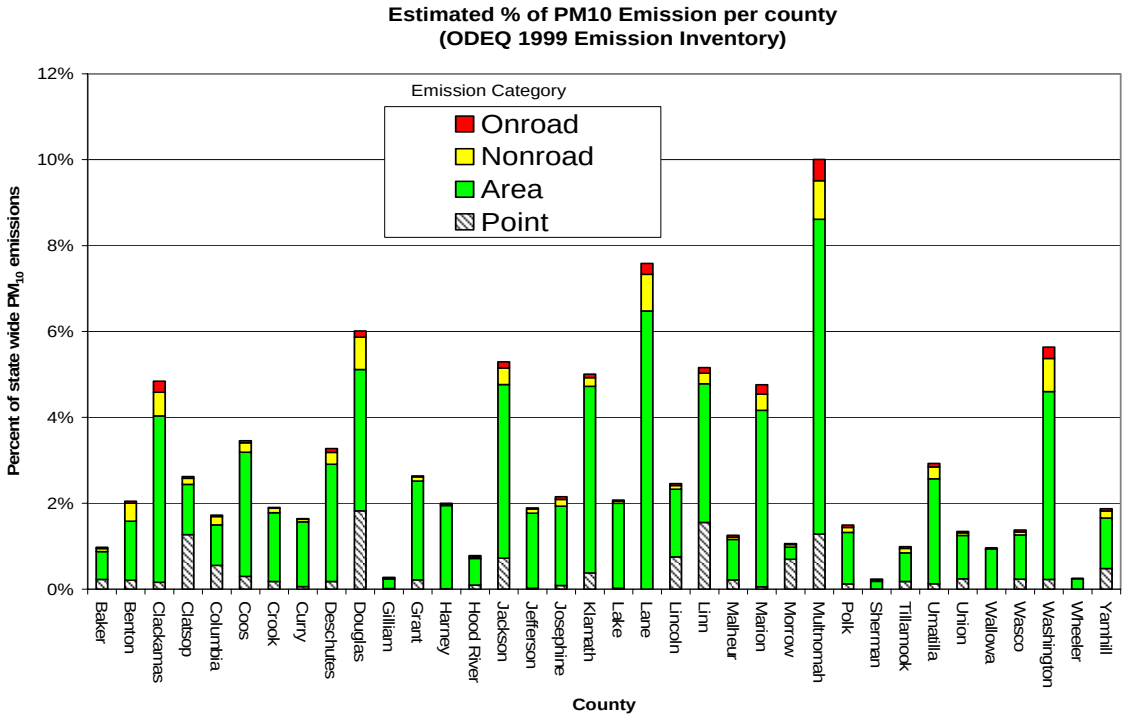


Figure 29. 1999 Oregon PM_{10} estimated emissions by source category by county.

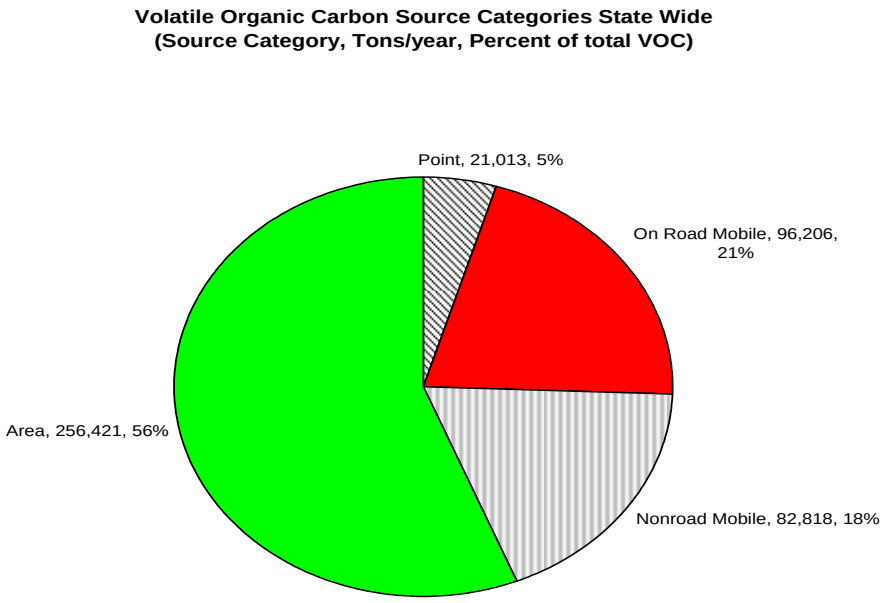


Figure 30. 1999 Oregon VOC estimated emissions by source category.

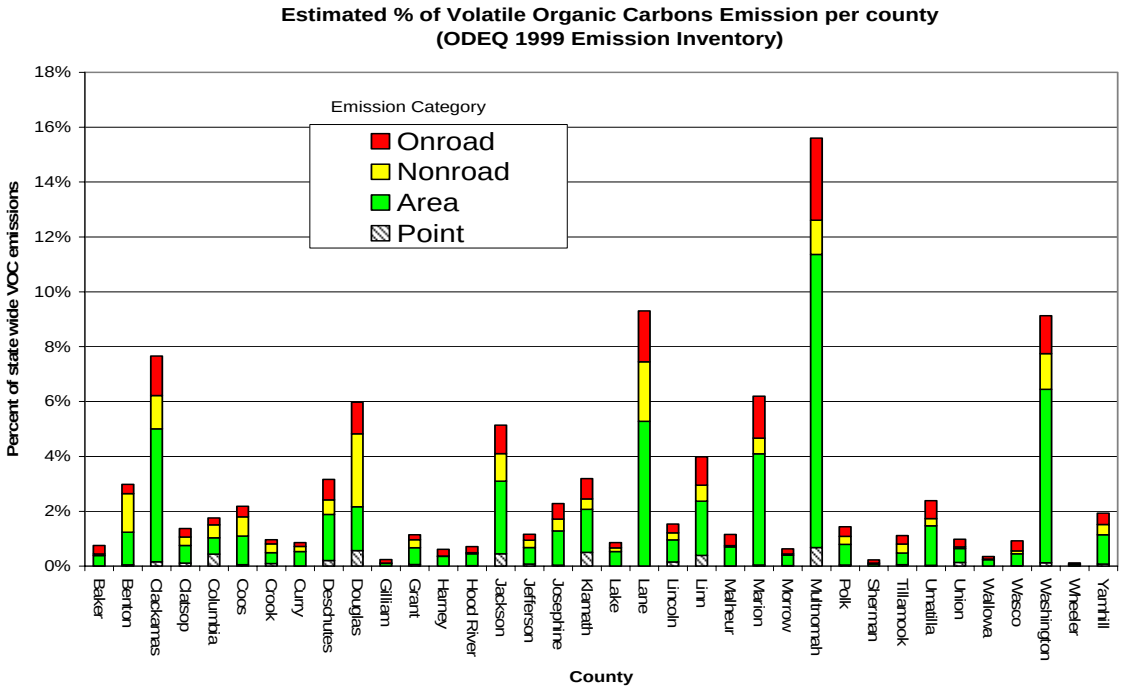


Figure 31. 1999 Oregon VOC estimated emissions by source category by county.

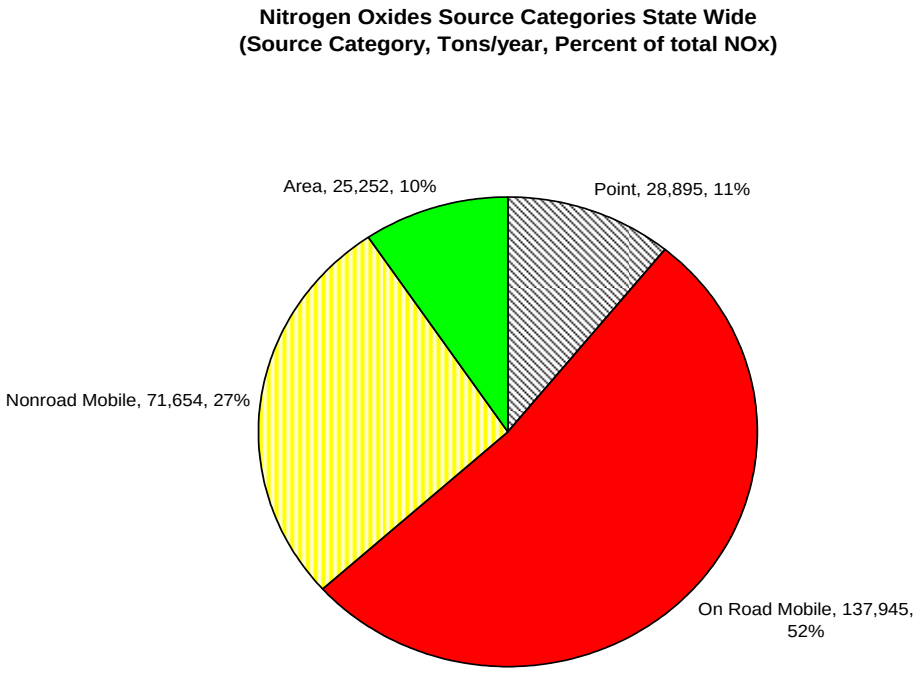


Figure 32. 1999 Oregon NOx estimated emissions by source category.

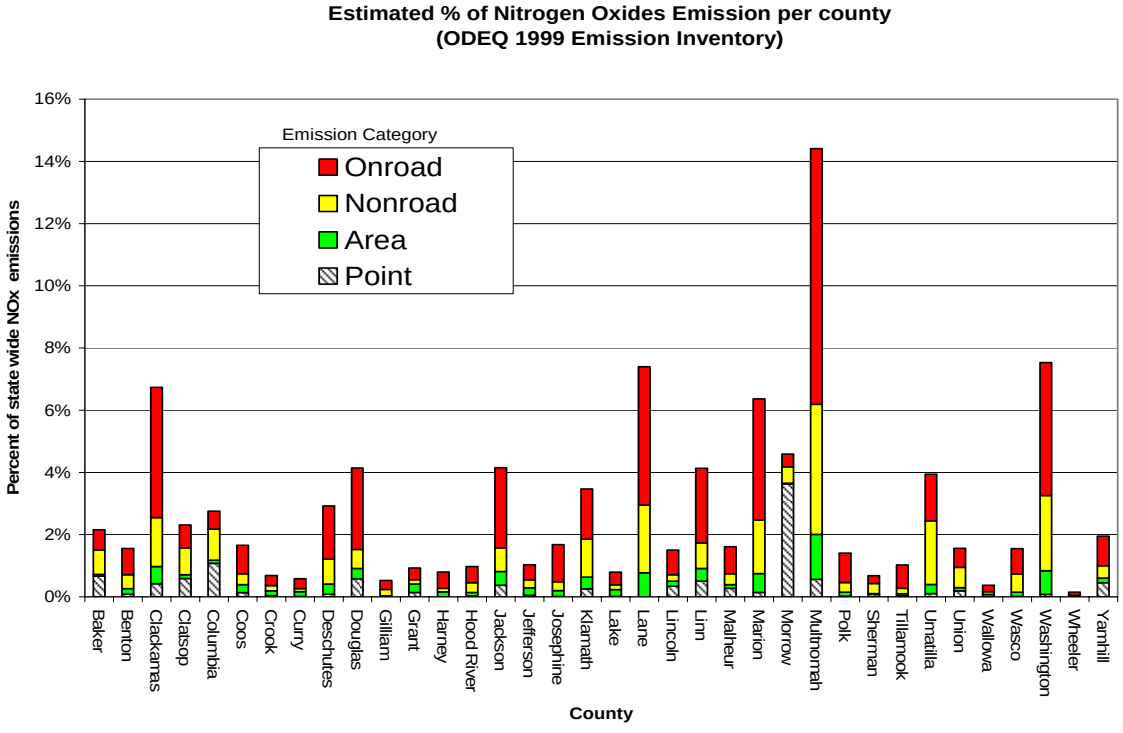


Figure 33. 1999 Oregon NOx estimated emissions by source category by county.

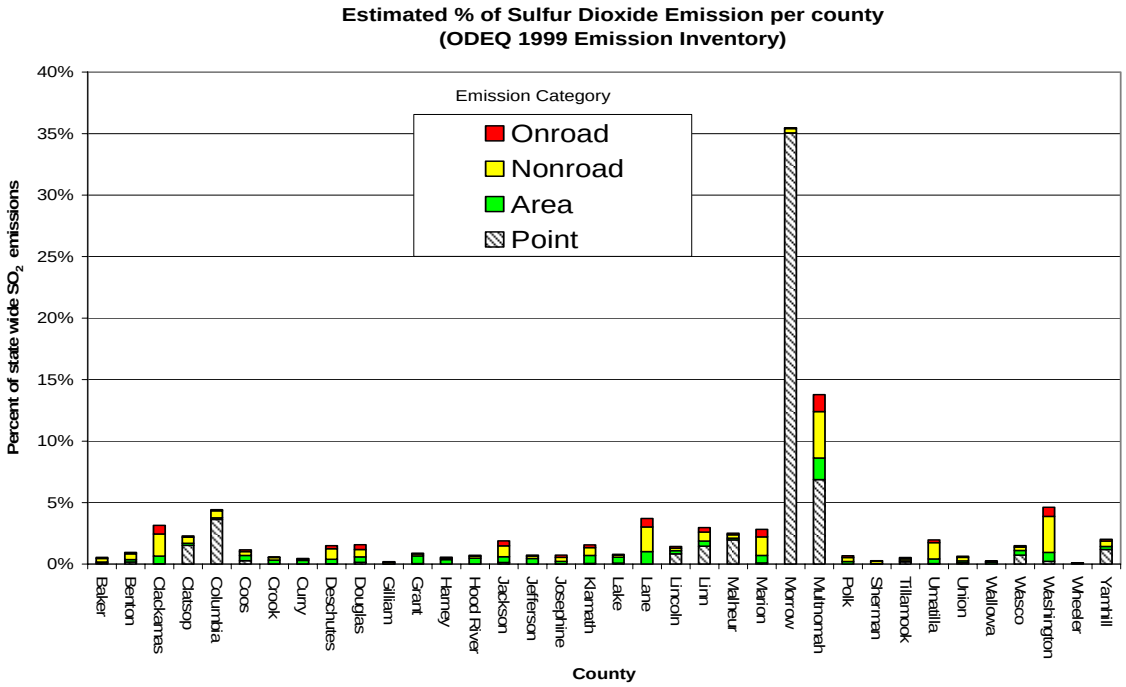


Figure 34. 1999 Oregon SO_2 estimated emissions by source category by county.

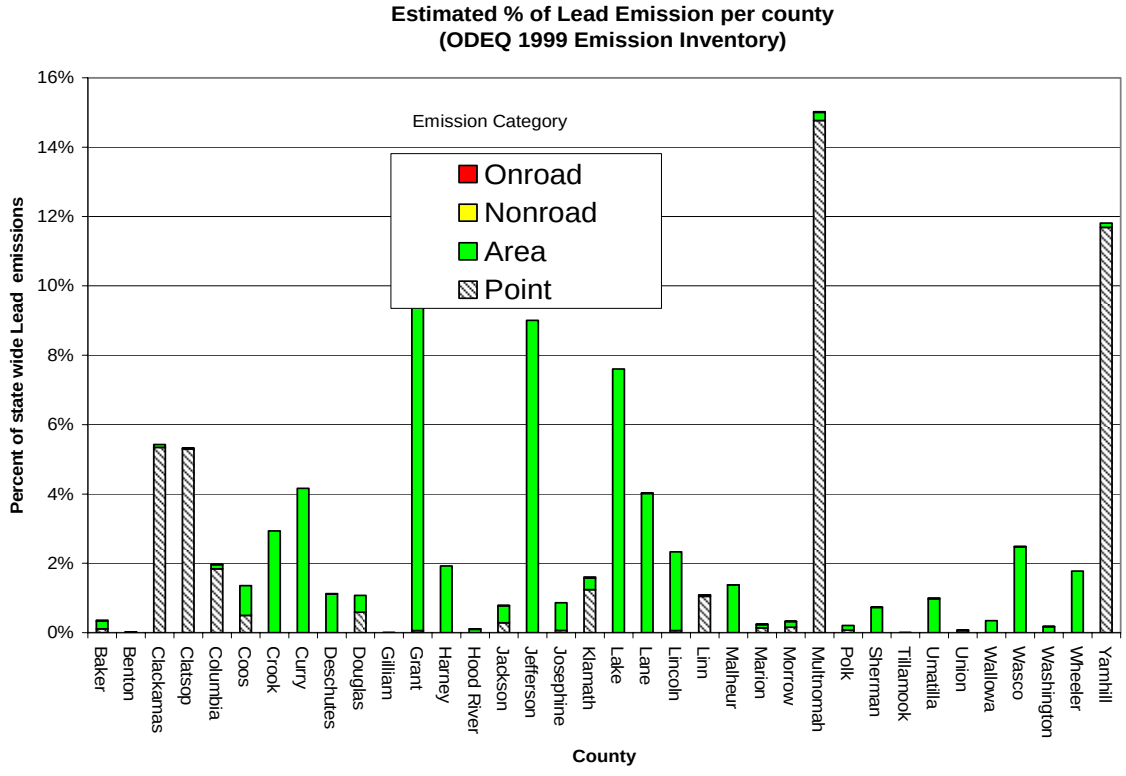


Figure 35. 1999 Oregon lead estimated emissions by source category by county.

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:

Vehicle Testing	Air Toxics	Visibility
Fuel Additives	Asbestos	Ambient Air Monitoring
Industrial Air Permitting	Wood Burning	Air Quality Index
Business Assistance	Outdoor Burning	

Vehicle Inspection

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.

On May 1, 1998, DEQ implemented an Enhanced Vehicle Emissions Testing Program in the Portland area. Enhanced vehicle inspection revs the engine while the vehicle is on a treadmill in order to simulate typical driving conditions and emission levels.

