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2003
Air Quality Data Summary

September 2004

Working Together for Clean Air

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The 2003 Air Quality Data Summary is available
for viewing or download on the internet at:

www.pscleanair.org/

Links to additional documents for download are also available at the web site.

This material is available in alternate formats for people with disabilities. Please call Carol Pogers at (206) 689-4080 (1-800-552-3565, ext. 4080).

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Forward

This annual report is issued by the Puget Sound Clean Air Agency (the Agency) to inform the public of air quality throughout the Puget Sound region. It summarizes the results of regional air monitoring and describes the sources and effects of the following criteria air pollutants (CAP), for which the U.S. Environmental Protection Agency (EPA) and the State of Washington have established ambient air quality standards:

- Particulate Matter (10 micrometers and 2.5 micrometers)
- Carbon Monoxide
- Sulfur Dioxide
- Nitrogen Dioxide
- Ozone
- Lead

A brief overview of the report is provided in the executive summary. A description and summary of the Air Quality Index (AQI) and the Agency's monitoring program and network are provided directly following the executive summary. Agency-issued burn bans and smog watches and a local emissions inventory are then presented.

The primary focus of this report is to present information on criteria air pollutants, which are monitored most rigorously in the Puget Sound region. Descriptions and measured concentrations of the pollutants listed above and a discussion of visibility comprise the rest of the report, following the emission inventory. The data are presented graphically and as statistical summaries, including relevant comparisons to the ambient air quality standards and discussion of the temporal variability of some pollutants.

Air toxics, not listed above, are also monitored in the Puget Sound region by the Washington State Department of Ecology, although not as extensively as the criteria air pollutants. Air toxics are broadly defined by the Agency as a category that covers over 400 air pollutants. These pollutants are associated with a range of negative health impacts, both carcinogenic and non-carcinogenic. Air toxics are outlined briefly in the monitoring and emission inventory sections of this report and defined in the definitions section. Links are provided in these sections for additional resources for air toxics.

The Puget Sound Clean Air Agency and Washington State Department of Ecology work together to monitor air quality within the Puget Sound region. Real-time air monitoring data are available on the Internet at www.pscleanair.org and https://fortress.wa.gov/ecy/aqp/Public/aqn.shtml. We encourage you to visit our website at www.pscleanair.org to find more extensive air quality data, educational materials, monthly air quality summaries, and discussions of current topics.

We are expanding and refining our Internet site to better serve the residents of the Puget Sound region. We want your feedback on our air quality data and program. Please submit your comments via email to Mary Hoffman at maryh@pscleanair.org or call at 206-689-4006.

Executive Summary for 2003

The AQI is a nationwide standard developed by the U S EPA that incorporates the criteria pollutants, and is used to report daily air quality. The AQI for the Puget Sound region is summarized below, and discussed in detail in the section directly following the executive summary.

The number of "good" AQI days continues to dominate regionally in the Puget Sound area. However, there were brief periods when the air quality degraded into "moderate" or "unhealthy for sensitive groups". The table below shows the AQI breakdown by percentage in each category for the year. In 2003 the AQI highest value of 132 was recorded in King County on June 6th. This value still falls below the unhealthy range; ozone was the pollutant driving the AQI that day. Typically, however, $PM_{2.5}$ is the pollutant that drives the AQI in this region.

2003 AQI Ratings

County	AQI Rating (% of year)				Highest AQI
	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	
Snohomish	77%	22%	1%	—	108
King	73%	26%	1%	—	132
Pierce	73%	25%	2%	—	122
Kitsap	87%	13%	0%	—	78

Criteria Air Pollutants and Visibility

Criteria air pollutants listed in the forward were monitored throughout the Puget Sound region, with the exception of lead and sulfur dioxide, and concentrations were compared against federal and local standards. Historical data is presented for both lead and sulfur dioxide. There were no NAAQS violations in 2003 for any pollutants. In most cases, pollutant concentrations fell well below standards. With the exception of ozone, there were no criteria pollutants that exceeded the federal standard. The 8-hour ozone standard of 0.084 ppm was exceeded twice in 2003: 0.097 ppm on June 6th (in Enumclaw) and 0.088 ppm on July 29th (in North Bend).

Visibility was also measured in Pierce, Snohomish, and King counties. Data show that Puget Sound area visibility associated with particulate matter has steadily improved over the last decade.

Air Toxics

Air toxics were monitored in 2003 by the Washington State Department of Ecology at two monitoring sites, Beacon Hill and Georgetown. Information on the pollutants monitored and results are available at https://fortress.wa.gov/ecy/aqp/Toxics/AirToxicsHome.shtml.

Burn Bans and Smog Watches

The Agency issued one burn ban and one smog watch in 2003. In winter 2003, a first-stage ban was declared on Tuesday, January 7th at 3 pm which lasted until Thursday, January 9th at 12 pm (a total of 45 hours). A smog watch was issued in summer 2003, which lasted from 11 am on Monday, July 28th through 2 pm on Thursday, July 31st (a total of 75 hours).

Air Emission Inventory

An emission inventory for both criteria air pollutants and air toxics was conducted for all four counties for calendar year 2002 and included in this report. 2003 data are not yet available. An emissions inventory summarizes the quantities of air pollutants reported by large industrial sources, as well as pollutants from other sources estimated using EPA methods. Emission inventory information is presented in detail for carbon monoxide, particulate matter (2.5 micron diameter), sulfur dioxide, nitrogen dioxide, and VOCs. Emission inventory information is briefly summarized for air toxics.

The inventory demonstrates that on-road vehicles are the most significant contributors to both criteria pollutant and air toxics emissions in the Puget Sound air shed. Stationary area sources (home heating, small industrial sources, outdoor burning, etc.) are the major contributor of $PM_{2.5}$ emissions**.** This finding supports modeling exercises that have been conducted by the Agency and others to determine where pollutants are primarily coming from.

Air Quality Index

The AQI is reported according to a 500-point scale for each of the major criteria air pollutants: ozone, particulate matter (both $PM_{2.5}$ and PM_{10}), carbon monoxide, nitrogen dioxide, and sulfur dioxide. The "worst denominator" determines the ranking. For example, if an area has a carbon monoxide value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The scale breaks down into six categories, listed below. Each category has a corresponding color, shown with pollution concentration breakpoints for each category, also shown in the definitions section of this document.

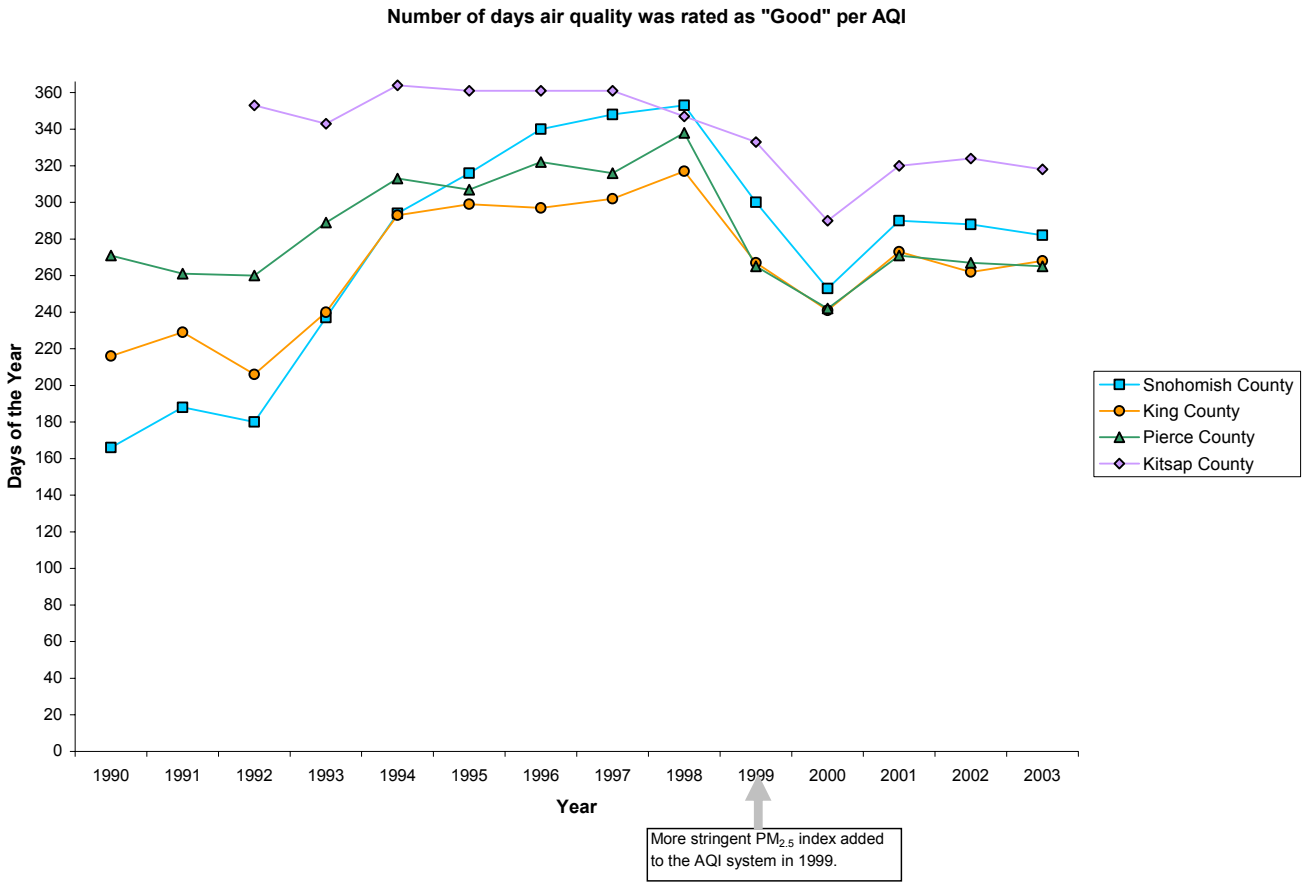
- **0 - 50: Good.** Satisfactory air quality; little or no risk from pollution.
- **51 - 100: Moderate.** Acceptable air quality; potential moderate health concerns for a very small number of people.
- **101 - 150: Unhealthy for Sensitive Groups.** Air quality is acceptable for the general public, but people with health conditions that make them sensitive to a particular pollutant are at greater risk of health problems.
- **151 - 200: Unhealthy.** Everyone may experience some health effects, more serious for members of sensitive groups.
- **201 - 300: Very Unhealthy.** Everyone may experience more serious health effects.
- **301 - 500: Hazardous.** Health risk is at emergency levels. Everyone is likely to be affected.

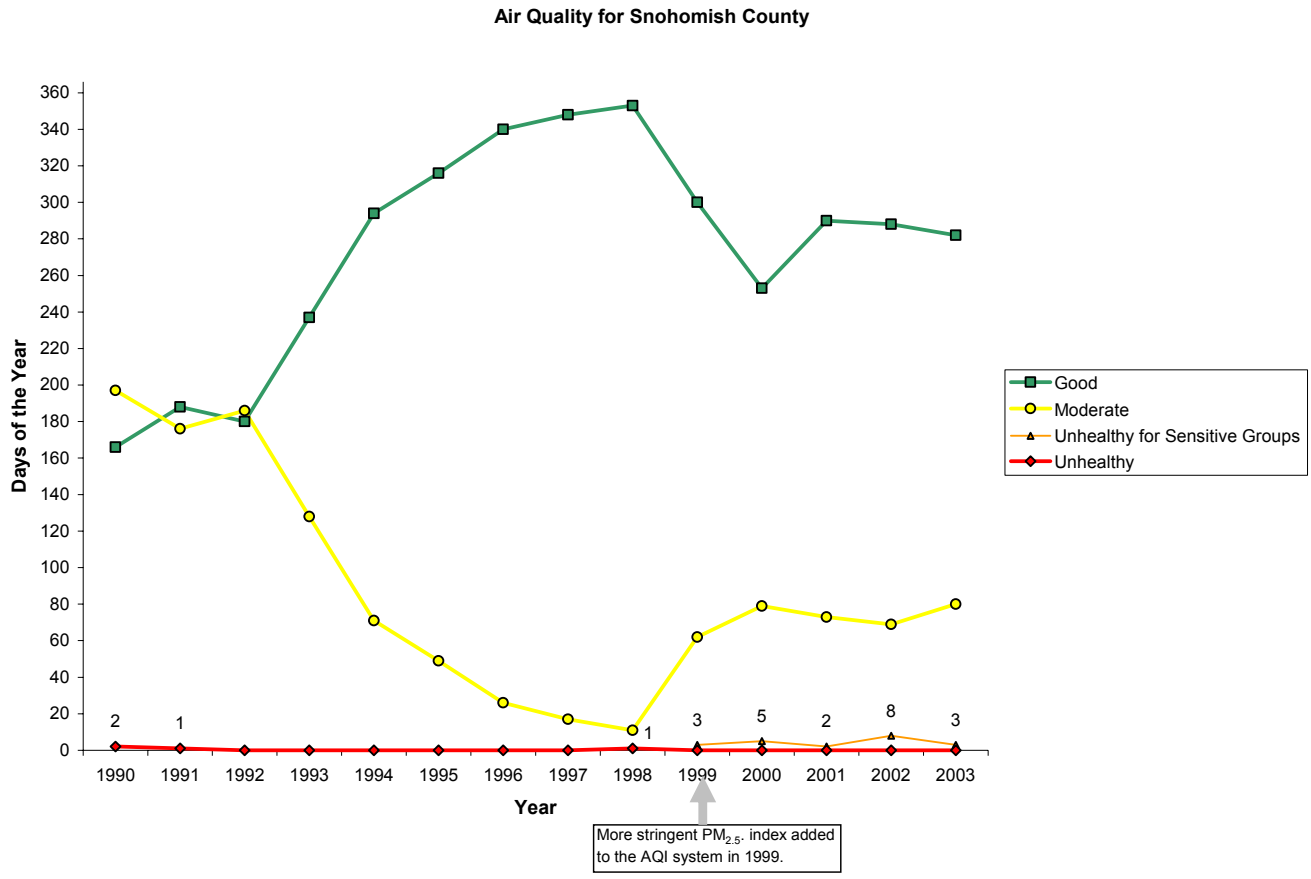
The AQI is a national index, so the values and colors used to show local air quality and the associated level of health concern will be the same everywhere you go in the U.S.A. Current and archived AQI values for Puget Sound can be found on our website at www.pscleanair.org.

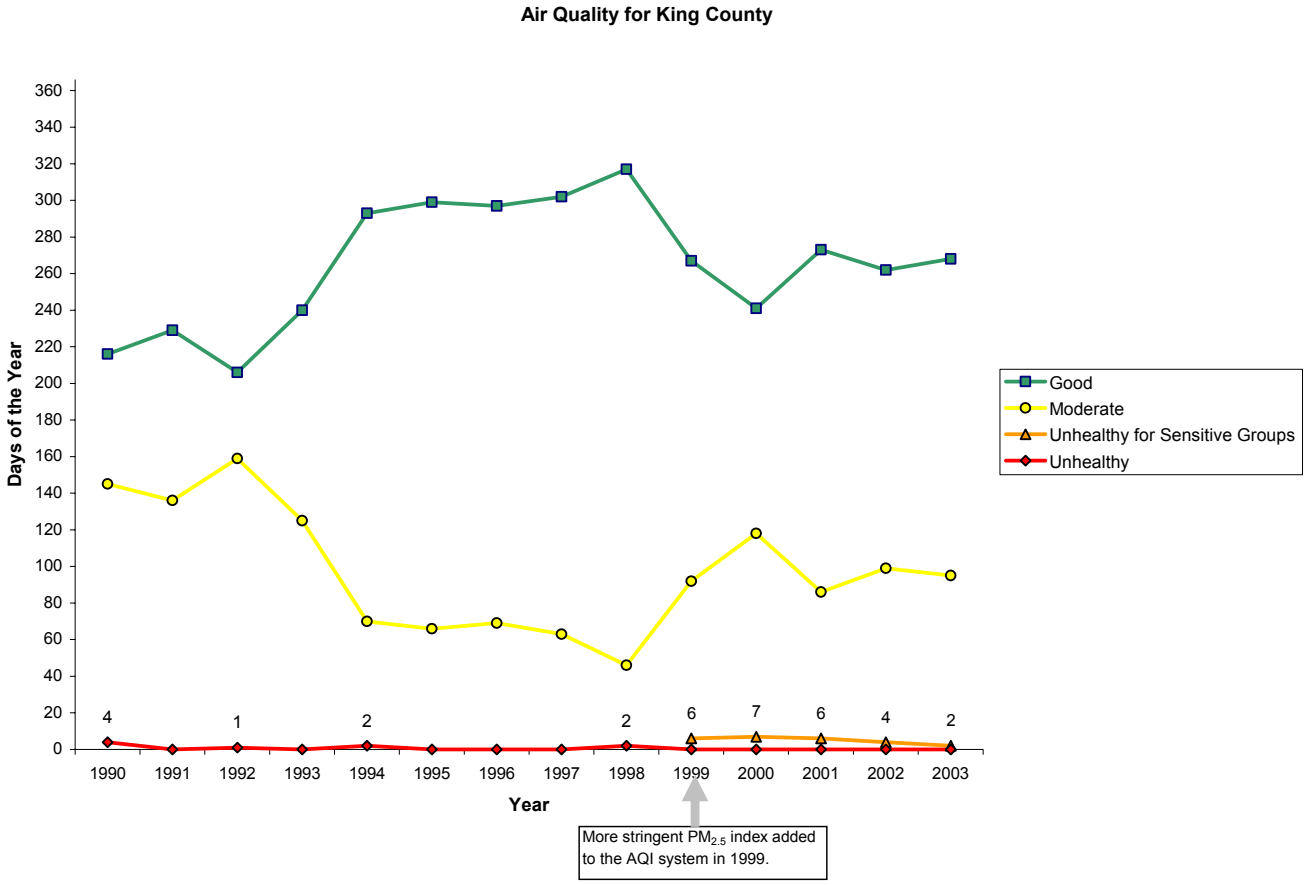
The number of "good" air quality days continues to dominate regionally in the Puget Sound area. However, there were brief periods when the air quality degraded into "moderate" or "unhealthy for sensitive groups." The table presented in the executive summary shows the AQI breakdown by percentage in each category for the year.

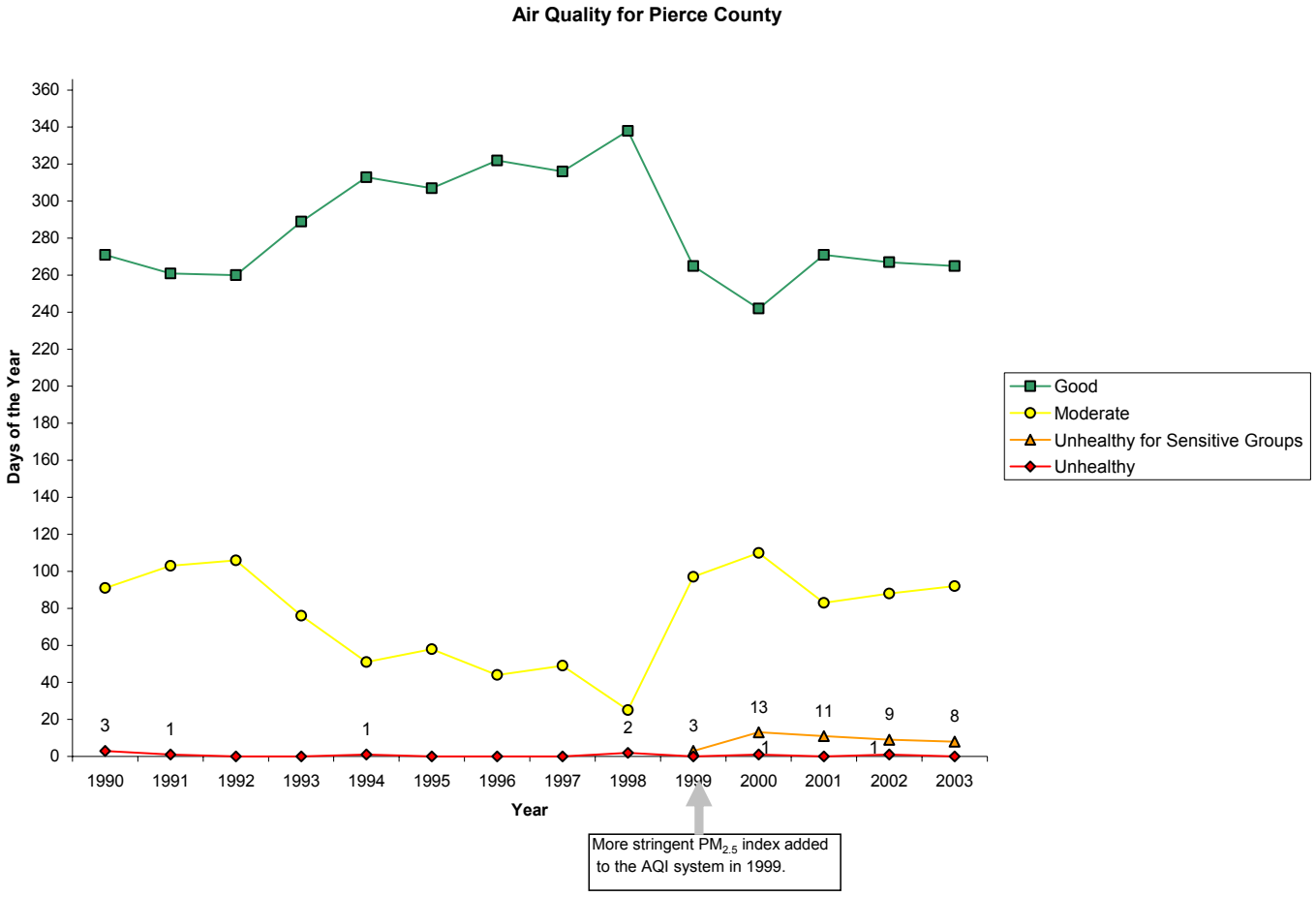
The graph on page 5 presents the annual number of "good" days for each of the four counties. The number of "good" days has been relatively constant over the last few years for each county. Lower numbers of "good" days now can not be directly compared with the numbers before 1999, when $PM_{2.5}$ was added to the index and the "unhealthy" category was divided into "unhealthy" and "unhealthy for sensitive groups."

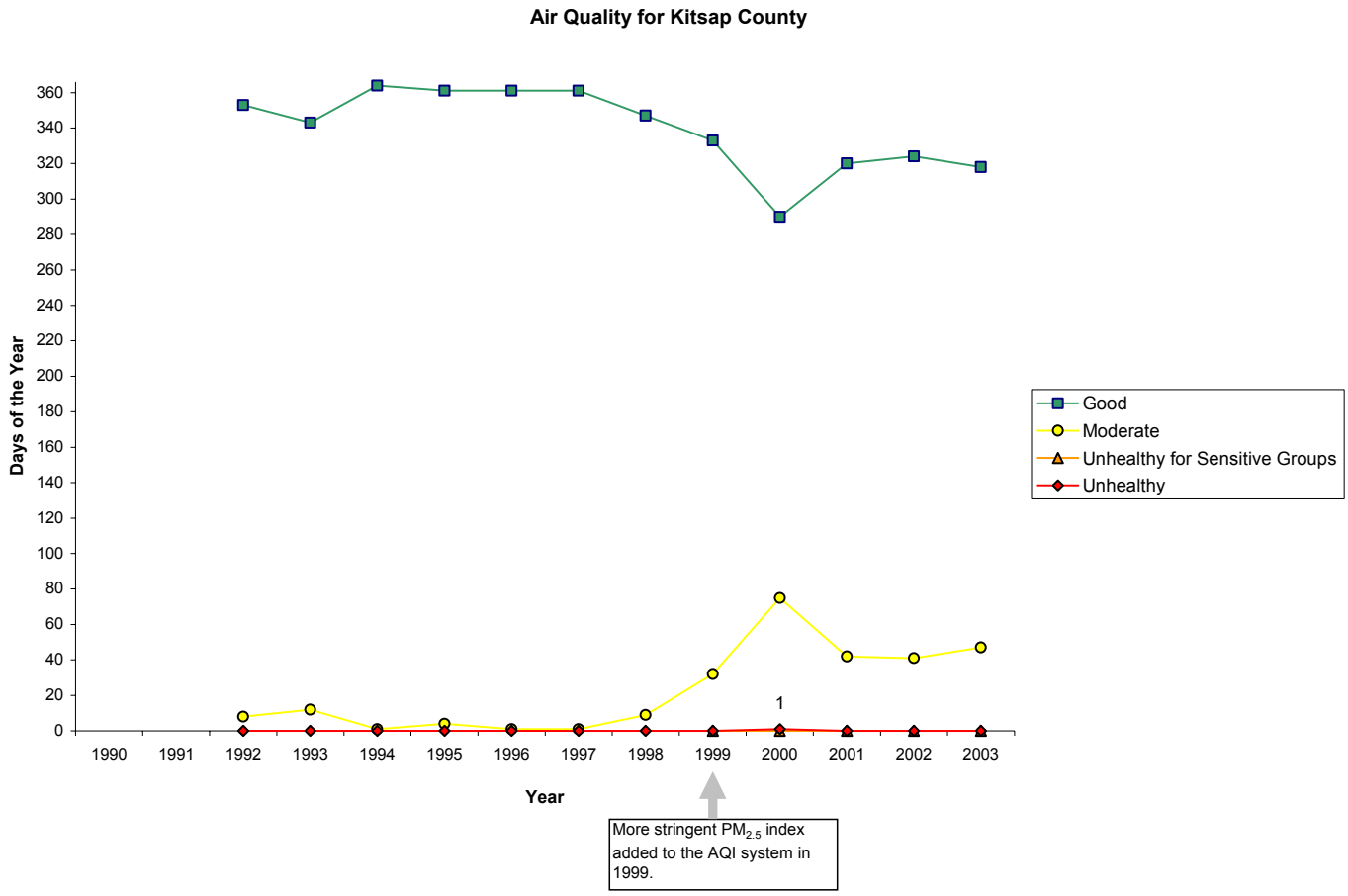
Graphs on pages 6 through 9 present all types of days recorded for Snohomish, King, Pierce, and Kitsap. The number 1 shown on the Kitsap County graph (page 8) in the year 2000 is referencing one day where "unhealthy" air quality was recorded. AQI summaries for each county that support data presented on graphs are located on pages A-1 through A-4 of the Appendix.


Number of days air quality was rated as "Good" per AQI
Days of the Year
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Year
Snohomish County
King County
Pierce County
Kitsap County
More stringent PM2.5 index added to the AQI system in 1999.


Air Quality for Snohomish County
Days of the Year
Year
Good
Moderate
Unhealthy for Sensitive Groups
Unhealthy
2
1
1
3
5
2
8
3
More stringent PM2.5 index added to the AQI system in 1999.


Air Quality for King County
Days of the Year
Year
Good
Moderate
Unhealthy for Sensitive Groups
Unhealthy
4
1
2
2
6
7
6
4
2
More stringent PM2.5 index added to the AQI system in 1999.


Air Quality for Pierce County
Days of the Year
Year
Good
Moderate
Unhealthy for Sensitive Groups
Unhealthy
3
1
1
2
3
13
11
9
8
1
1
More stringent PM2.5 index added to the AQI system in 1999.


Air Quality for Kitsap County
Days of the Year
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Year
1
Good
Moderate
Unhealthy for Sensitive Groups
Unhealthy
More stringent PM2.5 index added to the AQI system in 1999.

Monitoring Network

The Puget Sound monitoring network is a composite of meteorological and pollutant-specific monitoring equipment. The Puget Sound Clean Air Agency and the Washington State Department of Ecology operate all of the monitoring stations. Data from the network are either collected manually by field staff or sent directly to engineers and scientists through a telemetry network. The table on pages 12 through 14 presents a summary of the monitoring stations used and parameters monitored from 1999 through 2003. Some parameters were monitored for only part of this time frame.

Monitoring stations are located in different types of areas all over the Puget Sound region. The EPA provides specific siting criteria. Using these criteria ensures a consistent and representative picture of air quality in the overall area. The monitoring network map on page 16 shows monitoring stations that were active in 2003, and reflects this attempt at a representative picture. Monitoring stations are located mostly in highly populated areas. There are also a few in rural areas. The station IDs shown on the map correspond with table identification letters; these identifications are used throughout this data summary. General location descriptors are also provided for each station in the monitoring network table (last column). These descriptors make broad distinctions between urban center, suburban, and rural, and also provide information as to whether areas are more commercial, industrial, or residential. Sites that have more than two descriptors have varied land use; for example, both residential and commercial. In addition, some sites are selected to focus on the emissions of a single pollutant or group of sources (for example, near a high traffic volume or residential burning area). These monitoring locations and objectives are discussed in the pollutant-specific sections of this report.

Pollutants are measured using reference methods that are approved by the EPA. In addition, some pollutants of particular interest are measured using more than one method in order to better understand the presence and behavior of these pollutants. For example, as shown in the monitoring network table, particulates (both 10 micrometers and 2.5 micrometers) are monitored according to the EPA reference method ("ref" in the table) as well as by various other methods. Measuring pollutants using different methods better informs scientists and engineers about the nature of a pollutant, and ultimately will affect the methods that will be used in the future for monitoring. For pollutants where no specific method is mentioned (in the monitoring table), the reference method is the one that was used. The table on page 15 lists the methods used for the various pollutants. It is noteworthy that the beta attenuation, teom, aethalometer, and nephelometer methods (for particulate matter) are continuous. They enable real-time data interpretation. These methods are discussed further in the particulate matter section of this report. Additional information on these methods is available at EPA's website: http://www.epa.gov/ttn/amtic/.

In addition to the criteria air pollutants described in this report, air toxics were monitored in 2003 at two sites, Beacon Hill and Georgetown. The Washington State Department of Ecology conducts this monitoring. Additional information on air toxics measured, monitoring methods, and results can be found on their air toxics website at https://fortress.wa.gov/ecy/aqp/Toxics/AirToxicsHome.shtml. The Agency conducted an air toxics evaluation based on monitoring conducted at the Beacon Hill and Georgetown sites (as well as four others that are now discontinued) in 2000 and 2001. This evaluation is located at http://www.pscleanair.org/news/other/psate_final.pdf. It includes an interpretation of health

risks presented by air toxics. For details on air toxics and chemical toxicity, visit the EPA web site at www.epa.gov/ttn/atw/index.html.

Monitoring Network for 1999-2003

Station ID	Location	PM_{10} ref	PM_{10} bam	PM_{10} teom	$PM_{2.5}$ ref	$PM_{2.5}$ bam	$PM_{2.5}$ teom	$PM_{2.5}$ ls	$PM_{2.5}$ bc	O_3	SO_2	NO_x	CO	b_{sp}	Wind	Temp	AT	VSBY	Location
AO ⊙	Northgate, 310 NE Northgate Way, Seattle												●						b, d, f
AQ	Queen Anne Hill, 400 W Garfield St, Seattle (began Mar 1, 2001) (photo/visibility included)							●						●				●	a, d, f
AR⊙	4th Ave & Pike St, 1424 4th Ave, Seattle												●						a, d
AS⊙	5th Ave & James St, Seattle (ended Feb 28, 2001)												●						a, d
AU⊙	622 Bellevue Way NE, Bellevue (ended Jul 30, 1999)												●						a, d
AZ	Olive Way & Boren Ave, 1624 Boren Ave, Seattle (began 1/16/2003)							●	●					●	●			●	a, d
BF⊙	University District, 1307 NE 45th St, Seattle												●						b, d
BU⊙	Highway 410, 2 miles E of Enumclaw (ended Sep 30, 2000)									●									c, e
BV⊙	Sand Point, 7600 Sand Pt Way NE, Seattle														●	●			b, d
BW ⊙	Beacon Hill, 15th S & Charlestown, Seattle				●		●	●	●	●	●	●	●	●	●	●	●	●	b, d, f
CE	Duwamish, 4752 E Marginal Way S, Seattle	●		●	●		●	●	●		●			●	●			●	a, e
CW	James St & Central Ave, Kent	●		●	●		●	●						●	●			●	b, d
CX	17711 Ballinger Way NE, Lake Forest Park (ended Jun 4, 1999)	●	●											●	●			●	b, d, f
CZ	Aquatic Center, 601 143rd Ave NE, Bellevue (began Oct 1,2000)						●	●						●				●	b, f
DA	South Park, 8025 10th Ave S, Seattle (ended 12/31/2002)	●			●			●						●	●			●	b, e, f
DB	17171 Bothell Way NE, Lake Forest Park (began Mar 10, 1999)	●	●		●		●	●	●					●	●			●	b, d, f
DC ⊙	305 Bellevue Way NE, Bellevue (began Nov 2, 2000)				●			●						●					a, d
DD	South Park, 8201 10th Ave S, Seattle (began 1/6/2003)							●						●				●	b, e, f
DE⊙	City Hall, 15670 NE 85th St, Redmond (began Aug 4, 1999)				●			●						●					a, d
DF⊙	30525 SE Mud Mountain Road, Enumclaw				●					●									c
DG ⊙	42404 SE North Bend Way, North Bend (began Jan 3, 1999)				●		●	●		●				●	●	●			c, d, f

Monitoring Network for 1999-2003

Station ID	Location	PM_{10} ref	PM_{10} bam	PM_{10} teom	$PM_{2.5}$ ref	$PM_{2.5}$ bam	$PM_{2.5}$ teom	$PM_{2.5}$ ls	$PM_{2.5}$ bc	O_3	SO_2	NO_x	CO	b_{sp}	Wind	Temp	AT	VSBY	Location
DH ⊙	2421 148th Ave NE, Bellevue (began Jan 1, 2000)												●						b, d
DK⊙	43407 212th Ave SE, 2 mi W of Enumclaw														●	●			c
DL⊙	NE 8th St & 108th Ave NE, Bellevue												●						a, d
DN ⊙	20050 SE 56th, Lake Sammamish State Park, Issaquah									●							●		b, d
DP⊙	504 Bellevue Way NE, Bellevue (ended Sep 30, 1999)	●			●														a, d
DZ⊙	Georgetown, 6431 Corson Ave S, Seattle (began Feb 1, 2000)											●	●		●		●		a, d, e, f
EA	Fire Station #12, 2316 E 11th St, Tacoma (ended Dec 31, 2000)	●	●												●				a, e
EP	27th St NE & 54th Ave NE, Tacoma (ended Feb 29, 2000)	●									●				●				b, e, f
EQ	Port of Tacoma, 2301 Alexander Ave, Tacoma	●	●		●		●	●			●			●	●			●	a, e
ER	South Hill, 9616 128th St E, Puyallup	●	●		●	●		●						●	●			●	b, f
ES	7802 South L St, Tacoma (began Oct 3, 1999)				●		●	●	●					●	●			●	b, f
FF⊙	5225 Tower Drive NE, Northeast Tacoma														●	●			b, f
FG⊙	Mt Rainier National Park, Jackson Visitor Center (began May 1, 1999)									●									c
FH⊙	Charles L Pack Forest, La Grande									●									c, f
FL⊙	1101 Pacific Ave, Tacoma												●						a, d
ID	Hoyt Ave & 26th St, Everett (ended Feb 29, 2000)										●				●				a, e, d
IG	Marysville JHS, 1605 7th St, Marysville	●	●		●		●	●						●	●			●	b, d
IH	20935 59th Place West, Lynnwood (ended Jun 8, 1999)	●		●										●	●			●	a, d
II	6120 212th St SW, Lynnwood (began Oct 1, 1999)				●		●	●						●	●			●	b, d
JP⊙	2939 Broadway Ave, Everett (began Apr 1, 2001)												●						a, d
JQ⊙	44th Ave W & 196th St SW, Lynnwood												●						a, d
JS⊙	Broadway & Hewitt Ave, Everett (ended May 21, 2000)												●						a, d
QE	Meadowdale, 7252 Blackbird Dr NE, Bremerton	●				●									●				b, f

Monitoring Network for 1999-2003

Station ID	Location	PM_{10} ref	PM_{10} bam	PM_{10} teom	$PM_{2.5}$ ref	$PM_{2.5}$ bam	$PM_{2.5}$ teom	$PM_{2.5}$ ls	$PM_{2.5}$ bc	O_3	SO_2	NO_x	CO	b_{sp}	Wind	Temp	AT	VSBY	Location
QF	Lions Park, 6th Ave NE & Fjord Dr, Poulsbo (ended Feb 29, 2000)														●				b, f
QG	Fire Sta #51, 10955 Silverdale Way, Silverdale (began Jun 2, 2000)				●	●									●				a, d
UB⊙	71 E Campus Dr, Belfair (began May 1, 2002)									●									c
VK⊙	Fire Station, 709 Mill Road SE, Yelm (began May 1, 2000)									●									c. f

Notes:

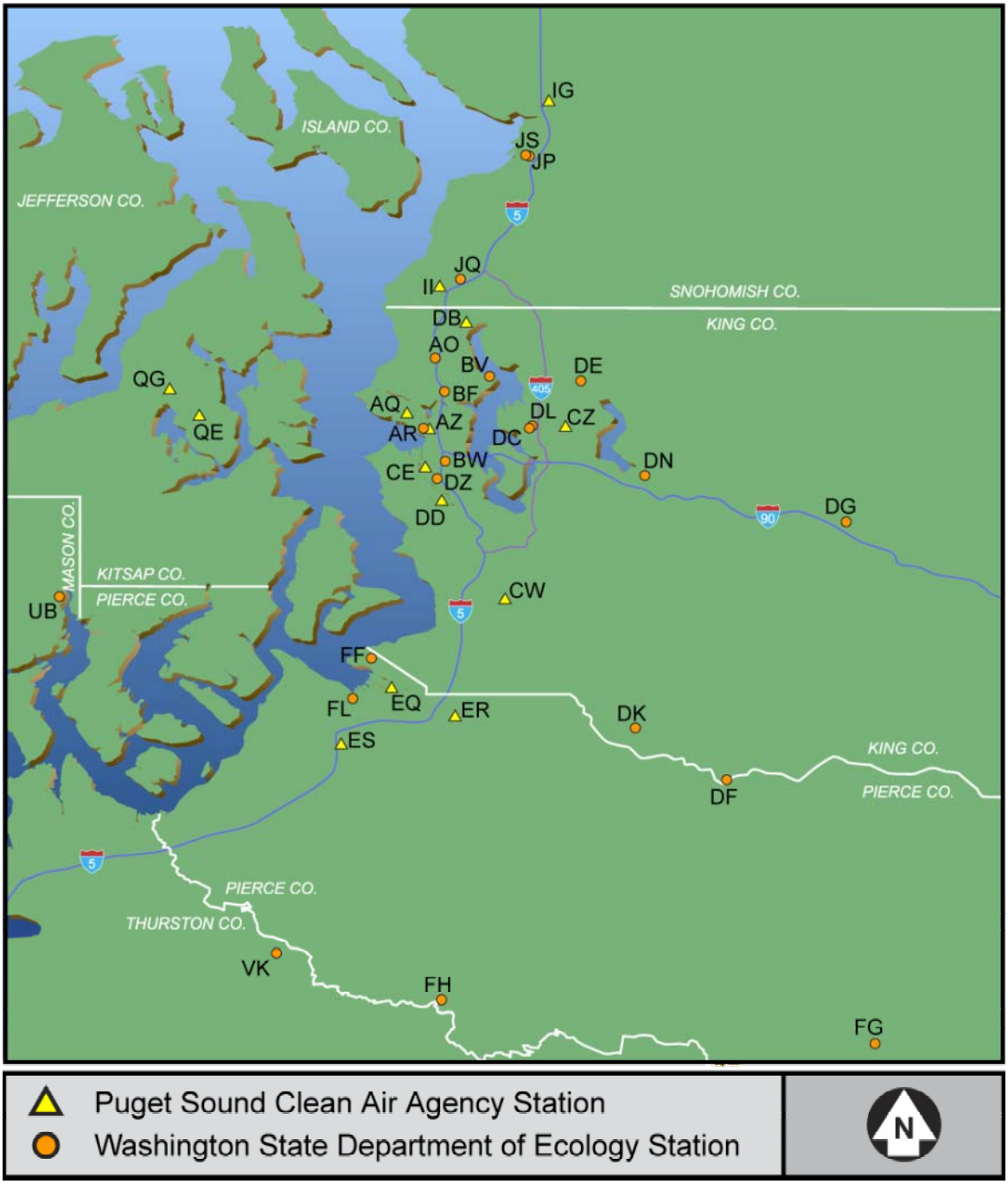
⊙	Station operated by Washington State Department of Ecology
CX	Italics indicate a station not currently operating
PM_{10} ref	Particulate Matter 10 micrometers (reference)
PM_{10} bam	Particulate Matter 10 micrometers (beta attenuation continuous)
PM_{10} teom	Particulate Matter 10 micrometers (teom continuous)
$PM_{2.5}$ ref	Particulate Matter 2.5 micrometers (reference)
$PM_{2.5}$ bam	Particulate Matter 2.5 micrometers (beta attenuation continuous)
$PM_{2.5}$ teom	Particulate Matter 2.5 micrometers (teom continuous)
$PM_{2.5}$ ls	Particulate Matter 2.5 micrometers (light scattering nephelometer continuous)
$PM_{2.5}$ bc	Particulate Matter 2.5 micrometers black carbon (light absorption aethalometer continuous)
O_3	Ozone (May through September)
SO_2	Sulfur Dioxide
NO_x	Nitrogen Oxide
CO	Carbon Monoxide
b_{sp}	Light scattering by atmospheric particles (nephelometer)
Wind	Wind direction & speed
Temp	Air temperature (relative humidity also measured at Beacon Hill)
AT	Air Toxics
VSBY	Visual range (light scattering by atmospheric particles)
PHOTO	Visibility (camera)

	Location
a	Urban Center
b	Suburban
c	Rural
d	Commercial
e	Industrial
f	Residential

Monitoring Methods Used from 1999 to 2003 in Puget Sound Air Shed

Pollutant Code	Measurement	Method	Units
Bap	Light Absorption by Particles	Light Absorption by Aethalometer	bap (x 10 exp-4)/m
Bsp	Light Scattering by Particles	Nephelometer - Heated Inlet	bsp (x 10 exp-4)/m
CO	Carbon Monoxide	Gas Nondispersive Infrared Radiation	Parts per Million
NO_x	Nitrogen Oxides (NO_x)	Chemiluminescence	Parts per Million
	Nitric Oxide (NO)	Chemiluminescence	Parts per Million
	Nitrogen Dioxide (NO_2)	Chemiluminescence	Parts per Million
O_3	Ozone	UV Absorption	Parts per Million
Pb	Lead	Standard High Volume	Micrograms per Standard Cubic Meter
PM_{10} ref	PM_{10} Reference	Reference - Hi Vol Andersen/ GMW 1200	Micrograms per Cubic Meter
PM_{10} bam	PM_{10} Beta Attenuation	Andersen FH621-N	Micrograms per Cubic Meter
PM_{10} teom	PM_{10} Teom	R&P Mass Transducer	Micrograms per Cubic Meter
$PM_{2.5}$ ref	$PM_{2.5}$ Reference	Reference—R&P Partisol 2025	Micrograms per Cubic Meter
$PM_{2.5}$ bam	$PM_{2.5}$ Beta Attenuation	Andersen FH621-N	Micrograms per Cubic Meter
$PM_{2.5}$ teom	$PM_{2.5}$ Teom	R&P Mass Transducer	Micrograms per Cubic Meter
$PM_{2.5}$ ls	$PM_{2.5}$ Nephelometer	Radiance Research M903 Nephelometer	Micrograms per Cubic Meter
$PM_{2.5}$ bc	$PM_{2.5}$ Black Carbon	Light Absorption by Aethalometer	Micrograms per Cubic Meter
RH	Relative Humidity	Continuous Instrument Output	Percent Relative Humidity
SO_2	Sulfur Dioxide	UV Fluorescence	Parts per Million
Temp	Temperature	Continuous Instrument Output	Degrees F
TSP	PM Total Hi-Vol	Standard High Volume	Micrograms per Standard Cubic Meter
Vsby	Visual Range	Light Scattering by Nephelometer	Miles
Wind	Wind Speed	RM Young 05305 Wind Monitor AQ	Miles per Hour
	Wind Direction	RM Young 05305 Wind Monitor AQ	Degrees

2003 Monitoring Station Locations



Impaired Air Quality—Burn Bans and Smog Watch

Burn Bans

Washington State has a winter impaired air quality program targeting sources of particulate matter from wood stoves and fireplaces. According to the Agency's *Regulation I, Article 13 Solid Fuel Burning Device Standards*, the first stage of impaired air quality is reached when at any monitoring station:

- PM_{10} concentrations (24-hour average) reach 60 $\mu g/m^3$, or
- Carbon monoxide concentrations (8-hour average) reach 8 ppm

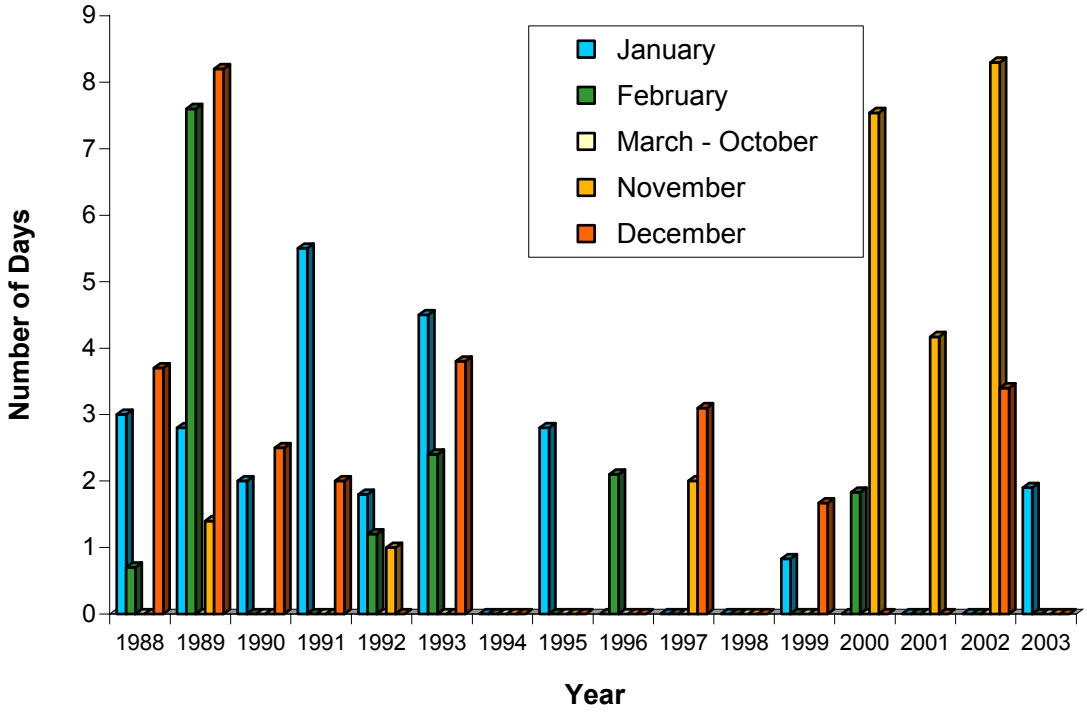
At these levels, a first-stage burn ban may be declared. For a first-stage burn ban, residential burning in fireplaces or uncertified wood stoves is prohibited (unless it is the only adequate source of heat). A second-stage burn ban may be declared when PM_{10} levels reach 105 $\mu g/m^3$ (24-hour average). For a second-stage burn ban, the use of any kind of wood-burning device is prohibited. The Agency has not issued a second-stage burn ban since 1991.