Fuels Program

This program's goal is to reduce ozone and carbon monoxide that result from the use of gasoline and other fuel blends. The program reduces wintertime carbon monoxide in the Portland area by adding compounds containing oxygen to the fuel (typically ethanol). These additives enhance the engines ability to burn fuel more completely and result in lower carbon monoxide emissions.

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 businesses in Oregon that release air pollutants have permits to operate. The permits regulate the amount of annual pollution these businesses can emit into the air. 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.

In 1995, Oregon instituted the federally required Title V Air Operating Permit Program for major industrial sources of air pollution. A major industrial source of air emissions has the potential to

emit 100 tons per year of particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, or volatile organic compounds (VOCs). For emitters of hazardous air pollutants, a major source has the potential to emit 10 tons per year of any individual hazardous air pollutant or 25 tons per year of any combination of hazardous air pollutants. DEQ currently requires about 100 businesses to have Title V permits. Other permitted businesses in the state operated with the Air Contaminant Discharge Permits.

In addition to issuing Title V permits, DEQ has worked with over 90 sources to modify their permits to limit the allowable air emissions to levels below the Title V permitting threshold of 100 tons per year. Many other sources avoided Title V permitting by incorporating pollution prevention measures to reduce actual emissions below the major source threshold level. Title V sources were also required to improve in-stack pollution monitoring so they could have real time feedback about their pollution levels. DEQ will continue to permit emissions from these industrial sources.

Business Assistance Program

The Business Assistant Program (BAP) 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 educate 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.

Air Toxics (Hazardous Air Pollutant) Program

Air Toxic or hazardous air pollutants are substances in the air that 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 HAPS including benzene, dioxin, chromium, perchloroethylene, and toluene. The complete list of HAPs can be found in Title III of the 1990 Clean Air Act Amendments (see www.epa.gov).

Many types of human activities produce air toxics in varying amounts. These include manufacturing, energy production, burning waste materials or wood, painting, cleaning activities, and driving vehicles. Natural sources can also contribute toxic air emissions. For example, radon gas comes from rocks in the earth's surface.

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 VOC 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 and use a plan to prevent accidental toxic air pollutant releases, and to minimize their impacts on the surrounding community in a worst case accident scenario.

For more information on DEQ's Air Toxics program, visit DEQ's web site.

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 educates 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 pollution from wood smoke.

The success of DEQ's Wood Burning Program is demonstrated by Klamath Falls' dramatic improvement in air quality. In 1989, Klamath Falls was listed by the federal government as having one of the worst wintertime smoke-related air quality problems in the nation. Because of active, committed citizen participation, Klamath Falls now has attained federal air quality standards for fine particulate. A certified wood stove program, an aggressive public education program, a wood burning curtailment program and the use of natural gas fireplaces are credited with helping to clean the air. Klamath Falls is not alone. The Medford area has also vastly improved their air quality partially because of their very successful woodstove certification and wood burning advisory efforts.

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.

Visibility

DEQ monitors visibility in federally designated wilderness areas and Crater Lake National Park. This monitoring data is used to determine if visibility is impaired and, if so, to develop strategies to improve protection for these areas. Strategies involve managing forestry and field burning, and changing slash burning practices. Most burning now takes place in spring and fall to preserve visibility during the summer when most people are enjoying Oregon's beautiful scenery.

Emission Inventory and Modeling

The emission inventory group collects information from point (e.g. industry), area (e.g. wood stove emissions), mobile (cars, trucks, buses), and off-road mobile (e.g. boats, lawn mowers) and

estimates how much CO, NOx, lead, PM_{10}, and Air Toxics are emitted in a given year. This is a tremendous effort so emission estimates are done every three years.
The 1999 emission inventory is summarized in Figures 26 through 35.

The modeling group uses the emission inventory, meteorological data, and ambient monitoring data to estimate pollutant concentrations across different air sheds. Recent modeling efforts include the Portland air toxics assessment and the Medford PM_{10}. 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 and sampling sites throughout the state. Monitoring air quality is the method used to demonstrate attainment and continued maintenance of the ambient air quality standards. Monitoring information is also used for wood stoves burning advisories, air stagnation health alerts, smog clean air action day forecasts, forest fire smoke health alerts, the Air Quality Index, $PM_{2.5}$ forecasting for Portland, and EPAs AIRNow nationwide ambient ozone and $PM_{2.5}$ web site.

Air Quality Index

Oregonians can get air quality information twice daily for Portland, Eugene, Medford, Bend, and Salem from the Air Quality Index. Oregon's Eastern Regional Office also makes the AQI available for Baker City, Burns, Enterprise, John Day, Klamath Falls, La Grande, Lakeview, Pendleton, and Treasure Valley Idaho. The AQI is available at the Air Quality section of the DEQ website www.deq.state.or.us or by phone at 503-229-6397.

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 the newspaper.

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 much 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 $PM_{2.5}$)

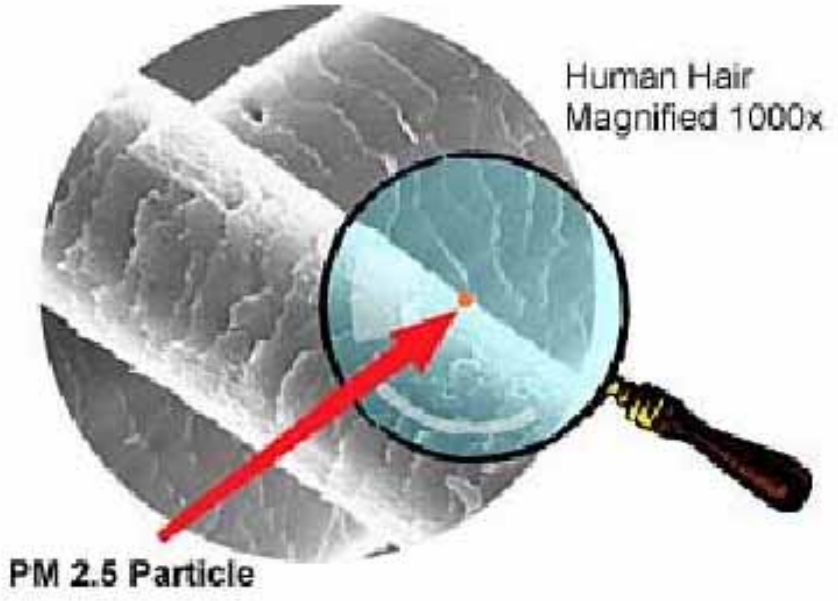
Fine particulate air pollution consists of solid particles or liquid droplets that are less than 10 microns in diameter (PM_{10}) or less than 2.5 microns in diameter **(**$PM_{2.5}$). Particles in these size ranges are of great concern because they can be inhaled deeply into the lungs where they can 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 stoves, 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, 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.



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 that 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.

Sulfur dioxide 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 combustion 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.

How a motor vehicle is operated has an effect on the amount of CO emitted. In stop-and-go driving conditions, CO emissions are high. Emissions are also increased when the outside temperature is low. Oregon's most serious CO problems occur during the winter in urban areas when CO emitted by slow-moving traffic is trapped near the ground where people can inhale them.

Ozone (O_3)

Ozone (a component of smog) is a pungent, toxic, highly reactive form of oxygen. A new eight hour standard protects the public against lower level exposures over a longer time period which have 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) at high temperatures. 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.

The Portland region has attained the one hour ozone standard and in 1996 EPA approved a 10-year plan to maintain good air quality. DEQ is currently preparing a Portland maintenance plan for the new 8 hour ozone standard.

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, and 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.

Hydrocarbons (Non-Methane)

Non-methane hydrocarbons (also know as 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.

The compounds come mainly from motor vehicles, fuel evaporation, the coatings industry, and combustion processes. The EPA has repealed its standard for non-methane hydrocarbons and DEQ has taken similar action, however, hydrocarbons are still controlled because of their contribution to ozone formation.

Air Toxics

Air toxics are generally defined as air pollutants known or suspected to cause serious health problems. The U.S. EPA regulates 188 air toxics, also known as hazardous air pollutants (refer to EPAs web site for a full list – www.epa.gov).

The EPA used 1996 emission inventory data to estimate concentrations of 33 of these toxics in the air, nationwide. According to EPA's National Air Toxics Assessment, there are 16 toxic air

pollutants in Oregon's air modeled at levels more than 10 times the federally determined safe level. These substances are Acetaldehyde, Acrolein, Arsenic, Benzene, 1,3-Butadiene, Beryllium, Carbon tetrachloride, Chloroform, Chromium, diesel particulate matter, Ethylene dibromide, Ethylene dichloride, Formaldehyde, Perchloroethylene, polycyclic organic matter (POM), 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.

Of these chemicals, current measurement methods cannot detect Carbon tetrachloride, Chloroform, Ethylene dibromide or Ethylene dichloride. At the time of this report, measurement methods were not available to measure Acrolein, Beryllium or diesel particulate matter. For more information about these chemicals please visit http://www.deq.state.or.us/aq/HAP/natafacts.HTM and click on 'Chemical Information.

Acetaldehyde

Acetaldehyde is a colorless flammable liquid that evaporates when exposed to air. It has a pungent odor, but smells fruity at dilute concentrations. Acetaldehyde occurs naturally in some foods, including ripe fruit and coffee.

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 a colorless flammable liquid with a sweet odor that evaporates easily. It comes from both natural processes and human activities.

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 colorless gas with a mild gasoline odor. It 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 colorless gas with a pungent odor. It 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 of formaldehyde 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 breath it. EPA has classified several forms of nickel as known or probable human carcinogens.

Perchloroethylene

Perchloroethylene, also called Perc or tetrachloroethene, is a nonflammable colorless liquid with a sharp, sweet odor. Most of us know it as dry-cleaning fluid.

In addition to dry-cleaning, perchloroethylene is used in textile processing, chemical manufacturing, and as a degreasing agent in metalworking. It is also used 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 humans health impacts is limited. Long-term exposure to one form of POM, benzo(a)pyrene, has resulted in dermatitis and eye irritation. 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.

The major lead source in the air was from leaded gasoline. This one source accounted for close to 90 percent of the U.S. annual lead emissions. Because leaded gasoline was eliminated, the ambient lead levels have dropped substantially.

Noise Pollution

In addition to the gaseous and particulate pollutants described above, noise is also a pollutant that is transmitted through the air. Noise control standards have been adopted in Oregon for various noise-generating activities. These standards have been set at a level that protects the public from the known adverse health effects of noise, as well as protecting public welfare. In 1991 budget cuts eliminated the noise program at DEQ and enforcement of the standards is now the responsibility of local enforcement officials.

Noise has often been treated as merely a nuisance. However, many studies have now shown that noise has a definite effect on public health and welfare. Exposure to loud noises can result in hearing loss or tinnitus (a high-pitched ringing or roaring in the ears). 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. The noise in cities from cars, trucks, leaf blowers, mowers, chain saws, and a variety of other power tools, toys, and gadgets contributes to irritability and stress. Stress has been identified as a significant cause of disease.

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 Monitoring Program. In 1986, regulations were adopted to minimize visibility impairment in the North and Central Cascade wilderness areas. The goal of the regulations is to reduce the frequency of visibility impairment by 60 to 90 percent over 1982-84 levels.

NAAQS

National Ambient Air Quality Standards (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. Oregon's control strategies are designed to meet the more stringent secondary NAAQS. Table 5 shows the standards for the most common pollutants.

TABLE 5. Ambient Air Quality Standards - 2003

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
Lead	Calendar Quarter	Quarterly arithmetic mean	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Nitrogen Dioxide	Annual	Annual arithmetic mean	0.053 ppm	0.053 ppm
Ozone	1-hour	The expected number of days per calendar year with max hourly average concentrations above 0.12 ppm is equal to or less than 1.	0.12 ppm	0.12 ppm
	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration.	0.08 ppm	
PM2.5	24 hour	98th percentile of the 24-hour values determined for each year. 3-year average of the 98^{th} percentile values.	65 $\mu g/m^3$	
	Annual Average	3-year average of the annual arithmetic mean	15 $\mu g/m^3$	
PM10	Annual Average	3-year average of the annual arithmetic mean	50 $\mu g/m^3$	50 $\mu g/m^3$
	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	0.050 ppm

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

Exceedence vs Violation

Violations consist of one or more exceedences of the NAAQS as discussed in Table 5. Exceedances occur when the NAAQS is surpassed. NAAQS exceedences are determined using values rounded as shown in Table 6.

Table 6. Rounding Convention for NAAQS compliance determination.

Pollutant	Averaging Time	Rounding	Exceedance Value (rounded up)
Carbon Monoxide	1-hour	Nearest 0.1	35.5 ppm or greater
Carbon Monoxide	8-hour	Nearest 0.1	9.5 ppm or greater
Lead	Annual	Nearest 0.1	1.55 $\mu g/m^3$ or greater
Nitrogen Dioxide	Annual	Nearest 0.001	0.0535 ppm or greater
Ozone	1-hour	Nearest 0.1	0.125 ppm or greater
Ozone	8-hour	Nearest 0.001	0.085 ppm or greater
PM_{10}	24-hour	Nearest 10	155 $\mu g/m^3$ or greater
PM_{10}	Annual	Nearest 1	50.5 $\mu g/m^3$ or greater
$PM_{2.5}$	24-hour	Nearest 1	66 $\mu g/m^3$ or greater
$PM_{2.5}$	Annual	Nearest 0.1	15.1 $\mu g/m^3$ or greater
Sulfur Dioxide	24-hour	Nearest 0.01	0.145 ppm or greater
Sulfur Dioxide	Annual	Nearest 0.001	0.035 ppm or greater

1992-2003 NAAQS Exceedences.

Oregon communities had minimal NAAQS exceedences and no violations. Tables 7 through 10 summarize Oregon's NAAQS exceedences from 1992 to 2003. Forest fire exceedences are flagged as natural events and don't count as NAAQS exceedences which focuses on man made pollution. Forest fires impact health and are reflected in the AQI.

Table 7a. $PM_{2.5}$: Number of exceedences – Eastern Oregon

Year	Bend	Burn	Klamath Falls	La Grande	Lakeview	Pendleton	The Dalles
1999	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0
2002	0	0	**14**⚐	0	**2**⚐	0	0
2003	0	0	0	0	0	0	0

Table 7b. $PM_{2.5}$: Number of exceedences – Western Oregon

Year	Albany	Beaverton	Corvallis	Eugene	Grants Pass	Hillsboro	Medford	Oakridge	Portland	Salem
1999	0	0	0	0	0	0	0	**1**	**1**	0
2000	0	0	0	0	0	0	0	**1**	**1**	0
2001	0	0	0	0	0	0	0	**4**	0	0
2002	0	0	0	0	0	**3.3**✓	**1**⚐	**3**	0	0
2003	0	0	0	0	0	0	0	**1**	0	0

⚐ The flagged exceedences were caused by the July and August , 2002 forest fires. 12 of Klamath Falls 14 exceedences were caused by forest fires.

✓ The estimated annual exceedences replaces the actual exceedences when sampling is done less than daily. In Hillsboro, 111 days were sampled , so the one actual exceedence was multiplied by (365/111) or 3.3. Violations are determined by the 98th Percentile which automatically accounts for limited sampling schedules.

Table 8a. PM_{10}: Number of exceedences – Eastern Oregon

Year	Bend	Burns	Klamath Falls	La Grande	Lakeview	Pendleton	Prineville
1992	0	0	1	0	**1**	0	
1993	0	0	0	0	**4**	**2**	
1994	0	0	0	0	**2**	0	0
1995	0	0	0	0	0	0	0
1996	**1**	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	
1999	0	0	0	0	0	**1**	
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	

⚑ The flagged exceedences were caused by the July and August, 2002 forest fires. In 2002 Klamath Falls had 2 exceedences caused by forest fires. The exceedence occurred on non-required sample days and were flagged as exceptional events.

Table 8b. PM_{10}: Number of exceedences – Western Oregon

Year	Cottage Grove	Eugene /Springfield	Grants Pass	Medford	Oakridge	Portland	Roseburg
1992	0	0	0	0	**2**	0	0
1993	0	0	0	0	**1**	0	0
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	
1998	0	0	0	0	0	0	
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	

Table 9. Carbon monoxide: Number of exceedences

Year	Bend	Eugene	Grants Pass	Klamath Falls	Medford	Portland	Salem
1992	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	**1**
1994	0	0	0	0	**1**	0	0
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
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

Table 10. Ozone: Number of exceedences

	One Hour Average Exceedences				Eight Hour Average Exceedences			
Year	Eugene	Portland	Medford	Salem	Eugene	Portland	Medford	Salem
1992	0	**1**	0		1	5	2	
1993	0	0	0		0	0	0	
1994	0	0	0		0	3	0	
1995	0	0	0	0	0	2	0	0
1996	0	**3**	0	**1**	6	7	1	10
1997	0	0	0	0	0	0	0	0
1998†	0	3	1	0	**2**	**3**	**5**	**1**
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	**1**	0	0
2003	0	0	0	0	0	0	0	0

† The bolded exceedences refer to years where the NAAQS applies. Before 1998 the 1 hour standard was in effect. From 1998 to present, the 8 hour standard is in effect.

Appendix 1

Air Quality Data Summaries for 1993 through 2003

The following pages present ambient air quality data summaries for the State of Oregon. These summaries represent the most recent information available to DEQ.

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:

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

A. For 2003 - PM_{10} Non-attainment areas are sampled every third day Oct 1st to Mar 31st and every sixth day Apr 1stt to Sep 30th. PM_{10} attainment areas are sample every sixth day year round. $PM_{2.5}$ samples are mostly every sixth or every third day. Oakridge has the only daily sampler.
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 $PM_{2.5}$ 98th percentile is determined by multiplying the number of days sampled by 0.98 and rounding up.

1-C. CARBON MONOXIDE (CO)

A. Most sites sample from Oct 1st to Mar 31st. Portland, Eugene, and Bend have one year round site each..
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.

1-D. OZONE (O_3)

A. All sites sample from May 1st to Sept 30th.
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.

1-E. OXIDES OF NITROGEN (NOx) AND HYDROCARBONS (HC)

A. Sampling occurs from mid May to Sept 30th.
B. Only NO_2 has a NAAQS standard.
B. The max one hour averageNO_2 is determined by taking the highest one hour average for the year.
C. The max one hour average NO is determined by taking the highest one hour average for the year.
D. Hydrocarbon data is collected for ozone modeling but not included here.

1-F. LIGHT SCATTERING

A. No air quality standards have been adopted. Light scattering is used as a PM_{10} and $PM_{2.5}$ concentration surrogate. It is used for the AQI, 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.

1-G. 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.

1-H. 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.
B. 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), and above 0.60BScat.

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

SULFUR DIOXIDE (SO_2) SO_2 sampling started up again in December 2003 but is not included here.

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

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.

Medium-Volume Sampler: PM_{10} samples are collected with DEQ designed medium volume samplers which draw air through size-separating inlets at 4 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.

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.

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.

1-D. OZONE: Continuous Methods

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.

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.

1-F&H.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 (B_{scat}) 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.

1-G. Air Toxics:

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

Volatile Organic Carbons – Ambient air is drawn into a evacuated canister during preprogram cycle times at about 50cc/minute for 24 hours. The sample is analyzed using GC/MS.

Poly Organic Carbons - Ambient air is drawn through a quartz filter then through polyurethane foam at 8cubic feet per minute for 24 hours. The sample is Soxhlet extracted from the filter and foam and analyzed using GC/MS.

Metals - A TSP, PM_{10}, or $PM_{2.5}$ sample is collected on a Teflon filter for 24 hours then the filter is analyzed using X-ray Fluorescence.

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

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS** >65	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
Albany						
Calapooia Middle Sch. (ACS)	1999	22	0	*	38 (11/02)	38 (11/02)
830 SE 24th	2000	115	0	8.7	44 (11/17)	33 (01/28)
DEQ# 21886 EPA# 410430009	2001	120	0	8.2	37 (11/09)	29 (11/12)
* Started - 10/99	2002	119	0	8.2	39 (11/28)	30 (12/01)
	2003	111	0	8.0	31 (01/09)	28 (02/08)
Bend						
8th & Newport (BEN)	1999	145	0	8.5	27 (12/27)	24 (03/07)
DEQ# 10099 EPA # 410170113	2000	351	0	7.3	40 (11/16)	25 (11/20)
*Moved to PumpStation 3/02/01	2001	46	0	*	21 (01/08)	21 (01/08)
Pump Station (BPS)	2001	286	0	7.2	42 (11/03)	21 (08/15)
35 Portland Rd	2002	321	0	8.0	31 (12/09)	24 (11/28)
DEQ# 24172 EPA # 410170120	2003	87	0	7.6	27 (08/25)	26 (06/29)
Burns						
267 E Madison St. (BMS)	1999	15	0	*	29 (12/26)	29 (12/26)
DEQ# 10105 EPA # 410250002	2000	44	0	9.3	38 (12/08)	38 (12/08)
* Started 10/99	2001	60	0	9.1	39 (01/31)	31 (11/15)
**Discontinued 10/03	2002	54	0	9.7	36 (11/16)	30 (01/08)
	2003	47	0	**	29 (01/09)	29 (01/09)
Corvallis						
Corvallis Intermed Sch (CIS)	1999	109	0	7.1	41 (11/05)	32 (01/03)
1310 NW Circle Blvd.	2000	120	0	7.8	38 (11/17)	30 (11/20)
DEQ# 20478 EPA # 410030013	2001	116	0	7.3	33 (11/09)	28 (01/28)
Discontinued 12/02	2002	116	0	7.6	30 (11/28)	27 (11/25)
Eugene						
Amazon Park (EAP)	1999	347	0	8.6	53 (12/26)	36 (12/22)
499 E 29TH	2000	342	0	9.4	59 (11/18)	39 (12/26)
DEQ# 18524 EPA # 410390060	2001	361	0	9.4	51 (11/09)	34 (01/02)
	2002	345	0	9.7	56 (11/27)	46 (11/03)
	2003	120	0	9.5	40 (01/18)	31 (11/08)
Saginaw						
Delight School (SAG)	1999	115	0	6.8	25 (10/30)	21 (11/02)
79980 Delight Valley School Rd	2000	114	0	6.7	21 (11/17)	19 (11/14)
DEQ# 18315 EPA # 410391007	2001	119	0	7.0	27 (11/12)	17 (10/04)
	2002	121	0	6.7	22 (11/13)	18 (03/03)
	2003	59	0	6.2	17 (11/05)	16 (02/08)
Grants Pass						
Sewage Treatment Plant (GPS)	1999	37	0	*	30 (10/30)	30 (10/30)

⚐ Forest fire smoke impacted.

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

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS** >65	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
1200 SW Greenwood Ave.	2000	117	0	8.8	35 (11/11)	28 (11/17)
DEQ# 18508 EPA # 410330107	2001	116	0	10.6	55 (11/12)	41 (01/07)
✶Started 9/99, moved to GPP 7/02	2002	63	0	*	32 (02/16)	29 (02/10)
** GPS & GPP combined*						
Grants Pass Parkside Sch (GPP)	2002⚐	52	0	11.5*	39 (11/19)	32 (02/16)
DEQ# 28859 EPA # 410330114	2003	85	0	9.7	46 (11/23)	34 (02/08)
Moved from GPS - 6/02						
Klamath Falls						
Peterson School (KFP)	1999	149	0	10.5	52 (01/06)	44 (12/30)
4856 Clinton St.	2000	346	0	9.6	63 (12/07)	37 (11/19)
DEQ# 10118 EPA # 410350004	2001	322	0	8.9	40 (12/12)	35 (11/12)
⚐*12 excedences- Forest Fire Smoke*	2002⚐	339	14	17.1	155 (08/02)	93 (08/19)
With forest fire flagged data removed	*2002*	*314*	*2*	*12.5*	*66 (12/02)*	*51 (01/31)*
	2003	115	0	10.0	54 (11/23)	31 (12/17)
La Grande						
Willow Street (LWS)	1999	39	0	✶	18 (01/06)	18 (01/06)
DEQ# 10148 EPA # 410610006						
✶Moved to LTI –9/99						
3rd & I Street (LTI)	1999	97	0	7.7*	20 (12/29)	20 (12/23)
DEQ# 21638 EPA # 410610117	2000	327	0	6.5	36 (08/16)	24 (11/22)
* averaged with LWS	2001	337	0	6.7	34 (01/06)	23 (11/07)
✶Moved to LAS –12/03	2002	333	0	7.3	43 (12/05)	27 (01/28)
	2003	104	0	✶	25 (11/05)	18 (09/03)
Ash Street (LAS)						
DEQ# EPA # 410610119	2003	7	0	6.3*	19 (12/11)	19 (12/11)
* averaged with LTI						
Ladd Marsh-Foothills Rd (LLM)	1999	17	0	✶	9 (09/21)	9 (09/21)
DEQ# 10147 EPA # 410619103	2000	47	0	6.7	39 (08/16)	39 (08/16)
✶Started - 9/99	2001	51	0	4.7	16 (01/19)	14 (08/17)
	2002	57	0	5.2	24 (12/04)	14 (07/13)
Lakeview						
Center and M Street (LCM)	1999	156	0	8.6	60 (01/06)	38 (12/29)
DEQ# 10123 EPA # 410370001	2000	320	0	7.3	51 (12/29)	37 (12/07)
✶Discontinued 10/01/03	2001	351	0	7.2	37 (01/31)	29 (01/18)
	2002⚐	347	2	9.0	78 (07/31)	40 (08/19)

⚐ Forest fire smoke impacted.

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

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS** >65	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
With forest fire flagged data removed	*2002*	*339*	*0*	*8.0*	*41 (02/04)*	*30 (08/01)*
	2003	51	0	*	29 (01/09)	29 (01/09)
Grange Hall (LGH)	1999	19	0	*	13 (09/09)	13 (09/09)
DEQ# 10122 EPA # 410370003	2000	58	0	2.7	8 (08/22)	7 (06/29)
*Started - 9/99	2001	61	0	3.0	12 (09/10)	11 (08/11)
	2002⚐	60	0	5.3	57 (07/31)	46 (07/25)
With forest fire flagged data removed	*2002*	*58*	*0*	*3.9*	*21 (7/19)*	*19 (8/06)*
Lebanon						
Fire Station (LFS)	2003	70	0	*	34 (09/02)	NA
DEQ# 18331 EPA # 410411004						
*Summer Field Burning Site only						
Medford						
Dodge Road (MDR)	1999	220	0	6.4	20 (01/06)	18 (12/29)
4035 Dodge Road	2000	120	0	5.6	23 (11/23)	19 (01/07)
DEQ# 10106 EPA # 410291001	2001	117	0	5.2	16 (11/18)	13 (01/07)
	2002⚐	110	1	8.9	69 (07/28)	50 (08/09)
With forest fire flagged data removed	*2002*	*103*	*0*	*6.7*	*29 (08/15)*	*23 (08/24)*
	2003	60	0	5.2	17 (08/31)	15 (01/09)
Grant & Belmont (MGB)	1999	316	0	11.8	63 (12/25)	49 (12/28)
902 Grant Ave.	2000	347	0	11.4	56 (12/09)	40 (12/28)
DEQ# 20448 EPA # 410290133	2001	347	0	10.6	45 (01/06)	32 (11/09)
	2002⚐	348	0	14.0	64 (07/29)	45 (11/21)
With forest fire flagged data removed	*2002*	*328*	*0*	*12.4*	*60 (11/15)*	*41 (12/05)*
	2003	116	0	11.1	45 (01/09)	32 (11/14)
Welch & Jackson (MWJ)	1999	106	0	*	61 (12/26)	50 (12/24)
711 Welch St.	2000	331	0	11.4	52 (12/29)	44 (07/04)
DEQ# 10113 EPA # 410292129	2001	356	0	10.2	46 (01/06)	33 (01/16)
*Started 9/99	2002⚐	348	0	13.8	64 (11/15)	48 (08/12)
With forest fire flagged data removed	*2002*	*327*	*0*	*12.1*	*64 (11/15)*	*38 (11/26)*
	2003	121	0	11.3	47 (01/18)	39 (11/14)
Provolt						
BLM Seed Orchard (PSO)	2003	51	0	7.4*	22 (01/16)	20 (01/09)
DEQ# 18432 EPA # na						
*<75% data completion						
Oakridge	1999	317	1	13.1	72 (12/27)	57 (12/28)
Willamette Cntr. (OAK)	2000	362	1	13.1	74 (01/29)	52 (02/07)
47674 School St.	2001	355	4	13.8	96 (01/07)	60 (01/27)

⚐ Forest fire smoke impacted.

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

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS** >65	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
DEQ# 18733 EPA # 410392013	2002	353	3	14.1	80 (11/01)	55 (03/02)
	2003	362	1	12.3	69 (01/11)	53 (02/25)
Pendleton						
McKay Creek Park (PMC)	1999	113	0	8.4	33 (12/21)	30 (12/22)
3745 SW Marshall Place	2000	327	0	8.9	42 (11/19)	34 (11/14)
DEQ# 10146 EPA # 410590121	2001	302	0	8.7	40 (11/27)	25 (08/15)
✶Discontinued 06/03	2002	308	0	9.3	52 (11/04)	40 (11/26)
	2003	55	0	✶	39 (02/08)	31 (02/26)
Portland Area						
Beaverton Highland Park Sch (BHP)	1999	266	0	7.4	41 (01/01)	29 (10/30)
	2000	117	0	8.6	42 (11/23)	28 (12/08)
3745 SW Marshall Place	2001	119	0	7.6	29 (11/09)	24 (10/28)
DEQ# 20481 EPA # 410670111	2002	116	0	7.9	56 (12/01)	28 (10/26)
	2003	59	0	6.7	23 (01/21)	18 (03/04)
Hillsboro (HFO)	1999	32	0	✶	51 (12/29)	51 (12/29)
15th & Oak St.	2000	111	0	9.7	38 (12/05)	32 (10/15)
DEQ# 21639 EPA # 410671003	2001	117	0	8.9	47 (11/09)	31 (01/28)
✶Started - 9/99	2002	111	1	10.5	66 (12/01)	38 (07/04)
	2003	110	0	8.3	38 (01/21)	23 (12/20)
N.E. Portland (PNR)	1999	117	0	✶	33 (10/30)	24 (12/29)
24 N. Emerson (N. Roselawn)	2000	353	0	9.5	46 (07/04)	29 (10/31)
DEQ# 21889 EPA # 410510246	2001	351	0	8.8	50 (09/19)	23 (01/12)
✶Started - 8/99	2002	350	0	8.5	36 (11/15)	26 (10/26)
	2003	117	0	8.1	28 (10/27)	21 (09/03)
N.W. Portland (PNW)	1999	333	0	8.5	35 (01/10)	22 (12/31)
1706 NW 24th St.	2000	336	0	9.2	36 (11/12)	28 (02/18)
(Forest Heights PO)	2001	359	0	8.3	30 (12/07)	22 (01/10)
DEQ# 18399 EPA # 410510244	2002	348	0	7.9	32 (11/15)	23 (11/26)
✶Discontinued 01/01/03						
S.E. Portland (SEL)	1999	331	1	8.8	71 (01/05)	27 (12/14)
5824 SE Lafayette	2000	351	1	9.6	104 (07/04)	27 (12/19)
DEQ# 10139 EPA # 410510080	2001	347	0	8.6	35 (12/07)	25 (01/31)
	2002	348	0	8.4	45 (12/01)	28 (10/25)
	2003	114	0	8.2	26 (10/27)	23 (09/03)
Sauvie Island (SIS)	1999	220	0	6.5	34 (01/05)	23 (01/04)
Social Security Beach	2000	118	0	7.0	19 (11/17)	18 (11/20)
DEQ# 14152 EPA # 41090004	2001	116	0	6.2	20 (11/12)	13 (03/23)

⚐ Forest fire smoke impacted.

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

STATION LOCATION AND NUMBER	YEAR	SAMPLE DAYS	DAYS** >65	ARITHMETIC MEAN†	24-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGES 98th Percentile (date)†
	2002	118	0	6.4	24 (12/01)	18 (11/28)
	2003	57	0	5.6	14 (03/04)	13 (02/08)
Salem						
Salem General Hospital (SGH)	1999	113	0	7.5	38 (11/05)	26 (10/30)
867 Medical Center Drive	2000	121	0	8.9	33 (11/20)	29 (12/08)
DEQ# 20480 EPA # 410470040	2001	122	0	8.2	49 (11/09)	33 (01/16)
✶Discontinued 10/03	2002	117	0	8.2	39 (11/04)	35 (12/01)
	2003	47	0	✶	29 (01/21)	29 (01/21)
Between Salem & Portland						
North Marion	1999	151	0	✶	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	0	6.7*	37 (10/30)	37 (10/30)
DEQ# 21251 EPA # 410470110	2000	119	0	7.1	29 (12/08)	24 (10/27)
*Butteville & N Marion High	2001	120	0	6.7	28 (11/09)	18 (11/12)
combined for annual average.	2002	121	0	6.6	28 (12/01)	21 (01/11)
✶Discontinued 0703	2003	32	0	✶	23 (01/21)	23 (01/21)
Springfield	1999	43	0	✶	33 (12/28)	33 (12/28)
Springfield High Sch. (SHS)	2000	352	0	8.8	37 (11/18)	29 (10/25)
875 N 7th	2001	349	0	8.6	52 (12/06)	27 (11/08)
DEQ# 18734 EPA # 410391061	2002	364	0	8.2	35 (11/28)	26 (11/02)
✶Started - 11/99	2003	120	0	7.8	28 (11/08)	23 (11/14)
The Dalles	2000	53	0	9.9	36 (11/20)	30 (01/07)
Cherry Heights (TDC)	2001	61	0	7.4	42 (11/09)	19 (11/03)
1112 Cherry Heights Rd	2002	59	0	7.7	30 (11/04)	28 (11/03)
DEQ# 21252 EPA # 410650007	2003	52	0	6.6	22 (11/07)	19 (02/08)

⚐ Forest fire smoke impacted.