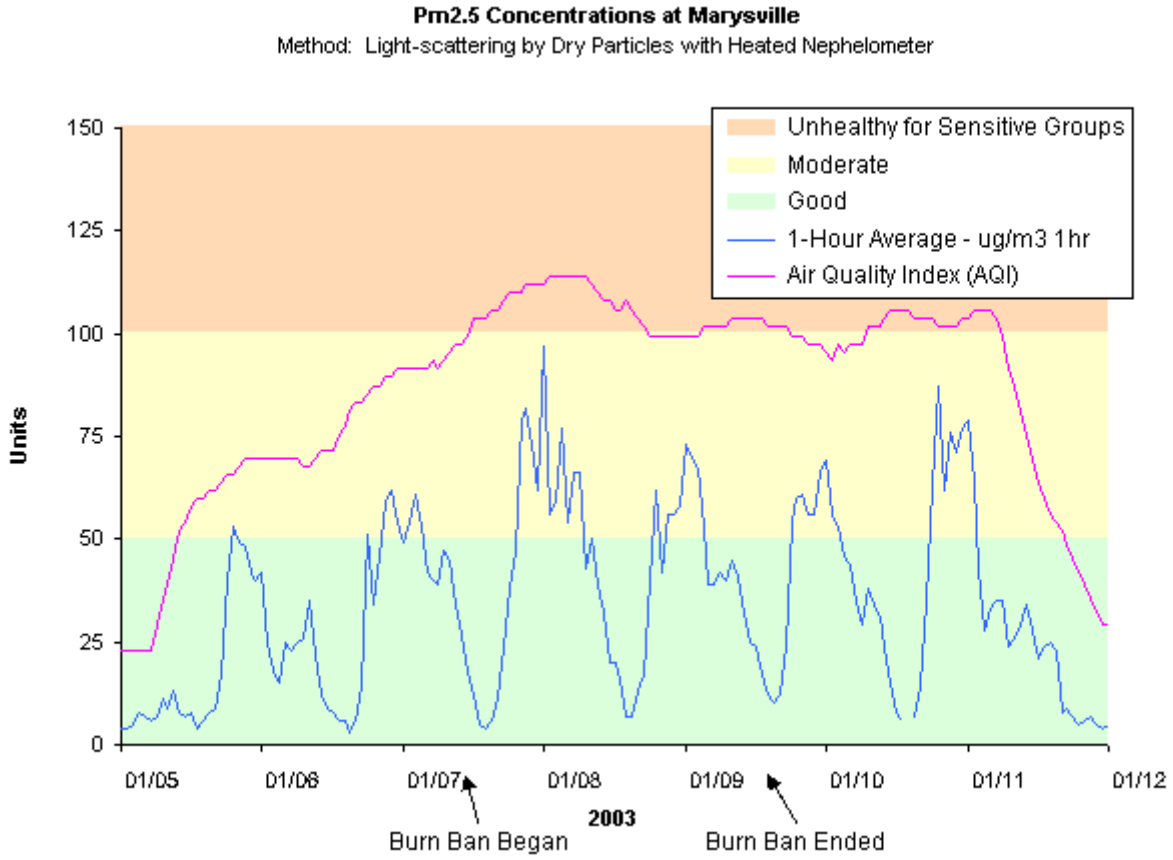
In decisions related to burn bans, the Agency considers that $PM_{2.5}$ levels, as the fine particulate fraction (<2.5 micrometers), are more indicative of wood smoke than PM_{10}, which also contains a coarse particulate fraction (2.5-10 micrometers). So, although the trigger is legally based on PM_{10}, $PM_{2.5}$ is discussed below.

Burn bans typically occur in November through February. In 2003 there was one first-stage ban, declared on Tuesday, January 7th at 3 pm which lasted until Thursday, January 9th at 12 pm (a total of 45 hours). A persistent ridge of high pressure over the Northwest created nightly temperature inversions that trapped pollutants. This was also a period of very cool temperatures and residential heating from wood burning. This, combined with poor air circulation and limited day-time ventilation, inhibited effective dispersion of pollutants and led to elevated coarse and fine particulate levels.

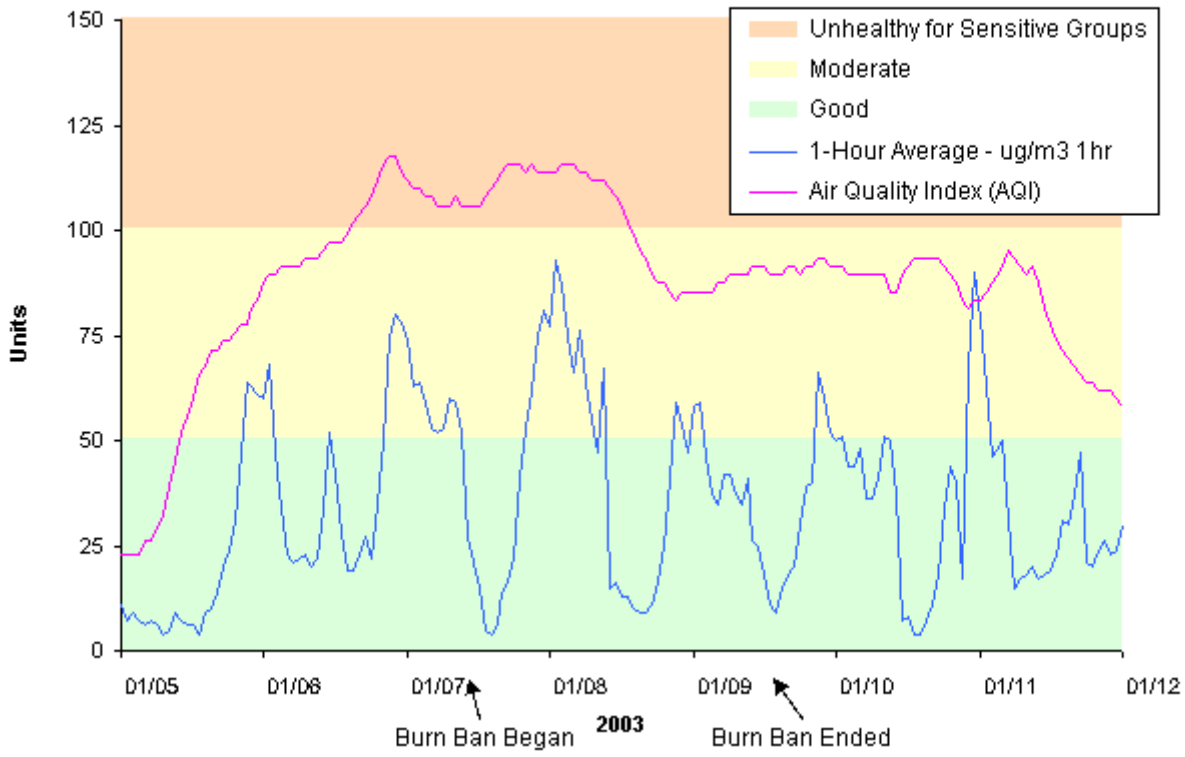
The graph on page 18 shows the number of days when burn bans have been declared since 1988. The graphs on pages 19 through 22 show the $PM_{2.5}$ levels at four monitoring sites before, during, and after the issued 2003 burn ban. The blue lines on these graphs represent 1-hour averages for $PM_{2.5}$ (measured by nephelometer), and the red lines represent the corresponding AQI (based on a 24-hour averaging time). Marysville and Tacoma (pages 19 and 20) are in residential areas with the heaviest wood burning, and both show the highest concentrations of $PM_{2.5}$, with the AQI going into the "unhealthy for sensitive groups" AQI range. In contrast, the Seattle and Bellevue monitors, sited in areas with less wood burning, show lower levels of $PM_{2.5}$ (pages 21 and 22). It is also apparent (looking at the blue lines) that the highest $PM_{2.5}$ concentrations are occurring in the late evening and early morning hours, which coincides with peak wood burning hours.

Impaired Air Quality
Number of Days with Indoor Burning Bans in Puget Sound Region

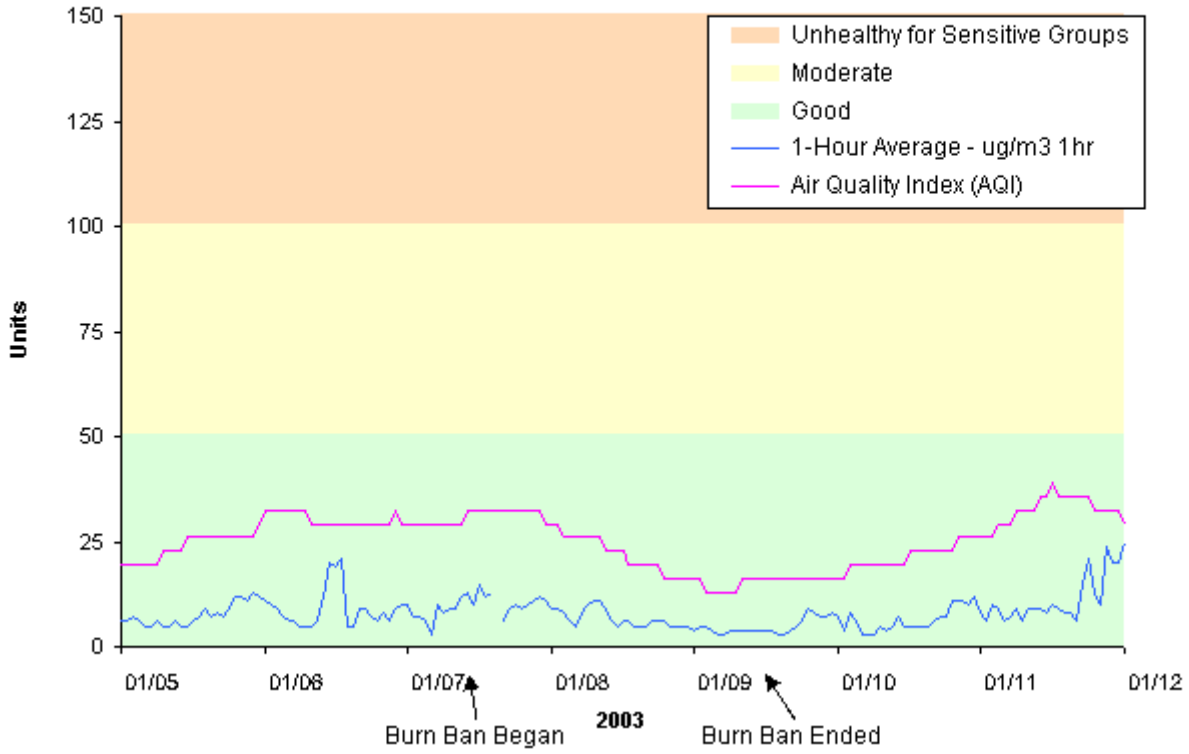



Pm2.5 Concentrations at Marysville
Method: Light-scattering by Dry Particles with Heated Nephelometer
Unhealthy for Sensitive Groups
Moderate
Good
1-Hour Average - ug/m3 1hr
Air Quality Index (AQI)
Units
150
125
100
75
50
25
0
01/05
01/06
01/07
01/08
01/09
01/10
01/11
01/12
2003
Burn Ban Began
Burn Ban Ended

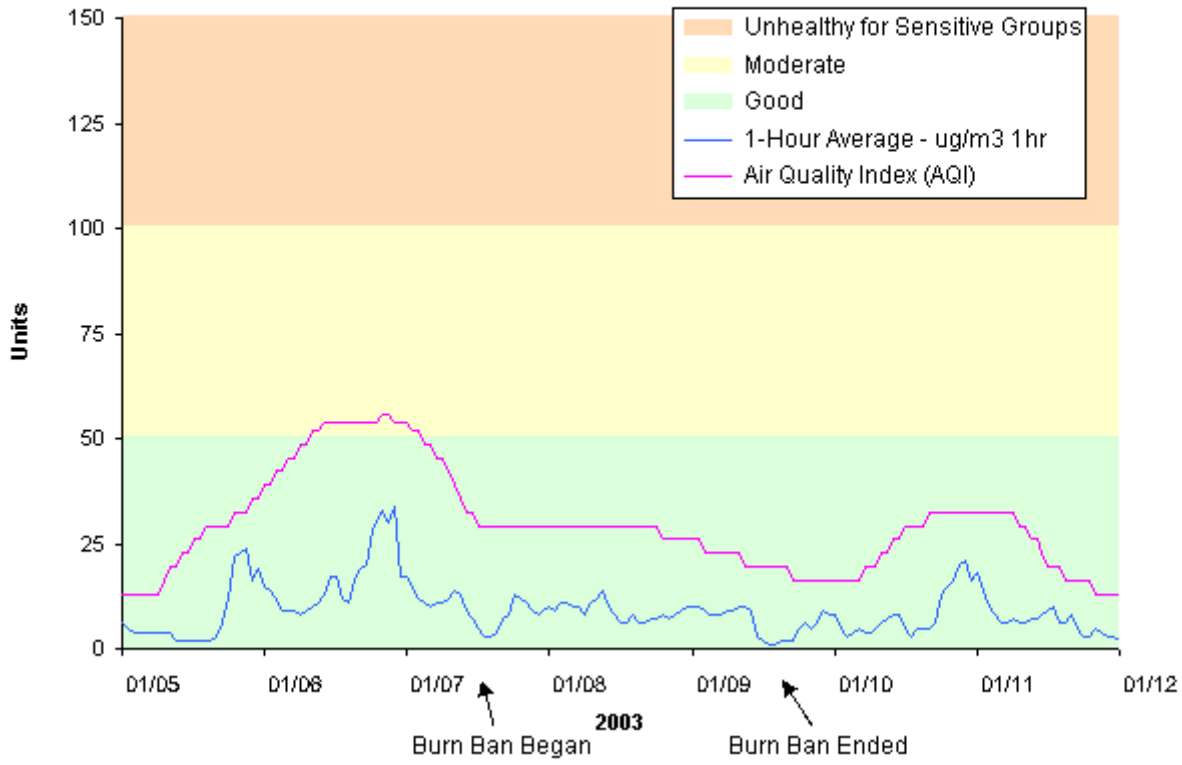
Pm2.5 Concentrations at Tacoma South L Street
Method: Light-scattering by Dry Particles with Heated Nephelometer



Pm2.5 Concentrations at Seattle, Queen Anne Hill
Method: Light-scattering by Dry Particles with Heated Nephelometer



Pm2.5 Concentrations at Bellevue, 143rd Ave NE
Method: Light-scattering by Dry Particles with Heated Nephelometer

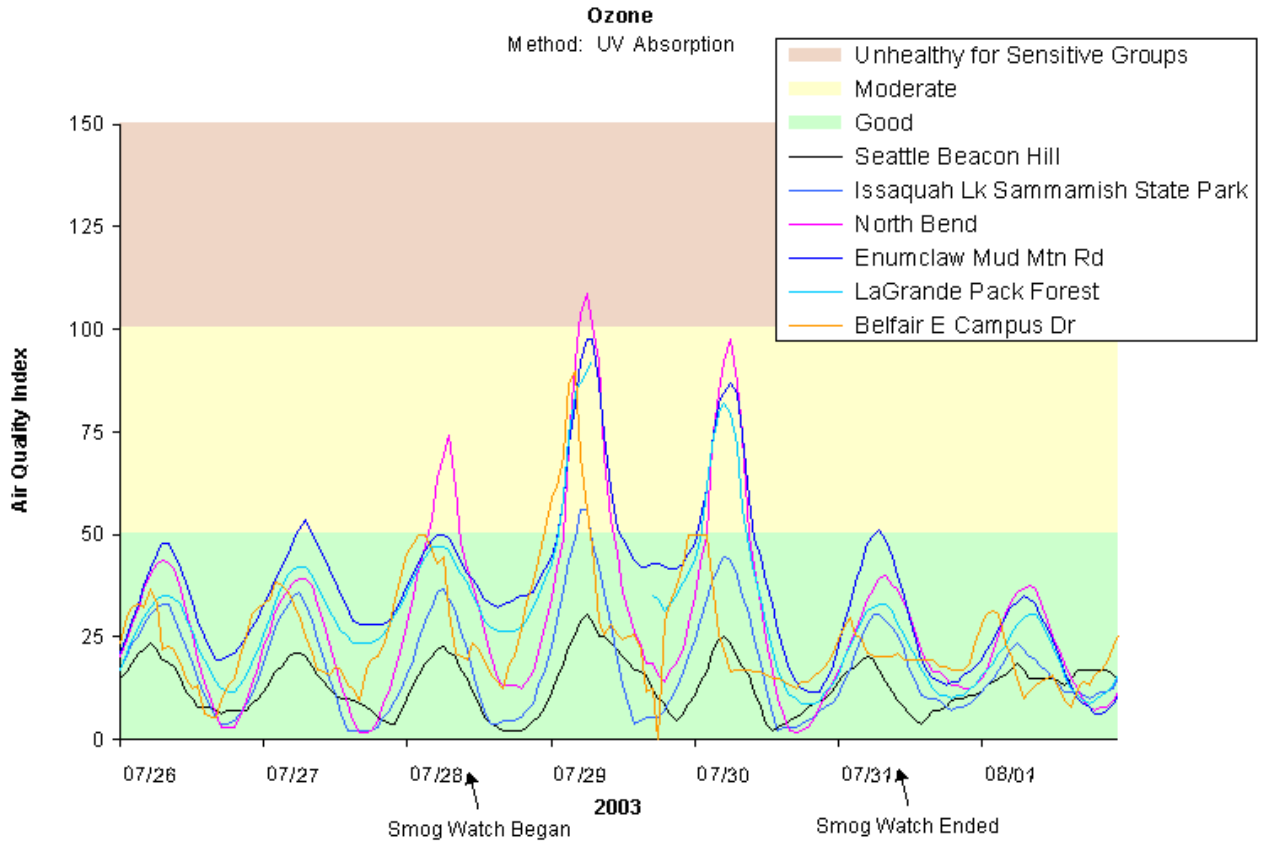


Smog Watch

The Agency maintains a voluntary air quality program called Smog Watch. It is an outreach awareness program that addresses causes of summer smog between June and September. The purpose of the program is to advise residents of potential smog problems and to recommend short-term actions they can take to help reduce maximum ozone levels. Smog Watch advisories are driven more by meteorology than by monitored air quality data. A Smog Watch is called when forecasts call for temperatures in the upper 80s or higher with little or no wind for at least a 48-hour period.

There was one Smog Watch issued during the summer of 2003, which lasted from 11 am on Monday, July 28th through 2 pm on Thursday, July 31st (a total of 75 hours). This period included hot weather and light winds that trapped pollutants near the surface. The graph on page 24 shows AQI ozone levels at six different monitoring sites before, during, and after this period. The graph confirms that the predicted conditions that spurred the smog watch were correct. The North Bend monitoring site registered an AQI of "unhealthy for sensitive groups" during this period. Ozone was the 'driving pollutant' for the AQI during this time period. The 8-hour ozone average is used to determine the AQI. These 8-hour ozone concentrations are shown in the table on page A-15 of the Appendix.

The Agency communicated with meteorologists, traffic reports, news media, and local businesses and agencies during the Smog Watch to encourage people to take measures to reduce smog levels. These voluntary actions included driving less (by carpooling, riding transit, teleworking), waiting until it cools off to use gasoline-powered mowers and power equipment, and refueling vehicles during the cooler evening hours.


Ozone
Method: UV Absorption
Unhealthy for Sensitive Groups
Moderate
Good
Seattle Beacon Hill
Issaquah Lk Sammamish State Park
North Bend
Enumclaw Mud Mtn Rd
LaGrande Pack Forest
Belfair E Campus Dr
Air Quality Index
150
125
100
75
50
25
0
07/26
07/27
07/28
07/29
07/30
07/31
08/01
2003
Smog Watch Began
Smog Watch Ended

Regional Air Emission Inventory

This section presents an air emission inventory summary for four of the six criteria pollutants (CO, NO_X, $PM_{2.5}$, SO_2) and volatile organic compounds (VOC), a precursor of ozone, as well as a brief overview of air toxics. An emission inventory is useful because it helps to identify the sources of pollutants. Identified sources of pollution can then be addressed in an effort to reduce emissions through improved technologies, campaigns and education to change behaviors, and economic incentives. The National Emission Inventory (NEI) is prepared by the US EPA every three years, with input from local and state agencies. The inventory discussed below includes data from the EPA NEI for this region, as well as data that has been collected by the Agency and the Washington State Department of Ecology. Local data has been substituted for the NEI data in instances where local estimates more accurately reflect local conditions. The Agency updates the regional emission inventory more frequently than the national inventory, in order to more accurately characterize sources and determine trends, which ultimately affects the prioritization of emission reduction programs.

Source Categories

There are four general categories that are used to characterize emission sources, and virtually hundreds of subcategories. The four general categories include:

- Point Sources
- Mobile On-Road Sources
- Mobile Non-Road Sources
- Stationary Area Sources

Point sources are those that many people think of when thinking of air pollution. These include large industries that emit several tons of pollution or more per year from a single location. A description of the thresholds associated with these sources is included on page 87 of the definitions section of this document.

Mobile on-road sources include cars, trucks, and buses, both commercial and private. This category includes vehicles that run on both gasoline and diesel fuel. As with stationary area sources, on-road mobile sources contribute significantly to air pollution in this region.

Mobile non-road sources include, for example, marine vessels, farm vehicles, construction vehicles, aircraft, trains, locomotive, and garden equipment.

Area sources are stationary, and do not individually emit as much tonnage as point sources. Area sources include commercial businesses such as dry cleaners, printers, and small construction, as well as everyday activities such as burning in a wood stove or fireplace. Although area sources on an individual basis emit far less than point sources, the large numbers of these activities make them a significant contributor to pollution in this region.

Criteria Air Pollutants

An emission inventory was performed by the Agency for calendar year 2002 that summarized the quantities of criteria air pollutants for the four categories described above. This inventory covers only anthropogenic sources; biogenic sources of volatile organics such as vegetation and crops are not included. In many instances emission estimates from the EPA's 2002 Preliminary National Emission Inventory (NEI), released in March 2004, were used. 2002 information is used for this report since this is the latest complete inventory year of data. 1999 NEI values were used for a few stationary area subcategories where no 2002 data were available. 1999 values for these subcategories are likely comparable with values for 2002. The inventory covered all four counties (King, Kitsap, Pierce, and Snohomish) and was based on the following sources of information:

- Annual operating permit emission reports (point sources)
- Annual registered facility emission reports (point sources)
- Emission factor and activity level derived estimates (area and mobile sources)
- Mobile source models (on-road and non-road mobile sources)

Point sources, including annual operating and registered facility emission reports, are the most straightforward source of information for the emission inventory. Facilities are required to report the tonnage of emissions that they release each year. The area source emission factor derived estimates may have more uncertainty associated with them, as they must take into account activity levels (for example, the amount that people perform an activity such as burning wood in a fireplace, or driving to work) that are taken from sources such as surveys, census reports, etc. In addition to the uncertainty associated with activity levels, there is also uncertainty regarding the emission factors themselves. These values are typically developed by EPA, in consultation with state and local air agencies and industry. Additional information on emission factors and how they are derived is available at http://www.epa.gov/oar/oaqps/efactors.html.

The following table presents the contributions from each source category for criteria pollutants. For particulate matter, only $PM_{2.5}$ is listed. Tables providing a detailed breakdown of pollutants in subcategories are available beginning page A-5 of the Appendix. These tables are divided into the major source categories: point (page A-5 through A-6), on-road mobile (pages A-7 through A-9), non-road mobile (pages A-10 through A-11), and stationary area sources (pages A-12 through A-13).

Puget Sound Region 2002 Estimated Criteria Air Pollutant Emission Inventory Summary (thousands of tons)

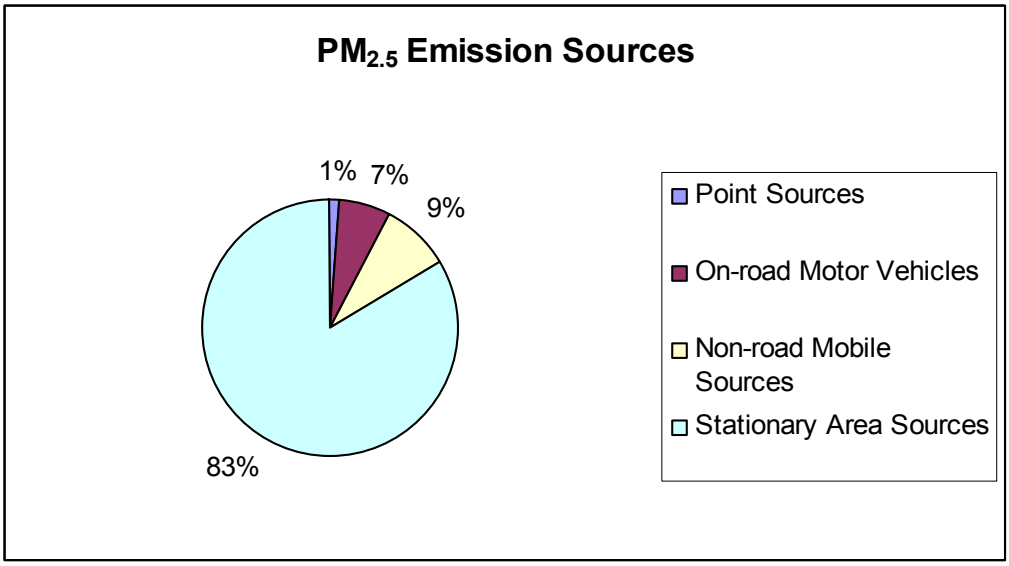
Source Category	CO	NO_X	$PM_{2.5}$	SO_2	VOC
Point Sources	4	6	0	2	2
On-road Motor Vehicles	925	105	2	3	77
Non-road Mobile Sources	276	38	2	4	21
Stationary Area Sources	62	9	22	2	65
Totals	**1,268**	**158**	**27**	**11**	**164**

Note: Totals represent rounding to the nearest thousand tons and are not simply the sum of the rounded subcategory values.

This inventory demonstrates that on-road vehicles are the most significant contributor to criteria pollutant emissions in the Puget Sound air shed. Area sources are the major contributor of $PM_{2.5}$ emissions. Each pollutant is discussed briefly below, and information in the table above is presented graphically.

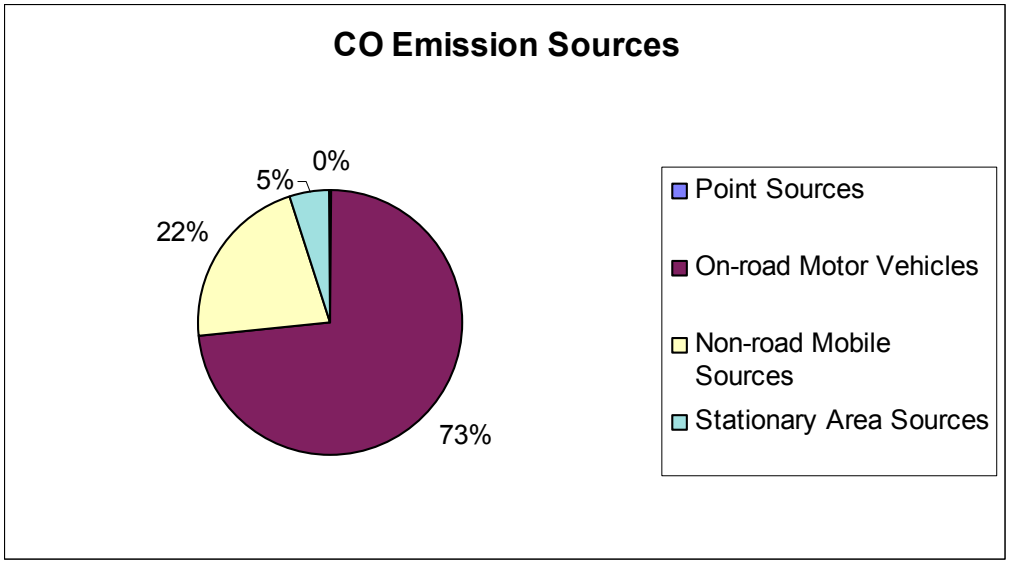
Particulate Matter ($PM_{2.5}$)

Stationary area sources (also called area sources) are the largest contributor of $PM_{2.5,}$ with 83% of the contribution as shown below. The largest stationary area contributing subcategories are open burning for land clearing, open burning of residential trash, and residential burning in fireplaces and wood stoves. These three combined contribute over half of the contribution of stationary area sources.



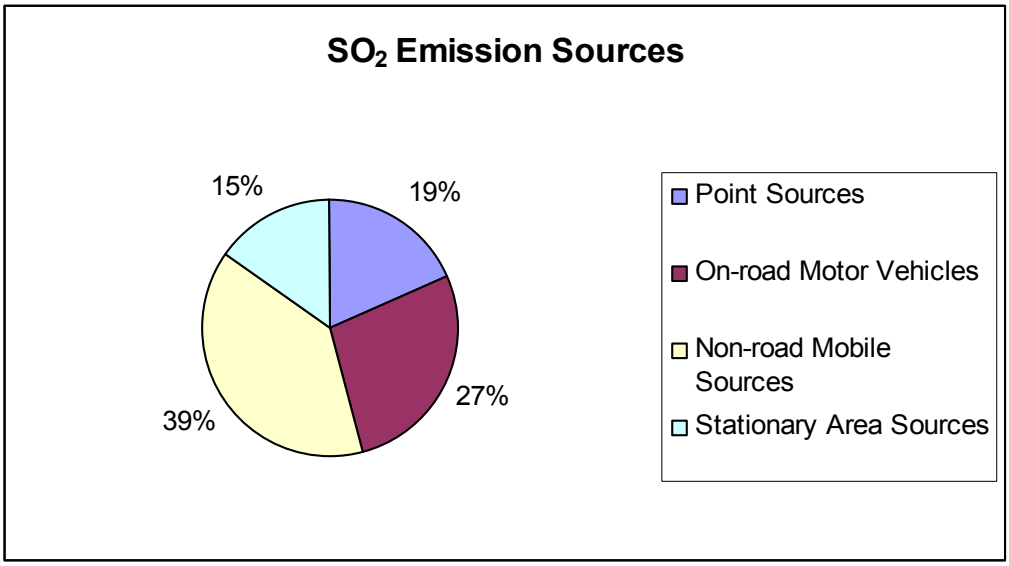
Carbon Monoxide

On-road vehicles are clearly the greatest contributor of CO to the atmosphere in the region. In the graph below, point sources are barely visible as contributors, as they emit less than 1% of the total CO (the 5% is attributed to stationary area sources). Almost 95% of the on-road vehicle contribution comes from light duty gasoline vehicles (cars) and light duty gasoline trucks (trucks and sport utility vehicles).



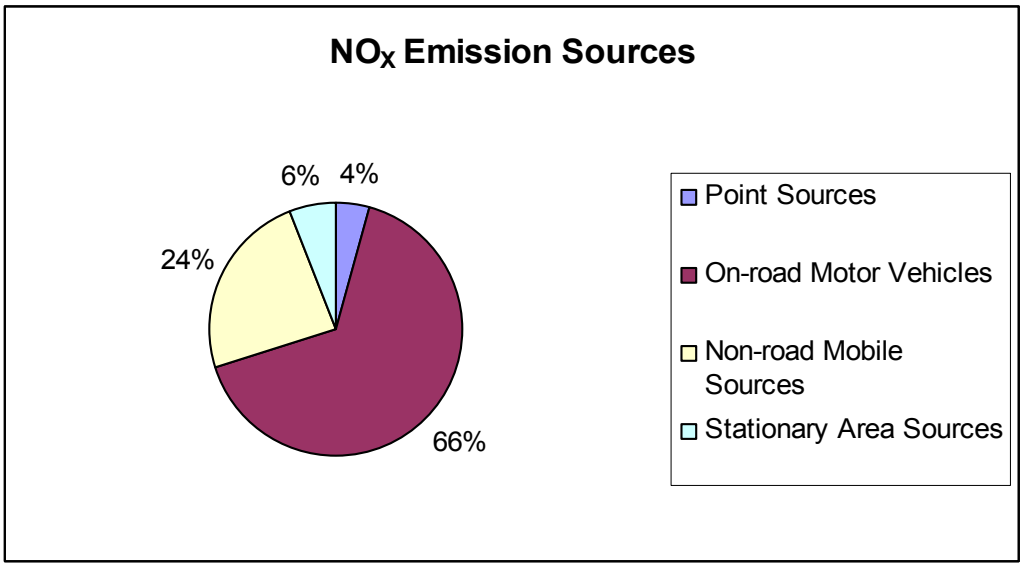
Sulfur Dioxide

Non-road vehicles comprised the greatest portion of contributors of SO_2 emissions, with 39% of the contribution. On-road vehicles also contributed a significant portion, with 27%. The largest contributing subcategories for non-road vehicles are port emissions from marine vessels (both residual and diesel fuels), and construction crawler tractors and dozers (that run on diesel). These three combined contribute more than half of the non-road portion. The largest on-road contributing sub-categories are light duty gasoline vehicles, light duty gasoline trucks, and heavy duty diesel trucks. These three contribute three-fourths of the on-road portion.



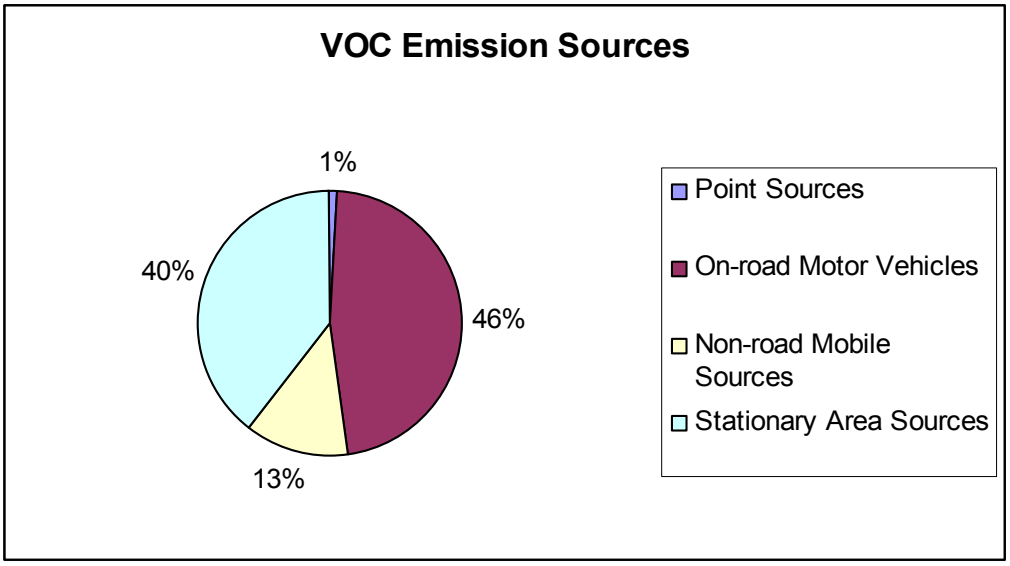
Nitrogen Oxides

On-road vehicles are also the greatest source of emissions of NO_X, with 66% of the total source contribution. The largest subcategories for on-road contributors for NO_X are light duty gasoline vehicles and light duty gasoline trucks. These subcategories combined contribute almost nine-tenths of the total on-road portion.



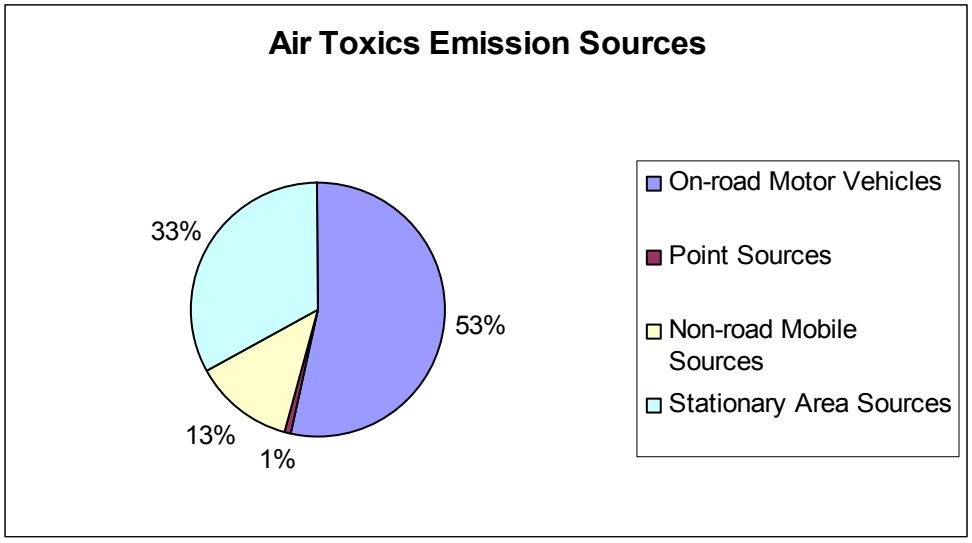
Volatile Organic Compounds

VOCs are included in the CAP emission inventory discussion as they are a primary precursor for ozone (a criteria pollutant). The graph below shows that on-road vehicles contribute the greatest portion of VOCs to the atmosphere with 46% of the total. Area sources also contribute a significant amount, with 40% of the total. The largest contributing subcategories for on-road are light duty gasoline vehicles and trucks. Together these contribute almost the entire on-road portion. The largest contributing subcategories for area sources are burning wood in fireplaces, and solvents in architectural coatings and personal care products. These three combined contribute about one-third of the area source portion. There is some concern that the EPA emission factor for calculating VOCs from fireplace burning is high when compared to open burning VOC factors; thus, its impact may not be as significant as presented here.



Air Toxics

A 2002 emission inventory was also conducted for air toxics. A full presentation of this inventory is not within the scope of this report. The number of pollutants involved makes it difficult to make simple comparisons between the source categories. Additionally, the air toxics emissions estimates for non-road mobile sources are incomplete for 2002. Data presented in this report for non-road mobile sources are from the 1999 NEI. Air toxics included in the 2002 inventory are listed, along with associated amounts, on page A-14 of the Appendix. In general, the greatest source category for air toxics emissions was on-road vehicles, with greater than half of the total contribution. The three greatest pollutants associated with on-road vehicles are toluene, xylenes, and benzene. Benzene is classified by EPA as a human carcinogen; toluene and xylenes are associated with central nervous system effects. Area sources also contributed significantly to emissions, with one-third of the total contribution. Toluene was the most significant air toxic in this source group, with the greatest portion coming from burning in wood stoves and fireplaces. Formaldehyde, a pollutant listed as a probable human carcinogen by EPA, is also a pollutant of concern in the Puget Sound region. Formaldehyde has significant emissions from on-road vehicles and area sources. More specific information about the 2002 air toxics inventory is available upon request.



Air Quality Standards

The Clean Air Act (CAA), last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The standards are designed to primarily protect the general public, including sensitive populations such as asthmatics, children, and the elderly. They are also intended to safeguard public welfare by reducing effects such as decreased visibility and damage to animals, crops, vegetation, and buildings. The US EPA has established standards for six criteria pollutants (the seven listed below include two types of particulate matter).

The state of Washington and the Puget Sound region have adopted these standards, and in the case of sulfur dioxide have also applied a stricter state standard. For more information, the US EPA air quality standards and supporting rationale are available at http://epa.gov/air/criteria.html. Washington State air quality regulations are available at http://www.ecy.wa.gov/laws-rules/ecywac.html#air (specifically chapter 173-470, 474, and 475 WAC). The air quality standards that are applied for the Puget Sound air shed are summarized in the table below.

Puget Sound Region Air Quality Standards for Criteria Pollutants

Pollutant	Standard	Level
Ozone	The daily maximum 1-hour average cannot exceed the level more than an average of once per year over a 3-consecutive-year period	0.12 ppm
	The 3-year average of the 4th highest daily maximum 8-hour average concentration cannot exceed the level	0.084 ppm
Particulate Matter (10 micrometers)	The 3-year annual average of the daily concentrations cannot exceed	54 $\mu g/m^3$
	The 3-year average of the 99th percentile (based on the number of samples taken) of the daily concentrations cannot exceed	154 $\mu g/m^3$
Particulate Matter (2.5 micrometers)	The 3-year annual average of the daily concentrations cannot exceed	15.4 $\mu g/m^3$
	The 3-year average of the 98th percentile (based on the number of samples taken) of the daily concentrations cannot exceed	65 $\mu g/m^3$
Carbon Monoxide	The 1-hour average cannot exceed the level more than once per year	35 ppm
	The 8-hour average cannot exceed the level more than once per year	9.4 ppm
Sulfur Dioxide	Annual arithmetic mean of 1-hour averages cannot exceed	0.02 ppm
	24-hour average cannot exceed	0.10 ppm
	1-hour average cannot exceed	0.40 ppm
	AND no more than twice in 7 consecutive days can the 1-hour average exceed	0.25 ppm
Lead	The quarterly average (by calendar) cannot exceed	1.5 $\mu g/m^3$
Nitrogen Dioxide	The annual mean of 1-hour averages cannot exceed	0.053 ppm

Note: Daily concentration is the 24-hour average, measured from midnight to midnight.

In some instances, comparison of numbers in this table with sources listed above may appear to be slightly off (for instance, ozone 8-hour standard 0.084 ppm listed in the table versus 0.08 ppm on the EPA website). These slight differences are due to a rounding convention adopted by EPA and the

number of significant figures. The numbers shown on the table above are those used to determine if an area is in compliance, and are reflected in the graphs on the following pages.

Each pollutant typically has different standards for different averaging times (for example, hourly and 8-hour average). These different standards are created and enforced to address varied health impacts that happen as a result of a shorter, high-level exposure versus longer, low-level exposures. These differences are addressed pollutant-by-pollutant in the following sections, and additional information is on the EPA website listed above. A distinction exists between "exceeding" and "violating" a standard; the two are not equivalent. This distinction is due to the nature of the standards. In most instances it is allowable for an area to exceed the standard a few times, to allow for possible meteorological aberrances. For example, a carbon monoxide 8-hour average of 10 ppm clearly exceeds the standard, however it does not violate the standard if it is the only exceedance that year (the standard allows for one exceedance).

The EPA standards typically apply to an 'area', which may be defined in different ways. Data are often presented for individual monitoring stations in the following sections because this provides more insight into how pollutants are distributed in the Puget Sound area. The summaries that follow show how the Puget Sound air shed compared to the standards above for the year 2003, and in many instances also incorporates the AQI and other measures of air quality where appropriate. The AQI shading is shown to aid interpretation of air quality, but does not imply whether or not standards were actually met for each pollutant; only meeting the conditions listed in the table above warrant compliance.

Ozone

Ozone is a summertime air pollution problem, and is not directly emitted by pollutant sources. It forms when photochemical pollutants from cars and industrial sources react with sunlight. Ozone levels are usually highest in the afternoon because of the intense sunlight. The months of May through September are of concern for high ozone levels in the Pacific Northwest. Hotter areas of the country such as the Southwest have longer periods of ozone concern. People frequently hear of ozone in the atmosphere. In this context ozone is considered beneficial because it helps to protect the earth from the sun's rays; however, when it is formed at ground level it is unhealthy. High concentrations of ground-level ozone can cause respiratory distress in humans and are associated with decreased yields of agricultural crops and forests. The damage ozone causes to the lungs heals within a few days, but repeated or prolonged exposure may cause permanent damage. People with respiratory conditions should limit outdoor exertion if ozone levels are high. Even healthy individuals may experience respiratory symptoms on a high-ozone day.

The majority of monitoring stations measuring ozone are located in rural regions of the Puget Sound, although the precursor chemicals that react with sunlight to produce ozone are generated primarily in large metropolitan areas. The photochemical formation of ozone takes several hours; thus, the highest concentrations of ozone are measured in the communities downwind of these large urban areas. In the Puget Sound region, the hot sunny days favorable for ozone formation are typified by light north-to-northwest winds. Ozone has typically been transported 10 to 30 miles downwind from the original source by the time the highest concentrations have formed in the afternoon and early evening. Thus, the highest ozone concentrations are measured in areas such as North Bend, Enumclaw, and Eatonville.

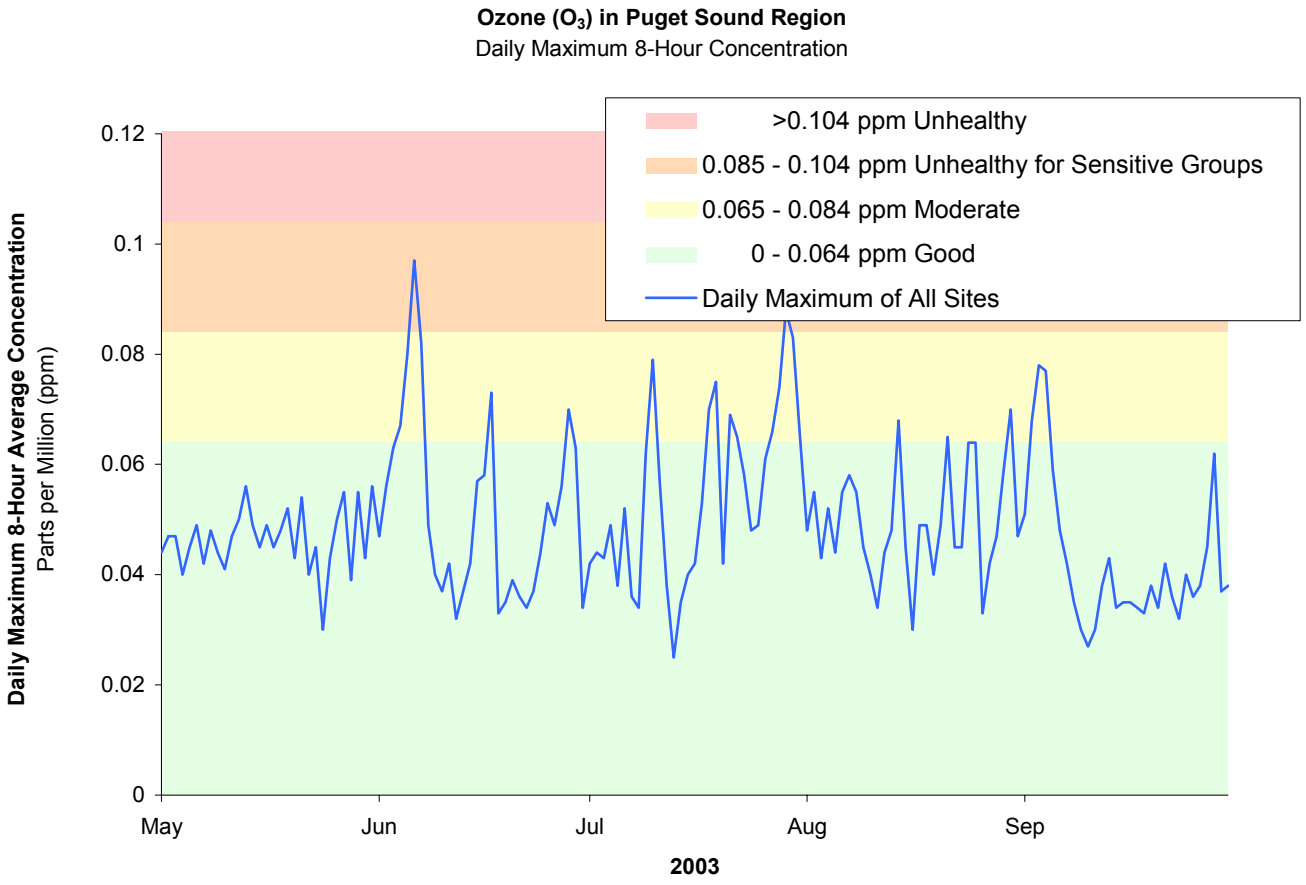
Graphs presented on the following pages show trends in ozone levels in the Puget Sound air basin, reflecting both the AQI and the NAAQS standards. The graph on page 36 presents 8-hour average data for the months of May through September, as these are the months where ozone levels are greatest. The shading on the graph corresponds to the AQI breakpoints for ozone, which is typically based on the 8-hour average. The graph on page 37 shows the trend of ozone over the summer for the last six years; it is easy to see that there have not been levels in the "unhealthy" zone since 1998.

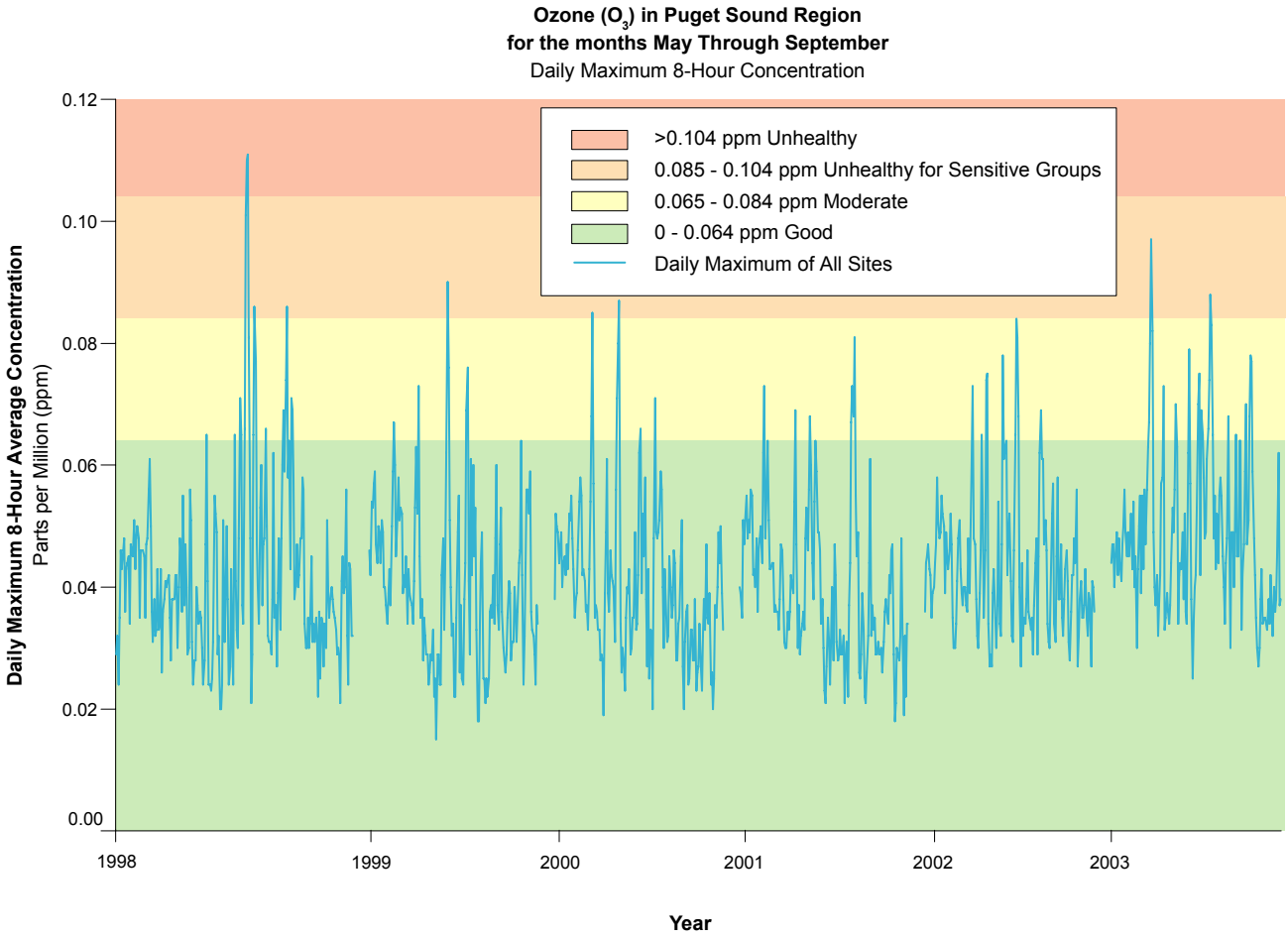
The graph on page 38 shows monitoring data for each monitoring station against the federal standard, and shows that the region has fallen below the standard since 1993. This means the 3-year average of the 4th-highest 8-hour concentration has not violated the NAAQS standard of 0.084 ppm since 1992. The ozone standard is defined such that the three highest concentrations can exceed the level of the standard while still maintaining attainment. Values presented on the graph are 3-year averages (of 4th-highest concentrations); the year on the x-axis represents the last year averaged. For example, concentrations shown for 2003 are an average of 2001, 2002, and 2003 concentrations. The table on page A-15 of the Appendix shows that the 8-hour standard of 0.084 ppm was exceeded twice in 2003: near Enumclaw (0.097 ppm on June 6th) and in North Bend (0.088 ppm on July 29th).

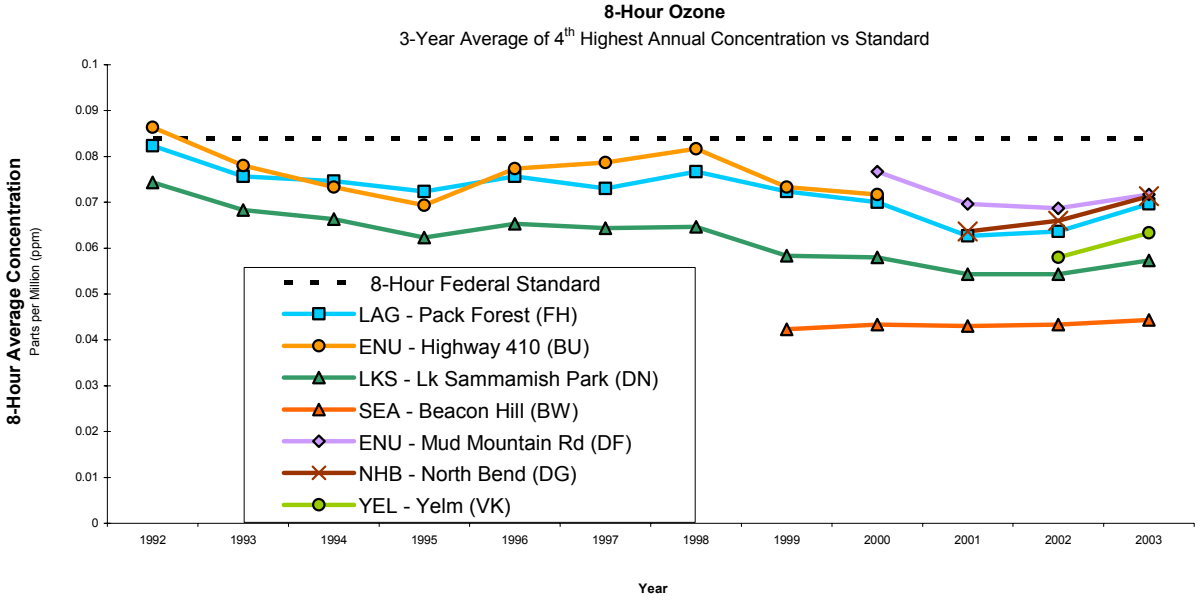
The 1-hour standard of 0.12 ppm was not exceeded in 2003 at any site during measurements, as seen in the table on page A-16 of the appendix. The 1-hour standard is not believed to be as important as the 8-

hour standard in regard to health effects, and may be phased out in areas that are in attainment. Thus, compliance with the 8-hour standard is stressed here.

For additional information on ozone, visit www.epa.gov/air/urbanair/ozone/index.html. There is also additional information on ozone in question/answer format in the definitions section of this document.




Ozone (O_3) in Puget Sound Region
for the months May Through September
Daily Maximum 8-Hour Concentration
>0.104 ppm Unhealthy
0.085 - 0.104 ppm Unhealthy for Sensitive Groups
0.065 - 0.084 ppm Moderate
0 - 0.064 ppm Good
Daily Maximum of All Sites
Daily Maximum 8-Hour Average Concentration
Parts per Million (ppm)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1998
1999
2000
2001
2002
2003
Year


8-Hour Ozone
3-Year Average of 4th Highest Annual Concentration vs Standard
8-Hour Average Concentration
Parts per Million (ppm)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Year
8-Hour Federal Standard
LAG - Pack Forest (FH)
ENU - Highway 410 (BU)
LKS - Lk Sammamish Park (DN)
SEA - Beacon Hill (BW)
ENU - Mud Mountain Rd (DF)
NHB - North Bend (DG)
YEL - Yelm (VK)

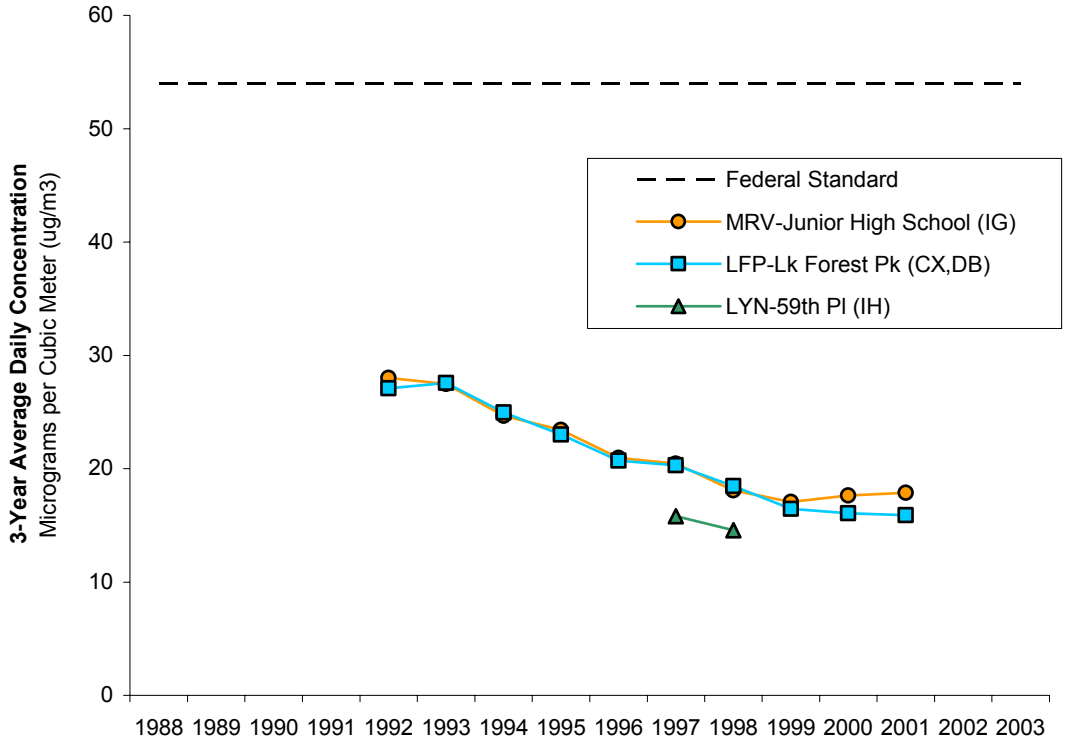
Particulate Matter (10 micrometers)

Particulate matter (PM) includes both solid matter and liquid droplets suspended in the air. Particles smaller than 2.5 micrometers in diameter are called "fine" particles, or $PM_{2.5}$. Particles between 2.5 and 10 micrometers in diameter are called "coarse" particles. PM_{10} includes both fine and coarse particles. Coarse particles typically come from crushing or grinding operations and dust from roads. PM_{10} can aggravate respiratory conditions such as asthma. People with respiratory conditions should avoid outdoor exertion if PM_{10} levels are high. PM_{10} is monitored in the Puget Sound area using both reference and continuous methods. Reference method results are shown in graphs below, and continuous data is primarily used to inform the public of air quality values in near real time.

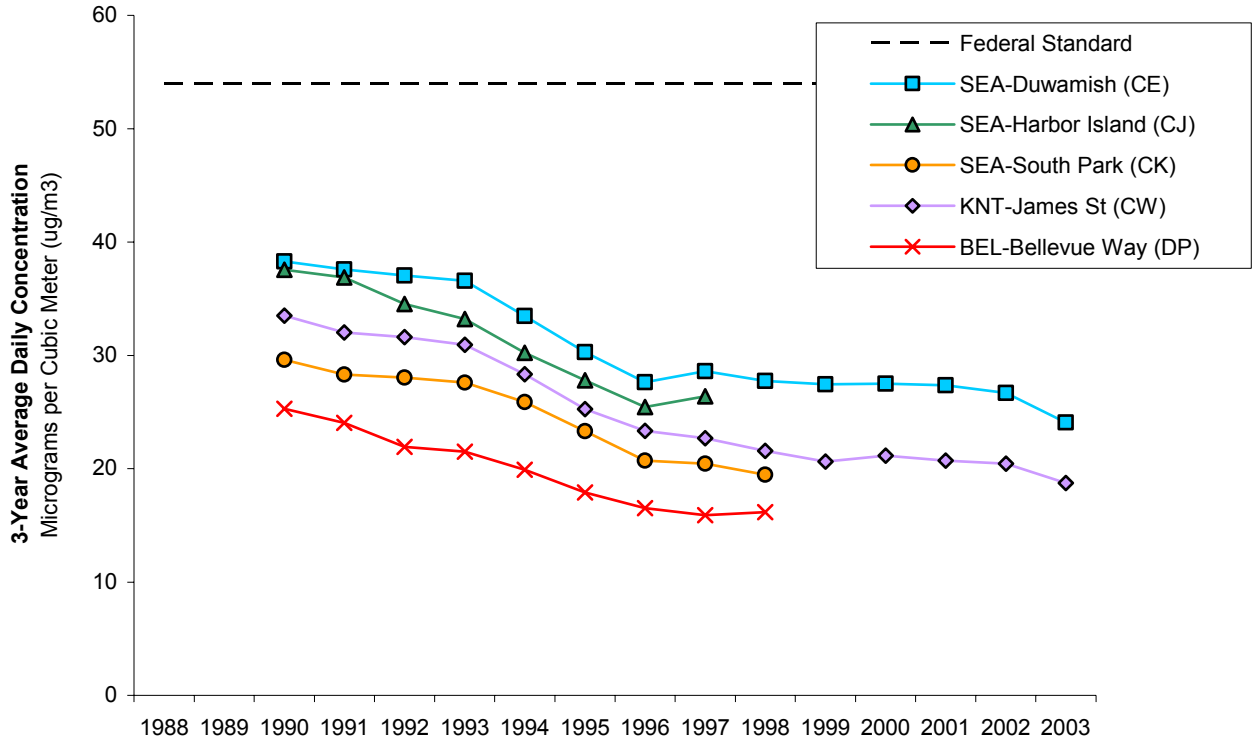
The graphs on the following pages demonstrate that the Puget Sound air shed was in compliance for both the annual and daily NAAQS standards for PM_{10}. Concentrations were measured using the reference method. Graphs on pages 40 through 43 show the annual PM_{10} at individual monitoring stations for each county. Average annual values have been further averaged over three years to be consistent with the federal standard. It is clear that all concentrations are well below the NAAQS standards. Years shown on the x-axis are actually the last year that was averaged. For example, data points for 2003 are actually data points reflecting the 3-year average of 2001, 2002, and 2003. It is apparent that values in Snohomish and Kitsap Counties have historically been so far below the standard, with decreasing trends, that they are no longer monitored for PM_{10} using the reference method. Their graphs are included on pages 40 and 43 for consistency with previous reports. Graphs show that all counties have been below standards since the early 1990s, and in 2001 the US EPA designated the Puget Sound in attainment for PM_{10}. Consistently, the highest values (which are well below standards) for PM_{10} are measured in the industrial areas of the Duwamish valley in Seattle (station CE) and the port area in Tacoma (station EQ).

The daily maximum 24-hour PM_{10} values are shown for individual monitoring stations in each county on pages 44 through 47**.** The standard for 24-hour PM_{10} requires that the 99^{th} percentile of the 3-year average not exceed the standard of 154 $\mu g/m^3$. Again, years shown on the x-axis are actually the last year that was averaged, as the standard requires a 3-year average. Presenting the maximum value here is even more conservative than presenting the standard of the 99^{th} percentile. Maximum daily values confirm that the area has shown a fairly consistent decrease since 1990. Statistical summaries of reference and continuous method PM_{10} concentrations are provided in tables on pages A-17 and A-18 of the Appendix, respectively. The maximum PM_{10} measured was 88 $\mu g/m^3$ on January 10th in the Duwamish area measured by a continuous equivalent method analyzer. This value is well below the standard set for the 99^{th} percentile. For additional information on PM_{10}, visit www.epa.gov/air/urbanair/pm/index.html. More information on PM_{10} is also presented in question/answer format in the definitions section of this document.

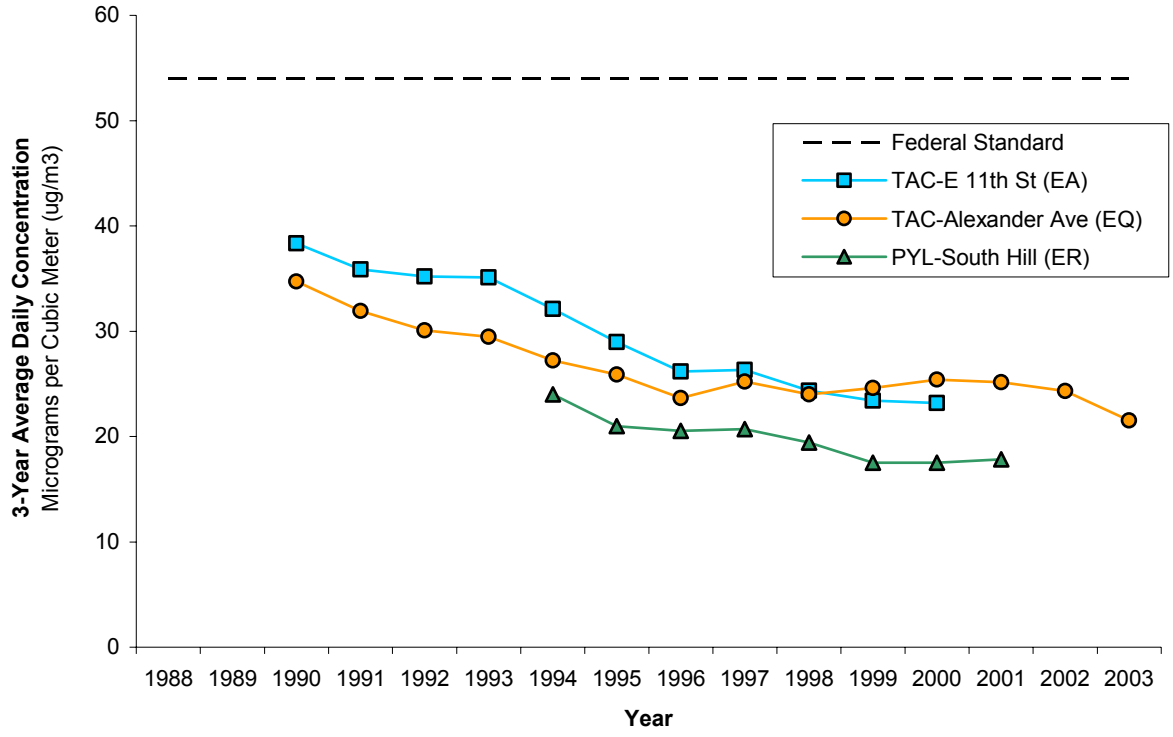
Annual Pm_{10} for Snohomish County
3-Year Average of Annual Mean vs Standard
Reference Method



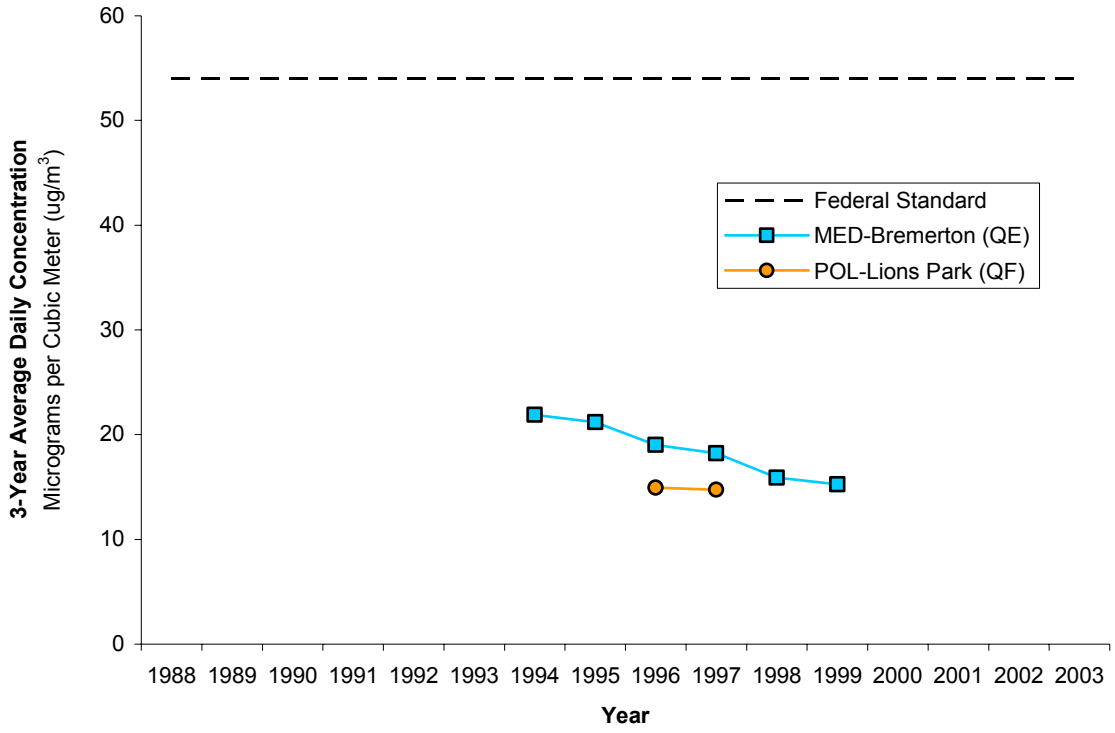
Annual Pm_{10} for King County
3-Year Average of Annual Mean vs Standard
Reference Method



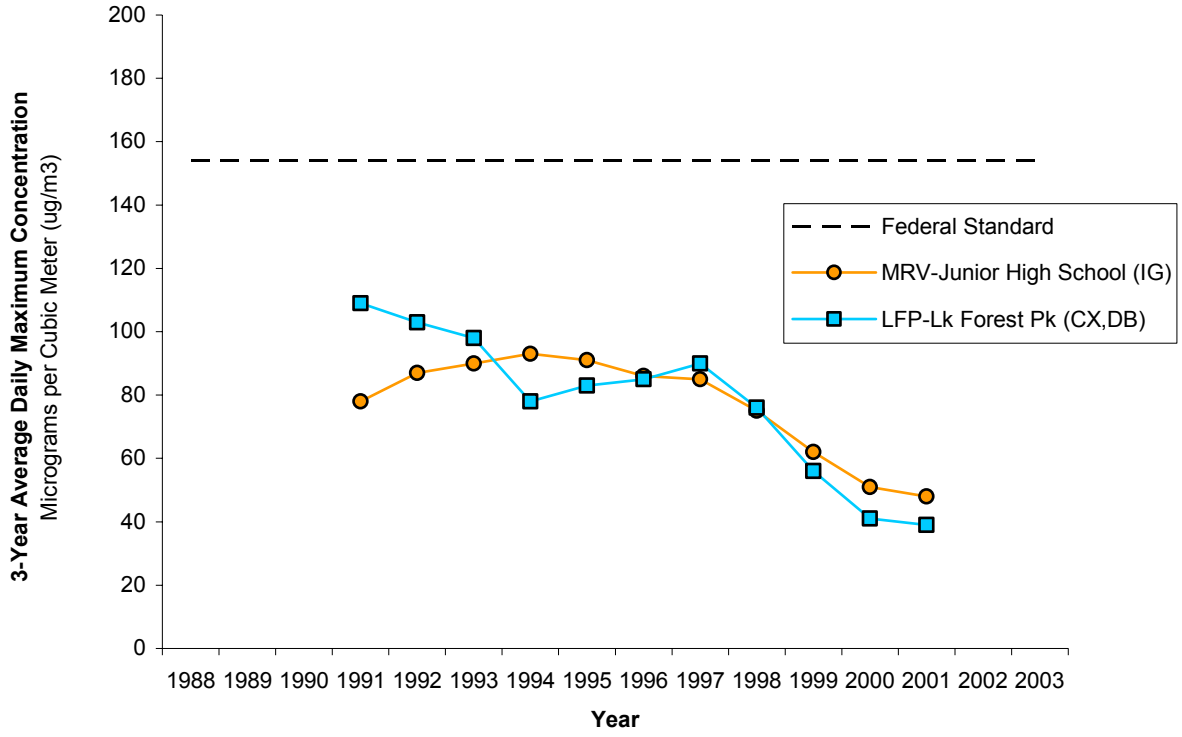
Annual Pm_{10} for Pierce County
3-Year Average of Annual Mean vs Standard
Reference Method



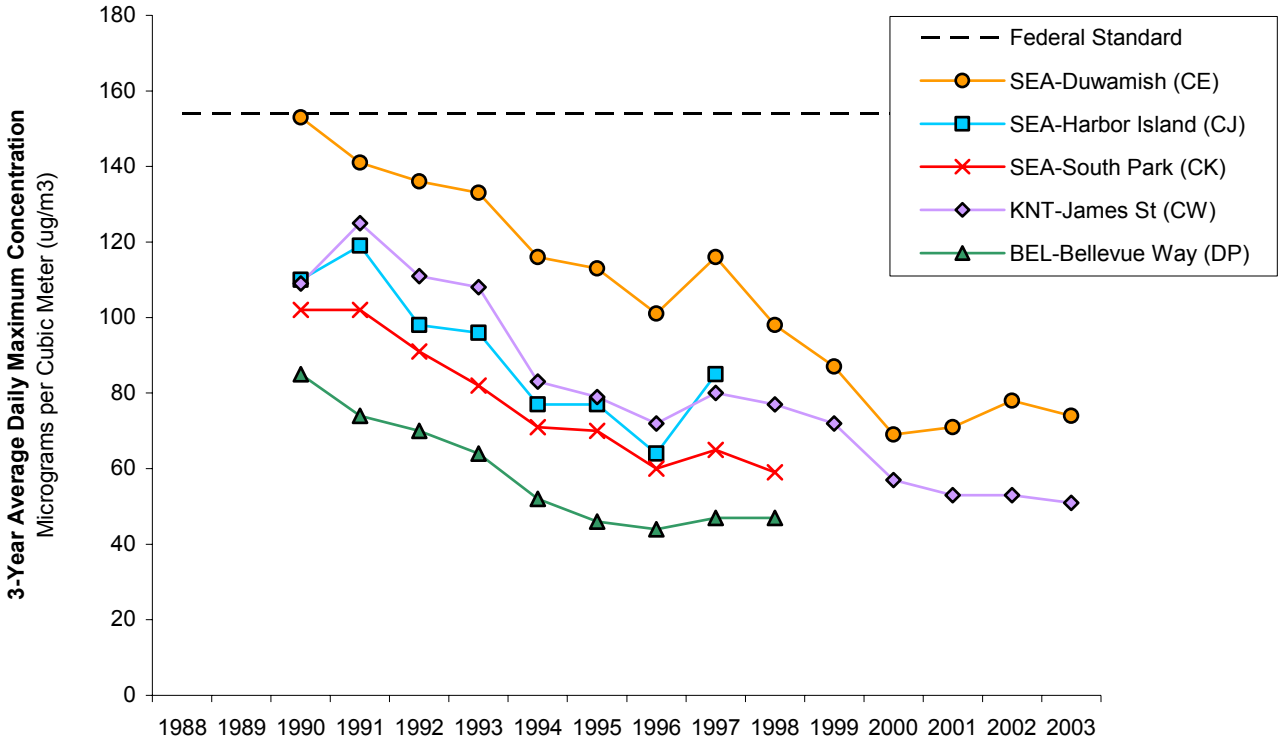
Annual Pm_{10} for Kitsap County
3-Year Average of Annual Mean vs Standard
Reference Method



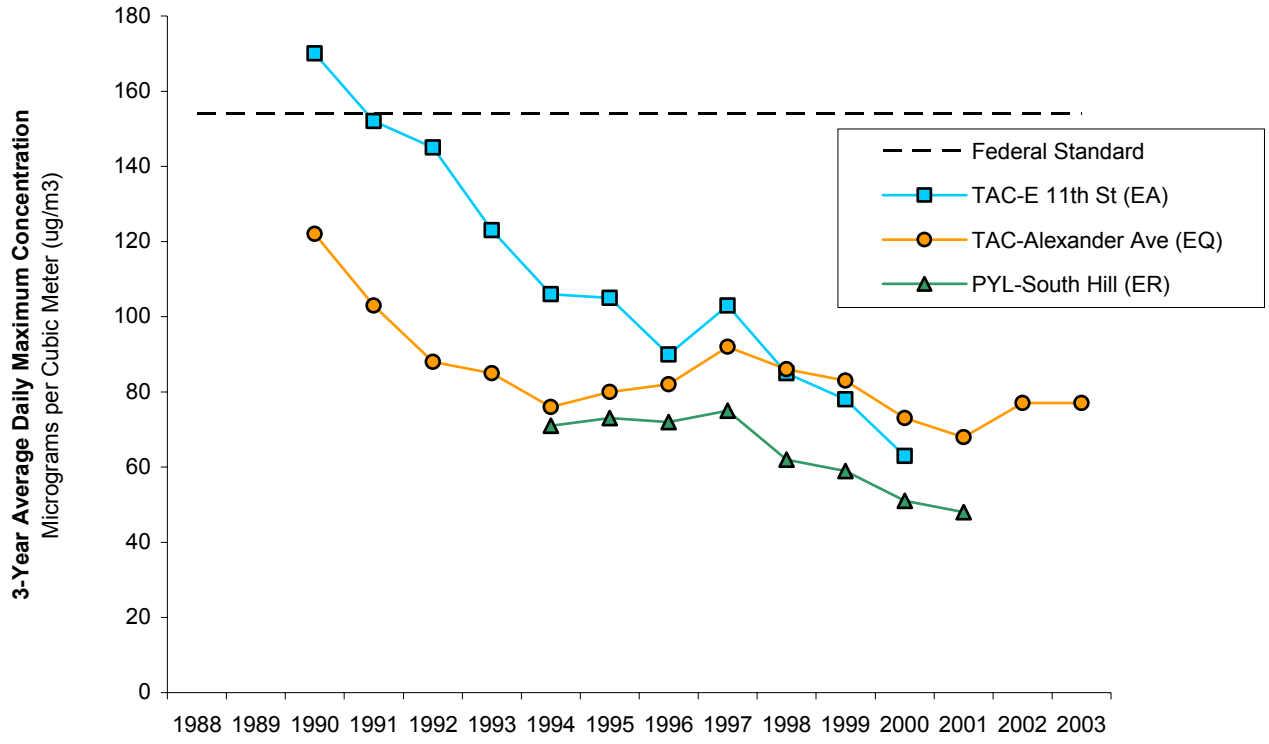
Daily Pm_{10} for Snohomish County
3-Year Average of Daily Maximum vs Standard
Reference Method



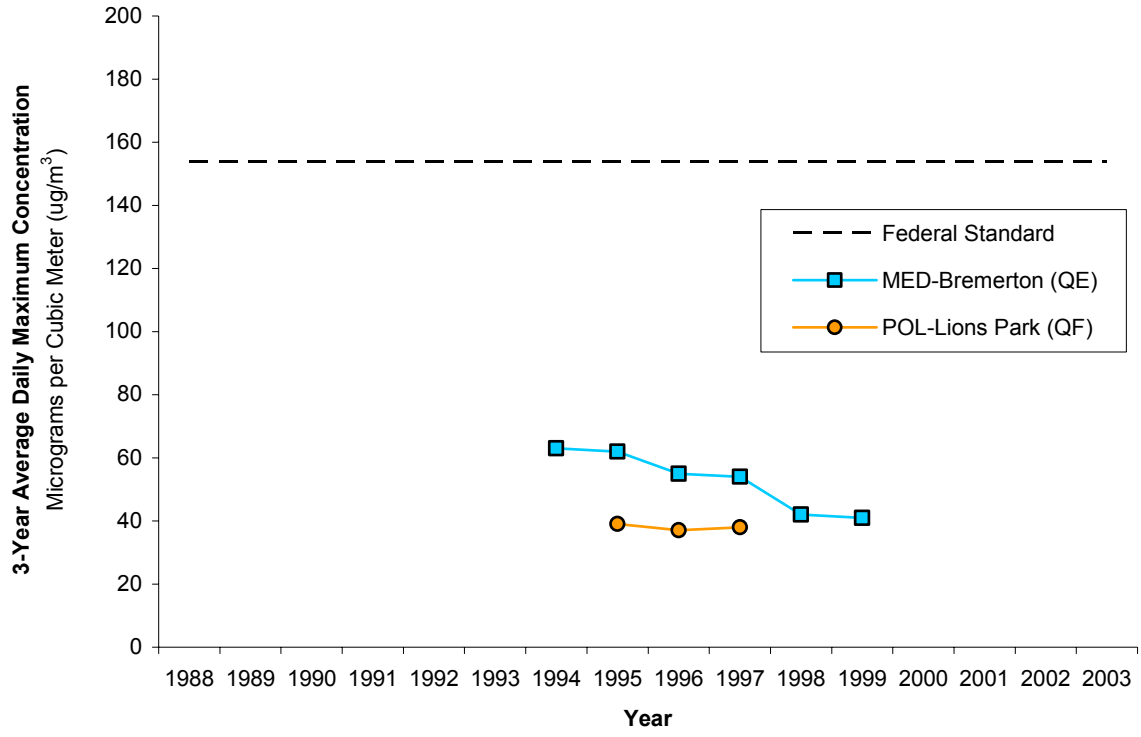
Daily Pm_{10} for King County
3-Year Average of Daily Maximum vs Standard
Reference Method



Daily Pm_{10} for Pierce County
3-Year Average of Daily Maximum vs Standard
Reference Method



Daily Pm_{10} for Kitsap County
3-Year Average of Daily Maximum vs Standard
Reference Method



Particulate Matter (2.5 micrometers)

Particles smaller than 2.5 micrometers in diameter are called "fine" particles, or *$PM_{2.5}$*. The Agency considers $PM_{2.5}$ one of the major air pollution concerns affecting our region. $PM_{2.5}$ generally comes from wood burning and other area sources, as well as vehicle exhaust including cars, diesel trucks, and buses. It can also be formed in the atmosphere by chemical reactions of pollutant gases. $PM_{2.5}$ exposure can have serious health effects. Fine particles are most closely associated with increased respiratory disease, decreased lung function, and even premature death. Children and older adults are more sensitive, and more likely to develop heart or lung problems associated with $PM_{2.5}$. People with respiratory or heart disease, older adults, and children should avoid outdoor exertion if $PM_{2.5}$ levels are high. $PM_{2.5}$ also significantly affects visibility.