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						
Kenwood School (BKS)	1993	19	0	-	101 (12/27)	86 (01/31)
701 NW Newport	1994	5	0	✶	92 (01/20)	66 (02/01)
DEQ# 10097 EPA# 410170003						
✶Discontinued 2/94						
8th & Newport (BEN)	1993	202	0	36.1	141 (02/01)	115 (03/06)
794 NW Newport	1994	201	0	31.1	145 (12/21)	142 (01/18)
DEQ# 10099 EPA# 410170113	1995	206	0	26.8	96 (02/20)	82 (12/18)
✶ Discontinued 3/01	1996	207	1	29.5	155 (02/16)	123 (02/13)
	1997	202	0	25.8	89 (01/08)	87 (02/15)
	1998	166	0	22.8	86 (01/08)	58 (12/23)
	1999	146	0	27.1	94 (01/04)	75 (01/05)
	2000	149	1	27.4	159 (02/07)	114 (01/28)
	2001	50	0	✶	71 (02/14)	70 (01/01)
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)
Burns (BMS)	1996	129	0	24.7	68 (02/12)	67 (02/15)
267 E Madison Street	1997	137	0	25.8	72 (03/30)	59 (01/08)
DEQ# 10105 EPA# 410250002	1998	170	0	24.7	81 (04/29)	58 (01/20)
	1999	144	0	25.2	62 (01/29)	61 (01/09)
	2000	145	0	21.9	54 (12/08)	54 (02/07)
	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)
Central Point						
City Shops, 399 S 5th	1993	60	0	-	91 (12/22)	83 (12/23)
DEQ# 18383 EPA# 410298002	1994	27	0	-	46 (01/29)	43 (01/28)
Cottage Grove	1993	60	0	26.2	68 (11/27)	67 (11/09)
Harrison School	1994	61	0	22.7	109 (02/01)	57 (12/10)
S. 10th	1995	61	0	22.3	93 (01/03)	46 (02/26)
DEQ# 18515 EPA# 410399002	1996	61	0	19.0	52 (11/11)	49 (02/27)
	1997	61	0	20.2	75 (01/16)	54 (01/28)
	1998	58	0	17.3	51 (09/02)	50 (04/29)
	1999	60	0	18.5	48 (10/21)	40 (11/02)
	2000	62	0	19.1	42 (11/28)	40 (11/23)
	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)
Eugene						
Lane Comm College (LCC)	1993	61	0	25.0	68 (02/06)	59 (09/28)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
1059 Willamette	1994	60	0	21.7	66 (02/01)	42 (08/24)
DEQ# 18320 EPA# 410390013	1995	60	0	20.7	52 (08/31)	49 (01/21)
	1996	57	0	18.5	60 (11/11)	46 (08/07)
	1997	60	0	20.7	52 (01/16)	49 (12/06)
	1998	62	0	16.9	66 (09/02)	57 (04/29)
	1999	60	0	18.3	45 (10/21)	43 (11/02)
	2000	60	0	18.7	48 (11/20)	47 (12/26)
	2001	60	0	18.2	51 (11/09)	35 (09/10)
	2002	60	0	16.1	46 (08/12)	45 (09/11)
	2003	58	0	14.5	32 (09/24)	29 (09/30)
Key Bank (EKB)	1993	212	0	33.6	103 (01/18)	92 (02/01)
450 Pacific Hwy 99 N	1994	197	0	27.6	117 (02/01)	102 (02/02)
DEQ# 18522 EPA# 410390058	1995	211	0	26.1	84 (11/03)	70 (01/25)
	1996	208	0	22.5	70 (02/13)	64 (02/14)
	1997	200	0	21.1	85 (01/15)	62 (10/21)
	1998	207	0	19.2	69 (09/02)	68 (04/29)
	1999	231	0	19.6	77 (10/22)	64 (10/21)
	2000	195	0	19.3	73 (03/30)	50 (11/22)
	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)
Amazon Park (EAP)	1993	61	0	23.6	70 (11/27)	64 (02/06)
499 E 29th	1994	61	0	20.6	71 (02/01)	46 (10/29)
DEQ# 18524 EPA# 410390060	1995	61	0	19.5	63 (11/03)	57 (01/21)
Site closed 12/01	1996	61	0	16.9	61 (11/11)	45 (02/03)
	1997	61	0	18.7	54 (12/06)	53 (01/16)
	1998	61	0	14.9	61 (09/02)	50 (04/29)
	1999	58	0	17.0	55 (12/26)	42 (10/21)
	2000	60	0	17.4	55 (11/20)	52 (12/26)
	2001	61	0	17.9	60 (11/09)	35 (10/04)
Santa Clara						
200 Santa Clara Avenue	1994	355	0	19.8	107 (02/06)	100 (02/05)
DEQ# 18736 EPA# 410390063	1995	349	0	17.8	68 (11/03)	63 (01/21)
✶Discontinued 06/97	1996	364	0	17.1	59 (02/13)	57 (08/23)
	1997	30	0	✶	56 (01/16)	32 (05/10)
Grants Pass	1998	11	0	✶	38 (11/13)	23 (12/19)
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)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
✶Started 10/98,discontinued 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*						
11th & K St	1993	109	0	30.5	97 (12/27)	76 (01/29)
DEQ# 10115 EPA# 410330008	1994	101	0	30.4	76 (02/05)	75 (02/02)
✶Discontinued 06/98	1995	61	0	22.3	45 (10/30)	41 (02/08)
	1996	59	0	20.0	61 (11/11)	40 (02/15)
	1997	59	0	22.1	73 (01/16)	47 (10/25)
	1998	30	0	✶	57 (04/29)	32 (03/06)
Beacon & Madrone	1993	209	0	27.2	117 (12/28)	114 (12/27)
DEQ# 18395 EPA# 410330112	1994	206	0	22.2	86 (02/03)	85 (02/02)
✶Discontinued 4/95	1995	94	0	✶	48 (02/09)	47 (01/20)
Corner lot	1993	15	0	-	132 (12/27)	101 (11/15)
720 NE 11th	1994	60	0	28.4	92 (02/01)	79 (12/04)
	1995	138	0	18.8	77 (11/04)	62 (11/03)
DEQ# 10116 EPA# 410330113	1996	182	0	18.9	65 (11/12)	62 (11/11)
✶Discontinued 4/00	1997	148	0	21.5	89 (01/15)	88 (01/16)
	1998	176	0	18.1	62 (12/23)	51 (11/13)
	1999	146	0	18.5	43 (11/11)	41 (10/21)
	2000	55	0	✶	43 (01/29)	37 (01/28)
Hermiston						
Pump Station (HPS)	2001	124	0	23.0	55 (10/04)	52 (05/19)
DEQ# 24735 EPA# na						
	1993	206	0	31.7	137 (01/27)	128 (01/28)
Klamath Falls	1994	202	0	30.1	104 (02/01)	104 (02/02)
Peterson School (KFP)	1995	212	0	20.4	67 (02/27)	66 (01/16)
4856 Clinton St	1996	210	0	21.0	107 (12/19)	86 (01/13)
DEQ# 10118 EPA# 410350004	1997	171	0	21.7	85 (01/07)	82 (01/09)
	1998	175	0	19.3	86 (12/11)	80 (12/23)
	1999	151	0	21.3	84 (01/05)	82 (01/06)
	2000	146	0	19.3	94 (12/06)	93 (12/07)
	2001	146	0	18.3	82 (01/03)	62 (01/04)
	2002⚐	151	0	28.5	145 (07/31)	121 (08/18)
	2003	87	0	20.6	110 (03/13)	63 (11/23)
Miller Island	1993	39	0	26.2	103 (05/19)	56 (12/27)
1211 Miller Is	1994	59	0	26.7	60 (12/22)	59 (08/24)
DEQ# 10120 EPA# 410350013	1995	60	0	18.1	59 (11/17)	44 (10/30)
✶Discontinued 11/99	1996	47	0	15.5	80 (04/15)	43 (05/03)
	1997	51	0	16.8	58 (10/01)	39 (07/15)
	1998	47	0	13.2	57 (04/29)	35 (09/08)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	1999	30	0	*	34 (03/19)	34 (05/24)
Wocus Marsh	1993	172	0	18.0	112 (11/22)	103 (11/21)
10500 Hwy 140	1994	174	0	16.6	56 (09/25)	55 (08/24)
DEQ# 10121 EPA# 410350014	1995	205	0	15.5	74 (10/19)	61 (10/17)
	1996	199	0	18.8	83 (10/08)	70 (10/09)
	1997	198	0	12.9	55 (10/30)	53 (10/14)
	1998	182	0	14.2	56 (04/29)	43 (10/23)
	1999	153	0	16.6	48 (10/21)	46 (10/12)
La Grande						
Bond Lane (LBL)	1993	176	0	24.6	71 (10/04)	65 (09/28)
63902 Bond Lane	1994	173	0[1]	23.2	91 (10/25)	89 (09/23)
DEQ# 18391 EPA# 410619102	1995	131	0	18.8	58 (01/05)	52 (09/22)
	1995	28	0	-	20 (12/26)	17 (12/28)
	1996	153	0	11.0	44 (02/01)	43 (02/02)
Ladd Marsh (LLM)						
Foothills Road	1997	183	0	13.0	53 (10/01)	34 (08/20)
DEQ# 10147 EPA# 410619103	1998	170	0	11.1	71 (04/29)	34 (09/02)
	1999	124	0	12.9	64 (09/15)	46 (09/30)
Willow Street (LWS)	1993	188	0	35.7	148 (12/27)	121 (11/10)
1601 N Willow	1994	163	0	32.1	116 (02/03)	110 (02/04)
DEQ# 10148 EPA# 410610006	1995	153	0	27.3	122 (01/05)	98 (10/28)
	1996	166	0	28.6	146 (02/12)	121 (02/14)
	1997	183	0	27.6	89 (01/14)	79 (02/10)
	1998	175	0	21.5	88 (04/29)	59 (01/20)
	1999	132	0	23.1	96 (01/05)	89 (01/04)
	2000	133	0	22.2	87 (01/18)	71 (12/05)
	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)
Lakeview						
Center & M (LCM)	1993	213	4	31.2	256 (01/27)	218 (01/26)
DEQ# 10123 EPA# 410370001	1994	208	2	28.1	184 (01/19)	168 (01/18)
*No data for Oct – Dec, 2001	1995	213	0	20.6	83 (12/27)	81 (12/26)
	1996	210	0	20.3	88 (12/19)	68 (02/14)
	1997	202	0	19.5	99 (12/29)	87 (12/12)
	1998	175	0	17.8	110 (12/16)	74 (12/17)
	1999	142	0	22.5	95 (01/05)	94 (01/04)

[1] The La Grande Bond Lane site recorded two values above the 24-hr Standard of 150 $\mu g/m^3$; 197 (11/22) and 177 (12/10). DEQ received Special Event Status for the two values because they occurred under unusual conditions.

Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	2000	153	0	18.5	106 (12/29)	101 (12/28)
	2001	86	0	✶	94 (01/03)	94 (01/04)
	2002⚐	117	0	22.3	104 (07/31)	84 (02/04)
	2003	87	0	17.4	49 (02/11)	46 (01/09)
Vernon School	1993	94	0	-	19 (10/26)	19 (11/10)
DEQ# 18397 EPA# 410370002	1994	201	0	10.0	38 (02/11)	38 (02/24)
	1995	166	0	8.7	24 (10/06)	20 (10/25)
Lakeview Grange Hall (LGH)	1996	45	0	-	26 (08/19)	22 (08/13)
DEQ# 10122 EPA# 410370003	1997	148	0	8.0	21 (10/01)	20 (10/27)
	1998	171	0	8.0	57 (04/29)	26 (12/20)
	1999	140	0	9.4	30 (07/11)	30 (08/04)
336 N "L" Street	1993	20	1	-	159 (11/09)	140 (11/27)
DEQ# 10124 EPA# 410376002	1994	52	1	45.8	173 (01/20)	135 (01/14)
	1995	59	0	37.8	103 (02/20)	100 (10/24)
	1996	61	0	29.3	80 (02/15)	73 (02/03)
	1997	61	0	32.4	110 (12/12)	92 (12/30)
	1998	59	0	26.1	78 (11/13)	75 (04/29)
	1999	59	0	35.6	111 (01/06)	91 (09/09)
Freemont School						
DEQ# 18396 EPA# 410376003	1993	21	0	-	98 (11/27)	92 (12/21)
✶Discontinued 6/94	1994	27	0	✶	99 (01/14)	94 (01/20)
Medford	1993	51	0	32.4	75 (11/27)	74 (11/21)
Jackson Cnty Courthouse (MCO)	1994	60	0	29.2	69 (12/10)	68 (01/20)
Main & Oakdale	1995	61	0	21.8	40 (10/30)	40 (11/05)
DEQ# 10110 EPA# 410293001	1996	61	0	20.3	52 (11/11)	44 (10/30)
	1997	53	0	24.8	60 (01/10)	56 (12/30)
	1998	59	0	20.4	61 (04/29)	53 (12/25)
	1999	60	0	24.1	80 (12/26)	76 (01/06)
Welch & Jackson (MWJ)	1993	359	0	32.6	94 (12/22)	92 (12/23)
DEQ# 10113 EPA # 410292129	1994	363	0	30.8	77 (08/12)	77 (12/09)
	1995	295	0	24.7	64 (02/06)	64 (11/03)
	1996	204	0	24.3	91 (12/19)	82 (12/18)
	1997	185	0	26.4	101 (01/09)	85 (12/29)
	1998	182	0	23.9	76 (10/20)	66 (12/23)
	1999	152	0	27.3	98 (01/04)	93 (01/05)
	2000	151	0	23.1	72 (11/18)	68 (11/20)
	2001	140	0	21.8	64 (01/03)	63 (01/04)
	2002⚐	119	0	25.0	80 (07/31)	73 (08/12)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	2003	78	0	21.4	58 (11/14)	57 (01/18)
Dodge Road (MDR)	1993	349	0	13.1	46 (11/10)	41 (11/09)
4035 Dodge Road	1994	348	0	13.5	104 (08/25)	65 (08/27)
DEQ# 10106 EPA # 410291001	1995	301	0	10.0	28 (11/03)	24 (11/04)
	1996	204	0	11.2	30 (08/25)	29 (10/27)
	1997	170	0	11.9	39 (10/25)	38 (10/24)
	1998	181	0	12.0	39 (04/29)	36 (12/24)
	1999	147	0	13.8	55 (09/30)	33 (10/03)
	2000	145	0	11.2	29 (10/24)	29 (12/31)
	2001	148	0	10.5	23 (01/06)	21 (01/04)
	2002⚐	113	0	15.2	66 (08/18)	63 (08/12)
	2003	90	0	9.0	30 (08/31)	27 (10/03)
Oakridge	1993	201	1	32.7	166 (01/31)	151 (12/20)
Willamette Center Trailer (OAK)	1994	212	0	26.2	144 (01/31)	143 (12/30)
DEQ# 18733 EPA# 410392013	1995	205	0	22.8	142 (01/02)	135 (01/24)
	1996	198	0	20.8	84 (02/03)	78 (12/19)
	1997	165	0	22.2	93 (01/16)	91 (01/14)
	1998	195	0	19.0	78 (02/07)	78 (12/23)
	1999	230	0	18.8	102 (10/11)	93 (12/27)
	2000	207	0	19.4	85 (01/29)	69 (12/06)
	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)
Pendleton						
State Office Bldg (PSO)	1993	55	1	42.2	157 (11/03)	94 (10/04)
700 SE Emigrant	1994	59	0	34.5	78 (12/30)	70 (01/20)
DEQ# 10145 EPA# 410590002	1995	55	0	28.3	71 (07/02)	70 (02/20)
✶Sampling halted 8/96-6/97	1996	33	0	✶	85 (02/15)	66 (07/26)
	1997	14	0	✶	43 (12/30)	42 (10/19)
	1998	41	0	26.7	54 (07/22)	54 (08/28)
	1999	55	0	28.9	81 (05/30)	75 (10/21)
McKay Creek (PMC)	1993	185	1	37.6	333 (09/11)	129 (01/26)
3745 SW Marshall	1994	199	0	27.0	100 (01/18)	80 (01/17)
DEQ# 10146 EPA # 410590121	1995	202	0	23.4	87 (12/11)	72 (11/07)
	1996	202	0	23.3	66 (01/10)	60 (01/13)
	1997	227	0	23.9	70 (01/15)	65 (01/14)
	1998	191	0	22.9	88 (04/29)	68 (01/13)
	1999	137	1	24.7	246 (5/12)	107 (02/06)
	2000	136	0	17.5	47 (11/20)	45 (11/18)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	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)
Portland						
Carus (SPR)	1993	60	0	15.0	38 (09/28)	37 (09/10)
13575 Spangler Rd	1994	61	0	13.2	30 (09/23)	27 (10/29)
DEQ# 10093	1995	59	0	11.4	25 (10/06)	24 (09/24)
EPA# 410050004	1996	58	0	14.7	40 (08/25)	39 (08/13)
	1997	60	0	14.2	37 (01/16)	33 (08/14)
	1998	57	0	12.8	59 (04/29)	36 (07/28)
	1999	59	0	14.9	34 (9/21)†	32 (10/21)
Central Fire Station (CFS)	1993	60	0	28.9	71 (10/28)	64 (11/09)
55 SW Ash	1994	57	0	25.6	58 (01/20)	54 (10/17)
DEQ# 10136 EPA# 410510015	1995	59	0	22.7	53 (02/20)	43 (02/08)
✶Discontinued 03/00	1996	61	0	22.6	48 (02/15)	40 (08/13)
	1997	58	0	24.9	50 (09/25)	46 (12/18)
	1998	57	0	21.2	76 (04/29)	42 (07/28)
	1999	56	0	22.9	65 (10/21)	45 (09/21)
	2000	12	0	✶	51 (02/18)	36 (03/01)
SE Lafayette (SEL)	1993	206	0	24.4	103 (11/14)	99 (11/07)
5824 SE Lafayette	1994	207	0	21.5	64 (10/17)	61 (10/18)
DEQ# 10139 EPA# 410510080	1995	197	0	19.1	64 (02/10)	58 (02/12)
	1996	237	0	20.0	95 (01/01)	70 (10/27)
	1997	198	0	19.0	46 (10/21)	46 (10/22)
	1998	179	0	18.7	70 (04/29)	47 (10/23)
	1999	130	0	15.5	75 (01/05)	63 (01/04)
	2000	150	0	16.6	52 (02/18)	45 (07/05)
	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)
Roosevelt High	1993	56	0	24.5	68 (10/28)	68 (11/09)
6941 N Central	1994	58	0	22.5	49 (01/20)	40 (10/17)
DEQ# 10135 EPA# 410510003	1995	60	0	19.3	38 (02/14)	35 (10/24)
	1996	60	0	20.0	42 (09/18)	41 (07/26)
	1997	61	0	21.3	43 (09/25)	39 (10/25)
	1998	61	0	17.7	75 (04/29)	38 (05/05)
	1999	59	0	19.4	48 (10/21)	43 (01/06)
Transcon Terminal (TTT)	1993	58	0	34.4	79 (10/28)	74 (11/09)
3182 NW 26th	1994	57	0	32.3	74 (11/22)	70 (01/20)
DEQ# 10140 EPA# 410510009	1995	61	0	28.5	70 (02/20)	53 (03/28)
	1996	61	0	27.3	65 (02/15)	51 (11/11)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	1997	59	0	30.2	55 (09/25)	48 (12/18)
	1998	57	0	28.9	87 (04/29)	59 (10/20)
	1999	51	0	26.8	49 (03/19)	49 (09/21)
	2000	58	0	23.0	48 (02/18)	42 (04/12)
	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)
Metzger						
10105 SW Hall Blvd	1996	83	0	✶	70 (01/01)	53 (12/19)
DEQ# 10163 EPA# 410670007	1997	53	0	✶	59 (01/19)	52 (01/08)
✶Seasonal sampling	1998	13	0	✶	26 (12/31)	19 (01/17)
	1999	5	0	✶	52 (01/24)	40 (01/06)
Prineville						
Parks Dept	1994	53	0	-	85 (12/22)	70 (12/21)
NE 5th & Elm	1995	159	0	25.7	78 (10/23)	69 (02/23)
DEQ# 18413 EPA# na						
Ochoco School	1994	6	0	-	81 (12/23)	80 (12/29)
1000 Madras Hwy	1995	50	0	32.4	93 (12/20)	92 (02/09)
DEQ# 18414 EPA# na	1996	34	0	✶	87 (02/15)	70 (01/10)
✶Discontinued 9/96						
Fire Department	1995	24	0	-	80 (12/06)	78 (12/20)
500 N Belnap	1996	145	0	-	90 (02/13)	82 (08/13)
DEQ# 18421 EPA# na						
9th & Fairmont	1996	76	0	-	107 (12/19)	89 (12/18)
DEQ# 18427 EPA# na	1997	117	0	✶	77 (01/08)	75 (01/07)
✶Discontinued 03/97						
Roseburg						
Fullerton School	1992	150	0	23.7	86 (01/20)	84 (02/04)
2560 W Bradford	1993	164	0	22.0	88 (11/02)	86 (10/09)
DEQ# 18388 EPA# na	1994	150	0	20.0	93 (02/02)	91 (02/04)
✶Discontinued 10/96	1995	76	0	16.1	41 (02/09)	36 (03/07)
	1996	37	0	✶	35 (02/15)	27 (02/03)
Springfield						
City Hall (SCH)	1993	61	0	27.6	66 (09/28)	61 (09/22)
255 N 5th	1994	60	0	24.5	75 (02/01)	51 (08/30)
DEQ# 18538 EPA# 410391009	1995	60	0	21.7	48 (08/31)	45 (01/03)
	1996	59	0	19.6	58 (11/11)	55 (02/15)
	1997	60	0	21.0	57 (01/16)	49 (12/06)
	1998	60	0	18.8	65 (09/02)	60 (04/29)
	1999	60	0	19.4	55 (09/21)	54 (10/21)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