$PM_{2.5}$ is measured using different methods in the Puget Sound region. The federal reference method (FRM) is considered by EPA to be the most accurate way to determine $PM_{2.5}$ concentrations. This method involves pulling in air (at a given flow rate) and trapping particles of a certain size (in this case $PM_{2.5}$) on a filter. The filter is then weighed and divided by volume (determined from flow rate and amount of time) to provide concentration. Unfortunately, the FRM method does not provide continuous or timely information. Thus, three continuous methods are often used to provide more time-relevant data: the nephelometer, the Tapered Element Oscillating Microbalance (TEOM), and the Beta-ray Attenuation Monitor (BAM). The nephelometer method uses scattering of light, and the TEOM method uses measurement of mass to determine particulate matter present. The BAM measures beta-ray transmission across a filter tape to determine particulate concentration. In addition, aethalometers (which function by measuring light absorption) were recently added at several sites (in late 2002 and 2003) to better determine the black carbon component of $PM_{2.5}$. Black carbon (BC) includes particles from wood smoke, diesel particulate matter, and particles from other combustion sources. Black carbon analysis is performed to better understand and define the major sources of $PM_{2.5}$. Additional information on black carbon monitoring with aethalometers can be found at http://www.pscleanair.org/airq/Aeth-Final.pdf.

The graphs in this section use data primarily from the FRM, nephelometer, and TEOM methods. Every year all of the continuous methods are compared to the reference method values and calculations are made to determine the degree of difference from the reference method. The differences are then applied to the current continuous values in an attempt to make them "FRM -like."

The graphs on pages 50 through 55 show that $PM_{2.5}$ meets both annual and daily NAAQS using the standard reference method. The Puget Sound air shed has been in compliance with both standards for $PM_{2.5}$ since 1999. The graphs on pages 56 through 61 use data from the continuous samplers to display $PM_{2.5}$ with the AQI. Both types of graphs are discussed below.

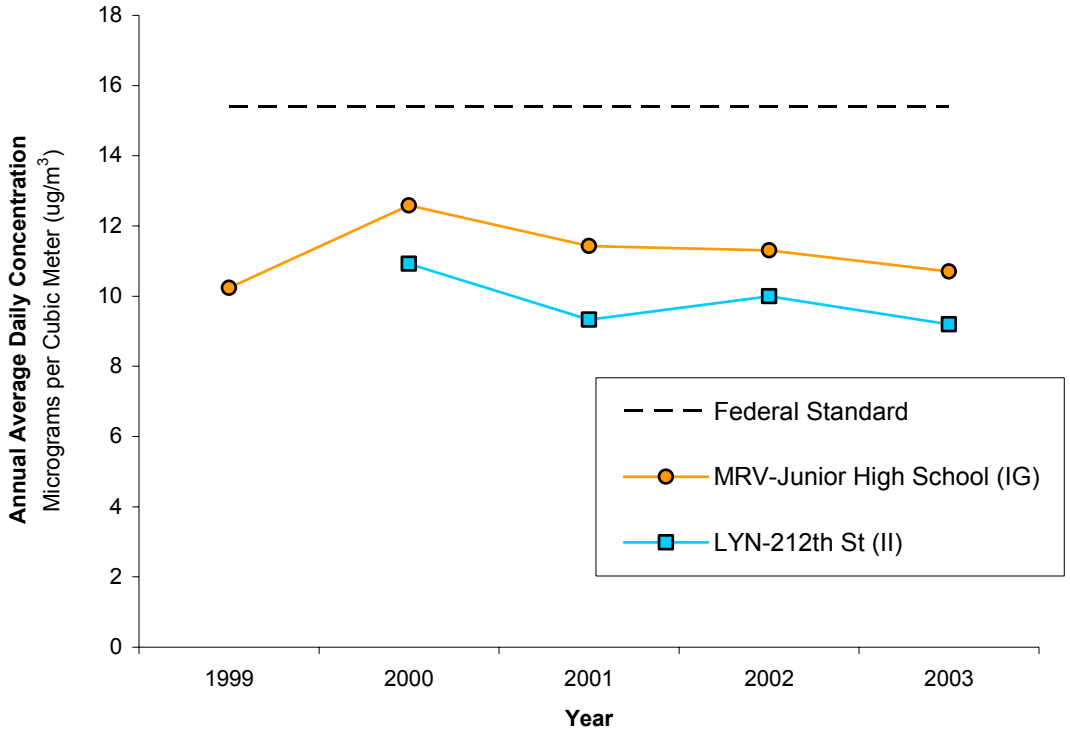
The graphs on pages 50 through 52 show annual averages at each monitoring station for Snohomish, King, and Pierce counties, against the federal standard. The standard calls for a 3-year average; however, annual averages are plotted on these graphs because 3-year averages would result in only a few data points. Nonetheless, it is easily seen that the annual standard of 15.4 $\mu g/m^3$ was not exceeded at any of the monitoring stations (nor would a 3-year average).

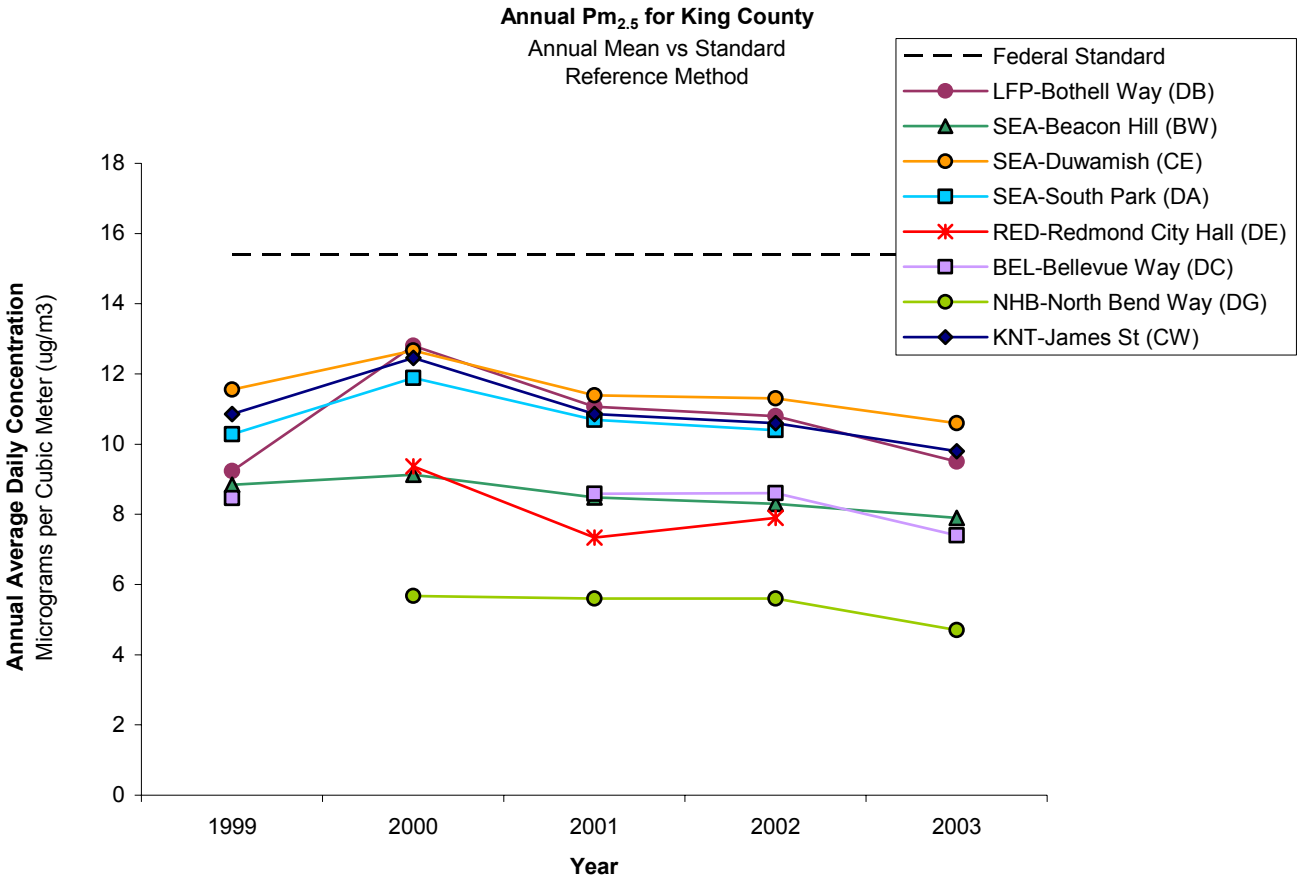
The graphs on pages 53 through 55 show daily 98th percentile averages at each monitoring station in Snohomish, King, and Pierce County against the federal standard. As shown in the standards table, the 98th percentile is actually for a 3-year average. For purposes of these graphs, however, the 3-year average is not taken because there are so few years to show (there would be only two or three points on each graph). It is easy to see, however, that data for all years fell well below the standard of 65 $\mu g/m^3$, and the 3-year average would also fall below.

Graphs on pages 56 through 60 show daily $PM_{2.5}$ concentrations measured at five sites during 2003 by two continuous analyzers (nephelometer and TEOM) set against a backdrop of AQI breakpoints. It is easily seen that the two methods (one using light scattering and the other mass) correspond well with each other. These sites are meant to represent different areas: Marysville, Lake Forest Park, Tacoma, and Bellevue are neighborhood/commercial in character, and the Duwamish is industrial. The pattern at all sites of higher $PM_{2.5}$ concentrations in winter months (October-March) is consistent with what has been observed earlier. The Seattle (Duwamish) site, with fewer wood smoke sources in the vicinity, shows less seasonal variability, and that the Marysville and Tacoma sites (associated with the most wood burning) reflect the greatest seasonal variability. An additional graph on page 61 shows daily $PM_{2.5}$ averages measured at Bremerton (Meadowdale) by a single continuous analyzer (BAM). This site is located in a neighborhood area, and does not exhibit as much seasonable variability (likely due to lower density housing/less wood smoke impact). As mentioned earlier, all continuous analyzer graphs represent data that were adjusted using site-specific relationships with the FRM (over the last two years). These adjustments were made by applying correctional coefficients to ensure that continuous data are comparable with the FRM.

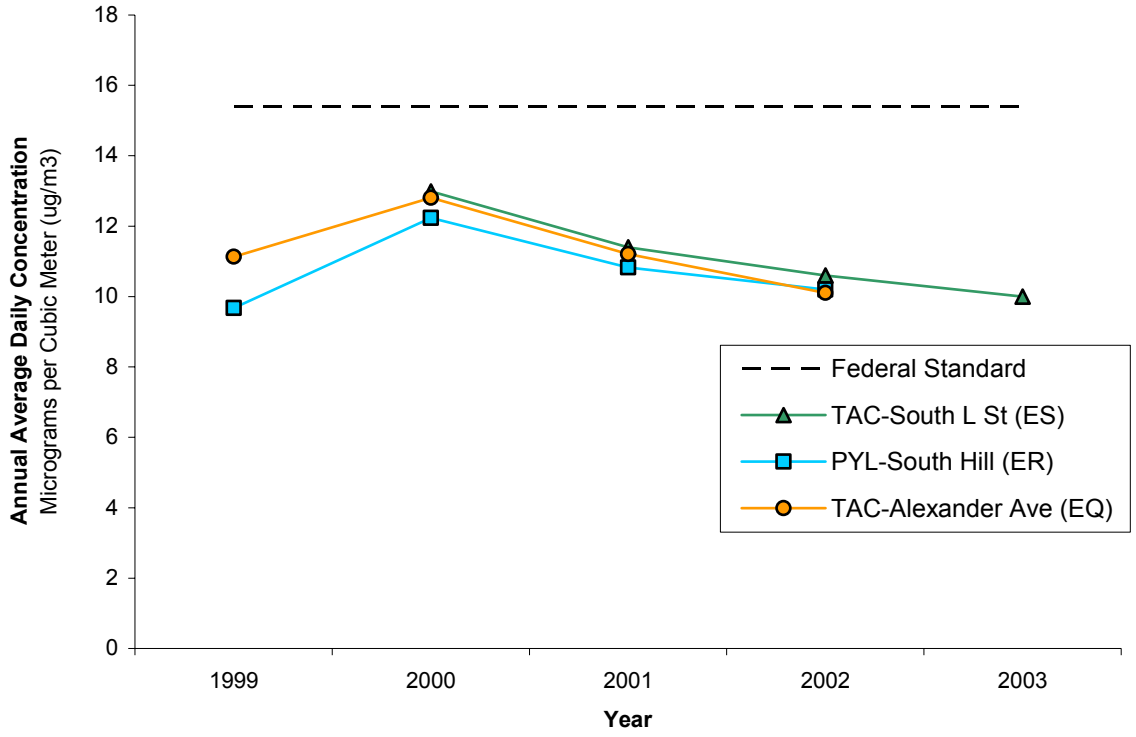
A data summary for FRM $PM_{2.5}$ is presented in tables on page A-19 of the Appendix, including a summary of AQI values based on FRM. Continuous nephelometer, TEOM, and BAM data are shown in tables on pages A-20 through A-22 of the Appendix. A summary of AQI levels based on TEOM and BAM analyzers is shown at the bottom of page A-22, and a similar summary based on nephelometers is shown on page A-21. A brief summary of black carbon data collected by aethalometer is presented on page A-23. The AQI that is reported to the public and used for air quality decisions is the one reflecting the highest concentration, regardless of the method of measurement. The highest concentration of $PM_{2.5}$ measured in 2003 was 50 $\mu g/m^3$, measured at South L Street in Tacoma using the FRM. For additional information on particulate matter, visit www.epa.gov/air/urbanair/pm/index.html. Information on $PM_{2.5}$ is also presented in a question/answer format in the definitions section of this document.

Annual $Pm_{2.5}$ for Snohomish County
Annual Mean vs Standard
Reference Method

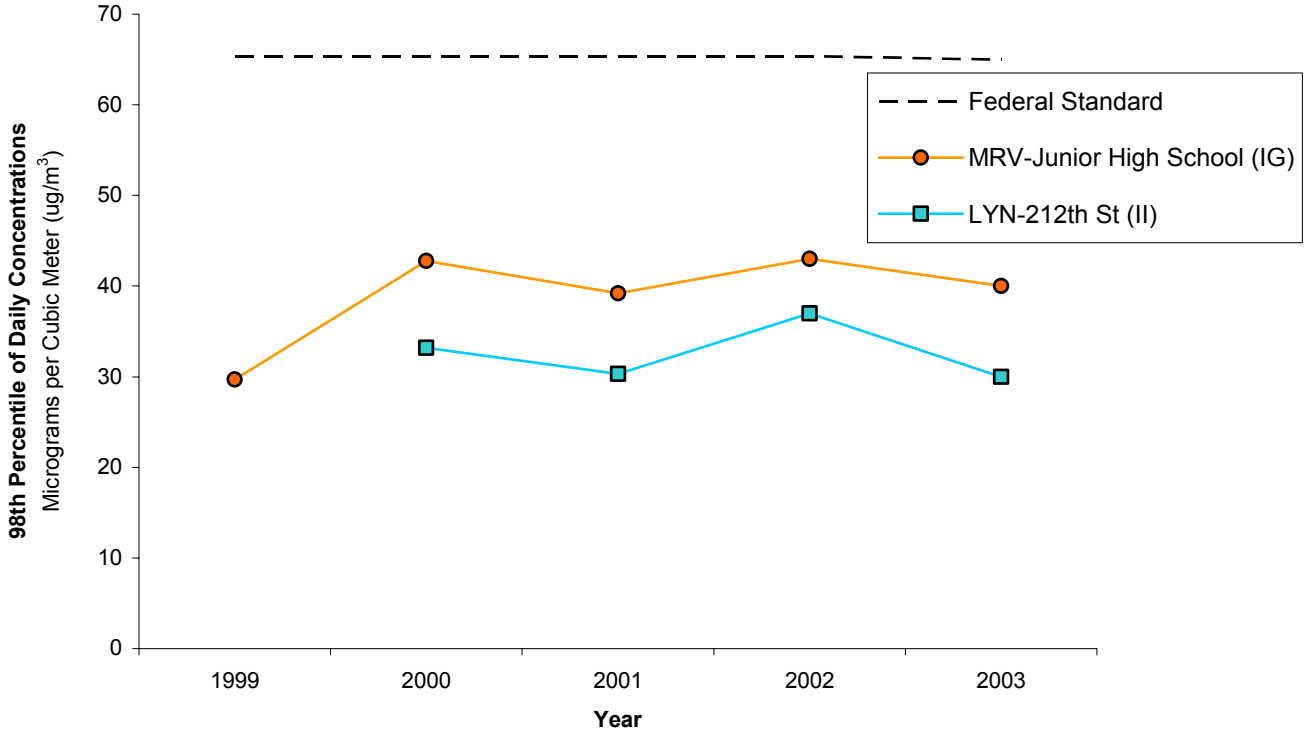



Annual Pm2.5 for King County
Annual Mean vs Standard
Reference Method
Federal Standard
LFP-Bothell Way (DB)
SEA-Beacon Hill (BW)
SEA-Duwamish (CE)
SEA-South Park (DA)
RED-Redmond City Hall (DE)
BEL-Bellevue Way (DC)
NHB-North Bend Way (DG)
KNT-James St (CW)
Annual Average Daily Concentration
Micrograms per Cubic Meter (ug/m3)
18
16
14
12
10
8
6
4
2
0
1999
2000
2001
2002
2003
Year

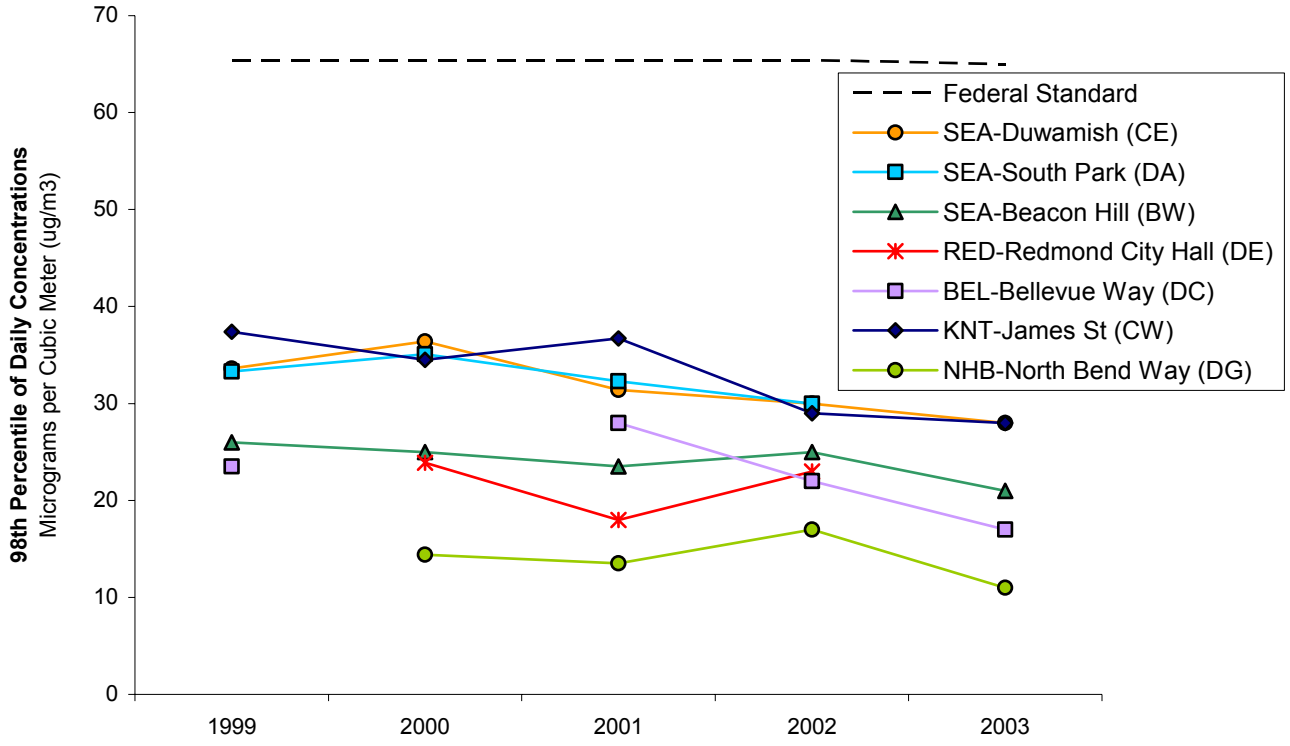
Annual $Pm_{2.5}$ for Pierce County
Annual Mean vs Standard
Reference Method



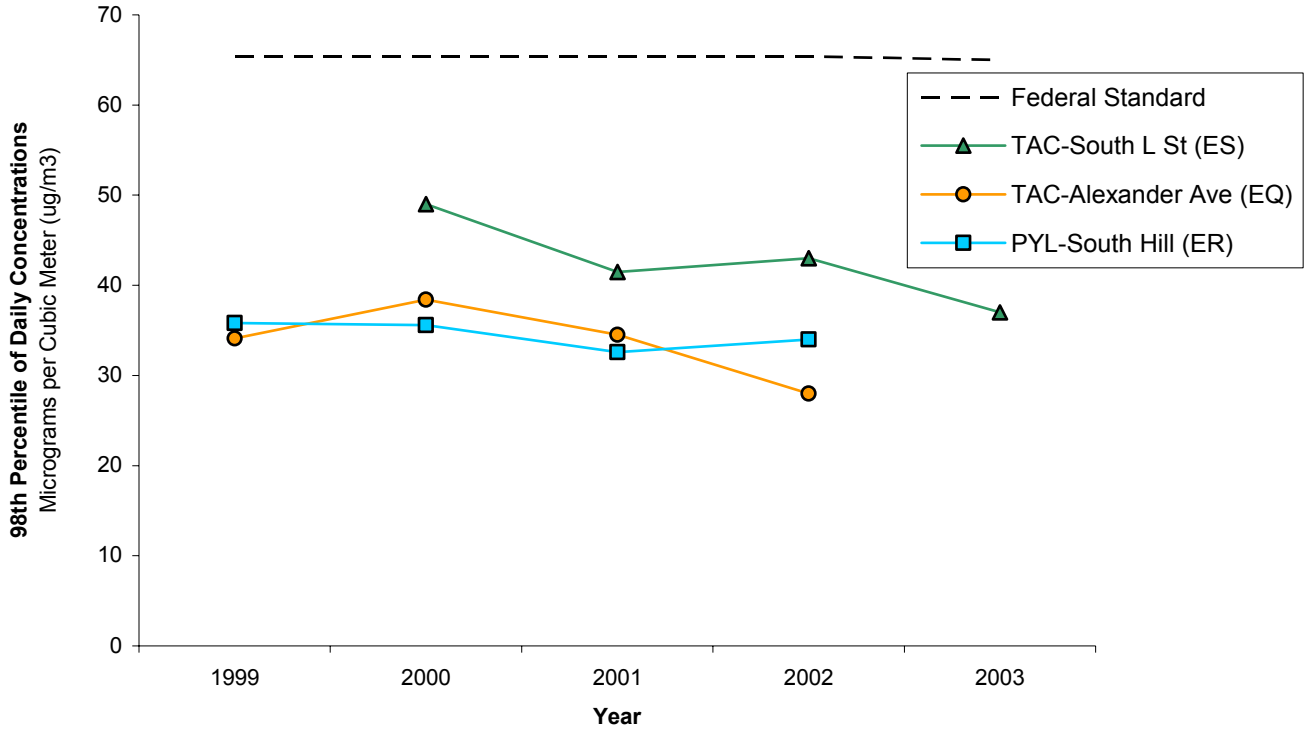
Daily $Pm_{2.5}$ for Snohomish County
Daily 98th Percentile vs Standard
Reference Method



Daily $Pm_{2.5}$ for King County
Daily 98th Percentile vs Standard
Reference Method

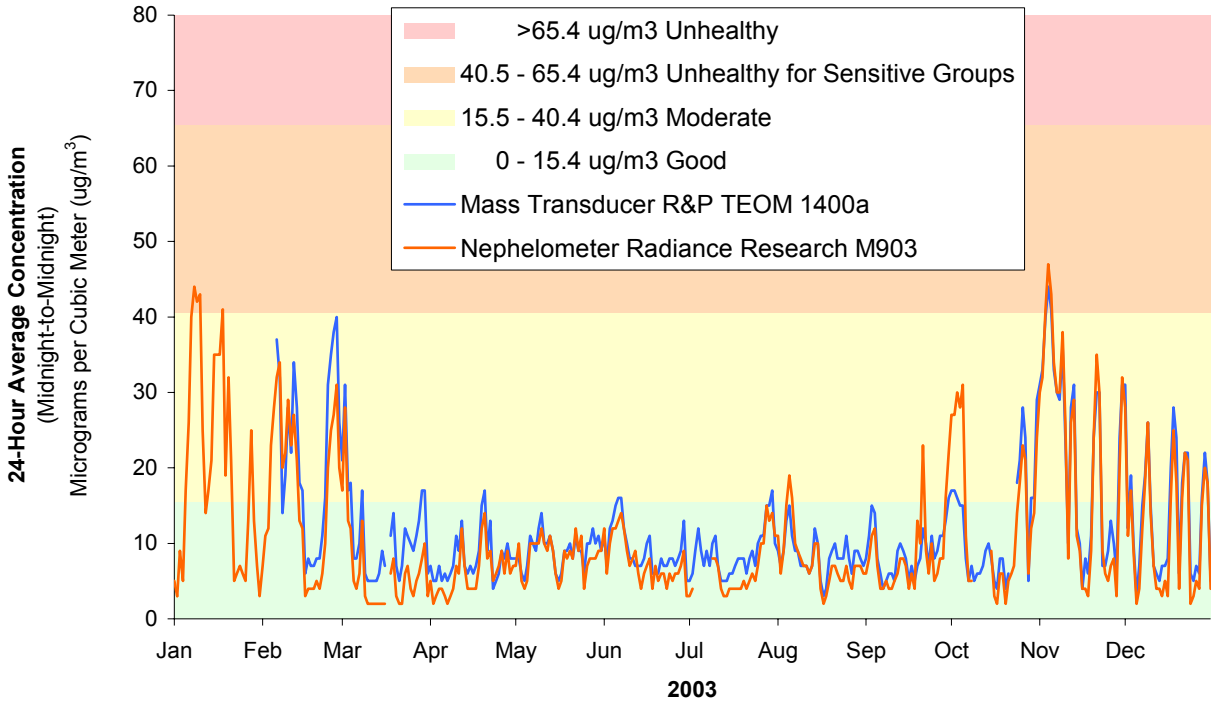


Daily $Pm_{2.5}$ for Pierce County
Daily 98th Percentile vs Standard
Reference Method



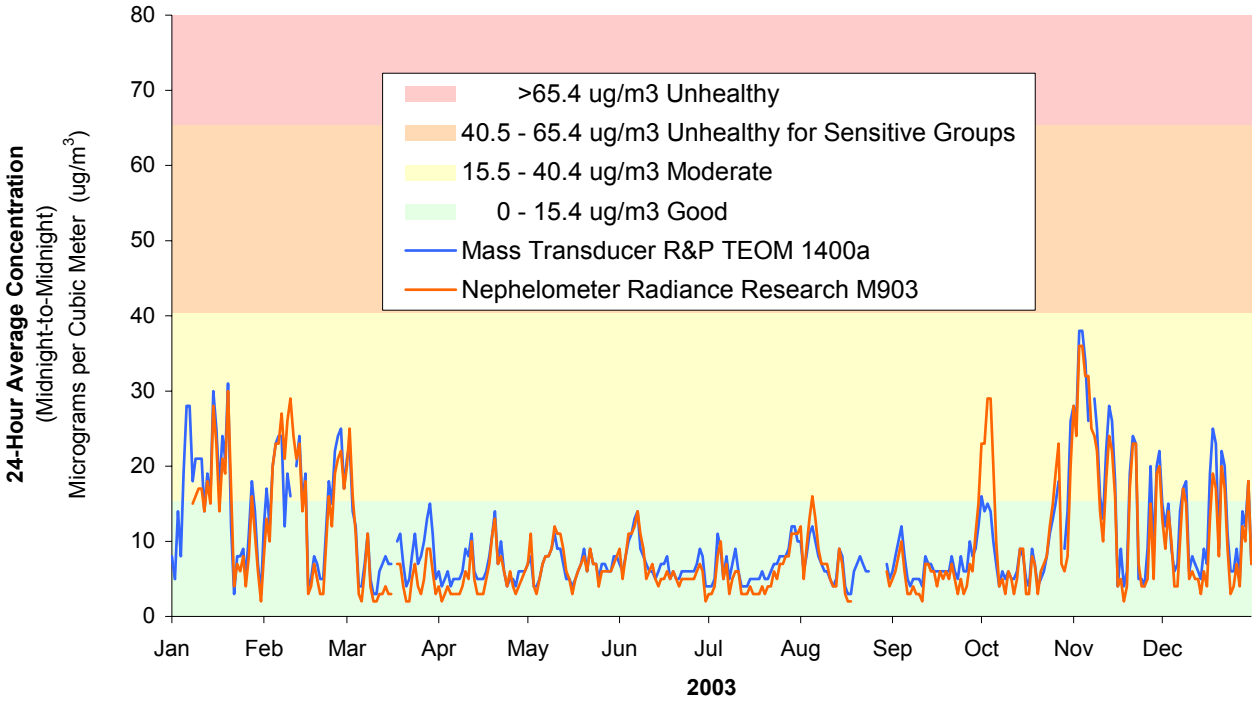
Marysville (IG)
Pm2.5 Daily Averages from Continuous Analyzers

Data are adjusted using previous 2-years site-specific relationships with Federal Reference Method



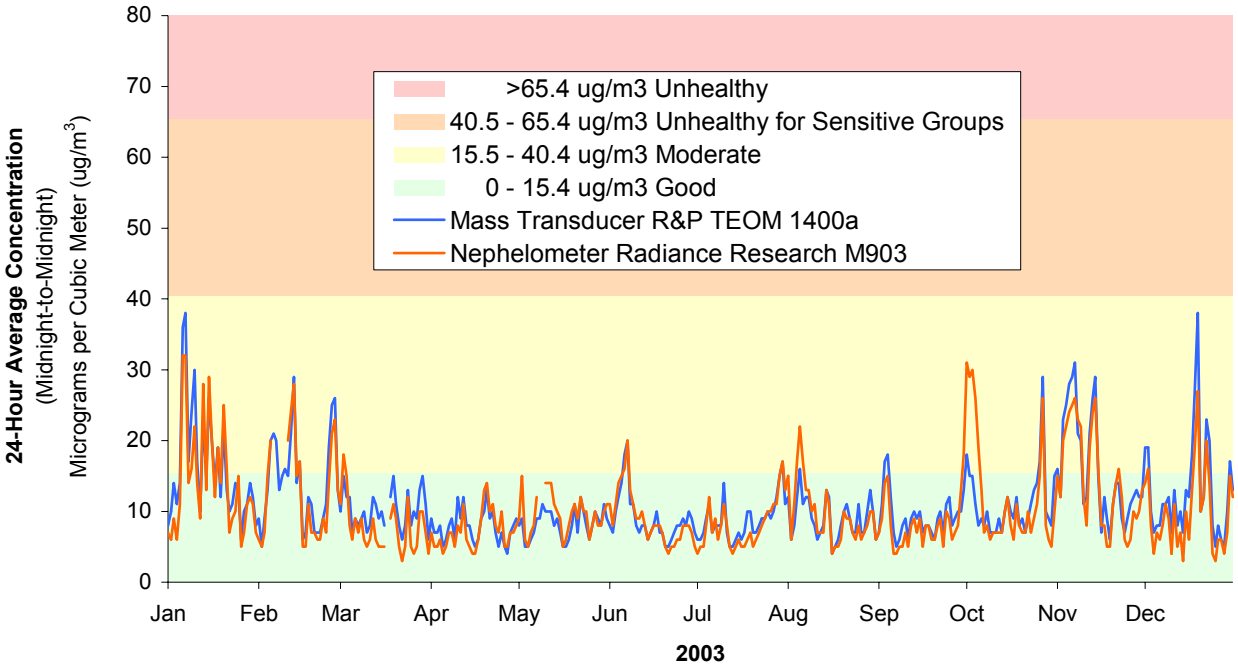
Lake Forest Park (DB)
Pm2.5 Daily Averages from Continuous Analyzers

Data are adjusted using previous 2-years site-specific relationships with Federal Reference Method



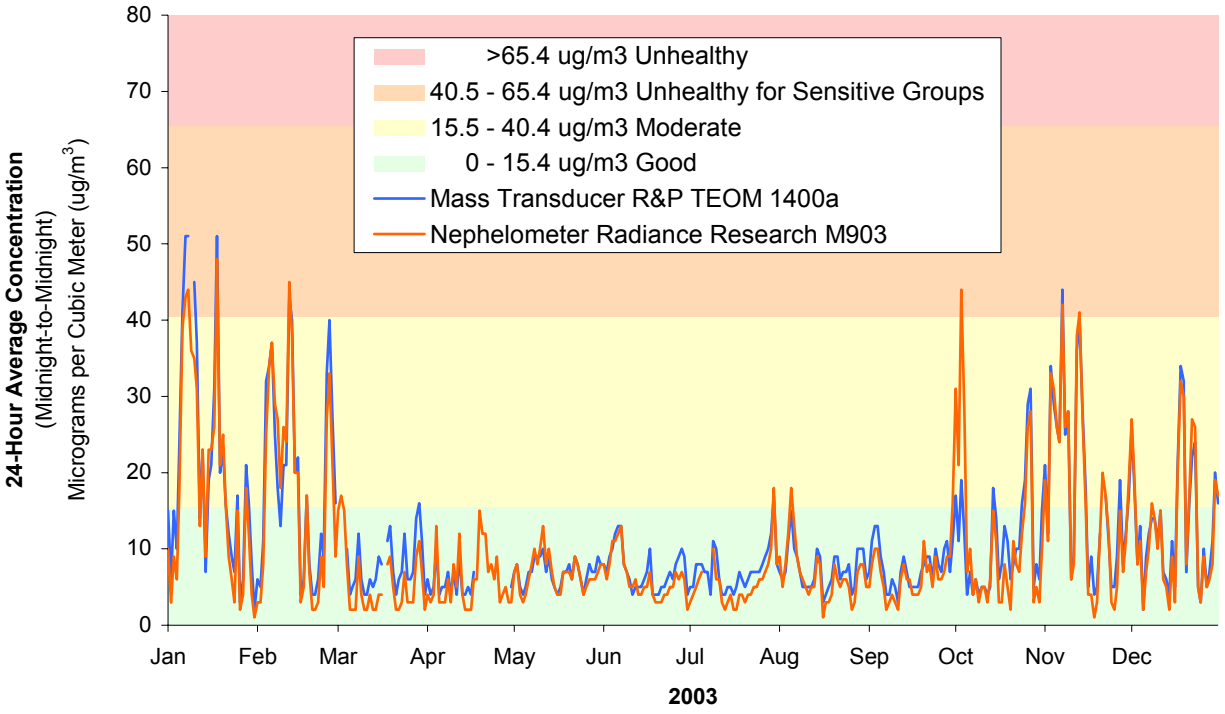
Seattle, Duwamish (CE)
Pm2.5 Daily Averages from Continuous Analyzers

Data are adjusted using previous 2-years site-specific relationships with Federal Reference Method



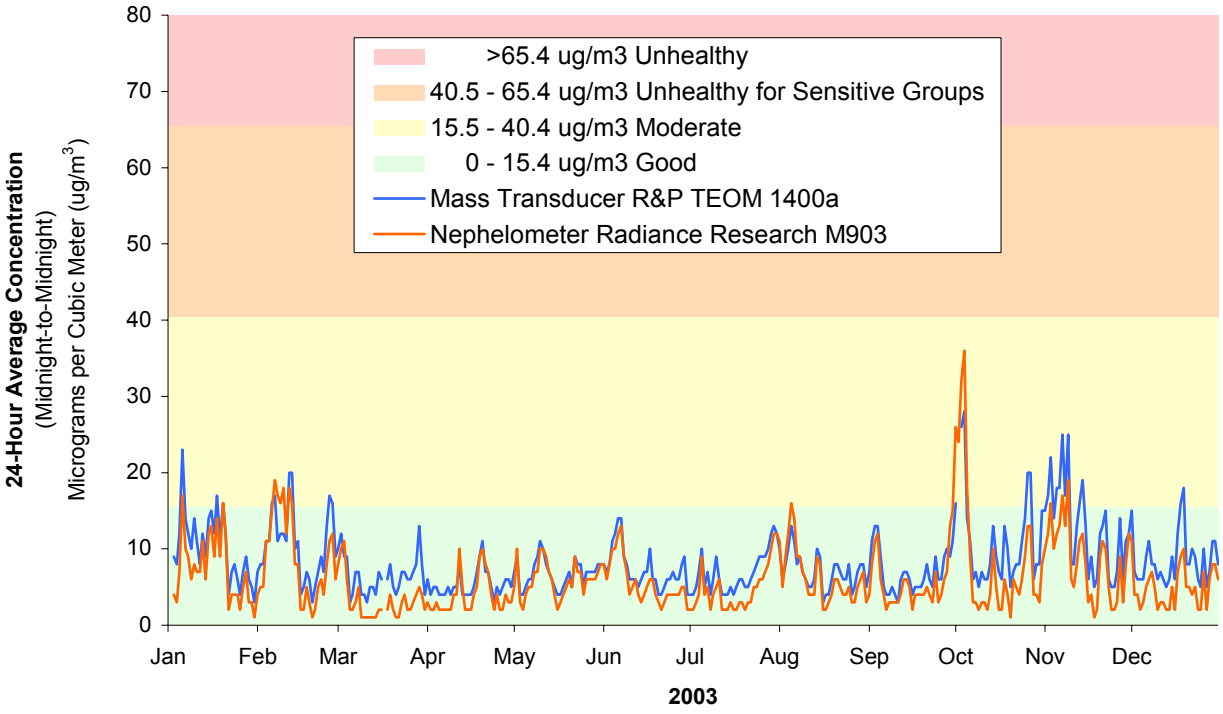
Tacoma, South L Street (ES)
Pm2.5 Daily Averages from Continuous Analyzers

Data are adjusted using previous 2-years site-specific relationships with Federal Reference Method

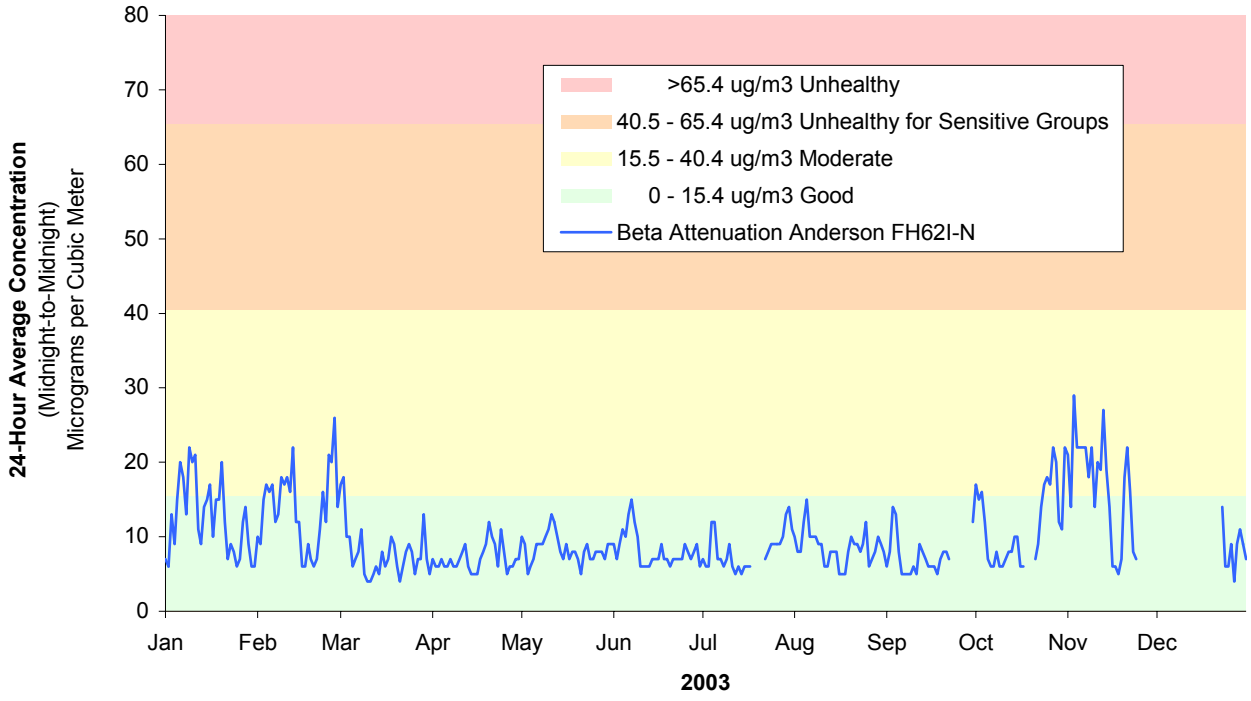


Bellevue, 143rd Ave NE (CZ)
Pm2.5 Daily Averages from Continuous Analyzers

Data are adjusted using previous 2-years site-specific relationships with Federal Reference Method



Bremerton, Meadowdale (QE)
Pm2.5 Daily Averages from Continuous Analyzer



Carbon Monoxide

Carbon Monoxide (CO) is an odorless, colorless gas that can enter the bloodstream through the lungs and reduce the amount of oxygen that reaches organs and tissues. Carbon monoxide forms when the carbon in fuels doesn't burn completely. The majority of all CO comes from vehicle exhaust. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85-95% of all CO emissions may come from motor vehicle exhaust. The highest levels of CO in the outside air typically occur during the colder months of the year when temperature inversions are more frequent. People with cardiovascular disease or respiratory problems might experience chest pain and increased cardiovascular symptoms, particularly while exercising, when CO levels are high. High levels of CO can affect alertness and vision even in healthy individuals. If CO levels are high, people should limit exertion and avoid sources of CO such as heavy traffic.