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)†
	2000	60	0	19.6	55 (08/22)	45 (11/20)
	2001	60	0	17.0	43 (11/09)	38 (09/10)
	2002	60	0	16.5	52 (11/16)	51 (09/11)
	2003	56	0	14.8	39 (09/24)	34 (10/30)
Springfield High Sch (SHS)	1992	56	0	27.5	53 (02/06)	53 (05/06)
DEQ# 18734 EPA# 410391061	1993	61	0	25.2	66 (02/06)	61 (11/27)
✶Discontinued 3/94	1994	15	0	✶	74 (02/01)	37 (01/14)
White City						
Post Office (WPO)	1993	216	0	40.8	126 (12/24)	106 (03/29)
751 Crater Lk Hwy	1994	210	0	38.1	105 (12/23)	94 (02/03)
DEQ# 10107 EPA# 410294001	1995	213	0	31.3	84 (11/04)	76 (01/20)
	1996	207	0	28.6	96 (02/13)	68 (02/12)
	1997	182	0	28.4	78 (12/29)	77 (01/09)
	1998	182	0	27.2	74 (12/23)	70 (04/29)
	1999	144	0	31.6	89 (01/05)	84 (01/04)
	2000	151	0	28.4	73 (11/20)	67 (03/31)
	2001	149	0	27.3	89 (01/02)	80 (01/03)
	2002⚐	118	0	32.0	90 (08/12)	89 (07/31)
	2003	83	0	22.9	68 (01/09)	59 (11/14)

⚐ Forest Fire Impact. Only Sampled every 6th day during fires. Refer to $PM_{2.5}$ data for more detail.

APPENDIX 1C
Carbon Monoxide Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	Oct-Apr Average	1-HOUR AVERAGES MAXIMUM	1-HOUR AVERAGES 2ND HIGH	TIMES** >9ppm	8-HOUR AVERAGES MAXIMUM (date)	8-HOUR AVERAGES 2ND HIGHEST (date)
Bend	1993	2.22	15.7	15.1	0	8.7 (12/27)	7.4 (12/23)
934 NE 3rd (BCO)	1994	1.91	16.4	14.7	0	6.6 (01/18)	5.8 (01/25)
DEQ# 10098 EPA# 410170002	1996	*	8.0	7.3	0	4.9 (12/30)	4.8 (12/20)
*Discontinued 3/94	1997	1.74	15.9	9.8	0	5.9 (11/21)	5.6 (01/28)
Restarted 11/96	1998	1.46	10.1	9.4	0	5.2 (11/30)	4.4 (01/08)
	1999	1.35	9.0	7.7	0	4.8 (12/28)	4.8 (12/27)
	2000	1.45	8.2	7.9	0	4.4 (01/21)	4.2 (11/22)
	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)
1045 NE 3rd							
DEQ# 18411 EPA# 410170114	1994	-	14.7	12.6	0	6.7 (12/22)	5.7 (12/25)
*Discontinued 11/96	1995	1.38	10.9	10.9	0	7.1 (12/06)	6.9 (12/07)
	1996	*	15.5	11.2	0	6.6 (03/01)	5.3 (01/11)
Eugene	1993	1.68	7.7	7.6	0	4.9 (02/08)	4.7 (11/02)
Lane Comm Coll. (LCC)	1994	1.52	8.7	7.6	0	6.0 (01/21)	4.5 (02/01)
1059 Willamette	1995	1.53	7.4	7.3	0	5.3 (01/20)	4.7 (11/03)
DEQ# 18320 EPA# 410390013	1996	1.4	7.8	7.3	0	4.6 (01/08)	4.6 (11/01)
	1997	1.55	7.6	7.1	0	4.8 (12/05)	4.7 (12/04)
	1998	1.25	5.7	5.5	0	4.0 (01/31)	3.9 (01/10)
	1999	1.14	7.5	6.9	0	5.0 (01/04)	4.0 (01/05)
	2000	1.25	6.0	5.7	0	3.6 (11/22)	3.5 (11/16)
	2001	1.20	5.7	5.3	0	3.6 (11/09)	3.6 (01/10)
	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)
Sacred Heart Hosp	1993	1.87	11.9	9.7	0	6.2 (11/02)	5.9 (11/11)
12555 Hilyard	1994	1.85	10.2	9.4	0	6.6 (01/21)	6.4 (02/02)
DEQ# 18735 EPA# 410392062	1995	1.74	9.0	8.3	0	6.4 (01/20)	5.7 (11/03)
	1996	1.54	9.6	9.2	0	6.5 (02/16)	6.3 (02/13)
	1997	1.64	7.8	7.7	0	5.2 (01/27)	5.2 (01/15)
	1998	1.24	7.1	7.0	0	4.6 (10/22)	4.6 (01/10)
	1999	1.27	8.0	7.8	0	6.1 (01/04)	5.6 (01/05)
	2000	1.32	7.8	6.6	0	4.4 (11/17)	4.3 (11/16)
	2001	1.30	6.1	5.5	0	4.2 (11/08)	4.1 (01/10)
	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)
Grants Pass							
Wing Bldg (GPW)	1993	2.39	12.9	11.7	0	7.7 (12/09)	7.1 (12/01)

*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 MAXIMUM	1-HOUR AVERAGES 2ND HIGH	TIMES** >9ppm	8-HOUR AVERAGES MAXIMUM (date)	8-HOUR AVERAGES 2ND HIGHEST (date)
215 SE 6th	1994	2.24	9.7	9.3	0	6.6 (02/01)	6.0 (12/09)
DEQ # 10114 EPA # 410330006	1995	2.10	9.6	9.4	0	7.2 (01/20)	6.4 (02/02)
	1996	1.91	9.5	9.5	0	6.4 (02/02)	6.0 (12/20)
	1997	1.74	8.0	7.7	0	5.3 (01/14)	5.1 (12/05)
	1998	1.74	7.5	7.4	0	4.7 (10/30)	4.6 (11/20)
	1999	1.61	8.5	7.9	0	4.9 (11/11)	4.6 (01/07)
	2000	1.50	8.4	6.6	0	4.5 (11/21)	4.3 (12/27)
	2001	1.53	7.7	7.7	0	5.5 (01/05)	4.7 (11/09)
	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)
Klamath Falls							
2306 Hope St (KFH)	1993	1.59	9.2	8.7	0	6.1 (12/20)	5.9 (11/19)
DEQ # 10098 EPA # 41035006	1994	1.36	9.0	8.3	0	5.9 (01/14)	5.1 (02/05)
	1995	1.25	8.4	8.3	0	4.2 (02/10)	4.1 (11/14)
	1996	1.22	8.1	7.8	0	4.9 (11/01)	4.8 (01/02)
	1997	1.43	8.0	7.6	0	5.3 (12/29)	5.1 (01/11)
	1998	1.07	6.6	6.4	0	4.7 (12/30)	4.5 (11/13)
	1999	1.20	7.7	7.3	0	4.7 (01/05)	4.5 (12/20)
	2000	1.23	6.7	6.7	0	4.6 (12/07)	4.5 (12/06)
	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)
Medford							
Brophy Building (MBB)	1993	2.24	13.0	12.1	0	7.2 (12/23)	6.9 (06/20)
10 N Central	1994	2.3	18.5	14.8	1	9.7 (06/18)	6.3 (12/23)
DEQ # 10111 EPA # 410290009	1995	2.21	10.1	10.0	0	5.9 (01/20)	5.3 (02/05)
	1996	2.04	16.1	15.7	0	8.6 (06/15)	6.4 (01/12)
	1997	2.13	12.3	8.4	0	7.3 (06/14)	5.7 (12/05)
	1998	1.98	18.0	16.7	0	9.3 (06/20)	5.2 (01/16)
	1999	1.82	18.7	18.5	1	10.6 (06/19)	5.7 (01/04)
	2000	1.65	24.8	18.8	1	9.9 (06/17)	4.0 (01/07)
	2001	1.53	9.9	8.3	0	4.3 (01/03)	4.0 (01/05)
	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)
Rogue Valley Mall (MRV)	1993	2.30	14.6	14.2	0	8.5 (12/23)	7.5 (11/24)
1502 N Riverside	1994	2.05	13.1	11.5	0	7.4 (12/23)	6.7 (12/21)
DEQ # 10112 EPA # 410290018	1995	2.07	12.4	10.9	0	6.1 (11/14)	6.0 (12/19)

*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 MAXIMUM	1-HOUR AVERAGES 2ND HIGH	TIMES** >9ppm	8-HOUR AVERAGES MAXIMUM (date)	8-HOUR AVERAGES 2ND HIGHEST (date)
	1996	2.00	12.3	12.3	0	6.7 (11/01)	6.6 (01/03)
	1997	1.95	10.0	9.9	0	6.3 (01/09)	5.7 (01/11)
	1998	1.68	8.2	8.0	0	5.5 (01/08)	5.3 (10/30)
	1999	1.71	11.3	10.4	0	6.8 (01/05)	6.1 (12/23)
	2000	1.57	8.4	8.2	0	4.8 (12/26)	4.7 (12/28)
	2001	1.34	8.6	7.3	0	4.8 (01/05)	4.6 (11/09)
	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)
Portland							
4th & Alder (PFA)	1993	1.73	15.7	11.9	0	6.6 (08/22)	5.8 (11/10)
DEQ # 10137 EPA # 410510078	1994	1.59	12.0	10.0	0	7.5 (01/20)	6.2 (09/22)
✶Site discontinued 04/02	1995	1.34	9.1	8.3	0	7.1 (10/14)	4.5 (11/14)
	1996	1.36	8.6	8.0	0	6.4 (09/27)	5.7 (09/10)
	1997	1.37	7.8	7.8	0	4.8 (02/24)	4.7 (10/15)
	1998	1.13	8.4	7.1	0	4.6 (03/11)	4.6 (09/30)
	1999	1.23	11.6	9.8	0	7.5 (01/05)	5.5 (10/22)
	2000	1.14	9.3	8.4	0	5.4 (11/17)	4.0 (04/11)
	2001	1.04	6.3	5.9	0	3.6 (08/09)	3.5 (05/31)
	2002	✶	3.6	3.5	0	2.4 (02/20)	2.4 (02/08)
SE Lafayette (SEL)	1993	0.95	8.5	8.4	0	7.3 (11/07)	6.6 (11/08)
5824 SE Lafayette	1994	0.74	9.0	7.5	0	6.1 (11/03)	5.7 (01/17)
DEQ # 10139 EPA # 410510080	1995	0.69	6.6	6.3	0	5.2 (10/15)	4.7 (02/10)
	1996	0.91	8.4	7.2	0	5.4 (03/02)	5.2 (01/11)
	1997	0.93	6.7	4.9	0	4.1 (03/29)	3.6 (10/28)
	1998	0.73	6.7	5.9	0	3.8 (12/09)	3.2 (12/16)
	1999	0.70	7.4	7.2	0	5.3 (01/04)	4.4 (01/10)
	2000	0.59	6.3	5.0	0	4.1 (02/08)	3.8 (11/02)
	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)
	1993	1.61	8.5	8.4	0	5.7 (12/09)	5.7 (10/02)
Old Postal Bldg (PPB)	1994	1.97	10.2	9.9	0	7.4 (01/20)	6.3 (12/16)
510 SW 3rd	1995	1.74	12.2	9.6	0	6.6 (10/14)	6.3 (12/17)
DEQ # 10141 EPA # 410510087	1996	1.82	10.6	8.6	0	5.3 (02/07)	5.2 (11/11)
	1997	1.68	9.6	7.8	0	5.9 (03/18)	4.8 (12/19)
	1998	1.60	8.1	8.0	0	4.7 (11/17)	4.6 (01/16)

*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 MAXIMUM	1-HOUR AVERAGES 2ND HIGH	TIMES** >9ppm	8-HOUR AVERAGES MAXIMUM (date)	8-HOUR AVERAGES 2ND HIGHEST (date)
	1999	1.54	12.6	10.4	0	7.3 (01/05)	6.2 (10/21)
	2000	1.43	6.3	6.0	0	3.7 (02/18)	3.6 (01/25)
	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)
82nd & Division	1993	2.12	11.7	11.6	0	8.7 (11/08)	8.4 (11/02)
DEQ# 10142 EPA# 410510243	1994	1.99	9.1	7.8	0	6.8 (11/03)	6.4 (10/08)
	1995	1.54	8.7	7.8	0	7.5 (10/15)	6.6 (10/07)
	1996	1.62	19.8	9.5	0	6.6 (01/11)	6.5 (03/02)
	1997	1.34	12.5	5.9	0	5.1 (12/31)	4.5 (11/08)
	1998	1.28	7.5	6.8	0	4.8 (10/22)	4.4 (12/16)
	1999	1.26	9.0	8.8	0	5.9 (01/10)	5.7 (01/04)
	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)
Salem							
Market & Lancaster	1993	1.97	14.8	13.2	1	9.7 (11/11)	8.8 (12/28)
1685 Lancaster NE	1994	1.82	10.5	10.3	0	9.0 (02/06)	7.8 (02/03)
DEQ# 10131 EPA# 410470039	1995	1.72	10.7	9.8	0	6.2 (11/03)	5.4 (02/03)
	1996	1.37	10.5	9.6	0	7.8 (02/15)	7.1 (11/01)
	1997	1.25	8.2	8.1	0	6.2 (11/02)	5.3 (01/15)
	1998	1.15	7.9	7.9	0	4.7 (10/26)	4.6 (10/05)
	1999	1.29	7.7	7.7	0	5.9 (01/05)	5.9 (12/23)
	2000	1.41	8.5	8.4	0	5.5 (11/16)	5.4 (01/18)
	2001	1.19	7.5	7.2	0	6.0 (11/09)	5.1 (11/10)
*AM and PM on same day and	2002	1.18	7.6	7.3	0	5.6 (11/26)	5.2 (11/03)
not same 8 hr average.	2003	0.94	7.1	6.9	0	5.2 (01/07)	4.9 (01/07)*

*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 >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Eugene Area	1993	0.017	0.081 (08.02)	0	0.067 (08/02)	0.056 (09/08)	0	0.063†
Amazon Park (EAP)	1994	0.022	0.085 (07/21)	0	0.076 (07/21)	0.068 (07/07)	0	0.065†
DEQ# 18524 EPA# 410390060	1995	0.020	0.089 (07/17)	0	0.074 (07/17)	0.061 (05/29)	0	0.062†
	1996	0.024	0.111 (07/13)	0	0.098 (07/13)	0.084 (07/12)	3	0.071†
	1997	0.020	0.077 (08/12)	0†	0.063 (08/12)	0.057 (07/20)	0	0.067
	1998	0.022	0.094 (09/01)	0†	0.082 (09/01)	0.073 (07/26)	0	0.071
	1999	0.020	0.071 (07/11)	0†	0.063 (07/11)	0.057 (07/11)	0	0.062
	2000	0.018	0.056 (06/26)	0†	0.050 (06/27)	0.047 (07/16)	0	0.059
	2001	0.022	0.090 (08/09)	0†	0.074 (08/09)	0.062 (05/26)	0	0.055
	2002	0.023	0.092 (07/10)	0†	0.071 (08/13)	0.068 (08/12)	0	0.059
	2003	0.023	0.088 (06/05)	0†	0.076 (06/05)	0.071 (07/29)	0	0.067
Saginaw (SAG)	1993	0.018	0.084 (09/08)	0	0.068 (08/02)	0.054 (08/01)	0	0.065†
79980 Delight Valley	1994	0.021	0.094 (07/19)	0	0.081 (07/21)	0.070 (07/20)	0	0.067†
School Road	1995	0.021	0.090 (07/17)	0	0.077 (07/17)	0.064 (05/29)	0	0.063†
DEQ# 18315 EPA# 410391007	1996	0.025	0.111 (08/09)	0	0.095 (08/09)	0.089 (08/08)	6	0.074†
	1997	0.020	0.077 (08/12)	0†	0.070 (08/12)	0.059 (07/27)	0	0.071
	1998	0.022	0.121 (07/27)	0†	0.095 (09/01)	0.078 (08/03)	2	0.075
	1999	0.022	0.086 (09/21)	0†	0.072 (07/11)	0.069 (09/21)	0	0.069
	2000	0.022	0.084 (06/20)	0†	0.073 (06/28)	0.065 (08/08)	0	0.071
	2001	0.021	0.086 (08/09)	0†	0.076 (08/09)	0.067 (07/09)	0	0.067
	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	0.070

*Parts per million

† The 8hour ozone standard became effective in 1998;
1-hour values are no longer evaluated for attainment purposes.
The 8 hr standard is the 3-year average of the 4th highest value.