CO monitoring stations are located in areas with heavy traffic congestion. These include central business areas, roadsides, and shopping malls. The Washington Department of Ecology conducts all CO monitoring.

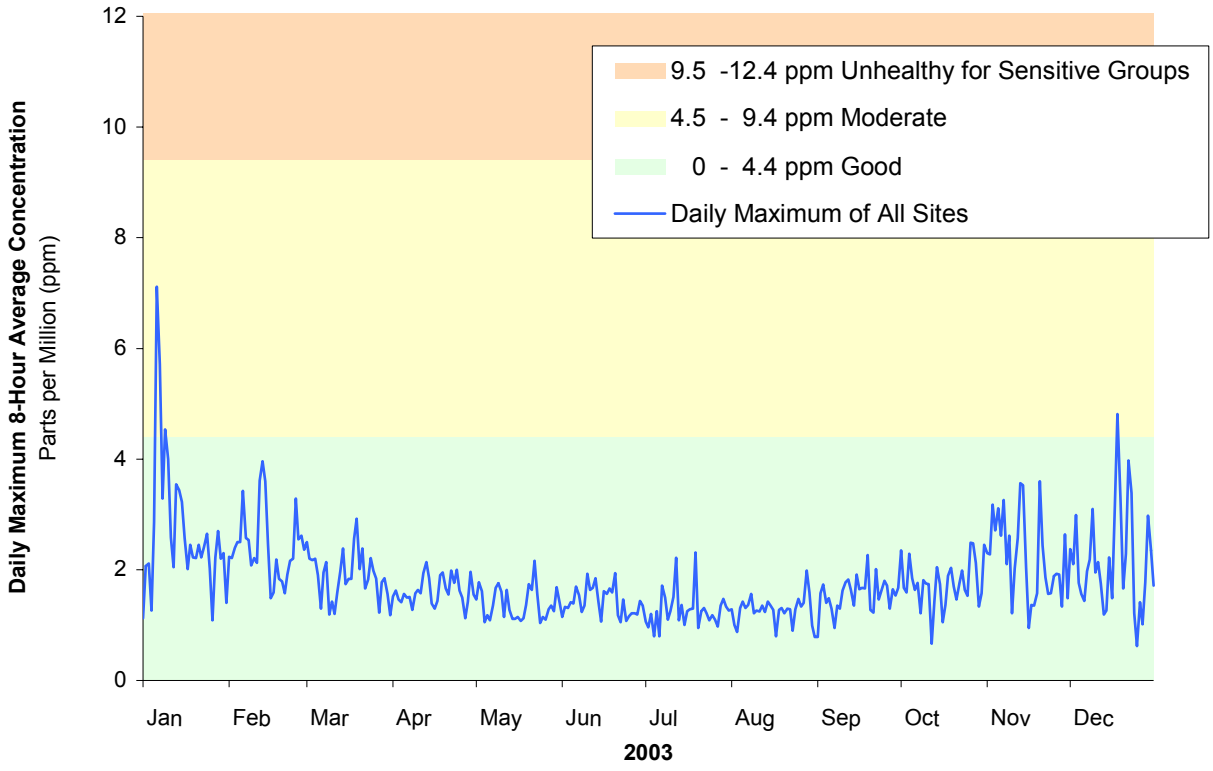
The graphs on pages 63 and 64 show general trends with the daily maximum 8-hour concentrations of all sites, set against the AQI breakpoints. It is apparent from these graphs that CO concentrations are noticeably higher in the winter months. Only during the months of December and January do maximum concentrations reach into the "moderate" level (in comparison with other months where maximums fall in the "good" level).

The graphs on pages 65 through 67 show the second highest 8-hour concentrations versus the NAAQS standard for Snohomish, King, and Pierce counties (there are no CO monitoring stations in Kitsap County). The second-highest concentration is displayed on these graphs because, under the federal rule, the 8-hour average can not be exceeded more than once per year (thus, choosing the second highest). These county-by-county graphs confirm the general downward trend that CO is taking from the early 1990s to present. The Puget Sound region was designated a CO attainment area by EPA in 1996. Although some sites (JP in Snohomish County, BW, DH, and DL in King County, and FL in Pierce County) show very slight increases in CO concentrations (second-highest), these increases are well below the standard. There were no 8-hour concentrations measured at any sites that exceeded the NAAQS standard of 9.4 ppm**.** The maximum 8-hour concentration for CO in 2003 was 6.5 ppm, well below the 8-hour standard. These data are provided on page A-24 of the Appendix.

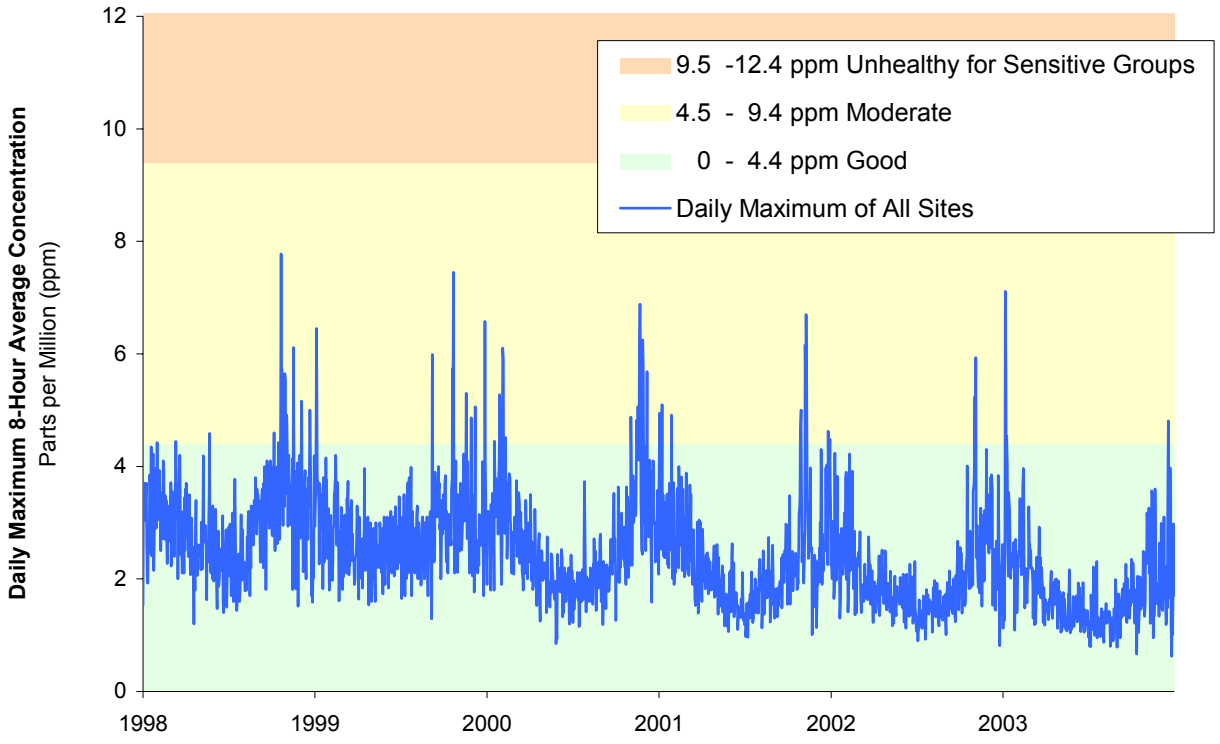
The NAAQS also includes a 1-hour standard for CO of 35 ppm (can not be exceeded more than once a year). Measured 1-hour concentrations in the Puget Sound area are historically much lower than the 35 ppm standard, and therefore 1-hour CO trends were not graphed. The maximum and second-highest measured 1-hour CO in 2003 are 10.1 and 9.1 ppm. Additional 1-hour average CO data are provided in the Appendix on page A-24.

For additional information on CO, visit www.epa.gov/air/urbanair/co/index.html. CO information is also provided in question/answer format in the definitions section of this document.

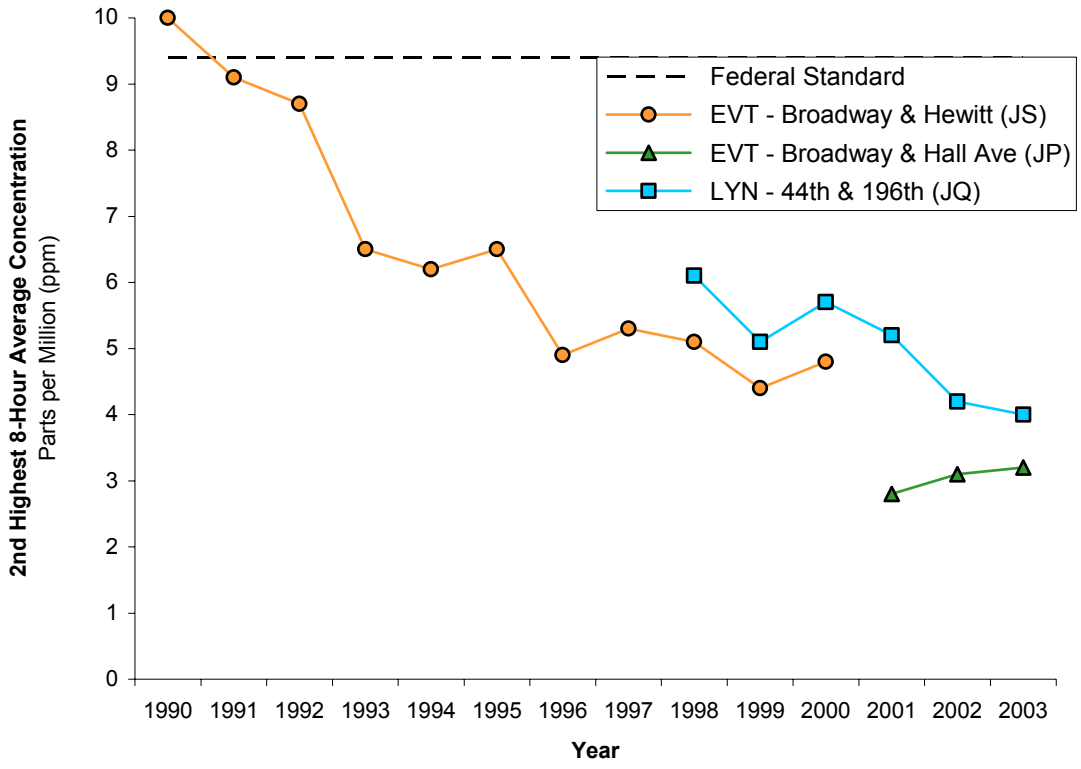
Carbon Monoxide (CO) in Puget Sound Region
Daily Maximum 8-Hour Concentration



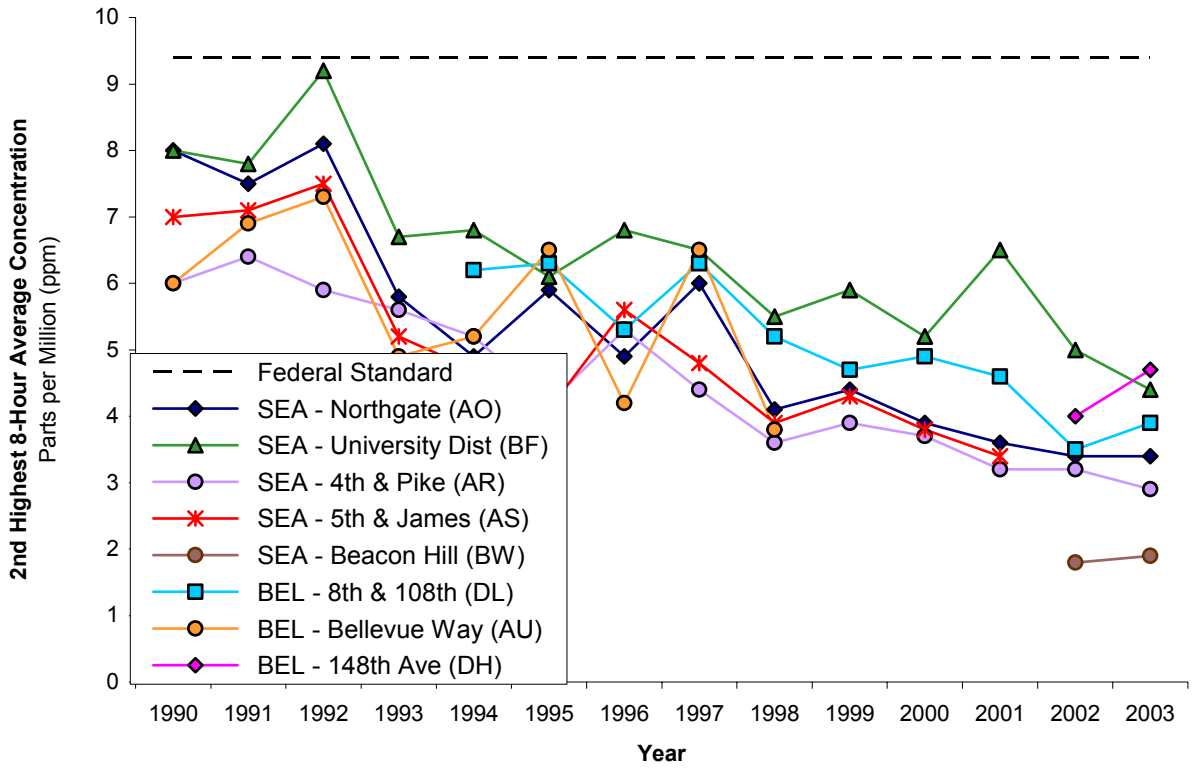
Carbon Monoxide (CO) in Puget Sound Region
Daily Maximum 8-Hour Concentration



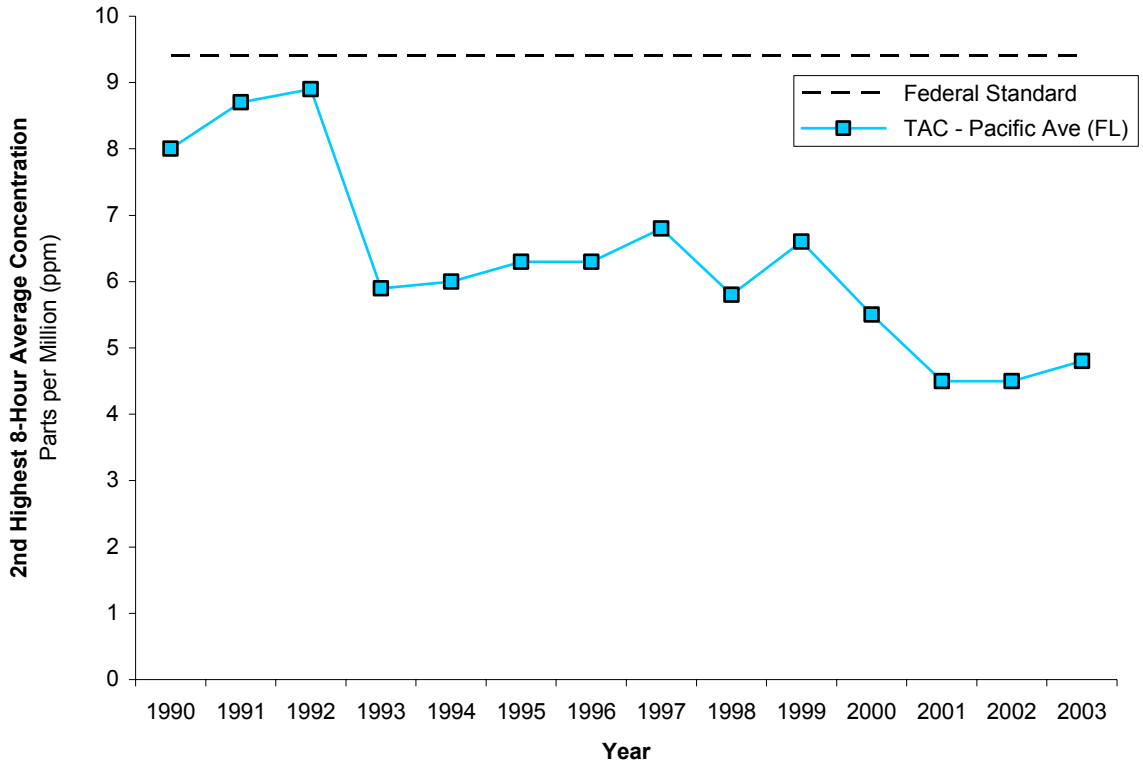
Carbon Monoxide (CO) for Snohomish County
2nd Highest 8-Hour Concentration vs Standard



Carbon Monoxide (CO) for King County
2nd Highest 8-Hour Concentration vs Standard



Carbon Monoxide (CO) for Pierce County
2nd Highest 8-Hour Concentration vs Standard



Sulfur Dioxide

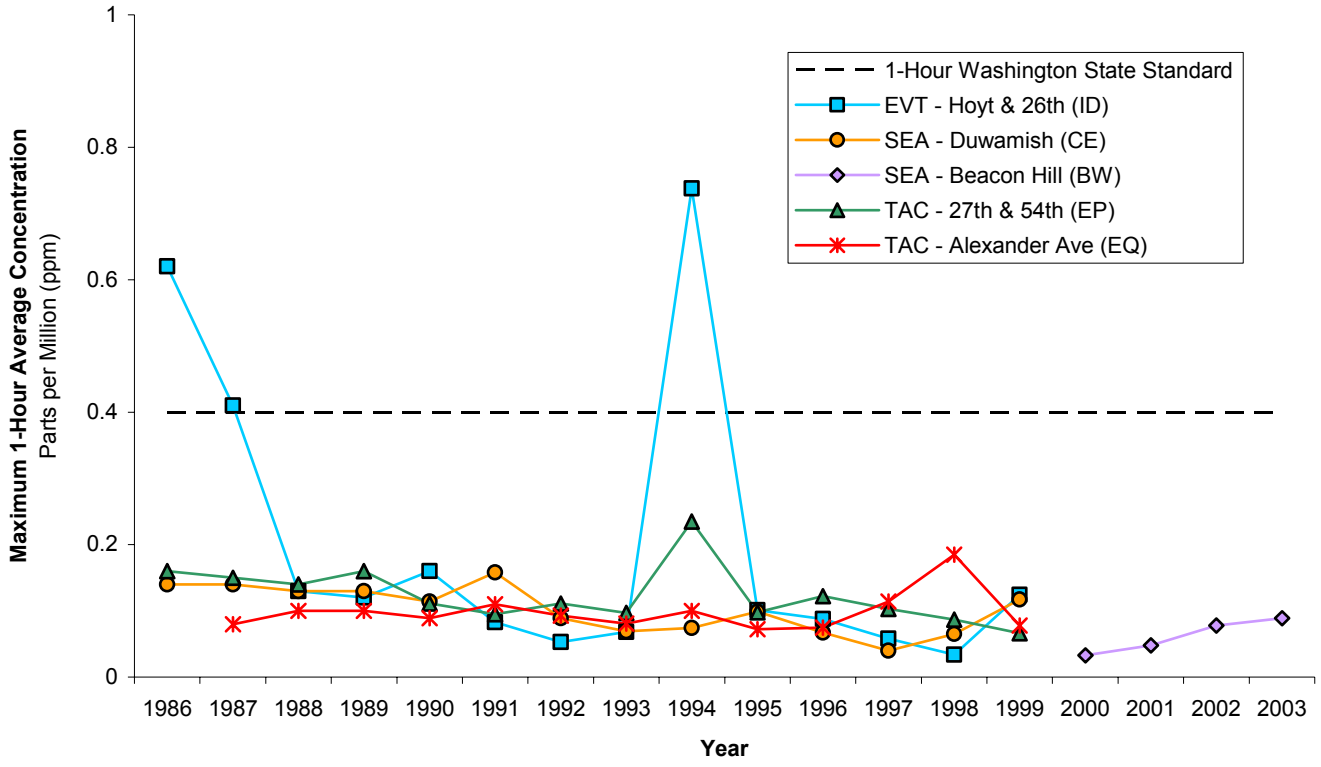
Sulfur dioxide (SO_2) is a colorless, reactive gas produced by burning fuels containing sulfur, such as coal and oil, and by industrial processes. Historically, the greatest sources of SO_2 were industrial facilities that derived their products from raw materials like metallic ore, coal, and crude oil, or that burned coal or oil to produce process heat (petroleum refineries, cement manufacturing, and metal processing facilities). Currently, on-road vehicles, marine craft, and diesel construction equipment also release significant SO_2 emissions to the air.

People with asthma who are active outdoors may experience bronchoconstriction, where symptoms include wheezing, shortness of breath, and tightening of the chest. People should limit outdoor exertion if SO_2 levels are high.

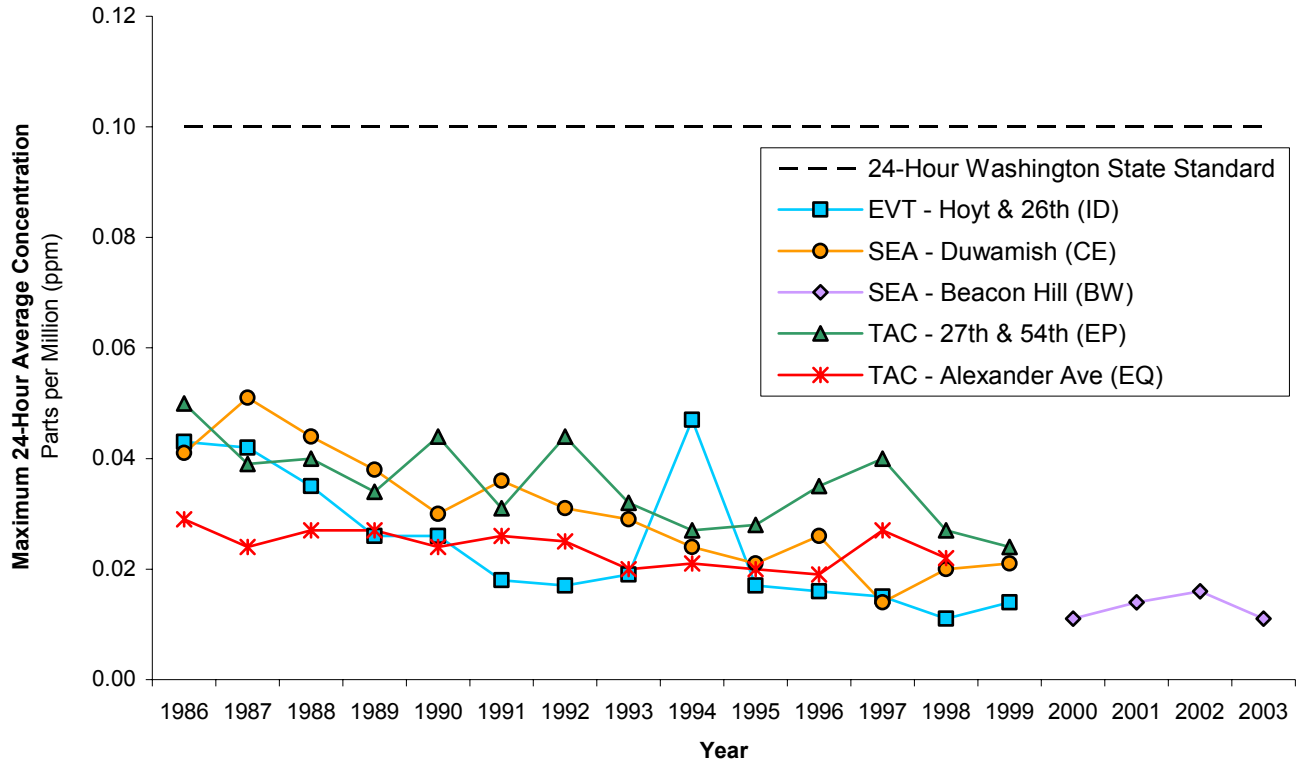
The Puget Sound area has experienced a significant decrease in SO_2 from sources such as pulp mills, cement plants, and smelters in the last several years. Monitoring for SO_2 was discontinued in 1999 (1999 was the last year with data) by the Puget Sound Clean Air Agency because of this decrease. The monitoring sites for SO_2 were historically sited in or near these industrial areas. The Department of Ecology monitors for SO_2 at their Beacon Hill site; this monitoring was begun in May 2000.

The maximum measured SO_2 concentrations in 2003 were significantly below all federal and regional standards. The graphs on pages 69 and 70 show the maximum 24-hour and 1-hour concentrations, respectively, at individual monitoring sites. The maximum 24-hour and 1-hour averages were 0.011 ppm (measured September 4, 2003) and 0.089 ppm (measured August 26, 2003), respectively. Additional SO_2 data from the Beacon Hill site are located on page A-25 of the Appendix, and information on SO_2 is available at www.epa.gov/air/urbanair/so2/index.html. SO_2 information is also provided in question/answer format in the definitions section of this document.

Sulfur Dioxide (SO2)
Maximum 1-Hour Average vs Standard



Sulfur Dioxide (SO_2)
Maximum 24-Hour Average vs Standard



Lead

Lead is a highly toxic metal that was used for many years in household products, automobile fuel, and industrial chemicals. Locally, airborne lead was associated primarily with automobile exhaust and lead smelters. The large reductions in lead emissions from motor vehicles have changed the nature of the air quality lead problem in the United States. Industrial processes, particularly primary and secondary lead smelters and battery manufacturers, are now responsible for most of the lead emissions.

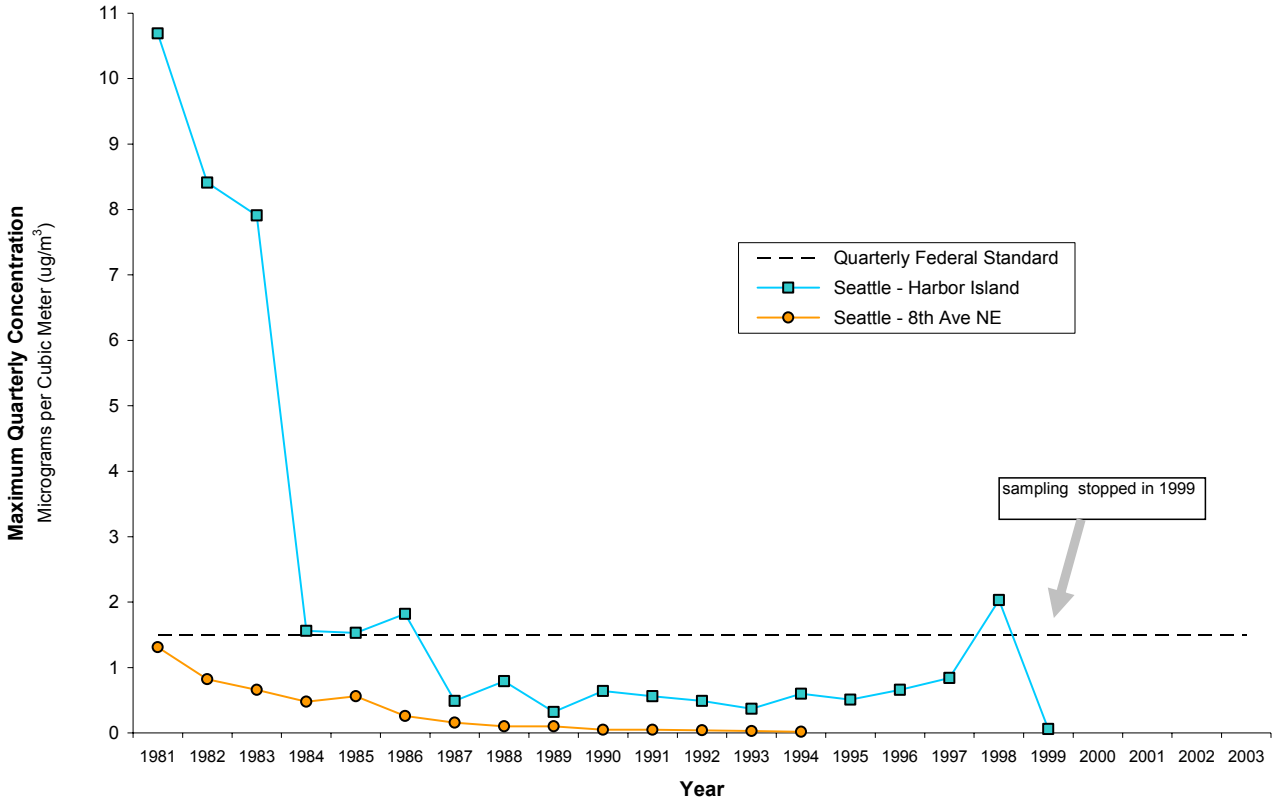
People, animals, and fish are mainly exposed to lead by breathing and ingesting it in food, water, soil, or dust. Lead accumulates in the blood, bones, muscles, and fat. Infants and young children are especially sensitive to even low levels of lead. Lead can have health effects ranging from behavioral problems and learning disabilities to seizures and death.

According to EPA, the primary sources of lead exposure are lead-based paint, lead-contaminated dust, and lead-contaminated residual soils. Refer to the EPA website www.epa.gov/ttnatw01/hlthef/lead.html for ways to limit your exposure to these lead sources.

Lead has not been monitored in the Puget Sound area since 1999. Since the phase-out of lead in fuel and the closure of the Harbor Island lead smelter, airborne lead is no longer a public health concern in the region. The graph on page 72 is included to show the historical reduction of airborne lead in the Puget Sound region. The elevated concentration that violated federal quarterly standards in early 1998 was due to the Harbor Island lead smelter. The smelter ceased all operations in May 1998.

For additional information on lead, visit www.epa.gov/air/urbanair/lead/index.html. Lead information is also available in a question/answer format in the definitions section of this document.

Lead (Pb)
Maximum Quarterly Average vs Standard



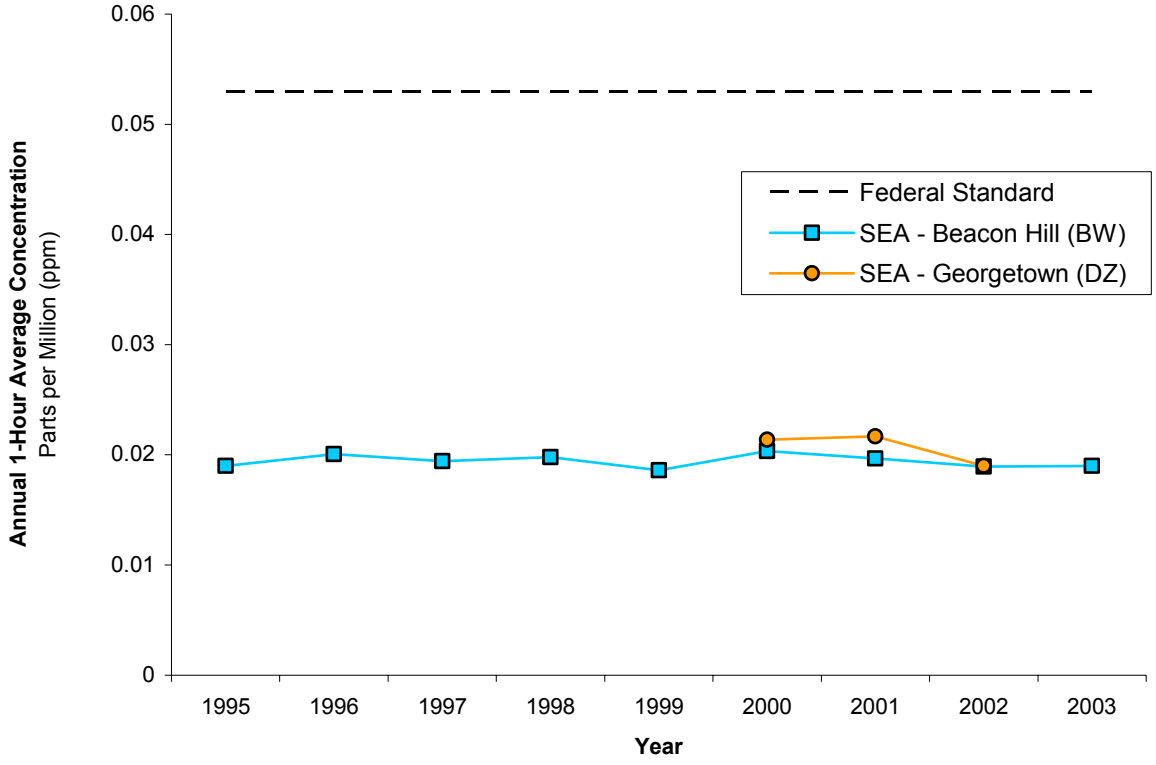
Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish brown, highly reactive gas that forms from the reaction of nitrogen oxide (NO) and oxygen in the atmosphere. The term "NO_X", which frequently appears (including in the air emission inventory section of this report), refers to both NO and NO_2. NO_2 will react with VOCs and can result in the formation of ozone. On-road vehicles like trucks and automobiles are the major sources of NO_X. Home heaters and gas stoves can also produce NO. NO_2 pollution is greatest in cold weather.

NO_2 can cause respiratory symptoms such as coughing, wheezing, and shortness of breath in people with respiratory diseases such as asthma. Long-term exposure can lead to respiratory infections.

Motor vehicle manufacturers have been required to reduce NO_X emissions from cars and trucks since the 1970s, and it is not considered a significant pollution problem in the Puget Sound area. The Department of Ecology maintains one monitoring site for nitrogen dioxide at the Beacon Hill monitoring site. The annual average for each year has consistently been less than half of the NAAQS standard, as shown in the graph on page 74 and in data on page A-26 of the Appendix. The maximum 1-hour average of NO_2 measured in 2003 was 0.076 ppm on January 6th. For additional information on NO_2, visit www.epa.gov/air/urbanair/nox/index.html.

Nitrogen Dioxide (NO_2)
Annual 1-Hour Average vs Standard



Visibility

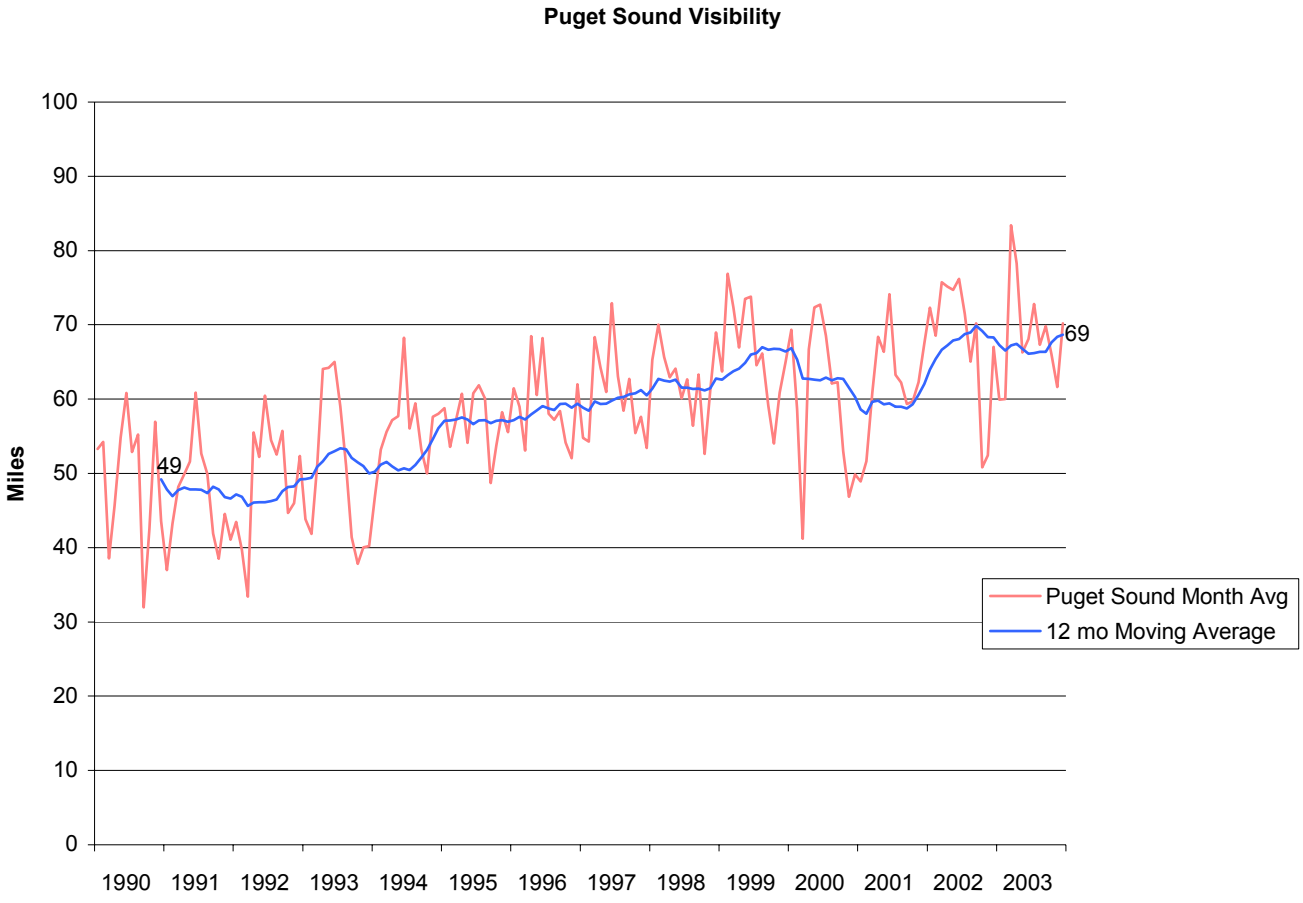
There are no federal or state standards established for visibility. This parameter is presented (without comparison to a standard) as an easily-understood indicator of air quality. Visibility is often explained in terms of visual range and light extinction. *Visual range* is the maximum distance—usually miles or kilometers—that you can see a black object against the horizon. *Light extinction* is the sum of light scattering and light absorption by fine particles and gases in the atmosphere. The more light extinction you have, the shorter your visual range will be. Visual range as measured by nephelometer instruments utilizing light-scattering methodology provides an objective approach to measuring visibility at a specific location, but does not address individual perceptions regarding the "quality" of a view on a given day.