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 >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Medford Area								
Talent (TAL)	1993	0.031	0.090 (09/08)	0	0.069 (08/03)	0.067 (08/02)	0	
7112 Rapp Lane	1994	0.036	0.094 (08/25)	0	0.071 (07/23)	0.069 (09/23)	0	0.073†
DEQ# 10109 EPA# 410290201	1995	0.032	0.093 (09/15)	0	0.077 (09/14)	0.072 (09/13)	0	0.069†
	1996	0.035	0.125 (08/09)	0	0.087 (08/09)	0.076 (07/10)	1	0.072†
	1997	0.031	0.074 (08/13)	0	0.068 (05/19)	0.063 (07/24)	0	0.070†
	1998	0.035	0.126 (08/04)	1†	0.093 (09/01)	0.086 (07/28)	5	0.075
	1999	0.035	0.078 (08/26)	0†	0.067 (09/22)	0.065 (08/17)	0	0.071
	2000	0.034	0.080 (08/03)	0†	0.071 (08/03)	0.069 (06/28)	0	0.073
	2001	0.033	0.090 (07/03)	0†	0.077 (07/03)	0.064 (09/22)	0	0.066
	2002	0.035	0.102 (08/14)	0†	0.083 (08/15)	0.076 (07/31)	0	0.070
	2003	0.037	0.095 (06/06)	0†	0.079 (09/02)	0.072 (06/04)	0	0.070
Salem Area	1995	0.022	0.105 (06/30)	0	0.072 (09/01)	0.065 (07/16)	0	
Cascade Jr High (CJH)	1996	0.028	0.130 (07/26)	1	0.104 (07/26)	0.093 (08/10)	10	
10226 Marion Rd. SE	1997	0.024	0.082 (07/04)	0†	0.068 (07/04)	0.061 (08/12)	0	0.073
Turner	1998	0.024	0.121 (07/27)	0†	0.098 (07/27)	0.077 (08/28)	1	0.077
DEQ# 10130 EPA# 410470004	1999	0.023	0.083 (09/21)	0†	0.075 (07/09)	0.065 (07/10)	0	0.068
	2000	0.020	0.075 (07/30)	0†	0.065 (07/30)	0.060 (06/26)	0	0.067
	2001	0.021	0.087 (08/09)	0†	0.068 (07/03)	0.058 (08/12)	0	0.061
	2002	0.023	0.097 (07/10)	0†	0.072 (07/12)	0.063 (08/13)	0	0.060
	2003	0.028	0.096 (09/04)	0†	0.080 (09/03)	0.072 (07/30)	0	0.064

*Parts per million

† The 8hour ozone standard became effective in 1998;
1-hour values are no longer evaluated for attainment purposes.
The 8 hr standard is the 3-year average of the 4th highest value.

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 >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Portland Area								
Carus (SPR)	1993	0.023	0.092 (08/04)	0	0.072 (08/04)	0.063 (09/10)	0	0.078†
13575 Spangler Road	1994	0.029	0.117 (07/21)	0	0.085 (07/21)	0.079 (07/27)	2	0.079†
Canby	1995	0.027	0.099 (06/30)	0	0.085 (09/01)	0.074 (09/14)	1	0.072†
DEQ# 10093 EPA# 410050004	1996	0.029	0.149 (07/26)	1	0.113 (07/26)	0.099 (07/27)	7	0.084†
	1997	0.025	0.085 (07/04)	0†	0.074 (07/04)	0.063 (05/13)	0	0.079
	1998	0.026	0.137 (07/28)	3†	0.117 (07/26)	0.082 (09/01)	3	0.081
	1999	0.028	0.102 (07/10)	0†	0.081 (07/09)	0.073 (07/28)	0	0.073
	2000	0.025	0.086 (06/28)	0†	0.072 (06/03)	0.065 (07/30)	0	0.073
	2001	0.025	0.099 (08/09)	0†	0.081 (08/09)	0.070 (06/20)	0	0.069
	2002	0.025	0.101 (07/22)	0†	0.085 (07/10)	0.064 (07/21)	1	0.066
	2003	0.029	0.097 (07/29)	0†	0.084 (09/03)	0.075 (07/28)	0	0.070
Milwaukie High Sch (MHS)	1993	0.016	0.112 (08/04)	0	0.074 (08/04)	0.052 (09/08)	0	0.062†
11300 SE 23rd	1994	0.018	0.103 (07/20)	0	0.087 (07/20)	0.057 (07/21)	1	0.060†
DEQ# 10095 EPA# 410052001	1995	0.018	0.110 (07/18)	0	0.093 (07/18)	0.067 (05/29)	1	0.059†
	1996	0.019	0.145 (07/14)	2	0.120 (07/14)	0.085 (07/13)	4	0.070†
	1997	0.016	0.101 (07/20)	0	0.083 (07/04)	0.055 (07/19)	0	0.069†
	1998	0.018	0.124 (07/26)	0†	0.100 (07/26)	0.061 (08/31)	1	0.067†
	1999	0.015	0.080 (06/14)	0†	0.054 (07/09)	0.051 (05/23)	0	0.056†

*Parts per million

† The 8hour ozone standard became effective in 1998;
1-hour values are no longer evaluated for attainment purposes.
The 8 hr standard is the 3-year average of the 4th highest value.

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 >0.085 ppm	3 YEAR AVG OF 4TH HIGH
Milwaukie (MSJ)	2000	0.018	0.085 (06/04)	0†	0.068 (06/04)	0.057 (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	0.056
DEQ# 23306 EPA# 410052002	2002	0.020	0.116 (07/22)	0†	0.082 (07/22)	0.063 (08/13)	0	0.060
	2003	0.021	0.091 (06/07)	0†	0.068 (06/06)	0.061 (07/28)	0	0.061
SE Lafayette (SEL)								
5824 SE Lafayette	2003	*	0.098 (07/10)	0†	0.068 (07/29)	0.060 (08/14)	0	*
DEQ# 10139 EPA# 410510080								
* Sampling begin 07/03								
Sauvie Island (SIS)	1993	0.022	0.091 (08/04)	0	0.073 (08/04)	0.066 (09/09)	0	0.063†
Social Security Beach	1994	0.023	0.102 (07/20)	0	0.086 (07/20)	0.062 (07/21)	1	0.066†
DEQ# 14152 EPA# 410090004	1995	0.022	0.103 (07/18)	0	0.089 (07/18)	0.061 (07/17)	1	0.063†
	1996	0.026	0.096 (08/10)	0	0.084 (07/13)	0.077 (07/26)	0	0.067†
	1997	0.022	0.081 (07/04)	0†	0.065 (07/04)	0.053 (05/11)	0	0.064
	1998	0.023	0.093 (07/26)	0†	0.078 (07/27)	0.067 (08/28)	0	0.066
	1999	0.021	0.070 (07/09)	0†	0.057 (07/09)	0.050 (09/22)	0	0.056
	2000	0.022	0.080 (06/04)	0†	0.067 (06/27)	0.054 (06/03)	0	0.057
	2001	0.025	0.089 (08/10)	0†	0.069 (08/10)	0.057 (05/10)	0	0.054
	2002	0.025	0.084 (07/10)	0†	0.068 (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
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 8hour ozone standard became effective in 1998;
1-hour values are no longer evaluated for attainment purposes.
The 8 hr standard is the 3-year average of the 4th highest value.

APPENDIX 1E
Oxides of Nitrogen Summary (ppm)

STATION LOCATION AND NUMBER	YEAR	ANNUAL MEANS ARITHMETIC	ANNUAL MEANS GEOMETRIC	MAXIMUM 1 HOUR AVERAGE
NITROGEN DIOXIDE				
Portland				
SE Lafayette at 58th	1993[a]	-	-	0.081 (09/27)
(SEL)	1994[a]	-	-	0.059 (09/22)
DEQ # 10139	1995[a]	-	-	0.070 (09/23)
EPA # 410510080	1996[a]	-	-	0.069 (09/10)
	1997[a]	-	-	0.056 (09/22)
	1998[a]	-	-	0.091 (08/28)
	1999[a]	-	-	0.074 (09/21)
	2000[a]	-	-	0.067 (06/03)
	2001[a]	-	-	0.052 (05/31)
	2002[a]	-	-	0.046 (05/24)
	2003[a]	-	-	0.061 (09/02)
NITRIC OXIDE				
	1993[a]	-	-	0.260 (09/21)
Portland	1994[a]	-	-	0.135 (09/06)
SE Lafayette at 58th	1995[a]	-	-	0.143 (08/24)
(SEL)	1996[a]	-	-	0.266 (09/27)
DEQ # 10139	1997[a]	-	-	0.227 (09/22)
EPA # 410510080	1998[a]	-	-	0.201 (09/22)
	1999[a]	-	-	0.173 (09/29)
	2000[a]	-	-	0.232 (09/27)
	2001[a]	-	-	0.165 (09/28)
	2002[a]	-	-	0.165 (09/18)
	2003[a]	-	-	0.116 (05/01)

*Parts per million

[a] Summer data only

APPENDIX 1F
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
Bend	1993	0.92	15.4 (11/28)	3.9 (11/26)
Kenwood School (BKS)	1994	0.71	10.7 (01/23)	2.1 (01/31)
701 NW Newport	1995	0.65	12.0 (01/08)	3.2 (12/06)
DEQ# 10097 EPA# 410170003	1996	0.61	26.7 (08/13)	5.1 (08/13)
✶Discontinued 06/02	1997	0.64	9.3 (12/13)	2.3 (01/16)
	1998	0.52	6.4 (09/03)	1.8 (01/08)
	1999	0.48	4.9 (01/03)	1.4 (01/03)
	2000	0.52	4.9 (07/04)	2.3 (11/16)
	2001	0.46	4.6 (11/18)	3.5 (01/06)
	2002	✶	5.0 (01/01)	1.6 (01/01)
Pump Station (BPS)				
35 Portland Road	2002	✶	4.2 (11/03)	1.2 (11/27)
DEQ# 24172 EPA# 410170120	2003	0.52	10.2 (06/29)	2.2 (08/24)
✶Started 03/02				
Burns				
Elks Lodge	1996	0.76	11.2 (02/16)	2.5 (02/16)
118 N Broadway	1997	✶	6.6 (01/28)	2.3 (01/18)
DEQ# 18423 EPA# na				
✶Discontinued 05/97				
	1997*	-	7.4 (12/08)	2.5 (12/09)
267 E Madison St.	1998*	1.05	8.5 (11/18)	2.4 (12/09)
DEQ# 10105 EPA# 410250002	1999*	1.02	11.4 (10/29)	2.7 (01/09)
*Oct - March	2000*	0.95	9.2 (01/01)	2.5 (01/05)
	2001*	0.81	8.1 (01/27)	2.6 (12/28)
	2002	0.70	10.4 (07/18)	4.2 (17/17)
	2003	0.57	8.7 (11/13)	2.1 (12/02)
Union High School				
DEQ# 10105 EPA# 410250002	1999*	0.38	2.6 (07/08)	1.2 (07/08)
*April - Sept	2000*	0.34	5.1 (08/06)	1.4 (08/29)
	2001*	0.36	4.3 (08/14)	1.6 (08/14)
Canby				
Carus (SPR)	1993	0.60	4.2 (11/09)	2.2 (11/11)
13575 Spangler Rd	1994	0.51	5.5 (08/08)	1.9 (02/06)
DEQ# 10093 EPA# 410050004	1995	0.50	8.6 (01/05)	2.6 (01/05)
	1996	0.46	5.5 (03/22)	1.5 (03/02)
	1997	0.45	6.3 (01/16)	1.9 (01/16)
	1998	0.48	4.8 (10/16)	1.9 (10/23)
	1999	0.41	4.3 (01/08)	0.9 (10/30)
	2000	0.48	3.4 (10/24)	1.7 (11/19)

* Reported as Scattering Coefficient (ßscat) per 10 kilometers

[a] Seasonal data only

⚐ Forest Fire Smoke Impact

APPENDIX 1F
Light Scattering (BScat)

STATION LOCATION AND NUMBER	YEAR	ANNUAL AVERAGE	1-HOUR AVERAGES MAXIMUM (date)	24-HOUR AVERAGE MAXIMUM (date)
	2001	0.47	5.3 (08/21)	1.9 (11/11)
	2002	0.45	4.1 (11/15)	2.3 (11/15)
	2003	0.47	3.6 (02/14)	1.6 (09/03)
Corvalis (CSS)				
Intermediate School	2003	*	5.6 (09/02)	2.5 (09/03)
DEQ# 20478 EPA# 410030013				
*started in Febuary				
Eugene				
Lane Comm College (LCC)	1993	0.95	7.9 (01/10)	3.9 (01/11)
1059 Willamette	1994[a]	-	4.6 (04/20)	1.8 (10/29)
DEQ# 18320 EPA# 410390013	1995	0.61	6.1 (12/25)	2.4 (12/25)
	1996	0.54	3.7 (11/10)	2.8 (02/04)
	1997	0.62	5.4 (12/11)	2.3 (10/20)
	1998	0.44	2.3 (12/16)	1.6 (12/23)
	1999	0.45	2.8 (01/05)	1.4 (12/30)
	2000	0.49	3.2 (11/18)	2.0 (11/19)
	2001	0.47	2.9 (11/11)	2.0 (11/11)
	2002	0.47	5.8 (08/19)	1.5 (11/29)
	2003	0.48	2.9 (09/02)	1.5 (09/03)
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)
Santa Clara				
200 Santa Clara Ave.	1994	-	5.7 (10/16)	2.8 (10/22)
DEQ# 18736 EPA# 410390063	1995	0.69	9.5 (01/21)	2.8 (11/03)
	1996	0.61	4.6 (12.18)	2.9 (02/04)
Grants Pass				
11th & K St	1993[a]	-	10.2 (12/28)	6.3 (12/28)
DEQ# 10115 EPA# 410330008	1994[a]	-	8.1 (12/21)	4.3 (02/05)
	1995[a]	-	6.4 (01/20)	2.8 (11/04)
	1996[a]	-	5.9 (11/11)	3.3 (11/12)
	1997[a]	-	8.1 (01/15)	4.5 (01/15)
	1998[a]	-	4.4 (01/30)	1.6 (03/06)

* Reported as Scattering Coefficient (ßscat) per 10 kilometers

[a] Seasonal data only

⚐ Forest Fire Smoke Impact

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)				
DEQ# 28859 EPA # 410330114	2002⚐	0.76*	11.6 (07/31)	3.3 (11/14)
✶Started 7/02,	2003	0.70	10.6 (07/22)	5.3 (09/28)
* *GPS&GPP aver together*				
Klamath Falls	1993[a]	-	14.5 (11/02)	5.7 (11/15)
Petersen School (KFP)	1994[a]	-	13.9 (01/03)	5.2 (11/22)
4856 Clinton St	1995[a]	-	10.6 (01/17)	4.1 (01/16)
DEQ# 10118 EPA# 410350004	1996[a]	-	10.8 (03/18)	3.8 (12/19)
	1997[a]	-	7.6 (01/114)	3.4 (01/07)
	1998[a]	-	8.5 (12/22)	3.0 (12/23)
	1999	0.73	2.9 (01/10)	2.6 (01/09)
	2000	0.60	7.4 (11/17)	2.9 (12/07)
	2001	0.51	6.5 (12/12)	2.3 (12/12)
	2002⚐	1.20	32.8 (08/01)	13.4 (08/02)
	2003	0.64	7.3 (1/19)	2.9 (11/23)
La Grande				
Willow St	1993	0.94	17.4 (02/01)	5.0 (02/01)
1601 N Willow	1994	0.79	10.8 (02/01)	3.6 (02/05)
DEQ# 10148 EPA# 410610006	1995	0.71	13.5 (10/28)	3.4 (10/28)
✶Discontinued 9/99	1996	0.86	20.1 (10/02)	6.4 (02/01)
	1997	0.68	8.0 (04/07)	2.4 (12/28)
	1998	0.65	7.7 (10/21)	2.3 (10/21)
	1999	*	6.3 (03/18)	2.3 (01/04)
3rd and I Street	1999	*	3.0 (12/31)	1.8 (12/25)
DEQ# 21638 EPA# 410610117	2000	0.52	14.5 (08/16)	2.7 (08/16)
✶Started 10/99	2001	0.50	3.4 (01/30)	2.1 (01/06)
✶✶Discontinued 12/03	2002	0.53	5.5 (07/26)	2.7 (12/05)
	2003	0.52	3.6 (11/05)	2.1 (11/06)
Ash Street				
DEQ# 26448 EPA# 410610119	2003	-	3.3 (12/10)	1.3 (12/11)
✶Started 12/03				

* Reported as Scattering Coefficient (ßscat) per 10 kilometers
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

Lakeview	1993[a]	-	38.9 (01/27)	13.8 (01/27)
Center & M St (LCM)	1994[a]	-	24.6 (01/18)	9.6 (01/19)
DEQ# 10123 EPA# 410370001	1995[a]	-	8.7 (01/02)	3.6 (12/27)
	1996[a]	-	8.4 (02/03)	2.8 (12/15)
	1997	0.66	8.2 (12/29)	3.8 (12/29)
	1998[a]	-	8.7 (01/23)	2.9 (12/16)
	1999	0.69	8.0 (12/23)	3.3 (12/23)
	2000	0.73	7.9 (12/30)	3.3 (12/04)
	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)
Medford	1993	0.81	7.1 (12/23)	3.3 (11/27)
Brophy Bldg (MBB)	1994	0.79	15.5 (08/25)	4.0 (01/19)
10 N Central	1995	0.65	5.8 (03/27)	2.2 (12/27)
DEQ # 10111 EPA # 410290009	1996	0.69	5.8 (01/13)	3.2 (01/03)
✶Discontinued 10/99	1997	0.78	6.4 (01/10)	3.9 (01/09)
	1998	0.69	3.7 (03/07)	2.5 (12/25)
	1999	✶	4.7 (01/05)	2.6 (01/05)
Grant & Belmont (MGB)	1999	✶	1.3 (09/03)	0.7 (09/03)
DEQ # 20448 EPA # 410290133	2000	0.82	7.3 (07/12)	3.5 (12/09)
✶Started 09/99	2001	0.75	5.4 (01/07)	2.7 (01/06)
	2002⚐	1.01	29.7 (07/31)	5.1 (07/29)
	2003	0.77	12.7 (07/22)	2.8 (01/18)
Oakridge				
Willamette Center (OAK)	1993[a]	-	26.3 (01/31)	11.7 (01/31)
Trailer Park	1994[a]	-	16.7 (12/29)	7.8 (12/30)
DEQ # 18733 EPA # 410392013	1995[a]	-	20.5 (03/07)	9.3 (01/24)
	1996[a]	-	18.2 (02/03)	5.5 (02/03)
	1997	0.94	13.1 (01/16)	5.5 (01/16)
	1998	0.76	10.2 (03/07)	3.7 (02/07)
	1999	0.70	8.0 (01/30)	3.2 (12/27)
	2000	0.71	8.0 (01/31)	3.2 (01/29)
	2001	0.78	8.9 (01/06)	4.4 (01/07)
	2002	0.81	10.7 (02/15)	3.7 (11/01)
	2003	0.71	8.4 (07/25)	3.2 (01/11)

* Reported as Scattering Coefficient (ßscat) per 10 kilometers
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

Pendleton	1993[a]	-		6.6 (02/05)
McKay Creek	1994[a]	-	13.6 (12/08)	5.9 (01/18
3745 SW Marshall	1995[a]	-	8.2 (01/13)	3.9 (12/11)
DEQ # 10146 EPA # 410590121	1996[a]	-	7.2 (01/08)	2.9 (11/12)
	1997	0.81	8.3 (01/15)	3.5 (01/14)
	1998[a]	-	11.1 (01/23)	3.3 (01/13)
	1999	0.65	5.8 (12/31)	1.9 (01/02)
	2000	0.82	5.5 (01/01)	2.4 (11/19)
	2001	0.92	5.5 (11/04)	2.6 (11/27)
	2002	0.92	5.8 (02/06)	2.4 (11/04)
	2003	0.67	5.4 (11/09)	2.6 (11/09)
Central Fire Station (CFS)	1993	0.79	10.2 (09/06)	3.1 (11/08)
55 SW Ash	1994	0.68	13.3 (09/07)	2.5 (10/17)
DEQ # 10136 EPA # 410510015	1995	0.66	4.1 (12/31)	2.0 (02/10)
	1996	0.66	7.1 (07/15)	2.8 (01/01)
	1997	0.63	3.0 (05/30)	1.8 (10/22)
	1998	0.61	4.7 (10/23)	3.0 (10/23)
	1999	0.56	6.3 (01/05)	4.0 (01/05)
	2000	0.60	3.1 (11/11)	2.1 (11/12)
	2001	0.53	2.6 (02/01)	1.5 (12/07)
N.E.Portland (PNR)				
24 N Emerson (N. Roselawn)	2002	0.54	3.7 (07/04)	1.8 (11/15)
DEQ# 21889 EPA# 410510246	2003	0.49	4.2 (08/15)	1.3 (10/01)
SE Lafayette (SEL)	1993	0.77	11.0 (11/08)	4.9 (11/14)
5824 SE Lafayette	1994	0.75	13.8 (11/03)	3.8 (11/03)
DEQ # 10139 EPA # 410510080	1995	0.61	6.2 (12/31)	3.0 (02/10)
	1996	0.59	8.1 (01/01)	3.5 (02/24)
	1997[a]	-	7.1 (11/16)	2.8 (10/22)
	1998	0.67	7.6 (01/03)	2.6 (10/23)
	1999	0.62	7.3 (01/24)	3.8 (01/05)
	2000	0.64	9.8 (07/04)	3.3 (11/12)
	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)

* Reported as Scattering Coefficient (ßscat) per 10 kilometers
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

Sauvie Island (SIS)	1993[a]	-	2.2 (09/06)	1.5 (09/07)
Social Security Beach	1994[a]	-	2.7 (09/25)	1.5 (09/24)
DEQ # 14152 EPA # 410090004	1995[a]	-	2.5 (09/15)	1.5 (09/15)
	1996[a]	-	2.1 (07/29)	1.2 (05/12)
	1997[a]	-	2.6 (09/25)	1.4 (09/23)
	1998[a]	-	2.6 (05/01)	1.2 (07/27)
	1999[a]	-	1.9 (09/06)	1.2 (08/06)
	2000[a]	-	1.9 (08/04)	1.0 (08/04)
	2001[a]	-	1.8 (08/12)	1.2 (08/12)
	2002[a]	-	1.2 (07/23)	0.9 (08/13)
	2003[a]	-	1.6 (09/30)	1.0 (09/03)
Prineville				
Parks Department	1995[a]	-	9.7 (03/25)	4.1 (12/06)
NE 5th & Elm	1996[a]	-	5.8 (02/13)	2.5 (02/13)
DEQ # 18413 EPA# na				
9th & Fairmont	1996[a]	-	10.2 (12/19)	3.3 (12/19)
DEQ # 18427 EPA# na	1997[a]	-	8.9 (01/15)	3.5 (01/28)
Salem				
Market/Lancaster (SML)	1993	0.89	13.6 (12/27)	5.3 (11/07)
1685 Lancaster NE	1994	0.73	15.8 (02/06)	4.8 (02/02)
DEQ # 10131 EPA # 410470039	1995	0.67	6.9 (11/03)	3.1 (12/25)
✶Discontinued 05/02	1996	0.59	6.2 (03/02)	2.9 (02/14)
	1997	0.67	7.0 (01/15)	3.1 (01/15)
	1998	0.57	4.1 (03/23)	1.9 (12/16)
	1999	0.60	6.6 (01/05)	3.4 (01/05)
	2000	0.72	8.5 (11/18)	4.0 (11/16)
	2001	0.61	7.4 (11/08)	3.4 (11/10)
	2002	✶	5.6 (02/04)	2.3 (02/17)
General Hospital (SGH)	2002	0.62*	4.3 (11/06)	2.7 (11/06)
867 Medical Center Dr	2003	0.54	3.3 (01/07)	1.8 (01/21)
DEQ# 20480 EPA# 410470040				
*Started 05/02				
*SML & SGH aver together				

* Reported as Scattering Coefficient (ßscat) per 10 kilometers
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

Springfield **City Hall** 255 North 5th St DEQ # 18538 EPA # 410391009	1993 1994[a] 1995 1996 1997 1998 1999 2000 2001 2002 2003	0.93 - 0.65 0.56 0.55 0.52 0.51 0.53 0.51 0.51 0.49	9.5 (02/06) 4.0 (10/22) 4.5 (01/23) 3.8 (03/01) 4.3 (01/15) 3.3 (12/23) 4.4 (01/05) 3.5 (11/18) 2.8 (11/11) 3.5 (08/19) 3.1 (09/02)	3.9 (01/11) 1.7 (10/22) 2.2 (01/25) 2.4 (02/04) 2.1 (01/15) 2.1 (12/23) 1.6 (10/22) 2.0 (11/20) 2.1 (11/11) 1.5 (11/29) 1.7 (09/03)

* Reported as Scattering Coefficient (ßscat) per 10 kilometers
[a] Seasonal data only
⚐ Forest Fire Smoke Impact

APPENDIX 1G
Air Toxics ($\mu g/m^3$)

Pollutant ($\mu g/m^3$)		Acetaldehyde		Formaldehyde		Benzene		1,3-butadiene		Perchloroethylene		Arsenic 1999, 2000 – $PM_{2.5}$ 2001-2003 – TSP		Chromium (VI) TSP		Lead 1999, 2000 – $PM_{2.5}$ 2001-2003 – TSP		Nickel 1999, 2000 – $PM_{2.5}$ 2001-2003 – TSP		Polycyclic Organic Matter	
City/Site	Year	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave	# of Samples	Annual Ave
Portland	1999	21	3.0	21	2.5	20	2.2	*20*	*<0.2*	*20*	*<0.7*	*11*	*0.0021*			11	0.0069	11	0.0023	9	0.063
N Roselawn	2000	43	2.2	43	3.8	41	2.0	*41*	*0.19*	*41*	*0.4*	*45*	*0.0021*			45	0.0066	45	0.0047	30	0.046
24 N Emerson	2001	60	2.0	60	2.6	59	1.5	*59*	*0.11*	*59*	*0.4*	*57*	*0.0020*			57	0.0091	57	0.0033	3	0.036
DEQ# 21889	2002	62	1.9	62	2.8	62	1.6	*62*	*<0.2*	*62*	*<0.7*	*61*	*0.0014*	20	0.00027	61	0.0104	61	0.0027	--	--
EPA# 410510246	2003	57	2.0	57	4.2	58	1.4	*58*	*<0.2*	*58*	*0.4*	*43*	*0.0015*	50	0.00024	54	0.0086	54	0.0032	12	0.026
NW Post Office	1999	28	2.4	28	2.1	27	1.8	--	--	27	2.3	*12*	*0.0009*			12	0.0044	12	0.0036		
1706 NW 24th	2000	44	2.0	44	3.0	41	2.0	*41*	*0.18*	41	2.4	*16*	*0.0025*			16	0.0084	16	0.0045		
DEQ# 18399	2001	56	1.9	56	2.8	58	1.5	*58*	*<0.2*	58	2.3	*13*	*0.0013*			13	0.0042	13	0.015		
EPA# 410510244	2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2003	28	0.7	28	1.9	26	1.3	*26*	*<0.2*	26	*2.6*	--	--	28	0.00018	--	--	--	--	13	0.031
Eugene																					
Amazon Park	2002	60	1.6	60	2.5	58	1.6	*58*	*<0.2*	*58*	*0.38*	*58*	*0.0011*	--	--	*58*	*0.0032*	*60*	*0.0012*	14	0.026
499 E 29th	2003	52	1.5	52	4.8	45	1.0	*45*	*<0.2*	*45*	*<0.7*	*54*	*0.0014*	--	--	*54*	*0.0029*	*54*	*0.0014*	24	0.020
DEQ# 18524																					
EPA# 410390060																					
Benchmark			0.45		0.077		0.13		0.033		0.017		0.00023		0.000083		0.083		0.0021		0.018

Values in italics when over half the measurements are less than the minimum detection level of the analysis method.
All measurements of carbon tetrachloride, chloroform, ethylene dibromide and ethylene dichloride values were below the minimum detection limit.
Acrolein, beryllium, and Diesel Particulate Matter have not been measured.

APPENDIX 1H
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	1994	20	2.0	13	1.3	15	1.5	4.8
Multopor	1995	56	6.0	28	3.0	0	0	9.0
DEQ# 10094	1996	82	8.7	31	3.3	12	1.3	13.3
EPA# 410050102	1997	56	5.1	17	1.5	8	0.7	7.4
	1998	183	19.2	72	7.5	7	0.7	27.5
	1999	97	8.7	28	2.5	5	0.5	10.9
	2000	52	2.9	22	1.2	7	0.4	4.0
	2001	92	15.6	15	2.6	4	0.7	18.9
	2002	30	3.4	10	1.1	1	0.1	4.7
	2003	52	5.3	53	5.4	31	3.1	13.8
Mt. Jefferson	1994	70	7.3	35	3.6	19	2.0	12.9
Big Lake	1995	36	3.8	24	2.5	2	0.2	6.6
DEQ# 10125	1996	70	10.2	80	11.6	39	5.7	27.6
EPA# 410430103	1997	20	2.1	6	0.6	1	0.1	2.8
	1998	110	13.0	34	4.0	8	0.9	17.9
	1999	133	9.2	105	7.3	25	1.7	2.3
	2000	116	6.3	30	1.6	3	0.2	4.6
	2001	62	6.9	38	4.2	8	0.9	12.0
	2002[2]	92	9.6	76	7.9	50	5.2	22.8
Monitor evacuated	2003[3]	46	7.5	19	3.1	31	5.0	15.6
Crater Lake National	1994	20	2.1	24	2.6	15	1.6	6.3
Park	1995	20	2.5	5	0.6	1	0.1	3.2
Rim Village	1996	61	7.0	32	3.7	50	5.8	16.5
DEQ# 10117	1997	3	0.3	0	0	0	0	0.3
EPA# 410351001	1998	24	2.4	8	0.8	1	0.1	3.3
	1999	131	7.3	27	1.5	21	1.2	9.9
	2000	8	0.4	6	0.3	2	0.1	1.2
	2001	46	5.6	24	2.9	7	0.8	9.3
	2002[2]	55	5.7	65	6.7	374	38.6	51.0
	2003	41	4.8	19	2.2	24	2.8	9.8
Eagle Cap Wilderness								
Mt. Harris	2003	63	12.1	95	18.3	27	5.2	35.6
DEQ# 30722								
EPA# 410610118								
Started 8/7/03								

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

APPENDIX 1J
Other Data
Supplemental Air Monitoring Data

This section is a record of Department of Environmental Quality ambient air monitoring not routinely done for compliance purposes, organized alphabetically by location. These reports, studies, and data are available from DEQ. Some material will involve a data preparation charge.

City	Season	Year	Pollutant Study
Albany	Summer	2003	One Month 1 minute average VOC Air Toxics & Met
Beaverton	Year long	1999/00	$PM_{2.5}$ Saturation Survey
Bend	Winter	1994/95	CO Saturation Survey
Bend	Winter	1994/95	PM_{10} Saturation Survey
Bend	Aug	1996	PM_{10} Bend Air Quality Modeling Project
Bend	Winter	2003/04	CO Saturation Survey
Bend	Year long	2003/04	$PM_{2.5}$ Saturation Survey
Burns	Winter	1993/94	PM_{10} Saturation Survey
Corvallis	Winter	1990/91	PM_{10} Saturation Survey
Eastern Oregon	Fall	1994	Eastern Oregon Dust Study - PM_{10} & $PM_{2.5}$ comparison to industrial self monitoring data
Eugene Amazon Park	Year long	2001	$PM_{2.5}$ Amazon Park Saturation Survey
Eugene/Springfield	Summer	1995/96	Ozone Mobile monitoring survey
Eugene/Springfield	Early 1990's		PM_{10} Saturation Survey
Grants Pass	Jan & Feb	1992	PM_{10} Saturation Survey
Grants Pass	Winter	1993/94	CO Saturation Survey
Grants Pass	Year long	2003/04	$PM_{2.5}$ Saturation Survey
Hermiston	Summer	2000	Particulate Fallout Study
Hillsboro	Winter	1994	PM_{10} Saturation Survey
Hillsboro	Year long	2001/02	$PM_{2.5}$ Saturation Survey
John Day	Year long	1997/00	$PM_{2.5}$ /PM_{10} Saturation Survey
Klamath Falls	Winter	1995/96	CO Saturation Survey
Klamath Falls	Winter	1996/97	PM_{10} Saturation Survey
Klamath Falls	Year long	2000/01	$PM_{2.5}$ Saturation Survey
La Grande	Winter	1990/91	PM_{10} Saturation Survey
La Grande	Year long	2001/02	$PM_{2.5}$ Saturation Survey
Lakeview	Winter	1990/91	PM_{10} Saturation Survey
Medford	Summer	1992	Ozone Saturation Survey
Medford	Winter	1990/91	PM_{10} Saturation Survey
Medford	Winter	1994/95	PM_{10} Saturation Survey
Medford	Winter	1995/96	CO Saturation Survey

* Data only, no report available.

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This section is a record of Department of Environmental Quality ambient air monitoring not routinely done for compliance purposes, organized alphabetically by location. These reports, studies, and data are available from DEQ. Some material will involve a data preparation charge.