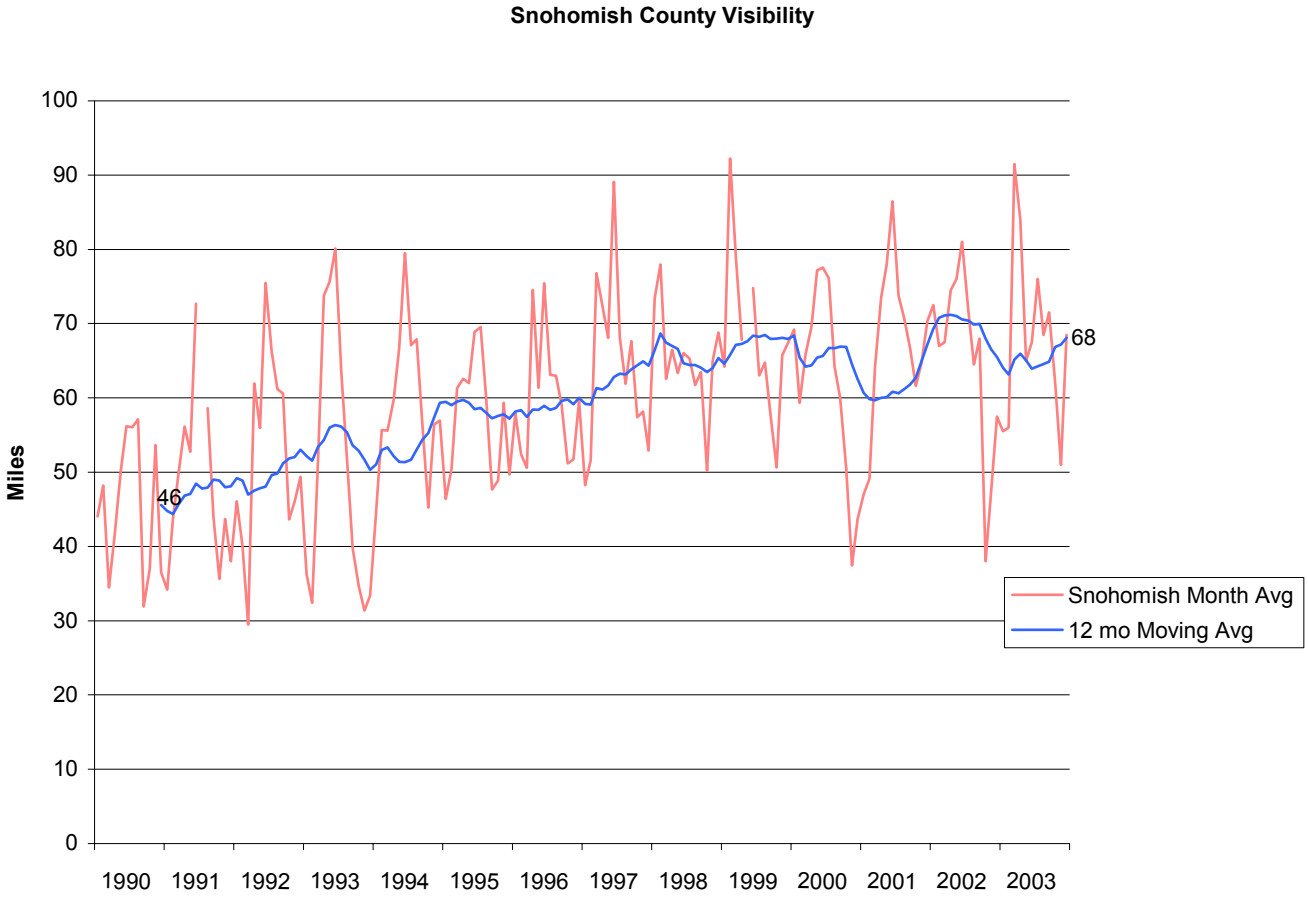
Reduced visibility (or visual range) is caused by weather (clouds, fog, and rain) and air pollution (fine particles and gases). The major pollution contributor is fine particulate matter ($PM_{2.5}$) emissions, which are transported aloft and may remain suspended for a week or longer. Fine particles have a greater impact than coarse particles at locations far from the emitting source because they remain suspended in the atmosphere longer and travel farther. $PM_{2.5}$ also presents some of the most serious health hazards to the public, so you can roughly assume that the worse the visibility due to particulate matter, the unhealthier the air is to breathe.

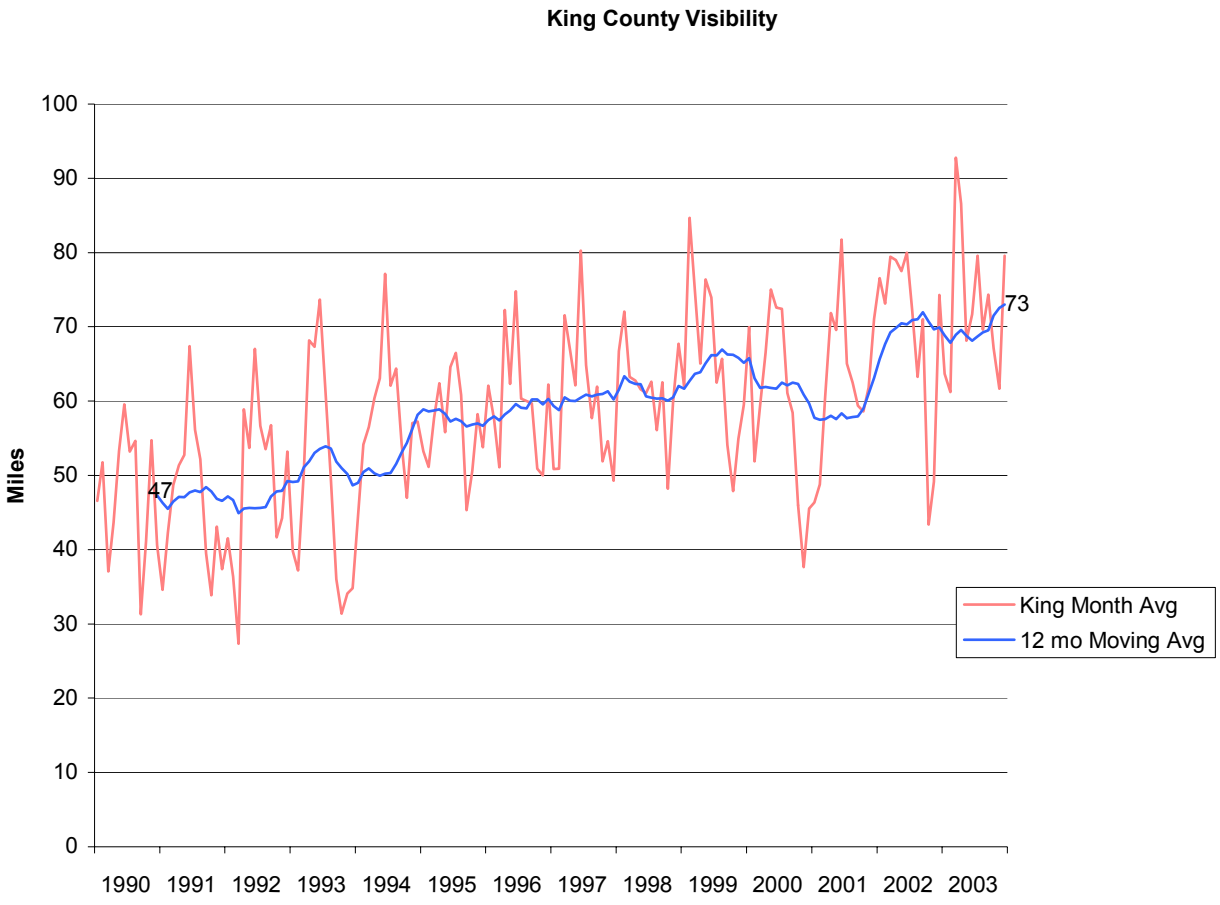
Graphs on the following pages show visibility for the overall Puget Sound area, as well as Snohomish, King, and Pierce counties. Visibility on these graphs, in units of miles, is determined by nephelometer monitoring. The nephelometer measures light scattering due to particulate matter, and then converts this unit (b_{sp}) into miles, more readily understood. The nephelometer does not take into account meteorology visibility effects such as cloudiness, so the visibility in these graphs is visibility as related to particulate matter. Data from nephelometers are shown on pages A-27 and A-28 of the Appendix.

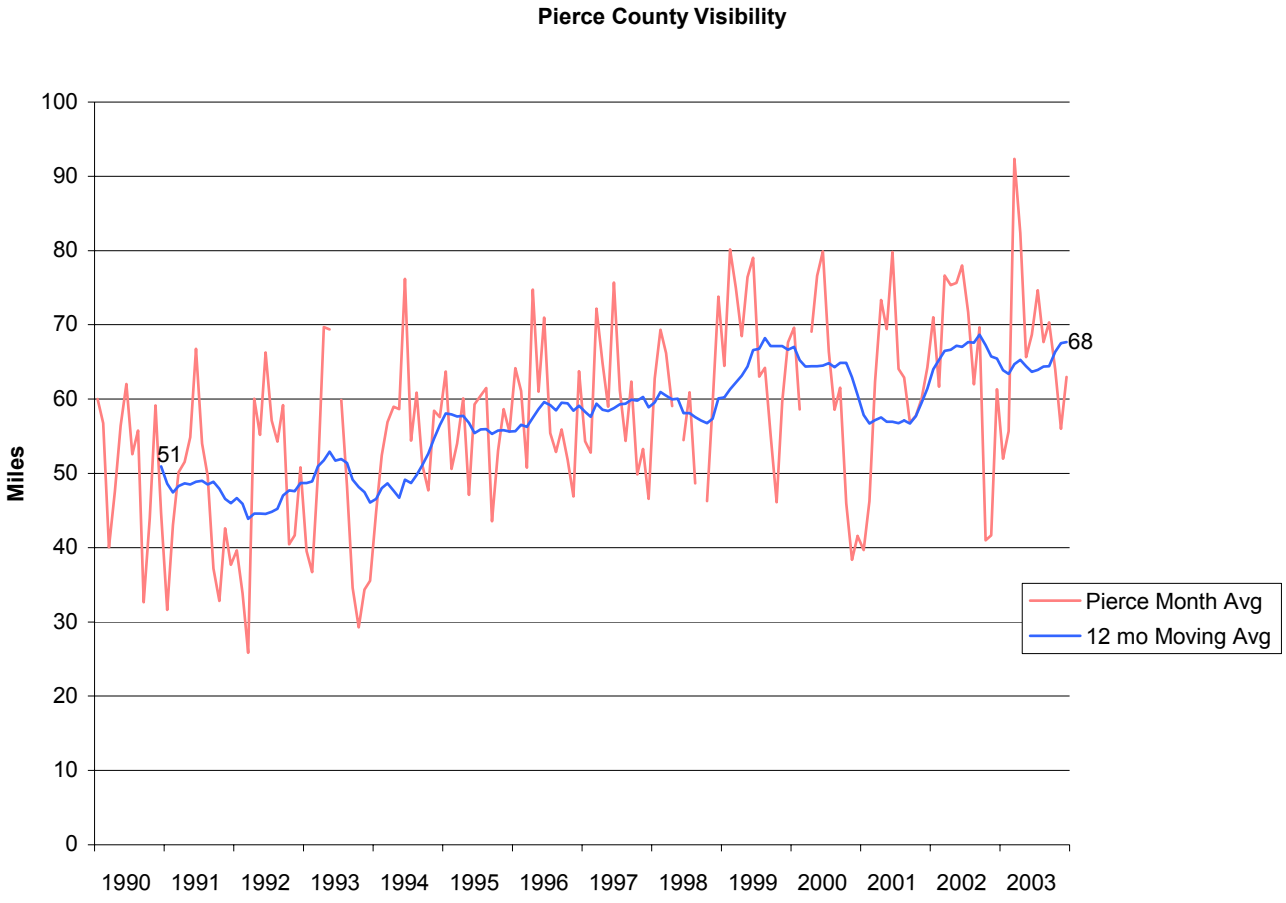
The red line on the graphs represents the monthly average visibility; it is apparent that there are large fluctuations, which correspond to the highest levels of visibility in the summer months and the lowest levels in the winter. The blue line shows a 12-month moving average, which incorporates the average of the previous 12 months to aid in smoothing out this seasonal variation. The blue line shows that the average visibility for the Puget Sound area has steadily increased over the last decade with year-to-year variability caused by meteorology. For the 13-year period from December 1990 through December 2003, the 12-month moving average of visual range increased from 49 miles to 69 miles.

For additional information on visibility, visit http://www.epa.gov/air/visibility/index.html. Visibility information is also available in a question/answer format in the definitions section of this document.


Puget Sound Visibility
Miles
100
90
80
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
49
69
Puget Sound Month Avg
12 mo Moving Average


Snohomish County Visibility
Miles
100
90
80
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
46
68
Snohomish Month Avg
12 mo Moving Avg


King County Visibility
Miles
100
90
80
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
47
73
King Month Avg
12 mo Moving Avg


Pierce County Visibility
Miles
100
90
80
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
51
68
Pierce Month Avg
12 mo Moving Avg

DEFINITIONS

Calculation and Breakpoints for the Air Quality Index (AQI)

Breakpoints for Criteria Pollutants							AQI Categories	
0_3 (ppm) 8-hour	**0_3 (ppm) 1-hour[a]**	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	CO (ppm)	SO_2 (ppm)	NO_2 (ppm)	AQI value	Category
0.000–0.064	—	0.0–15.4	0–54	0.0–4.4	0.000–0.034	(b)	0–50	Good
0.065–0.084	—	15.5–40.4	55–154	4.5–9.4	0.035–0.144	(b)	51–100	Moderate
0.085–0.104	0.125–0.164	40.5–65.4	155–254	9.5–12.4	0.145–0.224	(b)	101–150	Unhealthy for sensitive groups
0.105–0.124	0.165–0.204	65.5–150.4	255–354	12.5–15.4	0.225–0.304	(b)	151–200	Unhealthy
0.125–0.374	0.205–0.404	150.5–250.4	355–424	15.5–30.4	0.305–0.604	0.65–1.24	201–300	Very unhealthy
(c)	0.405–0.504	250.5–350.4	425–504	30.5–40.4	0.605–0.804	1.25–1.64	301–400	Hazardous
(c)	0.505–0.604	350.4–500.4	505–604	40.5–50.4	0.805–1.004	1.65–2.04	401–500	

a Areas are generally required to report the AQI based on 8-hour ozone values. However, there are a small number of areas where an AQI based on 1-hour ozone values would be safer. In these cases, in addition to calculating the 8-hour ozone value, the 1-hour ozone value may be calculated, and the greater of the two values reported.

b NO_2 has no short-term National Ambient Air Quality Standard (NAAQS) and can generate an AQI only above a value of 200.

c 8-hour O_3 values do not define higher AQI values (above 300). AQI values above 300 are calculated with 1-hour 0_3 concentrations.

For more detailed information about the AQI and the pollutants it measures, go to
www.epa.gov/airnow/aqibroch

General Definitions

Air Toxics

Air toxics are broadly defined as over 400 pollutants that the Agency considers potentially harmful to human health and the environment. These pollutants are listed in the Puget Sound Clean Air Agency Regulation III at http://www.pscleanair.org/reg3/asil.pdf. Hazardous air pollutants (see below) are checked on this list to identify them as a subset of air toxics. Air toxics are also called Toxic Air Contaminants (TAC) under Regulation III.

Criteria Air Pollutant (CAP)

The Clean Air Act of 1970 defined six *criteria pollutants* and established ambient concentrations to protect public health. EPA periodically has revised the original concentration limits and methods of measurement, most recently in 1997.

Hazardous Air Pollutant (HAP)

A *hazardous air pollutant* is an air contaminant identified as toxic in the Federal Clean Air Act, Section 112(b). 188 pollutants are currently listed as HAPs. They are listed by EPA at http://www.epa.gov/ttn/atw/188polls.html. They are also included under Puget Sound Clean Air Agency Regulation III.

Temperature Inversions

The earth gains and loses most of its energy at its surface. It is warmed by solar heating during the day and cooled by radiation emissions at night. During the late morning and afternoon hours, the air near the surface is warmer than the air aloft and allows for good pollutant dispersion (vertical mixing may be 1,500 meters or more). At night with clear skies, the surface radiates heat into outer space, creating cooler air at the surface and warmer air aloft. Warmer air above cooler air (temperature inversion) is a stable condition and limits the upward movement of pollution because the warmer air acts as a barrier. With little or no wind, pollutants are trapped near the surface (vertical mixing may be 200 meters or less) and can reach high levels of concentration.

Volatile Organic Compound (VOC)

An organic compound that participates in atmospheric photochemical reactions. This excludes all compounds determined to have negligible photochemical reactivity by EPA and listed in 40 CFR 51.100(s) in effect July 1, 1998.

Visibility/Regional Haze

Visibility is often explained in terms of visual range and light extinction. *Visual range* is the maximum distance—usually miles or kilometers—that you can see a black object against the horizon. *Light extinction* is the sum of light scattering and light absorption by fine particles and gases in the

atmosphere. The more light extinction you have, the shorter your visual range will be. Reduced visibility (or visual range) is caused by weather (clouds, fog, and rain) and air pollution (fine particles and gases). The major pollution contributor is fine particulate matter ($PM_{2.5}$) emissions, which are transported aloft and may remain suspended for a week or longer. Fine particles have a greater impact than coarse particles at locations far from the emitting source because they remain suspended in the atmosphere longer and travel farther. $PM_{2.5}$ also presents some of the most serious health hazards to the public, so you can roughly assume that the worse the visibility, the unhealthier the air is to breathe.

Criteria Air Pollutants

Ozone (O_3)

- **What is it?**
  Ozone, a bluish-colored gas molecule with a strong odor, is composed of three atoms of oxygen. In the upper atmosphere ozone occurs naturally and partially absorbs the sun's harmful ultraviolet rays. Ozone at ground level is a summertime air pollution problem.
- **How is it caused?**
  Ozone forms when photochemical pollutants from cars, trucks, and industrial sources react with sunlight. Ozone-forming pollutants include NO_X and VOCs. Even gasoline-powered yard equipment, paints, solvents, and boat motors contribute.
- **When does it happen?**
  Ozone pollution is most common in the summer months, when sunlight and stable atmospheric conditions occur. Ozone levels are usually highest in the afternoon, as sunlight photochemically transforms NO_x and VOCs into ozone.
- **Who is affected?**
  Adults and children who are active outdoors, people with respiratory disease such as asthma, and people with unusual sensitivity to ozone. During physical activity, ozone penetrates deeper into the lungs and can do more damage.

  Ozone is a very reactive gas. For this reason, high concentrations of ozone can cause respiratory distress and disease in humans, decreased yields of agricultural crops and forests, and damage to some rubber products, plastics, and paints used outdoors. National crop losses from ozone exposure are estimated at $3 billion to $5 billion annually. Forest losses are harder to estimate.
- **What are the health effects?**
  Ozone can cause coughing and throat irritation, make deep vigorous breathing more difficult, and increase the chance of respiratory infections. It increases sensitivity to allergens and can trigger asthma attacks. The damage it causes to the lungs heals within a few days, but repeated or prolonged exposure may cause permanent damage.
- **What can I do about it?**
  If ozone levels are high and you have a respiratory condition or are normally active outdoors, try to limit your outdoor exertion.

In the United States, management of ozone and other photochemical oxidants has been a major goal of federal and state clean air legislation (Clean Air Act). Although many of the pollution control efforts required by the CAA have been implemented, efforts to decrease ozone pollution have been only partially successful.

In the Puget Sound region the ozone trend is flat and is marginally within the Federal standards.

- **Where is it measured?**
  Unlike other pollutants monitored here in the Puget Sound, ozone is formed by precursors that react in the atmosphere. Winds transport ozone and chemical emissions from one area to another. For the Puget Sound, ozone precursors are emitted into the air in industrial areas of the Everett-Seattle-Tacoma urban corridor and subsequently travel southeasterly to more rural areas as they react to form ozone. The highest concentrations are measured downwind in areas such as North Bend, Enumclaw, and Eatonville. As a result, for the Puget Sound air shed the majority of sites that measure ozone are located in rural areas south to southeast of Seattle and Tacoma. See the map of the Puget Sound measuring locations. The Department of Ecology maintains all ozone-monitoring stations.

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

- **What is it?**
  Particulate matter (PM) includes both solid matter and liquid droplets suspended in the air. Particles smaller than 2.5 micrometers in diameter are called "fine" particles, or $PM_{2.5}$. Particles between 2.5 and 10 micrometers in diameter are called "coarse" particles. PM_{10} includes both fine and coarse particles. The Agency considers $PM_{2.5}$ one of the major air pollution concerns affecting our community.
- **How is it caused?**
  - $PM_{2.5}$ comes from all types of combustion, including cars, diesel trucks, power plants, and wood burning, and from some industrial processes. It can also be formed in the atmosphere by chemical reactions of pollutant gases.
  - The "coarse" particles in PM_{10} typically come from crushing or grinding operations and dust from roads.
- **When does it happen?**
  Any time.
- **Who is affected?**
  People with asthma and heart or lung diseases, the elderly, and children. $PM_{2.5}$ also significantly affects visibility.
- **What are the health effects?**
  Fine particulates ($PM_{2.5}$) pose a greater risk to human health than coarse particulates, because they penetrate deeper into the respiratory system.
  - $PM_{2.5}$ exposure can have serious health effects. People with heart or lung diseases are at increased risk of attacks or premature death. Children and the elderly are more likely to develop heart or lung problems.

- PM_{10} can aggravate respiratory conditions such as asthma.

- **What can I do about it?**
  - If $PM_{2.5}$ levels are high, people with respiratory or heart disease, the elderly, and children should avoid outdoor exertion.
  - If PM_{10} levels are high, people with respiratory conditions should avoid outdoor exertion.

- **Where is it measured?**
  Due to the health risks associated with PM, both $PM_{2.5}$ and PM_{10} are monitored throughout the Puget Sound. The majority of PM monitoring stations are maintained by the Agency.

Carbon Monoxide (CO)

- **What is it?**
  CO is an odorless, colorless gas that can enter the bloodstream through the lungs and reduce the amount of oxygen that reaches organs and tissues.

- **How is it caused?**
  Carbon monoxide forms when the carbon in fuels doesn't burn completely. 60% of all CO comes from vehicle exhaust, and up to 95% in cities.

- **When does it happen?**
  CO pollution is worst in cold weather because fuels burn less efficiently in low temperatures. It is usually at its peak during morning and evening rush hours.

- **Who is affected?**
  People with cardiovascular disease, such as angina, or cardiovascular or respiratory problems; also possibly fetuses and young infants.

- **What are the health effects?**
  Chest pain and increased cardiovascular symptoms, particularly while exercising. High levels of CO can affect alertness and vision even in healthy individuals.

- **What can I do about it?**
  If CO levels are high, limit exertion and avoid sources of CO such as heavy traffic.

- **Where is it measured?**
  CO monitoring stations are located in areas with heavy traffic congestion. These include central business areas, roadsides, and shopping malls. The Department of Ecology conducts all CO monitoring.

Sulfur Dioxide (SO_2)

- **What is it?**
  Sulfur dioxide is a colorless, reactive gas.

- **How is it caused?**
  SO_2 is produced by burning sulfur-containing fuels such as coal and oil, and by industrial processes.

- **Where does it happen?**
  The highest concentrations of SO_2 are usually near large industrial sources.
- **Who is affected?**
  People with asthma who are active outdoors.
- **What are the health effects?**
  Bronchoconstriction, which can cause wheezing, shortness of breath, and tightening of the chest. When exposure to SO_2 ends, the symptoms should clear up within an hour.
- **What can I do about it?**
  If SO_2 levels are high, limit your outdoor exertion.
- **Where is it measured?**
  Because the large primary sources of SO_2 in the Puget Sound area no longer exist, the Agency has not monitored for SO_2 since the end of 1999.

Lead (Pb)

- **What is it?**
  Lead is a highly toxic metal that was used for many years in household products, automobile fuel, and industrial chemicals.
- **How is it caused?**
  Locally, airborne lead is associated primarily with automobile exhaust and lead smelters. Since the phase-out of lead in fuels, however, cars and trucks are no longer a significant source of lead. Also, Seattle's Harbor Island lead smelter ceased operation at the end of 1998.
- **When does it happen?**
  Lead concentrations are likely to be highest near sources where current or former lead smelting/processing operations caused particle fallout, especially in nearby soils such as unpaved parking lots.
- **Who is affected?**
  Everyone. Children 6 years and younger are most at risk.
- **What are the health effects?**
  Lead can have health effects ranging from behavioral problems and learning disabilities to seizures and death.
- **What can I do about it?**
  According to EPA, the primary sources of lead exposure are lead-based paint, lead-contaminated dust, and lead-contaminated residual soils. Refer to the EPA website (below) for ways to limit your exposure to these lead sources.
- **Where is it measured?**
  Due to the phase-out of leaded fuels and the closure of Seattle's lead smelter in 1998, the Agency no longer monitors for airborne lead.

Nitrogen Dioxide (NO_2)

- **What is it?**
  Nitrogen dioxide (NO_2) is a reddish brown, highly reactive gas that forms from the reaction of nitrogen oxide (NO) and oxygen in the atmosphere. NO_2 will react with VOCs and can result in the formation of ozone.
- **How is it caused?**
  High temperature combustion sources such as power plants and automobiles are major producers of NO. Home heaters and gas stoves can also produce NO.
- **When does it happen?**
  NO_2 pollution is greatest in cold weather. It follows a similar trend to CO.
- **Who is affected?**
  People with respiratory diseases such as asthma; also children.
- **What are the health effects?**
  NO_2 can cause respiratory symptoms such as coughing, wheezing, and shortness of breath. Long-term exposure can lead to respiratory infections.
- **What can I do about it?**
  Since the 1970s, motor vehicle manufacturers have been required to reduce NO emissions from cars and trucks. It is not a significant pollution problem in the Puget Sound area.
- **Where is it measured?**
  Because NO_2 is not a major concern of the Puget Sound region, it is measured at only one location, Beacon Hill. The Department of Ecology conducts all NO_2 monitoring.

Pollution Sources

Area Sources

Countywide categories of pollution sources, in which each individual source emits pollutants below the thresholds for a point source facility.

Biogenics

Natural sources such as trees, plants, grass, crops, and soils. The worldwide emission rate of these natural hydrocarbons has been estimated to exceed that of non-methane hydrocarbons originating from human sources. Isoprene, one of the major constituents of biogenic emissions, is very photoreactive, and would seem to make biogenic VOC a contributor in the formation of ozone. The study of hydrocarbon emissions from plants is therefore of key importance to our understanding of the global effects of naturally produced hydrocarbons.

Emission Factor

A value derived from source tests, material balance calculations, or engineering comparisons with similar processes. Used to estimate emissions from process quantities.

Non-road Mobile Sources

Farm vehicles, on-site construction/industrial vehicles, logging equipment, small marine craft, aircraft, trains, ocean-going ships, tugs and ferries, lawn and garden equipment.

On-road Mobile Sources

Cars, trucks, sport utility vehicles, and buses.

Point Sources

Facilities that have annual air contaminant emissions equal to or exceeding 100 tons per year of CO; 25 tons per year of nitrogen oxides (NO_x), PM_{10}, $PM_{2.5}$, sulfur oxides (SO_x) such as SO_2 and sulfur trioxide (SO_3), or volatile organic compounds (VOC); or 2 tons per year of a any single HAP or 6 tons per year of facility total HAP.

Registered Facility

The total of all pollutant-emitting activities located on adjacent or contiguous properties owned or operated by one person or corporate entity. It includes all of the pollutant-emitting buildings, processes, structures, equipment, control apparatuses, and storage areas at a facility. The annual fees for large and small registered emission sources are based on Regulation I, 5.07(c)(1) and 5.07(c)(2), respectively.

Stationary Area Sources

Also called area sources. Pollution sources where each individual source emits pollutants below the thresholds for a point source facility. Sources include wood stoves/fireplaces, outdoor burning, architectural surface coating, automobile painting, commercial/consumer solvents, dry cleaning, printing, stationary diesel engines, and small utility engines, and construction activities.

110 Union Street, Suite 500
Seattle, Washington 98101

2003
Air Quality Data Summary Appendix

September 2004

Air Quality Index
1980 - 2003

Snohomish County

	Days in Each Air Quality Category					Pollutant Determining the AQI							Highest Value		
			Unhealthy for Sensitive		Very	All Days				Unhealthy Days					
Year	Good	Moderate	Groups	Unhealthy	Unhealthy	PM	CO	SO_2	O_3	PM	CO	SO_2	AQI	Date	Pollutant
1980	340	19		0	0	356		3		0		0	60	Jan 23	PM
1981	350	11		0	0	340		21		0		0	62	Jan 16	PM
1982	334	30		1	0	277	70	18		0	1	0	117	Dec 30	CO
1983	308	56		1	0	191	150	24		0	1	0	117	Nov 30	CO
1984	309	57		0	0	105	217	44		0	0	0	92	Sep 28	PM
1985	300	64		1	0	152	166	47		0	1	0	117	Dec 11	CO
1986	324	41		0	0	169	148	48		0	0	0	89	Jan 25	CO
1987	203	158		3	0	96	250	18		0	3	0	117	Jun 26 #	CO
1988	174	184		8	0	15	345	6		0	8	0	133	Sep 13 #	CO
1989	150	213		2	0	26	338	1		0	2	0	133	Feb 10	CO
1990	166	197		2	0	29	335	1		0	2	0	117	Mar 2 #	CO
1991	188	176		1	0	32	333	0		0	1	0	117	Dec 16	CO
1992	180	186		0	0	34	332	0		0	0	0	100	Feb 4 #	CO
1993	237	128		0	0	56	306	0	3	0	0	0	79	Jan 11	PM
1994	294	71		0	0	28	334	1	2	0	0	0	78	Dec 30	CO
1995	316	49		0	0	59	294	1	11	0	0	0	78	Jul 7	CO
1996	340	26		0	0	54	299	0	13	0	0	0	67	Jul 26	O_3
1997	348	17		0	0	210	151	0	4	0	0	0	67	Jan 14	PM
1998	353	11		1	0	143	219	3		1	0	0	153	Dec 22	PM
1999	300	62	3	0	0	260	105	0		3	0	0	129	Jan 3	PM
2000	253	79	5	0	0	301	36			5	0		113	Jul 4	PM
2001	290	73	2	0	0	356	9			2	0		111	Nov 10	PM
2002	288	69	8	0	0	343	22			8	0		116	Nov 4	PM
2003	282	80	3	0	0	364	1	___	___	3	0	_	108	Nov 4	PM
Totals	6627	2057	21	20	0	3996	4460	236	33	22	19	0			

PM = Particulate Matter CO = Carbon Monoxide SO_2 = Sulfur Dioxide O_3 = Ozone # = 1st Occurrence

Note: In 1987 the particulate matter (PM) standard, total suspended particulates (TSP), was replaced by only that fraction of particulate matter with particle diameters equal to or less than 10 micrometers (PM_{10}).

In 1999 the Pollutant Standard Index (PSI) was replaced by the Air Quality Index (AQI) and included new and more stringent fine particle ($PM_{2.5}$) and 8-hour ozone (O_3) standards.

Air Quality Index
1980 - 2003

King County

	Days in Each Air Quality Category					Pollutant Determining the AQI							Highest Value		
			Unhealthy for Sensitive		Very	All Days				Unhealthy Days					
Year	Good	Moderate	Groups	Unhealthy	Unhealthy	PM	CO	SO_2	O_3	PM	CO	O_3	AQI	Date	Pollutant
1980	73	275		18	0	95	270	1		1	17		194	Jan 23	PM
1981	69	267		28	1	109	254	2		5	24		213	Jan 15	CO
1982	86	268		10	1	96	264	5		1	10		214	Feb 6	PM
1983	98	258		9	0	101	261	3		0	9		183	Jan 28	CO
1984	146	218		2	0	111	242	13		2	0		103	Dec 6	PM
1985	150	202		10	3	156	206	3		6	7		204	Dec 12	PM
1986	130	226		8	1	113	246	6		1	8		206	Jan 7	PM
1987	120	238		7	0	119	246	0		3	4		184	Feb 6	PM
1988	215	146		5	0	67	298	1		2	3		150	Dec 3	CO
1989	231	134		0	0	129	233	3		0	0		100	Jan 19 #	CO
1990	216	145		4	0	139	201	6	19	0	0	4	131	Aug 11	O_3
1991	229	136		0	0	140	190	8	27	0	0	0	100	Dec 15 #	CO
1992	206	159		1	0	103	230	1	32	0	1	0	167	Feb 3	CO
1993	240	125		0	0	118	235	1	11	0	0	0	88	Jan 11	PM
1994	293	70		2	0	72	270	1	22	0	0	2	134	Jul 21	O_3
1995	299	66		0	0	95	249	5	16	0	0	0	89	Jan 3	CO
1996	297	69		0	0	85	252	2	27	0	0	0	100	Oct 9	CO
1997	302	63		0	0	117	230	0	18	0	0	0	94	Jan 16	PM
1998	317	46		2	0	111	228	0	26	0	0	2	114	Jul 27 #	O_3
1999	267	92	6	0	0	251	60	0	54	5	0	1	134	Jan 4	PM
2000	241	118	7	0	0	288	25		53	5	0	2	114	Nov 21	PM
2001	273	86	6	0	0	295	10		60	6	0	0	118	Nov 10	PM
2002	262	99	4	0	0	275	11		79	4	0	0	113	Nov 27	PM
2003	268	95	2	0	0	250	5	__	110	0	0	2	132	Jun 6	O_3
Totals	5028	3601	25	106	6	3435	4716	61	554	41	83	13			

PM = Particulate Matter CO = Carbon Monoxide SO_2 = Sulfur Dioxide O_3 = Ozone # = 1st Occurrence

Note: In 1987 the particulate matter (PM) standard, total suspended particulates (TSP), was replaced by only that fraction of particulate matter with particle diameters equal to or less than 10 micrometers (PM_{10}).

In 1999 the Pollutant Standard Index (PSI) was replaced by the Air Quality Index (AQI) and included new and more stringent fine particle ($PM_{2.5}$) and 8-hour ozone (O_3) standards.

Air Quality Index
1980 - 2003

Pierce County

	Days in Each Air Quality Category					Pollutant Determining the AQI							Highest Value		
			Unhealthy for Sensitive		Very	All Days				Unhealthy Days					
Year	Good	Moderate	Groups	Unhealthy	Unhealthy	PM	CO	SO_2	O_3	PM	CO	O_3	AQI	Date	Pollutant
1980	83	271		12	0	256	107	3		4	8		160	Apr 12	PM
1981	74	278		10	3	222	137	6		1	12		227	Jan 12	CO
1982	119	242		4	0	255	101	9		0	4		167	Dec 30	CO
1983	140	222		3	0	228	128	9		1	2		137	Dec 23	PM
1984	162	198		6	0	207	149	10		0	6		117	Jan 19 #	CO
1985	140	213		12	0	252	109	4		1	11		165	Dec 13	PM
1986	161	197		7	0	247	114	4		2	5		167	Oct 23	CO
1987	173	177		13	2	227	136	2		5	10		220	Feb 5	CO
1988	226	132		8	0	184	175	7		3	5		183	Jan 27	CO
1989	260	103		2	0	217	121	27		0	2		117	Nov 30 #	CO
1990	271	91		3	0	219	87	41	18	1	0	2	118	May 5	PM
1991	261	103		1	0	247	85	12	21	0	1	0	117	Jan 31	CO
1992	260	106		0	0	231	83	27	25	0	0	0	100	Feb 3 #	CO
1993	289	76		0	0	247	82	23	13	0	0	0	89	Feb 1	CO
1994	313	51		1	0	235	75	31	24	0	0	1	105	Jul 21	O_3
1995	307	58		0	0	239	97	13	16	0	0	0	83	Jan 3	PM
1996	322	44		0	0	206	119	23	18	0	0	0	78	Oct 9	CO
1997	316	49		0	0	262	75	16	12	0	0	0	84	Jan 16	PM
1998	338	25		2	0	213	112	25	15	0	0	2	120	Jul 27	O_3
1999	265	97	3	0	0	318	1	1	45	3	0	0	139	Jan 4	PM
2000	242	110	13	1	0	318	2		46	14	0	0	153	Dec 6	PM
2001	271	83	11	0	0	306	2		57	11	0	0	139	Nov 10	PM
2002	267	88	9	1	0	291	1		73	10	0	0	158	Nov 27	PM
2003	265	92	8	0	0	264	1	___	100	8	0	0	122	Jan 8	PM
Totals	5525	3106	44	86	5	5891	2099	293	383	64	66	5			

PM = Particulate Matter CO = Carbon Monoxide SO_2 = Sulfur Dioxide O_3 = Ozone # = 1st Occurrence

Note: In 1987 the particulate matter (PM) standard, total suspended particulates (TSP), was replaced by only that fraction of particulate matter with particle diameters equal to or less than 10 micrometers (PM_{10}).

In 1999 the Pollutant Standard Index (PSI) was replaced by the Air Quality Index (AQI) and included new and more stringent fine particle ($PM_{2.5}$) and 8-hour ozone (O_3) standards.

Air Quality Index
1990 - 2003

Kitsap County

	Days in Each Air Quality Category					Pollutant Determining the AQI							Highest Value		
			Unhealthy for Sensitive		Very	All Days				Unhealthy Days					
Year	Good	Moderate	Groups	Unhealthy	Unhealthy	PM	CO	SO_2	O_3	PM	CO	O_3	AQI	Date	Pollutant
1990															
1991															
1992	353	8		0	0	361				0			68	Nov 25	PM
1993	343	12		0	0	355				0			62	Jan 11	PM
1994	364	1		0	0	248	117			0	0		54	Dec 23	CO
1995	361	4		0	0	86	279			0	0		57	Jan 5	CO
1996	361	1		0	0	206	156			0	0		51	Mar 2	PM
1997	361	1		0	0	362				0			55	Jan 15	PM
1998	347	9		0	0	356				0			87	Nov 8	PM
1999	333	32	0	0	0	365				0			81	Jan 5 #	PM
2000	290	75	0	1	0	366				1			159	Jul 4	PM
2001	320	42	0	0	0	362				0			91	Dec 25	PM
2003	318	47	0	0	0	365	—	–	–	0	–	–	78	Nov 3	PM
Totals	4075	273	0	1	0	3797	552	0	0	1	0	0			

PM = Particulate Matter CO = Carbon Monoxide SO_2 = Sulfur Dioxide O_3 = Ozone # = 1st Occurrence

Note: In 1999 the Pollutant Standard Index (PSI) was replaced by the Air Quality Index (AQI) and included new and more stringent fine particle ($PM_{2.5}$) and 8-hour ozone (O_3) standards.

SCC Code	Descriptor 1	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	$PM_{2.5}$*	SO_2	VOC	Data
					Tons	Tons	Tons	Tons	Tons	Source
10200401	External Combustion Boilers	Industrial	Residual Oil	Grade 6 Oil	3	22	6	41	na	ECY
10200401	External Combustion Boilers	Industrial	Residual Oil	Grade 6 Oil	na	3	na	1	na	PSCAA
10200501	External Combustion Boilers	Industrial	Distillate Oil	Grades 1 and 2 Oil	na	2	na	na	na	PSCAA
10200601	External Combustion Boilers	Industrial	Natural Gas	> 100 Million Btu/hr	77	360	na	na	5	PSCAA
10200601	External Combustion Boilers	Industrial	Natural Gas	> 100 Million Btu/hr	7	25	na	na	na	ECY
10200602	External Combustion Boilers	Industrial	Natural Gas	10-100 Million Btu/hr	96	92	na	9	6	PSCAA
10200602	External Combustion Boilers	Industrial	Natural Gas	10-100 Million Btu/hr	3	47	na	na	na	ECY
10200902	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood/Bark-fired Boiler	297	312	8	3	26	ECY
10200903	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler - Wet Wood (>=20% moisture)	134	527	3	328	na	ECY
10500106	External Combustion Boilers	Space Heaters	Industrial	Natural Gas	1	5	na	na	na	PSCAA
20100102	Internal Combustion Engines	Electric Generation	Distillate Oil (Diesel)	Reciprocating	1	4	na	na	na	PSCAA
20100702	Internal Combustion Engines	Electric Generation	Process Gas	Reciprocating	44	113	na	4	4	PSCAA
20190099	Internal Combustion Engines	Electric Generation	Flares	Heavy Water	3	4	na	1	na	PSCAA
20200102	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating	3	11	na	1	na	PSCAA
20200202	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating	9	5	na	na	na	PSCAA
20201001	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Propane: Reciprocating	1	na	na	na	na	PSCAA
30200899	Industrial Processes	Food and Agriculture	Feed Manufacture	Not Classified **	2	2	na	na	126	PSCAA
30390003	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Process Heaters	44	112	4	na	3	PSCAA
30400701	Industrial Processes	Secondary Metal Production	Steel Foundries	Electric Arc Furnace	629	151	17	63	41	PSCAA
30500606	Industrial Processes	Mineral Products	Cement Manufacturing (Dry Process)	Kilns	1414	1213	28	188	na	PSCAA
30500612	Industrial Processes	Mineral Products	Cement Manufacturing (Dry Process)	Raw Material Transfer	na	na	2	na	na	PSCAA
30500614	Industrial Processes	Mineral Products	Cement Manufacturing (Dry Process)	Clinker Cooler	na	na	9	na	na	PSCAA
30500617	Industrial Processes	Mineral Products	Cement Manufacturing (Dry Process)	Clinker Grinding	na	na	1	na	na	PSCAA
30500706	Industrial Processes	Mineral Products	Cement Manufacturing (Wet Process)	Kilns	264	2251	6	771	na	PSCAA
30500714	Industrial Processes	Mineral Products	Cement Manufacturing (Wet Process)	Clinker Cooler	na	na	18	na	na	PSCAA
30500717	Industrial Processes	Mineral Products	Cement Manufacturing (Wet Process)	Clinker Grinding	na	na	11	na	na	PSCAA
30501402	Industrial Processes	Mineral Products	Glass Manufacture	Container Glass: Melting Furnace	na	404	64	117	na	PSCAA
30501406	Industrial Processes	Mineral Products	Glass Manufacture	Container Glass: Forming/Finishing	na	na	6	na	na	PSCAA
30501602	Industrial Processes	Mineral Products	Lime Manufacture	Secondary Crushing/Screening	na	na	10	na	na	PSCAA
30501604	Industrial Processes	Mineral Products	Lime Manufacture	Calcining: Rotary Kiln	71	283	17	109	na	PSCAA
30501607	Industrial Processes	Mineral Products	Lime Manufacture	Raw Material Transfer and Conveying	na	na	4	na	na	PSCAA
30501609	Industrial Processes	Mineral Products	Lime Manufacture	Hydrator: Atmospheric	na	na	1	na	na	PSCAA
30501610	Industrial Processes	Mineral Products	Lime Manufacture	Raw Material Storage Piles	na	na	3	na	na	PSCAA
30501615	Industrial Processes	Mineral Products	Lime Manufacture	Product Transfer and Conveying	na	na	2	na	na	PSCAA
30501616	Industrial Processes	Mineral Products	Lime Manufacture	Primary Screening	na	na	4	na	na	PSCAA
30599999	Industrial Processes	Mineral Products	Other Not Defined	Specify in Comments Field	na	na	13	na	na	PSCAA
30600503	Industrial Processes	Petroleum Industry	Wastewater Treatment	Process Drains and Wastewater Separators	na	na	na	na	10	PSCAA
30600801	Industrial Processes	Petroleum Industry	Fugitive Emissions	Pipeline Valves and Flanges	na	na	na	na	20	PSCAA
30600803	Industrial Processes	Petroleum Industry	Fugitive Emissions	Pump Seals w/o Controls	na	na	na	na	1	PSCAA
30600804	Industrial Processes	Petroleum Industry	Fugitive Emissions	Compressor Seals	na	na	na	na	15	PSCAA
30700102	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	Washer/Screens	na	na	na	na	46	ECY
30700105	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	Smelt Dissolving Tank	na	10	33	6	3	ECY
30700106	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	Lime Kiln	63	35	24	38	na	ECY
30700110	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	Recovery Furnace/Indirect Contact Evaporator	708	321	21	331	39	ECY
30700222	Industrial Processes	Pulp and Paper and Wood Products	Sulfite Pulping	Recovery System: NH3	336	135	27	53	250	ECY
30700299	Industrial Processes	Pulp and Paper and Wood Products	Sulfite Pulping	See Comment **	67	17	na	na	10	ECY
30900201	Industrial Processes	Fabricated Metal Products	Abrasive Blasting of Metal Parts	General	na	na	1	na	na	PSCAA
30988806	Industrial Processes	Fabricated Metal Products	Fugitive Emissions	Other Not Classified	na	na	3	na	na	PSCAA
30999999	Industrial Processes	Fabricated Metal Products	Other Not Classified	Other Not Classified	na	na	2	na	na	PSCAA
39999994	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Industrial Processes	Other Not Classified	na	na	na	na	1	PSCAA
39999995	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Industrial Processes	Other Not Classified	na	na	na	na	49	PSCAA
40100205	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Degreasing	Trichloroethylene: Open-top Vapor Degreasing	na	na	na	na	32	PSCAA
40100297	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Degreasing	Other Not Classified: Open-top Vapor Degreasing	na	na	na	na	3	PSCAA
40200101	Petroleum and Solvent Evaporation	Surface Coating Operations	Surface Coating Application - General	Paint: Solvent-base	na	na	18	na	99	PSCAA
40200401	Petroleum and Solvent Evaporation	Surface Coating Operations	Surface Coating Application - General	Lacquer	na	na	2	na	8	PSCAA
40200701	Petroleum and Solvent Evaporation	Surface Coating Operations	Surface Coating Application - General	Adhesive Application	na	na	na	na	11	PSCAA
40200998	Petroleum and Solvent Evaporation	Surface Coating Operations	Thinning Solvents - General	General: Specify in Comments	na	na	na	na	51	PSCAA

SCC Code	Descriptor 1	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	$PM_{2.5}$*	SO_2	VOC	Data
					Tons	Tons	Tons	Tons	Tons	Source
40201001	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Natural Gas	4	5	na	na	na	PSCAA
40201705	Petroleum and Solvent Evaporation	Surface Coating Operations	Metal Can Coating	Equipment Cleanup	na	na	na	na	6	PSCAA
40201722	Petroleum and Solvent Evaporation	Surface Coating Operations	Metal Can Coating	Interior Spray Coating	na	na	na	na	265	PSCAA
40201727	Petroleum and Solvent Evaporation	Surface Coating Operations	Metal Can Coating	Lithography	na	na	na	na	2	PSCAA
40201728	Petroleum and Solvent Evaporation	Surface Coating Operations	Metal Can Coating	Over Varnish	na	na	na	na	68	PSCAA
40201799	Petroleum and Solvent Evaporation	Surface Coating Operations	Metal Can Coating	Other Not Classified	na	na	na	na	11	PSCAA
40202132	Petroleum and Solvent Evaporation	Surface Coating Operations	Flatwood Products	Solvent-borne Coating	na	na	na	na	84	PSCAA
40202401	Petroleum and Solvent Evaporation	Surface Coating Operations	Large Aircraft	Prime Coating Operation	na	na	na	na	14	PSCAA
40202402	Petroleum and Solvent Evaporation	Surface Coating Operations	Large Aircraft	Cleaning/Pretreatment	na	na	na	na	181	PSCAA
40202406	Petroleum and Solvent Evaporation	Surface Coating Operations	Large Aircraft	Topcoat Operation	na	na	na	na	53	PSCAA
40202499	Petroleum and Solvent Evaporation	Surface Coating Operations	Large Aircraft	Other Not Classified	na	na	na	na	16	PSCAA
40299998	Petroleum and Solvent Evaporation	Surface Coating Operations	Miscellaneous	Specify in Comments Field	na	na	na	na	55	PSCAA
40301008	Petroleum and Solvent Evaporation	Petroleum Product Storage at Refineries	Fixed Roof Tanks (Varying Sizes)	Gasoline RVP 10: Working Loss	na	na	na	na	20	PSCAA
40388801	Petroleum and Solvent Evaporation	Petroleum Product Storage at Refineries	Fugitive Emissions	Specify in Comments Field	na	na	na	na	1	PSCAA
40400153	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Vapor Control Unit Losses	na	na	na	na	4	PSCAA
40600240	Petroleum and Solvent Evaporation	Transportation of Petroleum Products	Marine Vessels	Gasoline: Barge Loading - Average Tank Condition	na	na	na	na	40	PSCAA
49099999	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Miscellaneous VOC Evaporation	Identify the Process and Solvent in Comments	na	na	2	na	15	PSCAA
50100702	Waste Disposal	Solid Waste Disposal - Government	Sewage Treatment	Primary Settling Tank	na	na	na	na	5	PSCAA

PSCAA - Source of data is Puget Sound Clean Air Agency, 2002

ECY - Source of data is Washington State Department of Ecology, 2002

na - not applicable - there are no reported/calculated amounts greater than a half ton for pollutant for this source category

* PM_{10} Department of Ecology values used for $PM_{2.5}$.

Descriptors are those defined by EPA, February 2004.

2002 Emission Inventory by SCC for
On-Road Mobile Sources

SCC Code	Descriptor 3 (type of vehicle)	Descriptor 4 (Location)	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Data
			Tons	Tons	Tons	Tons	Tons	Source
220100111	Light Duty Gasoline Vehicles (LDGV)	Rural Interstate	14,196	965	8	32	894	ECY
220100113	Light Duty Gasoline Vehicles (LDGV)	Rural Other Principal Arterial	11,611	797	6	27	846	ECY
220100115	Light Duty Gasoline Vehicles (LDGV)	Rural Minor Arterial	12,523	927	8	34	995	ECY
220100117	Light Duty Gasoline Vehicles (LDGV)	Rural Major Collector	7,186	533	4	19	602	ECY
220100119	Light Duty Gasoline Vehicles (LDGV)	Rural Minor Collector	702	53	na	2	62	ECY
220100121	Light Duty Gasoline Vehicles (LDGV)	Rural Local	1,858	141	na	5	164	ECY
220100123	Light Duty Gasoline Vehicles (LDGV)	Urban Interstate	108,858	7,807	64	275	8,004	ECY
220100125	Light Duty Gasoline Vehicles (LDGV)	Urban Other Freeways and Expressways	49,589	3,518	29	123	3,638	ECY
220100127	Light Duty Gasoline Vehicles (LDGV)	Urban Other Principal Arterial	61,245	4,743	42	171	5,433	ECY
220100129	Light Duty Gasoline Vehicles (LDGV)	Urban Minor Arterial	55,122	4,269	37	154	4,888	ECY
220100131	Light Duty Gasoline Vehicles (LDGV)	Urban Collector	23,366	1,810	16	65	2,073	ECY
220100133	Light Duty Gasoline Vehicles (LDGV)	Urban Local	33,196	2,615	26	98	4,187	ECY
220102011	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Interstate	12,451	638	4	22	824	ECY
220102013	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Other Principal Arterial	10,700	534	4	18	771	ECY
220102015	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Minor Arterial	11,832	628	5	23	907	ECY
220102017	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Major Collector	6,859	361	2	13	548	ECY
220102019	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Minor Collector	673	36	na	1	56	ECY
220102021	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Rural Local	1,778	95	na	3	148	ECY
220102023	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Interstate	100,077	5,272	42	186	7,275	ECY
220102025	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Other Freeways and Expressways	45,626	2,372	19	83	3,309	ECY
220102027	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Other Principal Arterial	58,491	3,211	27	115	4,917	ECY
220102029	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Minor Arterial	52,660	2,891	24	104	4,424	ECY
220102031	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Collector	22,308	1,225	10	44	1,876	ECY
220102033	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	Urban Local	33,094	1,771	16	66	3,580	ECY
220104011	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Interstate	4,926	288	2	12	302	ECY
220104013	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Other Principal Arterial	4,236	241	2	10	278	ECY
220104015	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Minor Arterial	4,634	285	2	13	335	ECY
220104017	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Major Collector	2,688	163	1	7	201	ECY
220104019	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Minor Collector	264	16	na	na	21	ECY
220104021	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Rural Local	697	43	na	2	55	ECY
220104023	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Interstate	39,418	2,384	24	103	2,695	ECY
220104025	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Other Freeways and Expressways	17,988	1,072	10	46	1,217	ECY
220104027	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Other Principal Arterial	22,897	1,456	15	64	1,844	ECY
220104029	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Minor Arterial	20,606	1,311	14	58	1,659	ECY
220104031	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Collector	8,736	555	5	24	704	ECY
220104033	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	Urban Local	12,929	805	8	37	1,394	ECY
220107011	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Interstate	791	231	3	7	57	ECY
220107013	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Other Principal Arterial	740	188	3	6	55	ECY
220107015	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Minor Arterial	1,010	221	3	7	77	ECY
220107017	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Major Collector	709	122	2	4	54	ECY
220107019	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Minor Collector	69	12	na		5	ECY
220107021	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Rural Local	185	32	na	1	14	ECY
220107023	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Interstate	7,225	1,888	29	61	543	ECY
220107025	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Other Freeways and Expressways	3,258	846	12	27	244	ECY
220107027	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Other Principal Arterial	6,219	1,083	18	38	475	ECY
220107029	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Minor Arterial	5,595	975	16	34	427	ECY
220107031	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Collector	2,373	413	6	15	181	ECY
220107033	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Local	7,063	559	9	22	530	ECY
220108011	Motorcycles (MC)	Rural Interstate	115	12	na	na	16	ECY

2002 Emission Inventory by SCC for
On-Road Mobile Sources

SCC Code	Descriptor 3 (type of vehicle)	Descriptor 4 (Location)	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Data
			Tons	Tons	Tons	Tons	Tons	Source
220108013	Motorcycles (MC)	Rural Other Principal Arterial	50	8	na	na	11	ECY
220108015	Motorcycles (MC)	Rural Minor Arterial	64	10	na	na	14	ECY
220108017	Motorcycles (MC)	Rural Major Collector	40	5	na	na	8	ECY
220108019	Motorcycles (MC)	Rural Minor Collector	4	na	na	na	na	ECY
220108021	Motorcycles (MC)	Rural Local	12	1	na	na	2	ECY
220108023	Motorcycles (MC)	Urban Interstate	501	80	na	1	113	ECY
220108025	Motorcycles (MC)	Urban Other Freeways and Expressways	224	36	na	na	50	ECY
220108027	Motorcycles (MC)	Urban Other Principal Arterial	397	46	na	na	78	ECY
220108029	Motorcycles (MC)	Urban Minor Arterial	357	41	na	na	71	ECY
220108031	Motorcycles (MC)	Urban Collector	151	18	na	na	30	ECY
220108033	Motorcycles (MC)	Urban Local	423	23	na	na	63	ECY
223000111	Light Duty Diesel Vehicles (LDDV)	Rural Interstate	2	3	na	na	1	ECY
223000113	Light Duty Diesel Vehicles (LDDV)	Rural Other Principal Arterial	2	2	na	na	na	ECY
223000115	Light Duty Diesel Vehicles (LDDV)	Rural Minor Arterial	2	2	na	na	1	ECY
223000117	Light Duty Diesel Vehicles (LDDV)	Rural Major Collector	1	1	na	na	na	ECY
223000123	Light Duty Diesel Vehicles (LDDV)	Urban Interstate	19	18	3	na	9	ECY
223000125	Light Duty Diesel Vehicles (LDDV)	Urban Other Freeways and Expressways	8	8	1	na	4	ECY
223000127	Light Duty Diesel Vehicles (LDDV)	Urban Other Principal Arterial	13	10	2	na	7	ECY
223000129	Light Duty Diesel Vehicles (LDDV)	Urban Minor Arterial	12	9	2	na	6	ECY
223000131	Light Duty Diesel Vehicles (LDDV)	Urban Collector	5	4	na	na	3	ECY
223000133	Light Duty Diesel Vehicles (LDDV)	Urban Local	12	8	1	na	6	ECY
223006011	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Rural Interstate	6	6	na	na	3	ECY
223006013	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Rural Other Principal Arterial	5	4	na	na	3	ECY
223006015	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Rural Minor Arterial	6	5	na	na	4	ECY
223006017	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Rural Major Collector	4	3	na	na	2	ECY
223006021	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Rural Local	1	na	na	na	na	ECY
223006023	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Interstate	51	40	5	2	30	ECY
223006025	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Other Freeways and Expressways	23	18	2	na	13	ECY
223006027	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Other Principal Arterial	34	23	3	1	21	ECY
223006029	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Minor Arterial	31	21	3	1	19	ECY
223006031	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Collector	13	9	1		8	ECY
223006033	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Local	29	17	2		17	ECY
223007111	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Interstate	9	43	2	2	2	ECY
223007113	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Other Principal Arterial	8	36	1	1	2	ECY
223007115	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Minor Arterial	11	44	2	2	3	ECY
223007117	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Major Collector	8	26	na	1	2	ECY
223007119	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Minor Collector	na	3	na	na	na	ECY
223007121	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Rural Local	2	7	na	na	na	ECY
223007123	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Interstate	81	356	14	15	22	ECY
223007125	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Other Freeways and Expressways	36	160	6	7	10	ECY
223007127	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Other Principal Arterial	70	234	9	9	18	ECY
223007129	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Minor Arterial	63	210	8	8	16	ECY
223007131	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Collector	27	89	3	4	7	ECY
223007133	Heavy Duty Diesel Vehicles (HDDV) Class 2B	Urban Local	77	174	5	5	16	ECY
223007211	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Interstate	7	34	1	1	2	ECY
223007213	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Other Principal Arterial	6	28		1	2	ECY
223007215	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Minor Arterial	9	35	1	1	2	ECY
223007217	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Major Collector	6	21		na	2	ECY
223007219	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Minor Collector	na	2	na	na	na	ECY

2002 Emission Inventory by SCC for
On-Road Mobile Sources

SCC Code	Descriptor 3 (type of vehicle)	Descriptor 4 (Location)	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Data
			Tons	Tons	Tons	Tons	Tons	Source
223007221	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Rural Local	2	5	na	na	na	ECY
223007223	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Interstate	63	282	9	11	17	ECY
223007225	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Other Freeways and Expressways	28	126	4	5	8	ECY
223007227	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Other Principal Arterial	54	185	5	7	14	ECY
223007229	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Minor Arterial	49	167	5	6	13	ECY
223007231	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Collector	21	71	2	3	6	ECY
223007233	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	Urban Local	60	137	3	4	13	ECY
223007311	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Interstate	24	128	5	3	7	ECY
223007313	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Other Principal Arterial	22	105	4	2	7	ECY
223007315	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Minor Arterial	31	121	5	3	10	ECY
223007317	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Major Collector	22	73	3	2	6	ECY
223007319	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Minor Collector	2	7	na	na	na	ECY
223007321	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Rural Local	6	19	na	na	2	ECY
223007323	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Interstate	221	1,058	44	25	69	ECY
223007325	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Other Freeways and Expressways	99	474	20	11	31	ECY
223007327	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Other Principal Arterial	192	646	27	16	57	ECY
223007329	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Minor Arterial	173	582	24	14	51	ECY
223007331	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Collector	73	247	10	6	22	ECY
223007333	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	Urban Local	211	470	16	9	52	ECY
223007411	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Interstate	193	1,239	28	18	39	ECY
223007413	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Other Principal Arterial	180	1,031	23	15	37	ECY
223007415	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Minor Arterial	254	1,000	29	18	51	ECY
223007417	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Major Collector	177	595	16	10	34	ECY
223007419	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Minor Collector	17	58	2	1	3	ECY
223007421	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Rural Local	46	156	4	3	9	ECY
223007423	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Interstate	1,808	10,352	242	149	370	ECY
223007425	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Other Freeways and Expressways	810	4,639	108	67	166	ECY
223007427	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Other Principal Arterial	1,570	5,284	150	93	306	ECY
223007429	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Minor Arterial	1,413	4,756	135	84	275	ECY
223007431	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Collector	599	2,016	57	36	117	ECY
223007433	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	Urban Local	1,725	3,074	85	54	280	ECY
223007511	Heavy Duty Diesel Buses (School & Transit)	Rural Interstate	7	42	2	1	2	ECY
223007513	Heavy Duty Diesel Buses (School & Transit)	Rural Other Principal Arterial	7	34	2	na	2	ECY
223007515	Heavy Duty Diesel Buses (School & Transit)	Rural Minor Arterial	10	42	2	1	2	ECY
223007517	Heavy Duty Diesel Buses (School & Transit)	Rural Major Collector	7	25	1	na	1	ECY
223007519	Heavy Duty Diesel Buses (School & Transit)	Rural Minor Collector	na	2	na	na	na	ECY
223007521	Heavy Duty Diesel Buses (School & Transit)	Rural Local	2	7	na	na	na	ECY
223007523	Heavy Duty Diesel Buses (School & Transit)	Urban Interstate	68	343	19	10	16	ECY
223007525	Heavy Duty Diesel Buses (School & Transit)	Urban Other Freeways and Expressways	30	154	9	4	7	ECY
223007527	Heavy Duty Diesel Buses (School & Transit)	Urban Other Principal Arterial	59	225	12	6	13	ECY
223007529	Heavy Duty Diesel Buses (School & Transit)	Urban Minor Arterial	53	203	11	5	12	ECY
223007531	Heavy Duty Diesel Buses (School & Transit)	Urban Collector	22	86	5	2	5	ECY
223007533	Heavy Duty Diesel Buses (School & Transit)	Urban Local	64	167	7	3	12	ECY

ECY - Source of data is Washington State Department of Ecology, 2002

na - not applicable - there are no reported/calculated amounts greater than a half ton for pollutant for this source category

Descriptors 3, 4 are as defined by EPA, February 2004

Descriptors 1 (all mobile sources) and 2 (highway vehicles) are not included

2002 Emission Inventory by
SCC for
Non-Road Mobile Sources

SCC Code	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	PM_{15}	SO_2	VOC	Data
				Tons	Tons	Tons	Tons	Tons	Source
2260001010	Off-highway Vehicle Gasoline, 2-Stroke	Recreational Equipment	Motorcycles: Off-road	549	2	na	na	634	NEI 2002
2260001030	Off-highway Vehicle Gasoline, 2-Stroke	Recreational Equipment	All Terrain Vehicles	424	1	na	na	490	NEI 2002
2260001060	Off-highway Vehicle Gasoline, 2-Stroke	Recreational Equipment	Specialty Vehicles/Carts	495	4	na	na	13	NEI 2002
2260002006	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	Tampers/Rammers	275	1	6	na	105	NEI 2002
2260002009	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	Plate Compactors	13	na	na	na	6	NEI 2002
2260002021	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	Paving Equipment	15	na	na	na	7	NEI 2002
2260002039	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	Concrete/Industrial Saws	738	4	16	na	286	NEI 2002
2260002054	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	Crushing/Processing Equipment	3	na	na	na	1	NEI 2002
2260003030	Off-highway Vehicle Gasoline, 2-Stroke	Industrial Equipment	Sweepers/Scrubbers	8	na	na	na	4	NEI 2002
2260004015	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Rotary Tillers < 6 HP (Residential)	45	na	na	na	22	NEI 2002
2260004016	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Rotary Tillers < 6 HP (Commercial)	261	na	5	na	132	NEI 2002
2260004020	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Chain Saws < 6 HP (Residential)	594	na	11	na	333	NEI 2002
2260004021	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Chain Saws < 6 HP (Commercial)	4,029	18	86	1	1,735	NEI 2002
2260004025	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Residential)	845	1	15	na	433	NEI 2002
2260004026	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Commercial)	2,582	6	50	na	1,256	NEI 2002
2260004030	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Leafblowers/Vacuums (Residential)	528	na	10	na	266	NEI 2002
2260004031	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Leafblowers/Vacuums (Commercial)	2,627	9	54	na	1,152	NEI 2002
2260004035	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Snowblowers (Residential)	464	na	5	na	194	NEI 2002
2260004036	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Snowblowers (Commercial)	1,496	na	15	na	620	NEI 2002
2260006005	Off-highway Vehicle Gasoline, 2-Stroke	Commercial Equipment	Generator Sets	98	na	2	na	45	NEI 2002
2260006010	Off-highway Vehicle Gasoline, 2-Stroke	Commercial Equipment	Pumps	719	1	14	na	329	NEI 2002
2260007005	Off-highway Vehicle Gasoline, 2-Stroke	Logging Equipment	Chain Saws > 6 HP	782	4	17	na	311	NEI 2002
2265001010	Off-highway Vehicle Gasoline, 4-Stroke	Recreational Equipment	Motorcycles: Off-road	242	2	na	na	13	NEI 2002
2265001030	Off-highway Vehicle Gasoline, 4-Stroke	Recreational Equipment	All Terrain Vehicles	1,700	15	na	3	102	NEI 2002
2265001050	Off-highway Vehicle Gasoline, 4-Stroke	Recreational Equipment	Golf Carts	5,267	31	na	1	83	NEI 2002
2265001060	Off-highway Vehicle Gasoline, 4-Stroke	Recreational Equipment	Specialty Vehicles/Carts	445	3	na	na	15	NEI 2002
2265002003	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Pavers	258	3	na	na	6	NEI 2002
2265002006	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Tampers/Rammers	2	na	na	na	na	NEI 2002
2265002009	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Plate Compactors	441	3	na	na	20	NEI 2002
2265002015	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Rollers	487	5	na	na	9	NEI 2002
2265002021	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Paving Equipment	866	7	na	na	27	NEI 2002
2265002024	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Surfacing Equipment	395	3	na	na	10	NEI 2002
2265002027	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Signal Boards/Light Plants	21	na	na	na	na	NEI 2002
2265002030	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Trenchers	789	8	na	na	22	NEI 2002
2265002033	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Bore/Drill Rigs	232	3	na	na	12	NEI 2002
2265002039	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Concrete/Industrial Saws	1,898	14	na	na	32	NEI 2002
2265002042	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Cement and Mortar Mixers	758	6	na	na	27	NEI 2002
2265002045	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Cranes	51	1	na	na	2	NEI 2002
2265002054	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Crushing/Processing Equipment	108	na	na	na	3	NEI 2002
2265002057	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Rough Terrain Forklifts	75	2	na	na	3	NEI 2002
2265002060	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Rubber Tire Loaders	183	5	na	na	7	NEI 2002
2265002066	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Tractors/Loaders/Backhoes	574	4	na	na	10	NEI 2002
2265002072	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Skid Steer Loaders	325	6	na	na	9	NEI 2002
2265002078	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Dumpers/Tenders	119	na	na	na	4	NEI 2002
2265002081	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	Other Construction Equipment	65	2	na	na	2	NEI 2002
2265003010	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Aerial Lifts	1,032	22	na	na	33	NEI 2002
2265003020	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Forklifts	3,053	87	na	1	113	NEI 2002
2265003030	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Sweepers/Scrubbers	932	16	na	na	28	NEI 2002
2265003040	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Other General Industrial Equipment	1,878	16	na	na	77	NEI 2002
2265003050	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Other Material Handling Equipment	83	2	na	na	3	NEI 2002
2265003060	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	AC\Refrigeration	37	na	na	na	12	NEI 2002
2265003070	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	Terminal Tractors	318	9	4	na	667	NEI 2002
2265004010	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Lawn Mowers (Residential)	8,756	66	4	3	645	NEI 2002
2265004011	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Lawn Mowers (Commercial)	9,085	67	na	3	60	NEI 2002
2265004015	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Rotary Tillers < 6 HP (Residential)	739	6	2	na	329	NEI 2002
2265004016	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Rotary Tillers < 6 HP (Commercial)	4,475	34	na	1	4	NEI 2002
2265004025	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Residential)	49	na	na	na	13	NEI 2002
2265004026	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Commercial)	229	2	na	na	7	NEI 2002
2265004030	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Leafblowers/Vacuums (Residential)	94	na	2	na	256	NEI 2002
2265004031	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Leafblowers/Vacuums (Commercial)	9,886	103	na	3	22	NEI 2002
2265004035	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Snowblowers (Residential)	473	14	na	na	55	NEI 2002
2265004036	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Snowblowers (Commercial)	1,525	44	na	na	50	NEI 2002
2265004040	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Rear Engine Riding Mowers (Residential)	2,071	17	na	na	22	NEI 2002
2265004041	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Rear Engine Riding Mowers (Commercial)	1,184	9	na	na	32	NEI 2002
2265004046	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Front Mowers (Commercial)	1,291	10	na	na	38	NEI 2002
2265004051	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Shredders < 6 HP (Commercial)	514	4	6	na	647	NEI 2002
2265004055	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Lawn and Garden Tractors (Residential)	27,517	235	3	8	299	NEI 2002
2265004056	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Lawn and Garden Tractors (Commercial)	15,960	123	na	5	60	NEI 2002
2265004066	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Chippers/Stump Grinders (Commercial)	2,543	36	10	na	1,163	NEI 2002
2265004071	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Turf Equipment (Commercial)	50,746	423	na	14	43	NEI 2002
2265004075	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Other Lawn and Garden Equipment (Residential)	903	7	na	na	68	NEI 2002
2265004076	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	Other Lawn and Garden Equipment (Commercial)	1,406	10	6	na	806	NEI 2002
2265005010	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	2-Wheel Tractors	1	na	na	na	na	NEI 2002
2265005015	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Agricultural Tractors	4	na	na	na	na	NEI 2002
2265005025	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Balers	2	na	na	na	na	NEI 2002
2265005035	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Sprayers	10	na	na	na	na	NEI 2002
2265005040	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Tillers > 6 HP	22	na	na	na	na	NEI 2002
2265005045	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Swathers	4	na	na	na	na	NEI 2002
2265005050	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Hydro-power Units	8	na	na	na	na	NEI 2002
2265005055	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Other Agricultural Equipment	6	na	na	na	na	NEI 2002
2265005060	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	Irrigation Sets	6	na	na	na	na	NEI 2002
2265006005	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	Generator Sets	28,985	241	2	10	284	NEI 2002

2002 Emission Inventory by
SCC for
Non-Road Mobile Sources

SCC Code	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Data
2265006010	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	Pumps	6,891	67	na	2	121	NEI 2002
2265006015	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	Air Compressors	3,605	45	2	1	181	NEI 2002
2265006025	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	Welders	8,774	82	4	3	477	NEI 2002
2265006030	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	Pressure Washers	12,645	104	na	4	71	NEI 2002
2265007010	Off-highway Vehicle Gasoline, 4-Stroke	Logging Equipment	Shredders > 6 HP	1,660	12	na	na	8	NEI 2002
2265007015	Off-highway Vehicle Gasoline, 4-Stroke	Logging Equipment	Forest Eqp - Feller/Buncb/Skidder	20	na	na	na	na	NEI 2002
2265008005	Off-highway Vehicle Gasoline, 4-Stroke	Airport Ground Support Equipment	Airport Ground Support Equipment	212	4	na	na	1	NEI 2002
2267001060	LPG	Recreational Equipment	Specialty Vehicles/Carts	4	1	na	na	na	NEI 2002
2267002003	LPG	Construction and Mining Equipment	Pavers	6	2	na	na	na	NEI 2002
2267002015	LPG	Construction and Mining Equipment	Rollers	11	3	na	na	na	NEI 2002
2267002021	LPG	Construction and Mining Equipment	Paving Equipment	2	na	na	na	na	NEI 2002
2267002024	LPG	Construction and Mining Equipment	Surfacing Equipment	1	na	na	na	na	NEI 2002
2267002030	LPG	Construction and Mining Equipment	Trenchers	18	5	na	na	1	NEI 2002
2267002033	LPG	Construction and Mining Equipment	Bore/Drill Rigs	6	1	na	na	na	NEI 2002
2267002039	LPG	Construction and Mining Equipment	Concrete/Industrial Saws	18	4	na	na	2	NEI 2002
2267002045	LPG	Construction and Mining Equipment	Cranes	6	2	na	na	na	NEI 2002
2267002057	LPG	Construction and Mining Equipment	Rough Terrain Forklifts	12	3	na	na	na	NEI 2002
2267002060	LPG	Construction and Mining Equipment	Rubber Tire Loaders	29	7	na	na	1	NEI 2002
2267002066	LPG	Construction and Mining Equipment	Tractors/Loaders/Backhoes	3	na	na	na	na	NEI 2002
2267002072	LPG	Construction and Mining Equipment	Skid Steer Loaders	21	5	na	na	9	NEI 2002
2267002081	LPG	Construction and Mining Equipment	Other Construction Equipment	10	2	na	na	na	NEI 2002
2267003010	LPG	Industrial Equipment	Aerial Lifts	129	32	14	na	809	NEI 2002
2267003020	LPG	Industrial Equipment	Forklifts	11,926	2,994	na	3	6	NEI 2002
2267003030	LPG	Industrial Equipment	Sweepers/Scrubbers	94	23	na	na	2	NEI 2002
2267003040	LPG	Industrial Equipment	Other General Industrial Equipment	29	7	na	na	4	NEI 2002
2267003050	LPG	Industrial Equipment	Other Material Handling Equipment	7	2		na		NEI 2002
2267003070	LPG	Industrial Equipment	Terminal Tractors	57	14		na	9	NEI 2002
2267004066	LPG	Lawn and Garden Equipment	Chippers/Stump Grinders (Commercial)	131	33	na	na	21	NEI 2002
2267006005	LPG	Commercial Equipment	Generator Sets	283	104	na	na	5	NEI 2002
2267006010	LPG	Commercial Equipment	Pumps	70	26	na	na	6	NEI 2002
2267006015	LPG	Commercial Equipment	Air Compressors	85	31	na	na	11	NEI 2002
2267006025	LPG	Commercial Equipment	Welders	159	40	na	na	2	NEI 2002
2267006030	LPG	Commercial Equipment	Pressure Washers	2	na	na	na	na	NEI 2002
2267008005	LPG	Airport Ground Support Equipment	Airport Ground Support Equipment	24	6	1	na	4	NEI 2002
2268003020	CNG	Industrial Equipment	Forklifts	892	224	na	na	2	NEI 2002
2268003060	CNG	Industrial Equipment	AC\Refrigeration	2	na	na	na	na	NEI 2002
2268003070	CNG	Industrial Equipment	Terminal Tractors	2	na	na	na	na	NEI 2002
2268006005	CNG	Commercial Equipment	Generator Sets	99	36	na	na	na	NEI 2002
2268006010	CNG	Commercial Equipment	Pumps	4	2	na	na	na	NEI 2002
2268006015	CNG	Commercial Equipment	Air Compressors	7	2	na	na	na	NEI 2002
2268006020	CNG	Commercial Equipment	Gas Compressors	473	106	3	na	5	NEI 2002
2270001060	Off-highway Vehicle Diesel	Recreational Equipment	Specialty Vehicles/Carts	19	14	8	2	9	NEI 2002
2270002003	Off-highway Vehicle Diesel	Construction and Mining Equipment	Pavers	48	97	26	14	29	NEI 2002
2270002009	Off-highway Vehicle Diesel	Construction and Mining Equipment	Plate Compactors	2	3	na	na	na	NEI 2002
2270002015	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rollers	154	270	26	40	27	NEI 2002
2270002018	Off-highway Vehicle Diesel	Construction and Mining Equipment	Scrapers	176	394	2	55	2	NEI 2002
2270002021	Off-highway Vehicle Diesel	Construction and Mining Equipment	Paving Equipment	13	23	3	3	4	NEI 2002
2270002024	Off-highway Vehicle Diesel	Construction and Mining Equipment	Surfacing Equipment	4	6	na	na	na	NEI 2002
2270002027	Off-highway Vehicle Diesel	Construction and Mining Equipment	Signal Boards/Light Plants	14	24	14	3	16	NEI 2002
2270002030	Off-highway Vehicle Diesel	Construction and Mining Equipment	Trenchers	85	112	14	17	17	NEI 2002
2270002033	Off-highway Vehicle Diesel	Construction and Mining Equipment	Bore/Drill Rigs	71	176	76	18	81	NEI 2002
2270002036	Off-highway Vehicle Diesel	Construction and Mining Equipment	Excavators	397	1,067	na	164	1	NEI 2002
2270002039	Off-highway Vehicle Diesel	Construction and Mining Equipment	Concrete/Industrial Saws	6	7	14	1	18	NEI 2002
2270002042	Off-highway Vehicle Diesel	Construction and Mining Equipment	Cement and Mortar Mixers	4	7	na	na	na	NEI 2002
2270002045	Off-highway Vehicle Diesel	Construction and Mining Equipment	Cranes	64	237	25	30	28	NEI 2002
2270002048	Off-highway Vehicle Diesel	Construction and Mining Equipment	Graders	126	367	69	55	80	NEI 2002
2270002051	Off-highway Vehicle Diesel	Construction and Mining Equipment	Off-highway Trucks	491	1,162	3	159	4	NEI 2002
2270002054	Off-highway Vehicle Diesel	Construction and Mining Equipment	Crushing/Processing Equipment	18	50	39	6	42	NEI 2002
2270002057	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rough Terrain Forklifts	233	342	119	51	130	NEI 2002
2270002060	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rubber Tire Loaders	744	1,604	134	215	212	NEI 2002
2270002066	Off-highway Vehicle Diesel	Construction and Mining Equipment	Tractors/Loaders/Backhoes	855	906	117	118	135	NEI 2002
2270002069	Off-highway Vehicle Diesel	Construction and Mining Equipment	Crawler Tractor/Dozers	759	1,705	92	232	167	NEI 2002
2270002072	Off-highway Vehicle Diesel	Construction and Mining Equipment	Skid Steer Loaders	600	462	7	63	9	NEI 2002
2270002075	Off-highway Vehicle Diesel	Construction and Mining Equipment	Off-highway Tractors	53	97	13	12	14	NEI 2002
2270002078	Off-highway Vehicle Diesel	Construction and Mining Equipment	Dumpers/Tenders	1	1	na	na	na	NEI 2002
2270002081	Off-highway Vehicle Diesel	Construction and Mining Equipment	Other Construction Equipment	88	158	7	19	12	NEI 2002
2270003010	Off-highway Vehicle Diesel	Industrial Equipment	Aerial Lifts	39	45	33	5	31	NEI 2002
2270003020	Off-highway Vehicle Diesel	Industrial Equipment	Forklifts	183	331	13	57	17	NEI 2002
2270003030	Off-highway Vehicle Diesel	Industrial Equipment	Sweepers/Scrubbers	59	181	14	26	19	NEI 2002
2270003040	Off-highway Vehicle Diesel	Industrial Equipment	Other General Industrial Equipment	66	206	2	26	2	NEI 2002
2270003050	Off-highway Vehicle Diesel	Industrial Equipment	Other Material Handling Equipment	7	11	47	na	58	NEI 2002
2270003060	Off-highway Vehicle Diesel	Industrial Equipment	AC\Refrigeration	229	461	16	75	16	NEI 2002
2270003070	Off-highway Vehicle Diesel	Industrial Equipment	Terminal Tractors	70	215	40	35	69	NEI 2002
2270004036	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Snowblowers (Commercial)	4	8	na	na	na	NEI 2002
2270004046	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Front Mowers (Commercial)	220	348	5	48	9	NEI 2002
2270004056	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Lawn and Garden Tractors (Commercial)	29	46	11	6	13	NEI 2002
2270004066	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Chippers/Stump Grinders (Commercial)	54	108	14	13	18	NEI 2002
2270004071	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Turf Equipment (Commercial)	67	160	9	24	10	NEI 2002
2270005015	Off-highway Vehicle Diesel	Agricultural Equipment	Agricultural Tractors	49	82	1	10	na	NEI 2002
2270005020	Off-highway Vehicle Diesel	Agricultural Equipment	Combines	2	7	57	na	79	NEI 2002
2270005055	Off-highway Vehicle Diesel	Agricultural Equipment	Other Agricultural Equipment	1	2	na	na	na	NEI 2002
2270005060	Off-highway Vehicle Diesel	Agricultural Equipment	Irrigation Sets		1		na		NEI 2002
2270006005	Off-highway Vehicle Diesel	Commercial Equipment	Generator Sets	290	499	13	62	17	NEI 2002

2002 Emission Inventory by
SCC for
Non-Road Mobile Sources

SCC Code	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	PM_{10}	SO_2	VOC	Data
2270006010	Off-highway Vehicle Diesel	Commercial Equipment	Pumps	62	111	28	14	35	NEI 2002
2270006015	Off-highway Vehicle Diesel	Commercial Equipment	Air Compressors	133	291	33	41	60	NEI 2002
2270006025	Off-highway Vehicle Diesel	Commercial Equipment	Welders	224	147	2	21	2	NEI 2002
2270006030	Off-highway Vehicle Diesel	Commercial Equipment	Pressure Washers	9	15	43	2	44	NEI 2002
2270007015	Off-highway Vehicle Diesel	Logging Equipment	Forest Eqp - Feller/Buncb/Skidder	214	603	16	91	18	NEI 2002
2270008005	Off-highway Vehicle Diesel	Airport Ground Support Equipment	Airport Ground Support Equipment	97	210	na	28	2	NEI 2002
2275001000	Aircraft	Military Aircraft	Total	39	na	na	na	251	NEI 2002
2275020000	Aircraft	Commercial Aircraft	Total: All Types	1,595	1,389	11	131	25	NEI 2002
2275050000	Aircraft	General Aviation	Total	783	4	20	na	60	NEI 2002
2275060000	Aircraft	Air Taxi	Total	1,384	8	439	na	355	NEI 2002
2280002100	Marine Vessels, Commercial	Diesel	Port emissions	1,497	11,355	122	515	95	NEI 2002
2280002200	Marine Vessels, Commercial	Diesel	Underway emissions	3	26	na	1	na	NEI 2002
2280003100	Marine Vessels, Commercial	Residual	Port emissions	399	3,029	71	1,594	1,336	NEI 2002
2280003200	Marine Vessels, Commercial	Residual	Underway emissions		7		5		NEI 2002
2282005010	Pleasure Craft	Gasoline 2-Stroke	Outboard	2,792	36	29	2	663	NEI 2002
2282005015	Pleasure Craft	Gasoline 2-Stroke	Personal Water Craft	1,214	9	na	1	111	NEI 2002
2282010005	Pleasure Craft	Gasoline 4-Stroke	Inboard/Sterndrive	1,750	78	2	2	3	NEI 2002
2282020005	Pleasure Craft	Diesel	Inboard/Sterndrive	11	70	41	9	69	NEI 2002
2285002006	Railroad Equipment	Diesel	Line Haul Locomotives: Class I Operations	183	1,855	3	106	4	NEI 2002
2285002008	Railroad Equipment	Diesel	Line Haul Locomotives: Passenger Trains (Amtrak)	12	117	17	7	42	NEI 2002
2285002010	Railroad Equipment	Diesel	Yard Locomotives	77	727	5	31	7	NEI 2002
2285002015	Railroad Equipment	Diesel	Railway Maintenance	32	37	na	4	2	NEI 2002
2285004015	Railroad Equipment	Gasoline, 4-Stroke	Railway Maintenance	76	na	na	na	na	NEI 2002

NEI 2002 - Source of data is EPA's preliminary 2002 National Emission Inventory
na - not applicable - there are no reported/calculated amounts greater than a half ton for pollutant for this source category
Descriptors 2, 3, 4 are as defined by EPA, February 2004
Descriptors 1 for all non-road sources are 'mobile sources', and not included in table