City	Season	Year	Pollutant Study
Medford	Year long	1999/00	$PM_{2.5}$ Saturation Survey
Medford	Winter	2003/04	Extensive $PM_{2.5}$ Saturation Survey
Oakridge	Winter	1990/91	PM_{10} Saturation Survey
Ontario	Winter	1993/94	PM_{10} Saturation Survey
Pendleton	Winter	1990/91	PM_{10} Saturation Survey
Portland	Winter	1992/93	PM_{10} Saturation Survey
Portland	Winter	1993/94	CO Saturation Survey
Portland		1993/94	Air Toxics Special Study
Portland	Year long	1999/00	Air Toxics five site study
Portland	Year long	1999/00	$PM_{2.5}$ SE Portland Saturation Survey
Portland	Year long	2000/01	$PM_{2.5}$ N Portland Saturation Survey
Portland	Winter	1993/94	PM_{10} Saturation Survey
Portland (Canby)	Summer	1994	Ozone Mobile monitoring survey
Portland (NW)	Winter	2000	One Day VOC Air Toxics measurements
Portland (NW)	Summer	2003	One Month 1 minute average VOC Air Toxics & Met
Prineville	Winter	1992/93	PM_{10} Saturation Survey
Roseburg	Winter	1989/90	PM_{10} Saturation Survey
Salem	Winter	1988/89	PM_{10} Saturation Survey
Salem	Winter	1995/96	CO Saturation Survey
Salem	Winter	1997/98	CO Saturation Survey
Salem	Year long	1999/00	$PM_{2.5}$ Saturation Survey
Salem/Portland	Summer	1995	Ozone Study
Springfield	Year long	2001	$PM_{2.5}$ Spring Field Saturation Survey

* Data only, no report available.

Appendix 2

Oregon Air Quality Surveillance Network

The following tables and sampling location maps describe the Air Quality Surveillance Networks operational during 2003. 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 Locations, Washington's Gorge study sites, and EPA visibility sites (IMPROVE). 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_x	Oxides of Nitrogen	O_3	Ozone
Neph	Integrating Nephelometer (continuous particulate monitor)	$PM_{2.5}$	Fine Particulate (2.5 micron)
PM_{10}	Fine Particulate (10 micron)	$PM_{2.5}$ Spec	$PM_{2.5}$ Chemically Speciation
Pb	Lead	Temp	Temperature
Wind	Wind direction and speed	HAPS	Air Toxics (Hazardous Air Pollutants)
		IMPROVE	EPA visibility program

APPENDIX 2A
Oregon Ambient Air Monitoring Network

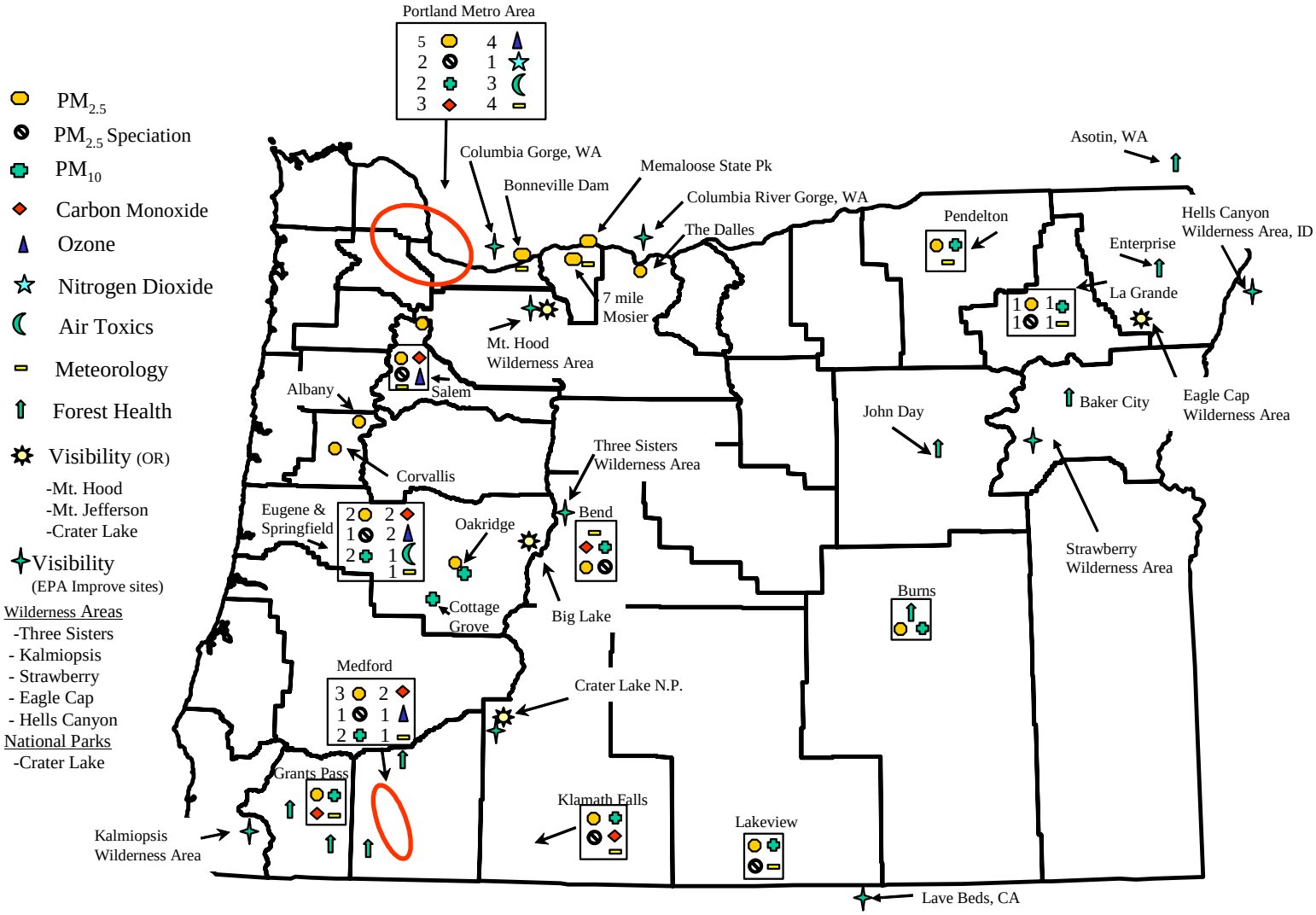
City	Address	DEQ #	SO2	CO	NO2	O3	Neph	HAPS	PM_{10}	$PM_{2.5}$	$PM_{2.5}$ Spec	Wind	Temp
Albany	Calapooia Middle School	21886								X	X		
Bend	NE 3rd Street	10098		X									
	Deschutes Mkt. Rd.	10101										X	X
	Bend Pump Station	24172					X		X	X	X		
Burns	E Madison St.	10105					X		X	X			
Corvallis	Intermediate School	20478					X						
Cottage Grove	Harrison School	18515							X				
Eugene	Lane Community College	18320		X			X		X				
	Pacific Hwy99N	18522							X				
	E 29th Amazon Park	18524				X	X	X		X	X		
	Sacred Heart Hospital	18735		X									
(Saginaw)	Delight Vly Sch Rd	18315				X				X			
Grants Pass	Parkside School	28859					X		X	X		X	X
	SE 6th St. (Wing Bldg)	10114		X									
Klamath Falls	Peterson School	10118					X		X	X	X	X	X
	Hope Street	10119		X									
La Grande	1601 N Willow	10148							X				
	3rd and I Street	21638					X			X	X	X	X
Lakeview	Center & M Streets	10123					X		X	X		X	X
Medford	N Central, Brophy Bldg	10111		X									
	Rogue Valley Mall	10112		X									
	Welch & Jackson	10113							X	X			
	Grant and Belmont	20448					X			X	X		
	7112 Rapp Rd Talent	10109				X							
	1440 Rossanley Drive	10108										X	X
	4035 Dodge Road	10106							X	X			
Oakridge	47674 School Street	18733					X		X	X		X	
Pendleton	3745 SW Marshall Place	10146					X		X	X		X	X
Portland	SW Miller (KPTV tower)	10132										X	X
	5824 SE Lafayette	10139		X	X		X		X	X		X	X
	3182 NW 26th -Transcon	10140							X				
	510SW Third Street	10141		X									
	8210 SE Division	10142		X									
	NW 26th , Forest Heights	18399						X			X		
	N Roselawn	21889						X		X	X		
	Jefferson High School	25606										X	X
(Beaverton)	Highland Prk Middle Sch	20481								X			
(Carus)	Spangler Road	10093				X						X	X
(Hillsboro)	15th and Oak	21639								X			
	Rt 1 Box 442 (Sauvie Is)	14152				X	X			X		X	X
(Milwaukie)	23rd St. Johns Church	23306				X							
Salem	1685 Lancaster & Market	10131		X									
	Cascade Jr. High, Turner	10130				X						X	X
	Salem General Hospital	20480					X			X	X		
Springfield	City Hall	18538					X		X			X	
	Springfield High School	18734								X			
The Dalles	Cherry Heights	21252								X			
White City	751 Crater Lake Hwy	10107							X				

APPENDIX 2A
Oregon Ambient Air Monitoring Network

Region	Location	DEQ # / IMPROVE CODE	Neph	IMPROVE	$PM_{2.5}$	Wind
Visibility Sites						
Crater Lake NP	Diamond Peak	10117 / CRLA	X	X		X
Eagle Cap Wild.	Mt. Harris	30722	X			X
Eagle Cap Wild.	Strawberry Mt.	STAR		X		
Kalmiopsis Wild.	Kalmiopsis	KALM		X		
Mt Hood Wild.	Multopor	10094 / MOHO	X	X		X
Mt Jefferson Wild.	Big Lake	10125	X			X
Three Sisters Wild.	Three Sisters	THIS		X		
Forest Health Sites						
Umatilla NF	Asotin WA	18435	X			
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			
Rogue River, Winema, Fremont NF	Klamath Falls	10118	X			
Siskiyou NF	Provolt	18432	X			
Siskiyou NF	Ruch	21067	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	Grand Ronde	10144				X
Willamette Valley	Halsey/Water Bureau	10128				X
NE Oregon	Island City	29267				X
Willamette Valley	Lebanon Fire Station	18331			X	
Willamette Valley	Lyons/Marilynn School	10126	X			
Willamette Valley	Rickreal	10143				X
Willamette Valley	Salem General Hosp.	20480	X			
Willamette Valley	Sweet Home/DOT	10129	X			
Willamette Valley	Venell Farms	10089				X
Columbia Gorge Sites						
Seven Mile	Mosier		X			X
Bonneville	Bonneville Dam		X			X
Memaloose State Pk	East of Hood River		X			

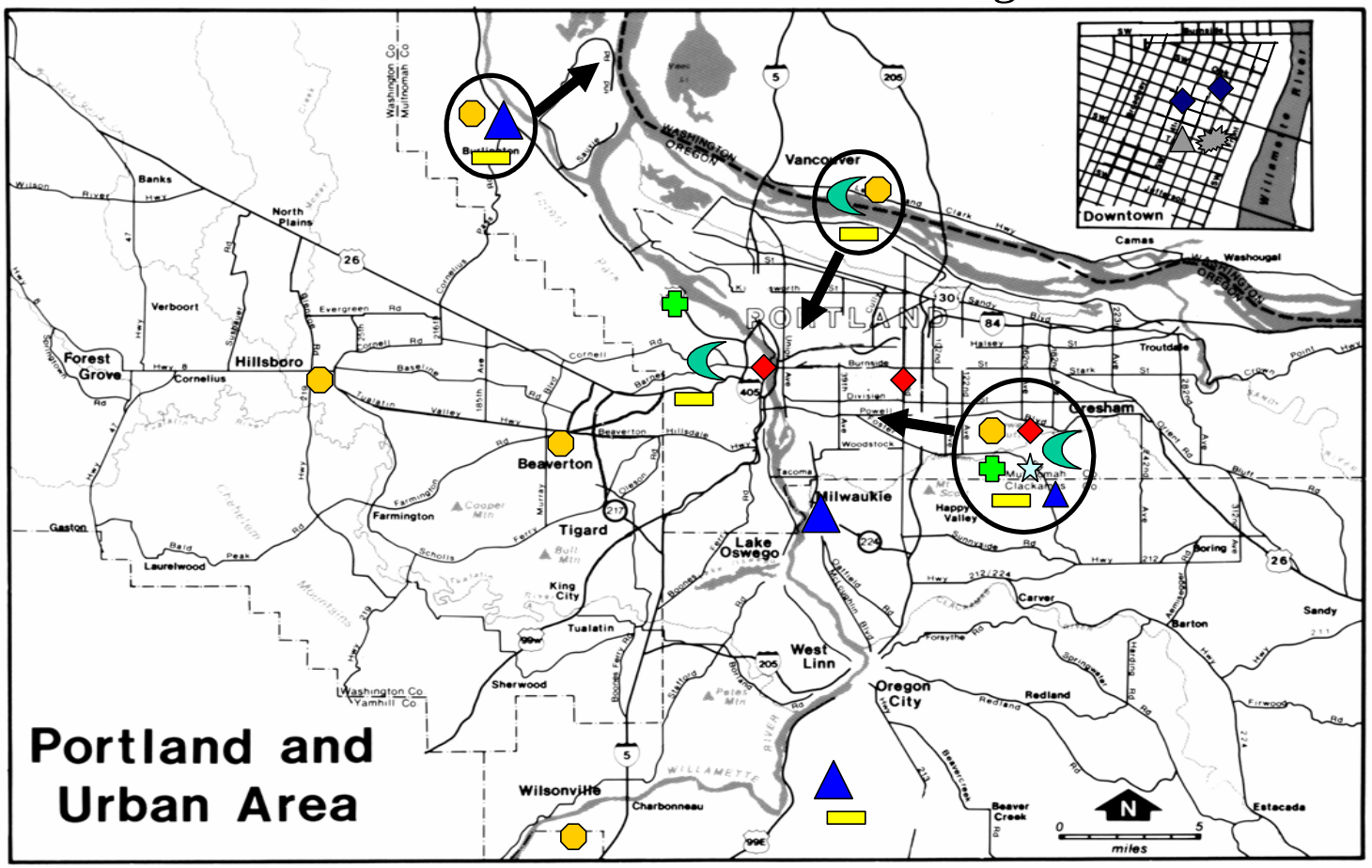
MAP 1

2003 Oregon Air Quality Surveillance Network



MAP 2

2002 Portland Area Monitoring Sites



$PM_{2.5}$ Carbon monoxide Nitrogen Dioxide Meteorology

PM_{10} Ozone Air Toxics

Oregon's other cities can be found on DEQ's web site (address on cover)

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:

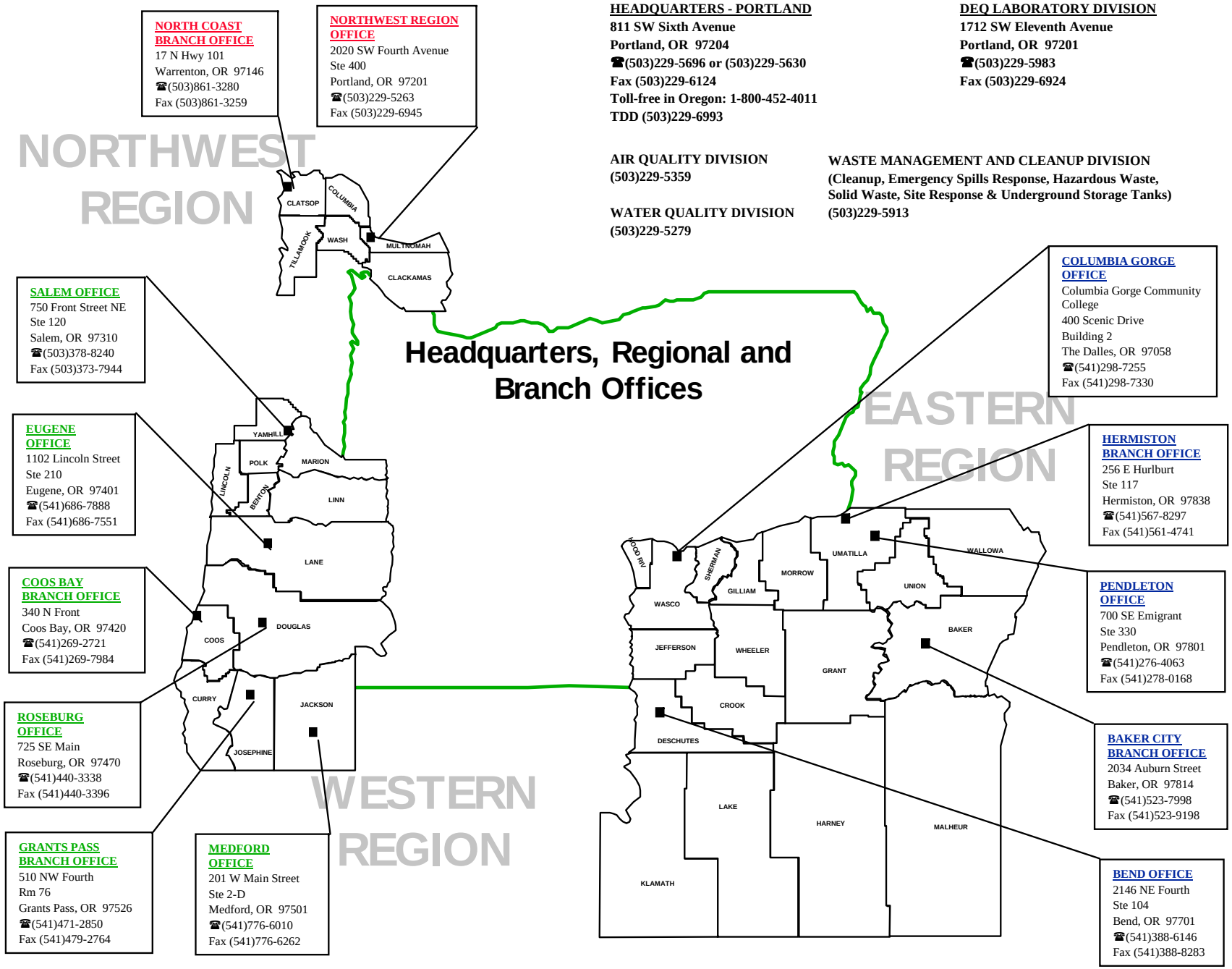
Quality Control

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 being 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.

Headquarters, Regional and Branch Offices



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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.

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

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