SCC Code	Descriptor 1	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Source
					Tons	Tons	Tons	Tons	Tons	
2102004000	Stationary Source Fuel Combustion	Industrial	Distillate Oil	Total: Boilers and IC Engines	173	691	67	75	7	NEI 2002
2102006000	Stationary Source Fuel Combustion	Industrial	Natural Gas	Total: Boilers and IC Engines	245	978	54	4	19	NEI 2002
2102007000	Stationary Source Fuel Combustion	Industrial	Liquified Petroleum Gas (LPG)	Total: All Boiler Types	72	426	13	2	7	NEI 2002
2103002000	Stationary Source Fuel Combustion	Commercial/Institutional	Bituminous/Subbituminous Coal	Total: All Boiler Types	102	172	55	309	8	NEI 2002
2103004000	Stationary Source Fuel Combustion	Commercial/Institutional	Distillate Oil	Total: Boilers and IC Engines	52	210	20	23	4	NEI 2002
2103006000	Stationary Source Fuel Combustion	Commercial/Institutional	Natural Gas	Total: Boilers and IC Engines	289	1,376	102	8	38	NEI 2002
2103007000	Stationary Source Fuel Combustion	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Total: All Combustor Types	6	41	1	na	na	NEI 2002
2104002000	Stationary Source Fuel Combustion	Residential	Bituminous/Subbituminous Coal	Total: All Combustor Types	70	2	1	4	3	NEI 2002
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total: All Combustor Types	80	287	34	679	11	NEI 2002
2104006000	Stationary Source Fuel Combustion	Residential	Natural Gas	Total: All Combustor Types	941	2,210	179	14	129	NEI 2002
2104007000	Stationary Source Fuel Combustion	Residential	Liquified Petroleum Gas (LPG)	Total: All Combustor Types	64	259	14	2	10	NEI 2002
2104008001	Stationary Source Fuel Combustion	Residential	Wood	Fireplaces: General	7,555	165	963	19	11,863	PSCAA
2104008002	Stationary Source Fuel Combustion	Residential	Wood	Fireplaces: Insert; non-EPA certified	1,262	16	156	3	290	PSCAA
2104008003	Stationary Source Fuel Combustion	Residential	Wood	Fireplaces: Insert; EPA certified; non-catalytic	1,799	25	234	6	154	PSCAA
2104008004	Stationary Source Fuel Combustion	Residential	Wood	Fireplaces: Insert; EPA certified; catalytic	1,050	20	192	5	151	PSCAA
2104008010	Stationary Source Fuel Combustion	Residential	Wood	Woodstoves: General	3,669	44	455	7	843	PSCAA
2104008030	Stationary Source Fuel Combustion	Residential	Wood	Catalytic Woodstoves: General	3,256	63	592	13	469	PSCAA
2104008050	Stationary Source Fuel Combustion	Residential	Wood	Non-catalytic Woodstoves: EPA certified	5,332	76	693	15	454	PSCAA
2104008053	Stationary Source Fuel Combustion	Residential	Wood	Non-catalytic Woodstoves: Pellet Fired	712	249	71	2	217	PSCAA
2104009000	Stationary Source Fuel Combustion	Residential	Firelog	Total: All Combustor Types	1,132	40	345	3	116	PSCAA
2294000000	Mobile Sources	Paved Roads	All Paved Roads	Total: Fugitives	na	na	1,750	na	na	NEI 2002
2296000000	Mobile Sources	Unpaved Roads	All Unpaved Roads	Total: Fugitives	na	na	2,637	na	na	NEI 2002
2302002100	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Conveyorized Charbroiling	123	na	143	na	37	NEI 2002
2302002200	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Under-fired Charbroiling	396	na	975	na	121	NEI 2002
2302050000	Industrial Processes	Food and Kindred Products: SIC 20	Bakery Products	Total	na	na	na	na	856	NEI 1999
2308000000	Industrial Processes	Rubber/Plastics: SIC 30	All Processes	Total	na	na	na	na	305	NEI 2002
2310000000	Industrial Processes	Oil and Gas Production: SIC 13	All Processes	Total: All Processes	na	na	na	na	23	NEI 2002
2311010000	Industrial Processes	Construction: SIC 15 - 17	Residential	Total	na	na	118	na	na	NEI 2002
2311020000	Industrial Processes	Construction: SIC 15 - 17	Industrial/Commercial/Institutional	Total	na	na	1,166	na	na	NEI 2002
2311030000	Industrial Processes	Construction: SIC 15 - 17	Road Construction	Total	na	na	1,081	na	na	NEI 2002
2325000000	Industrial Processes	Mining and Quarrying: SIC 14	All Processes	Total	na	na	139	na	na	NEI 2002
2399000000	Industrial Processes	Industrial Processes: NEC	Industrial Processes: NEC	Total	na	na	25	na	14	NEI 2002
2401001000	Solvent Utilization	Surface Coating	Architectural Coatings	Total: All Solvent Types	na	na	na	na	5,248	NEI 2002
2401005000	Solvent Utilization	Surface Coating	Auto Refinishing: SIC 7532	Total: All Solvent Types	na	na	na	na	664	NEI 2002
2401008000	Solvent Utilization	Surface Coating	Traffic Markings	Total: All Solvent Types	na	na	na	na	526	NEI 2002
2401015000	Solvent Utilization	Surface Coating	Factory Finished Wood: SIC 2426 thru 242	Total: All Solvent Types	na	na	na	na	401	NEI 2002
2401020000	Solvent Utilization	Surface Coating	Wood Furniture: SIC 25	Total: All Solvent Types	na	na	na	na	852	NEI 2002
2401025000	Solvent Utilization	Surface Coating	Metal Furniture: SIC 25	Total: All Solvent Types	na	na	na	na	987	NEI 2002
2401030000	Solvent Utilization	Surface Coating	Paper: SIC 26	Total: All Solvent Types	na	na	na	na	1,309	NEI 2002
2401040000	Solvent Utilization	Surface Coating	Metal Cans: SIC 341	Total: All Solvent Types	na	na	na	na	104	NEI 2002
2401045000	Solvent Utilization	Surface Coating	Metal Coils: SIC 3498	Total: All Solvent Types	na	na	na	na	258	NEI 2002
2401055000	Solvent Utilization	Surface Coating	Machinery and Equipment: SIC 35	Total: All Solvent Types	na	na	na	na	1,019	NEI 2002
2401060000	Solvent Utilization	Surface Coating	Large Appliances: SIC 363	Total: All Solvent Types	na	na	na	na	206	NEI 2002
2401065000	Solvent Utilization	Surface Coating	Electronic and Other Electrical: SIC 36 - 363	Total: All Solvent Types	na	na	na	na	201	NEI 2002
2401070000	Solvent Utilization	Surface Coating	Motor Vehicles: SIC 371	Total: All Solvent Types	na	na	na	na	36	NEI 2002
2401075000	Solvent Utilization	Surface Coating	Aircraft: SIC 372	Total: All Solvent Types	na	na	na	na	220	NEI 2002
2401080000	Solvent Utilization	Surface Coating	Marine: SIC 373	Total: All Solvent Types	na	na	na	na	123	NEI 2002
2401090000	Solvent Utilization	Surface Coating	Miscellaneous Manufacturing	Total: All Solvent Types	na	na	na	na	192	NEI 2002
2401100000	Solvent Utilization	Surface Coating	Industrial Maintenance Coatings	Total: All Solvent Types	na	na	na	na	1,221	NEI 2002
2401200000	Solvent Utilization	Surface Coating	Other Special Purpose Coatings	Total: All Solvent Types	na	na	na	na	442	NEI 2002
2415105000	Solvent Utilization	Degreasing	Furniture and Fixtures (SIC 25): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	45	NEI 2002
2415110000	Solvent Utilization	Degreasing	Primary Metal Industries (SIC 33): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	93	NEI 2002
2415120000	Solvent Utilization	Degreasing	Fabricated Metal Products (SIC 34): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	462	NEI 2002
2415125000	Solvent Utilization	Degreasing	Industrial Machinery (SIC 35): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	331	NEI 2002
2415130000	Solvent Utilization	Degreasing	Electronic and Other Elec. (SIC 36): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	424	NEI 2002
2415135000	Solvent Utilization	Degreasing	Transportation Equipment (SIC 37): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	854	NEI 2002
2415140000	Solvent Utilization	Degreasing	Instruments and Related Products (SIC 38): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	309	NEI 2002
2415145000	Solvent Utilization	Degreasing	Miscellaneous Manufacturing (SIC 39): Open Top Degreasing	Total: All Solvent Types	na	na	na	na	185	NEI 2002
2415305000	Solvent Utilization	Degreasing	Furniture and Fixtures (SIC 25): Cold Cleaning	Total: All Solvent Types	na	na	na	na	153	NEI 2002
2415310000	Solvent Utilization	Degreasing	Primary Metal Industries (SIC 33): Cold Cleaning	Total: All Solvent Types	na	na	na	na	30	NEI 2002

SCC Code	Descriptor 1	Descriptor 2	Descriptor 3	Descriptor 4	CO	NO_X	$PM_{2.5}$	SO_2	VOC	Source
					Tons	Tons	Tons	Tons	Tons	
2415320000	Solvent Utilization	Degreasing	Fabricated Metal Products (SIC 34): Cold Cleaning	Total: All Solvent Types	na	na	na	na	82	NEI 2002
2415325000	Solvent Utilization	Degreasing	Industrial Machinery and Equipment (SIC 35): Cold Cleaning	Total: All Solvent Types	na	na	na	na	138	NEI 2002
2415330000	Solvent Utilization	Degreasing	Electronic and Other Elec. (SIC 36): Cold Cleaning	Total: All Solvent Types	na	na	na	na	122	NEI 2002
2415335000	Solvent Utilization	Degreasing	Transportation Equipment (SIC 37): Cold Cleaning	Total: All Solvent Types	na	na	na	na	341	NEI 2002
2415340000	Solvent Utilization	Degreasing	Instruments and Related Products (SIC 38): Cold Cleaning	Total: All Solvent Types	na	na	na	na	220	NEI 2002
2415345000	Solvent Utilization	Degreasing	Miscellaneous Manufacturing (SIC 39): Cold Cleaning	Total: All Solvent Types	na	na	na	na	62	NEI 2002
2415355000	Solvent Utilization	Degreasing	Automotive Dealers (SIC 55): Cold Cleaning	Total: All Solvent Types	na	na	na	na	28	NEI 2002
2415360000	Solvent Utilization	Degreasing	Auto Repair Services (SIC 75): Cold Cleaning	Total: All Solvent Types	na	na	na	na	63	NEI 2002
2415365000	Solvent Utilization	Degreasing	Miscellaneous Repair Services (SIC 76): Cold Cleaning	Total: All Solvent Types	na	na	na	na	16	NEI 2002
2420010055	Solvent Utilization	Dry Cleaning	Commercial/Industrial Cleaners	Perchloroethylene	na	na	na	na	728	NEI 2002
2420020055	Solvent Utilization	Dry Cleaning	Coin-operated Cleaners	Perchloroethylene	na	na	na	na	16	NEI 2002
2425000000	Solvent Utilization	Graphic Arts	All Processes	Total: All Solvent Types	na	na	na	na	837	NEI 2002
2430000000	Solvent Utilization	Rubber/Plastics	All Processes	Total: All Solvent Types	na	na	na	na	303	NEI 2002
2440020000	Solvent Utilization	Miscellaneous Industrial	Adhesive (Industrial) Application	Total: All Solvent Types	na	na	na	na	2,480	NEI 2002
2460100000	Solvent Utilization	Miscellaneous Non-industrial	All Personal Care Products	Total: All Solvent Types	na	na	na	na	3,429	NEI 2002
2460200000	Solvent Utilization	Miscellaneous Non-industrial	All Household Products	Total: All Solvent Types	na	na	na	na	1,183	NEI 2002
2460400000	Solvent Utilization	Miscellaneous Non-industrial	All Automotive Aftermarket Products	Total: All Solvent Types	na	na	na	na	2,081	NEI 2002
2460500000	Solvent Utilization	Miscellaneous Non-industrial	All Coatings and Related Products	Total: All Solvent Types	na	na	na	na	1,597	NEI 2002
2460600000	Solvent Utilization	Miscellaneous Non-industrial	All Adhesives and Sealants	Total: All Solvent Types	na	na	na	na	879	NEI 2002
2460800000	Solvent Utilization	Miscellaneous Non-industrial	All FIFRA Related Products	Total: All Solvent Types	na	na	na	na	2,840	NEI 2002
2460900000	Solvent Utilization	Miscellaneous Non-industrial	Miscellaneous Products (Not Otherwise Covered)	Total: All Solvent Types	na	na	na	na	118	NEI 2002
2461021000	Solvent Utilization	Miscellaneous Non-industrial	Cutback Asphalt	Total: All Solvent Types	na	na	na	na	590	NEI 2002
2461800000	Solvent Utilization	Miscellaneous Non-industrial	Pesticide Application: All Processes	Total: All Solvent Types	na	na	na	na	274	NEI 2002
2501050120	Storage and Transport	Petroleum and Petroleum Product Storage	Bulk Stations/Terminals: Breathing Loss	Gasoline	na	na	na	na	2,422	NEI 2002
2501060000	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Total: All Gasoline/All Processes	na	na	na	na	3,252	NEI 2002
2501080050	Storage and Transport	Petroleum and Petroleum Product Storage	Airports : Aviation Gasoline	Stage 1: Total	na	na	na	na	339	NEI 2002
2501080100	Storage and Transport	Petroleum and Petroleum Product Storage	Airports : Aviation Gasoline	Stage 2: Total	na	na	na	na	21	NEI 2002
2515020000	Storage and Transport	Organic Chemical Transport	Marine Vessel	Total: All Products	na	na	na	na	1,901	NEI 2002
2601020000	Waste Disposal, Treatment, and Recovery	On-site Incineration	Commercial/Institutional	Total	21	7	5	5	2	NEI 2002
2610000100	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Yard Waste - Leaf Species Unspecified	82	na	28	na	20	NEI 1999
2610000400	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Yard Waste - Brush Species Unspecified	102	na	12	na	14	NEI 1999
2610000500	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Land Clearing Debris (use 28-10-005-000 for Lo	16,468	1,375	5,341	376	1,397	PSCAA
2610030000	Waste Disposal, Treatment, and Recovery	Open Burning	Residential	Household Waste (use 26-10-000-xxx for Yard V	11,825	275	3,876	42	3,045	NEI 1999
2620030000	Waste Disposal, Treatment, and Recovery	Landfills	Municipal	Total	105	51	8	64	3	NEI 2002
2630020000	Waste Disposal, Treatment, and Recovery	Wastewater Treatment	Public Owned	Total Processed	na	na	na	na	751	NEI 2002
2640000000	Waste Disposal, Treatment, and Recovery	TSDFs	All TSDF Types	Total: All Processes	na	na	na	na	48	NEI 2002
2801000003	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	Tilling	na	na	204	na	na	NEI 2002
2801500000	Miscellaneous Area Sources	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Total, all crop types	967	21	131	na	134	NEI 2002
2810001000	Miscellaneous Area Sources	Other Combustion	Forest Wildfires	Total	3,717	80	310	22	175	NEI 2002
2810015000	Miscellaneous Area Sources	Other Combustion	Prescribed Burning for Forest Management	Total	495	24	47	7	32	NEI 2002
2810030000	Miscellaneous Area Sources	Other Combustion	Structure Fires	Total	218	5	30	3	40	NEI 2002

PSCAA - Source of data is Puget Sound Clean Air Agency, 2002

NEI 2002 - Source of data is EPA's preliminary 2002 National Emission Inventory

NEI 1999 - Source of data is EPA's 1999 National Emission Inventory

na - not applicable - there are no reported/calculated amounts greater than a half ton for pollutant for this source category

Descriptors are those defined by EPA, February 2004.

	Pollutant	Area Source	On-road Mobile	Point Source	Non-road Mobile	Pollutant
Pollutant Name	**Code**	**Tons**	**Tons**	**Tons**	**Tons**	**Totals**
Toluene	108883	1,835	7,328	24	1,399	10,586
Xylenes (Mixture of o, m, and p Isomers)	1330207	1,050	4,108	18	1,493	6,669
Benzene	71432	706	3,253	2	563	4,524
2,2,4-Trimethylpentane	540841	211	2,545	na	535	3,291
Hexane	110543	1,557	933	4	209	2,703
Formaldehyde	50000	821	995	9	300	2,125
Ethyl Benzene	100414	236	1,063	3	361	1,663
Methanol	67561	1,403	na	2	na	1,405
Methyl Ethyl Ketone	78933	891	na	70	na	961
Acetaldehyde	75070	159	358	na	111	629
Methyl Chloroform	71556	594	na	1	na	595
Trichloroethylene	79016	516	na	31	na	547
Methylene Chloride	75092	517	na	7	na	524
Styrene	100425	298	204	2	7	511
1,3-Butadiene	106990	127	307	na	67	500
Methyl Bromide	74839	373	na	na	na	373
1,3-Dichloropropene	542756	288	na	na	na	288
Tetrachloroethylene	127184	244	na	na	na	244
Naphthalene	91203	169	29	na	1	198
Methyl Isobutyl Ketone	108101	164	na	15	na	179
Butyl Cellosolve	111762	21	na	142	na	163
Acrolein	107028	117	32	na	na	149
1,4-Dichlorobenzene	106467	131	na	na	na	131
Chlorobenzene	108907	109	na	na	na	109
Chloroform	67663	103	na	1	na	104
Selenium	7782492	99	na	na	na	99
Methyl Tert-Butyl Ether	1634044	91	1	na	na	92
Glycol Ethers	171	72	na	na	na	72
Phenol	108952	61	na	2	na	63
Propionaldehyde	123386	3	35	na	17	54
Ethylene Glycol	107211	42	na	na	na	42
Carbonyl Sulfide	463581	40	na	na	na	40
o-Xylene	95476	26	na	na	na	26
Diethylene Glycol Monobutyl Ether	112345	15	na	2	na	17
Hydrogen Fluoride	7664393	15	na	na	na	15
Ethyl Chloride	75003	15	na	na	na	15
Methyl Chloride	74873	14	na	na	na	14
N,N-Dimethylformamide	68122	14	na	na	na	14
Hydrochloric Acid	7647010	11	na	na	na	11
Diethanolamine	111422	na	na	10	na	10
Lead Chromate	7758976	9	na	na	na	9
N-Hexyl Carbitol	112594	na	na	7	na	7
1,2,4-Trichlorobenzene	120821	6	na	na	na	6
Acenaphthylene	208968	6	na	na	na	6
Propylene Oxide	75569	6	na	na	na	6
Cumene	98828	4	na	na	na	4
Propyl Cellosolve	2807309	na	na	4	n	4
Carbon Disulfide	75150	4	na	na	na	4
Ethylene Oxide	75218	4	na	na	na	4
Isophorone	78591	3	na	na	na	3
PAH, Total	234	2	na	na	na	2
Hydrogen Cyanide	74908	2	na	na	na	2
Phenanthrene	85018	1	na	na	na	1
Propylene Glycol Monomethyl Ether	107982	na	na	1	na	1
Source Totals		**13,202**	**21,190**	**356**	**5,063**	**39,811**

Area Source: sources of data are EPA preliminary 2002 National Emission Inventory, Puget Sound Clean Air Agency (2002), and EPA 1999 National Emission Inventory

Point Source: sources of data are Puget Sound Clean Air Agency (2002) and Washington State Department of Ecology (2002)

Non-Road Mobile: source of data is EPA 1999 National Emision Inventory

On-Road Mobile: source of data is Washington State Department of Ecology (2002)

na - not applicable - there are no reported/calculated amounts for pollutants for this source category

OZONE

(Parts per Million)
2003

Location / Continuous Sampling Period(s)	Six Highest Daily Maximum 1 Hour Averages			Estimated No. of Days Daily Maximum 1 Hour Average Exceeded .12 ppm			No. of Days Daily Maximum 1 Hour Average Expected to Exceed .12 ppm
	Value	Date	End Time	2001	2002	2003	
Beacon Hill, 15th S & Charlestown Seattle, Wa 1 May-30 Sep	.072 .065 .062 .060 .058 .057	10 Jul 5 Jun 31 May 21 Jul 17 Jun 7 Jun	1500 1900 1700 1800 1400 1400	0.0	0.0	0.0	0.0
20050 SE 56th Lake Sammamish State Park, Wa 1 May-30 Sep	.085 .081 .079 .076 .074 .071	29 Jul 6 Jun 10 Jul 7 Jun 5 Jun 17 Jun	1500 1400 1700 1400 1500 1700	0.0	0.0	0.0	0.0
42404 SE North Bend Way, North Bend 1 May-30 Sep	.110 .101 .096 .093 .090 .088	29 Jul 7 Jun 30 Jul 10 Jul 3 Sep 18 Jul	1700 1400 1600 1500 1600 1800	0.0	0.0	0.0	0.0
30525 SE Mud Mountain Road, Enumclaw 1 May-30 Sep	.114 .097 .095 .092 .091 .089	6 Jun 7 Jun 4 Sep 29 Jul 3 Sep 5 Jun	1600 1600 1500 1500 1400 1500	0.0	0.0	0.0	0.0
Charles L Pack Forest La Grande, Wa 1 May-30 Sep	.090 .089 .089 .088 .083 .083	3 Sep 6 Jun 30 Jul 29 Jul 28 Jun 4 Sep	1400 1700 1500 1500 1800 1400	0.0	0.0	0.0	0.0
71 E Campus Dr, Belfair, Wa 1 May-30 Sep	.080 .075 .071 .069 .069 .066	29 Jul 6 Jun 4 Sep 21 Aug 30 Aug 5 Jun	1800 1500 1700 1700 1700 1300		0.0	0.0	0.0
709 Mill Road SE, Yelm, Wa 1 May-30 Sep	.088 .086 .084 .081 .079 .079	4 Sep 10 Jul 6 Jun 30 Jul 17 Jun 9 Jul	1800 1500 1400 1200 1500 1600	0.0	0.0	0.0	0.0

Notes

(1) All ozone stations operated by the Washington State Department of Ecology.
(2) Ending times are reported in Pacific Standard Time.
(3) For equal concentration values the date and time refer to the earliest occurrences.
(4) Continuous sampling periods are those with fewer than 10 consecutive days of missing data.
(5) At all stations ozone was measured using the continuous ultraviolet photometric detection method.

OZONE

(Parts per Million)
2003

Location / Continuous Sampling Period(s)	2003 Six Highest Daily 8-Hour Concentrations			4th Highest Daily 8-Hour Concentration			3-Year Average of 4th Highest 8-Hour Concentration
	Value	Date	End Time	2001	2002	2003	2001 - 2003
Beacon Hill, 15th S & Charlestown	.055	21 Jul	2400				
Seattle, Wa	.053	31 May	1700				
1 May-30 Sep	.053	10 Jul	1900				
	.050	17 Jun	2000	.041	.042	.050	.044
	.049	5 Jun	2100				
	.046	14 May	2300				
20050 SE 56th	.072	6 Jun	1800				
Lake Sammamish State Park, Wa	.067	29 Jul	1800				
1 May-30 Sep	.066	5 Jun	1900				
	.066	7 Jun	1800	.052	.054	.066	.057
	.063	10 Jul	1800				
	.058	17 Jun	1900				
42404 SE North Bend Way,	.088	29 Jul	1900				
North Bend, Wa	.083	30 Jul	1900				
1 May-30 Sep	.082	7 Jun	1900				
	.079	10 Jul	2000	.066	.069	.079	.071
	.074	19 Jul	1900				
	.074	28 Jul	2000				
30525 SE Mud Mountain Road,	.097	6 Jun	2000				
Enumclaw, Wa	.083	29 Jul	1900				
1 May-30 Sep	.080	5 Jun	2000				
	.080	7 Jun	1800	.065	.070	.080	.072
	.079	30 Jul	1900				
	.077	3 Sep	1800				
Charles L Pack Forest	.081	29 Jul	2000				
La Grande, Wa	.078	6 Jun	1900				
1 May-30 Sep	.078	3 Sep	1800				
	.077	30 Jul	1800	.064	.068	.077	.070
	.077	4 Sep	1900				
	.070	5 Jun	1800				
71 E Campus Dr,	.072	29 Jul	2000				
Belfair, Wa	.066	6 Jun	1800				
1 May-30 Sep	.062	4 Jun	1900				
	.061	5 Jun	1800		.062	.061	
	.061	4 Sep	1900				
	.059	28 Jul	2000				
709 Mill Road SE,	.076	4 Sep	1900				
Yelm, Wa	.073	6 Jun	1900				
1 May-30 Sep	.073	30 Jul	1700				
	.072	10 Jul	1600	.060	.058	.072	.063
	.071	29 Jul	1700				
	.065	7 Jun	1700				

Notes

(1) All ozone stations operated by the Washington State Department of Ecology.
(2) Ending times are reported in Pacific Standard Time.
(3) For equal concentration values the date and time refer to the earliest occurrences.
(4) Continuous sampling periods are those with fewer than 10 consecutive days of missing data.
(5) At all stations ozone was measured using the continuous ultraviolet photometric detection method.

PARTICULATE MATTER (PM_{10})

Micrograms per Cubic Meter

Sampling Method: Reference - Hi Vol ANDERSEN/GMW 1200 Quartz Fiber filters

2003

Location	Number of Values	Quarterly Arithmetic Averages				Year Arith Mean	99th Percentile	Max Value
		1st	2nd	3rd	4th			
Duwamish, 4752 E Marginal Way S, Seattle	59	27.5	18.1	21.3	25.0	23.0	69	69
James St & Central Ave, Kent	59	16.6	14.9	23.7	20.4	18.9	46	46
Port of Tacoma, 2301 Alexander Ave, Tacoma	60	22.2	20.5	20.1	22.3	21.3	71	71

Notes

(1) Nationally scheduled particulate matter sampling occurs each sixth day. Quarterly averages are shown only when at least one data value exists for 75 percent or more of the six day intervals.

(2) Annual averages are shown only if there are at least three quarterly averages.

Summary of Maximum Observed Concentrations and Values > 60

Location	Jan 9 Thu	Jun 20 Fri	Sep 30 Tue
Duwamish, 4752 E Marginal Way S, Seattle	69		
James St & Central Ave, Kent			46
Port of Tacoma, 2301 Alexander Ave, Tacoma		71	

-- Indicates no sample on specified day

Air Quality Index Summary

Location	Good	Moderate	Unhealthy for Sensitive Groups
Duwamish, 4752 E Marginal Way S, Seattle, Wa	57	2	0
James St & Central Ave, Kent, Wa	59	0	0
Port of Tacoma, 2301 Alexander Ave, Tacoma	58	2	0

PARTICULATE MATTER (PM_{10}) - Continuous

Micrograms per Cubic Meter

Equivalent Sampling Methods: B - BetaAtten ANDERSEN FH62I-N Glass Fiber strip
T - Mass Transducer R&P TEOM 1400a Teflon Coated Glass Fiber

2003

Location	Method	Number of Values	Quarterly Arithmetic Averages 1st	2nd	3rd	4th	Year Arith Mean	99th Percentile	Max Value
Marysville JHS, 1605 7th St, Marysville	B	345	19.1	11.7	15.3	20.8	16.7	44	47
17171 Bothell Way NE, Lake Forest Park	B	353	17.5	11.2	12.3	18.6	14.9	39	48
Duwamish, 4752 E Marginal Way S, Seattle	T	268	28.0			26.8		74	88
James St & Central Ave, Kent	T	363	17.8	15.4	20.7	19.9	18.4	45	50
Port of Tacoma, 2301 Alexander Ave, Tacoma	B	362	22.8	19.2	21.2	22.5	21.4	60	84

Notes

(1) Sampling occurs continuously for 24 hours each day.
Quarterly averages are shown only if 75 percent or more of the data is available.
(2) Annual averages are shown only if there are at least three quarterly averages.
(3) All data values are adjusted using seasonal site-specific relationships with Federal Reference Method samplers.

Summary of Maximum Observed Concentrations and Values >60

Location	Method	Jan 6 Mon	Jan 7 Tue	Jan 9 Thu	Jan 10 Fri	Feb 13 Thu	Jul 30 Wed	Aug 15 Fri	Nov 4 Tue	Nov 7 Fri	Nov 14 Fri	Dec 18 Thu	Dec 19 Fri
Marysville JHS, 1605 7th St, Marysville	B		47						47			--	--
17171 Bothell Way NE, Lake Forest Park	B								48				
Duwamish, 4752 E Marginal Way S, Seattle	T	66	73	74	88	63		--			65	61	79
James St & Central Ave, Kent	T						50			50			
Port of Tacoma, 2301 Alexander Ave, Tacoma	B		69					84			65		

-- Indicates no sample on specified day

Air Quality Index Summary

Location	Method	Good	Moderate	Unhealthy for Sensitive Groups
Marysville JHS, 1605 7th St, Marysville	B	345	0	0
17171 Bothell Way NE, Lake Forest Park	B	353	0	0
Duwamish, 4752 E Marginal Way S, Seattle	T	256	12	0
James St & Central Ave, Kent	T	363	0	0
Port of Tacoma, 2301 Alexander Ave, Tacoma	B	356	6	0

PARTICULATE MATTER ($PM_{2.5}$)

Micrograms per Cubic Meter

Reference Sampling Method: R&P Partisol 2025 Sampler Teflon Filter

2003

Location	Number of Values	Quarterly Arithmetic Averages				Year Arith Mean	98th Percentile	Max Value
		1st	2nd	3rd	4th			
Marysville JHS, 1605 7th St, Marysville	117	14.6	7.2	7.6	13.3	10.7	40	42
6120 212th St SW, Lynnwood	62	13.8	5.5	6.5	10.8	9.2	30	34
17171 Bothell Way NE, Lake Forest Park	117	13.0	6.1	6.7	12.2	9.5	28	33
Duwamish, 4752 E Marginal Way S, Seattle	122	12.7	7.9	9.0	12.9	10.6	28	37
Beacon Hill, 15th S & Charlestown, Seattle	357	8.8	6.4	7.8	8.8	7.9	21	25
305 Bellevue Way NE, Bellevue	54	8.8	5.7	6.9	8.0	7.4	17	17
42404 SE North Bend Way, North Bend	63	3.5	4.9	5.7	4.8	4.7	11	13
James St & Central Ave, Kent	116	11.6	7.2	8.1	12.1	9.8	28	35
7802 South L St, Tacoma	124	13.3	6.5	7.0	13.1	10.0	37	50

Notes

(1) Sampling occurs for a 24 hour period from midnight to midnight.
Quarterly averages are shown only if 75 percent or more of the data is available.

(2) Annual averages are shown only if there are at least three quarterly averages.

Summary of Maximum Observed Concentrations and Values >40

Location / Method	Jan 6 Mon	Jan 7 Tue	Jan 8 Wed	Jan 9 Thu	Jan 18 Sat	Feb 8 Sat	Sep 30 Tue	Oct 27 Mon	Nov 5 Wed
Marysville JHS, 1605 7th St Marysville		--	--	42					41
6120 212th St SW, Lynnwood		--	--		--				34
17171 Bothell Way NE, Lake Forest Park		--	--						33
Duwamish, 4752 E Marginal Way, Seattle	37	--	--				--	--	
Beacon Hill, 15th S & Charlestown								25	
305 Bellevue Way NE, Bellevue	--	--	17	--	--	17		--	
42404 SE North Bend Way, North Bend		--	--				13	--	
James St & Central Ave, Kent	35	--	--						
7802 South L St, Tacoma	--	46	--	--	50				

-- Indicates no sample on specified day

Air Quality Index Summary

Location	Good	Moderate	Unhealthy for Sensitive Groups
Marysville JHS, 1605 7th St, Marysville	95	20	2
6120 212th St SW, Lynnwood	54	8	0
17171 Bothell Way NE, Lake Forest Park	95	22	0
Duwamish, 4752 E Marginal Way S, Seattle	104	18	0
Beacon Hill, 15th S & Charlestown, Seattle	325	32	0
305 Bellevue Way NE, Bellevue	50	4	0
42404 SE North Bend Way, North Bend	63	0	0
James St & Central Ave, Kent	100	16	0
7802 South L St, Tacoma	105	17	2

PARTICULATE MATTER (PM2.5) - Continuous

Micrograms per Cubic Meter

Equivalent Sampling Methods: T - Mass Transducer R&P TEOM 1400a Tef-coat Glass Fiber
B - BetaAtten ANDERSEN FH62I-N Glass Fiber strip

2003

Location	Method	Number of Values	Quarterly Arithmetic Averages 1st	2nd	3rd	4th	Year Arith Mean	98th Percentile	Max Value
Marysville JHS, 1605 7th St, Marysville	T	326		8.7	8.6	15.7	11.7	36	44
6120 212th St SW, Lynnwood	T	360	12.8	6.4	6.3	11.9	9.4	29	36
17171 Bothell Way NE, Lake Forest Park	T	356	13.4	6.8	6.8	13.3	10.1	28	38
Duwamish, 4752 E Marginal Way S, Seattle	T	364	13.5	8.3	9.1	13.2	11.0	29	38
601 143rd Ave NE, Bellevue	T	362	9.0	6.5	6.9	10.7	8.3	20	28
*42404 SE North Bend Way, North Bend	T	352	5.9	7.2	8.0	6.7	7.0	14	25
James St & Central Ave, Kent	T	356	12.4	7.3	8.4	13.5	10.4	29	33
Port of Tacoma, 2301 Alexander Ave, Tacoma	T	364	15.3	8.0	9.0	14.7	11.7	36	51
7802 South L St, Tacoma	T	347	16.0	6.7	7.3	13.9	11.0	41	51
South Hill, 9616 128th St E, Puyallup	B	362	14.1	7.0	8.4	14.1	10.9	28	31
*Meadowdale, 7252 Blackbird Dr NE, Kitsap Co	B	323	11.2	7.9	8.0		9.8	22	29
*10955 Silverdale Way NW, Silverdale	B	343	8.9	7.7	8.9	8.5	8.5	16	18

Notes

(1) Sampling occurs continuously for 24 hours each day.
Quarterly averages are shown only if 75 percent or more of the data is available.
(2) Annual averages are shown only if there are at least three quarterly averages.
(3) All data values are adjusted using seasonal site-specific relationships with Federal Reference Method samplers except those marked with an asterisk.

Summary of Maximum Observed Concentrations and Values >40

Location	Method	Jan 6 Mon	Jan 7 Tue	Jan 8 Wed	Jan 10 Fri	Jan 18 Sat	Feb 12 Wed	Feb 13 Thu	Aug 9 Sat	Oct 4 Sat	Nov 3 Mon	Nov 4 Tue	Nov 5 Wed	Nov 6 Thu	Nov 7 Fri	Nov 14 Fri	Dec 19 Fri
Marysville JHS, 1605 7th St, Marysville	T	--	--	--	--	--						44	41				
6120 212th St SW, Lynnwood	T													36			
17171 Bothell Way NE, Lake Forest Park	T										38	38					
Duwamish, 4752 E Marginal Way S, Seattle	T		38														38
601 143rd Ave NE, Bellevue	T									28							
*42404 SE North Bend Way, North Bend	T								25	--							
James St & Central Ave, Kent	T	33					33										
Port of Tacoma, 2301 Alexander Ave, Tacoma	T		51													43	
7802 South L St, Tacoma	T	41	51	51	45	51	43								44		
South Hill, 9616 128th St E, Puyallup	B					31											
*Meadowdale, 7252 Blackbird Dr NE, Kitsap Co	B										29						--
*10955 Silverdale Way NW, Silverdale	B							18			--	--	--	--			

-- Indicates no sample on specified day

Air Quality Index Summary

Location	Method	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
Marysville JHS, 1605 7th St, Marysville	T	259	65	2	
6120 212th St SW, Lynnwood	T	309	51	0	
17171 Bothell Way NE, Lake Forest Park	T	293	63	0	
Duwamish, 4752 E Marginal Way S, Seattle	T	315	49	0	
601 143rd Ave NE, Bellevue	T	337	25	0	
*42404 SE North Bend Way, North Bend	T	348	4	0	
James St & Central Ave, Kent	T	299	57	0	
Port of Tacoma, 2301 Alexander Ave, Tacoma	T	289	73	2	
7802 South L St, Tacoma	T	280	60	7	
South Hill, 9616 128th St E, Puyallup	B	290	72	0	
*Meadowdale, 7252 Blackbird Dr NE, Kitsap Co	B	279	44	0	
*10955 Silverdale Way NW, Silverdale	B	335	8	0	

PARTICULATE MATTER ($PM_{2.5}$) - Continuous

Micrograms per Cubic Meter

Sampling Method: Equivalent - Radiance Research M903 Nephelometer

2003

Location	Number of Values	Quarterly Arithmetic Averages				Year Arith Mean	98th Percentile	Max Value
		1st	2nd	3rd	4th			
Marysville JHS, 1605 7th St, Marysville	352	14.4	7.3	7.6	15.5	11.2	40	47
6120 212th St SW, Lynnwood	364	11.1	6.1	6.1	11.9	8.8	28	38
17171 Bothell Way NE, Lake Forest Park	346	11.8	6.3	6.0	12.6	9.2	29	36
Queen Anne Hill, Seattle	362	7.4	6.6	6.8	8.5	7.3	21	31
Olive & Boren, Seattle	298		6.4	8.6	9.3	7.5	23	34
Beacon Hill, 15th S & Charlestown, Seattle	283		7.9	8.1	9.0	8.2	18	26
Duwamish, 4752 E Marginal Way S, Seattle	357	11.5	8.5	8.5	12.0	10.1	28	32
South Park, 8025 10th Ave S, Seattle	358	13.1	8.7	9.0	12.2	10.7	30	37
City Hall, 15670 NE 85th, Redmond	364	7.6	6.2	6.5	8.3	7.2	21	36
601 143rd Ave NE,, Bellevue	363	6.4	5.2	5.5	7.4	6.1	18	36
305 Bellevue Way NE, Bellevue	295		6.5	6.2	8.8	7.0	20	34
42404 SE North Bend Way, North Bend	281		5.5	6.1	4.9	5.3	14	18
James St & Central Ave, Kent	364	11.7	7.7	8.1	12.1	9.9	32	40
Port of Tacoma, 2301 Alexander Ave, Tacoma	364	13.2	7.7	8.3	12.6	10.4	32	40
7802 South L St, Tacoma	361	14.0	6.3	6.2	13.7	10.0	39	48
South Hill, 9616 128th St E, Puyallup	361	11.6	6.3	6.5	13.2	9.4	29	41

Notes

(1) Sampling occurs continuously for 24 hours each day.
Quarterly averages are shown only if 75 percent or more of the data is available.

(2) Annual averages are shown only if there are at least three quarterly averages.

(3) All data values are correlated using site-specific relationships with Federal Reference Method samplers.

Summary of Maximum Observed Concentrations and Values >40

Location	Jan 6 Mon	Jan 7 Tue	Jan 8 Wed	Jan 9 Thu	Jan 10 Fri	Jan 18 Sat	Feb 12 Wed	Oct 1 Wed	Oct 3 Fri	Oct 4 Sat	Nov 3 Mon	Nov 4 Tue	Nov 5 Wed	Nov 6 Thu	Nov 7 Fri	Nov 9 Sun	Nov 13 Thu
Marysville JHS, 1605 7th St, Marysville			44	42	43	41					41	47	43				
6120 212th St SW, Lynnwood														38			
17171 Bothell Way NE, Lake Forest Park	--	--									36	36					
Queen Anne Hill, Seattle									31								
Olive & Boren, Seattle	--	--	--	--	--	--	--		34								
Beacon Hill, 15th S & Charlestown, Seattle	--	--	--	--	--	--	--	26	26								
Duwamish, 4752 E Marginal Way S, Seattle	32	32															
South Park, 8025 10th Ave S, Seattle	--								37								
City Hall, 15670 NE 85th, Redmond										36							
601 143rd Ave NE,, Bellevue										36							
305 Bellevue Way NE, Bellevue	--	--	--	--	--	--	--			34							
42404 SE North Bend Way, North Bend	--	--	--	--	--	--	--		--	--						18	
James St & Central Ave, Kent										40							
Port of Tacoma, 2301 Alexander Ave, Tacoma		40															
7802 South L St, Tacoma		43	44			48	45		44						42		41
South Hill, 9616 128th St E, Puyallup									41								

-- Indicates no sample on specified day

Air Quality Index Summary

Location	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
Marysville JHS, 1605 7th St, Marysville	275	70	7	
6120 212th St SW, Lynnwood	304	60	0	
17171 Bothell Way NE, Lake Forest Park	283	63	0	
Queen Anne Hill, Seattle	341	21	0	
Olive & Boren, Seattle	281	17	0	
Beacon Hill, 15th S & Charlestown, Seattle	271	12	0	
Duwamish, 4752 E Marginal Way S, Seattle	310	47	0	
South Park, 8025 10th Ave S, Seattle	295	63	0	
City Hall, 15670 NE 85th, Redmond	344	20	0	
601 143rd Ave NE,, Bellevue	346	17	0	
305 Bellevue Way NE, Bellevue	284	11	0	
42404 SE North Bend Way, North Bend	278	3	0	
James St & Central Ave, Kent	306	58	0	
Port of Tacoma, 2301 Alexander Ave, Tacoma	298	66	0	
7802 South L St, Tacoma	292	62	7	
South Hill, 9616 128th St E, Puyallup	294	66	1	

Pm2.5 BLACK CARBON

Micrograms per Cubic Meter

Sampling Method: Light Absorption by Aethalometer

2003

Location	Number of Values	Quarterly Arithmetic Averages				Annual Mean	Max Value
		1st	2nd	3rd	4th		
Olive & Boren, Seattle	310	2.3	1.6	2.0	2.1	2.0	5.7
Beacon Hill, 15th S & Charlestown, Seattle	258		0.7	1.0	1.1	0.9	3.5
Duwamish, 4752 E Marginal Way S, Seattle	304	2.7	1.2	1.4	2.2	1.7	8.0

Notes

(1) Sampling occurs continuously for 24 hours each day.
Quarterly averages are shown only if 75 percent or more of the data is available.

(2) Annual averages are shown only if there are at least three quarterly averages.

Summary of Maximum Observed Concentrations

Location	Jan 7 Tue	Oct 27 Mon	Dec 19 Fri
Olive & Boren, Seattle	--		5.7
Beacon Hill, 15th S & Charlestown, Seattle	--	3.5	3.5
Duwamish, 4752 E Marginal Way S, Seattle	8.0		--

-- Indicates no sample on specified day

CARBON MONOXIDE

(Parts per Million)

2003

Location / Continuous Sampling Period(s)	Six Highest Concentrations						Number of 8 Hour Averages Exceeding 9 ppm	Number of Days 8 Hour Average Exceeded 9 ppm
	1 Hour Average			8 Hour Average				
	Value	Date	End Time	Value	Date	End Time		
2939 Broadway Ave	7.1	9 Jan	2000	3.7	9 Jan	2200	0	0
Everett	6.5	9 Jan	1900	3.2	6 Jan	1800		
1 Jan-1 Apr	6.0	6 Jan	1800	2.7	10 Jan	2400		
	4.5	8 Jan	1900	2.6	8 Jan	2200		
	4.5	10 Jan	2000	2.2	6 Feb	2400		
	4.3	6 Jan	1500	2.2	16 Jan	0100		
44th Ave W & 196th St SW	6.0	9 Jan	1900	4.5	9 Jan	2400	0	0
Lynnwood	5.9	9 Jan	1800	4.0	15 Feb	0200		
1 Jan-31 Dec	5.4	6 Jan	0900	3.9	7 Jan	2300		
	5.4	7 Jan	1800	3.6	20 Nov	2400		
	5.3	14 Feb	2200	3.6	15 Jan	0100		
	5.1	7 Jan	0900	3.4	26 Feb	0100		
NE 8th St & 108th Ave NE	6.9	6 Jan	2000	5.8	6 Jan	2300	0	0
Bellevue	6.4	6 Jan	1700	3.9	10 Jan	2400		
1 Jan-24 Mar	6.3	6 Jan	1800	3.3	12 Feb	2300		
	6.1	6 Jan	1900	3.3	16 Jan	0100		
	5.9	6 Jan	2200	3.2	25 Feb	2200		
	5.6	6 Jan	2100	3.2	10 Jan	0200		
2421 148th Ave NE	9.0	6 Jan	1800	6.5	6 Jan	2200	0	0
Bellevue	8.7	6 Jan	2100	4.7	18 Dec	2400		
1 Jan-31 Dec	8.3	6 Jan	2000	3.6	14 Feb	2300		
	6.5	6 Jan	2200	3.6	13 Nov	2400		
	6.4	6 Jan	1900	3.5	7 Feb	0100		
	6.1	14 Feb	1900	3.4	11 Jan	0100		
Northgate, 310 NE Northgate Way	5.7	6 Jan	1900	4.0	6 Jan	2300	0	0
Seattle	5.4	6 Jan	0900	3.4	11 Jan	0100		
1 Jan-26 Mar	5.1	7 Jan	0900	3.3	6 Jan	1200		
	4.7	6 Jan	1000	3.0	14 Feb	2400		
	4.7	6 Jan	1800	3.0	7 Jan	1300		
	4.7	14 Feb	2200	2.7	7 Jan	2400		
University District, 1307 NE 45th St	9.1	6 Jan	2100	7.1	6 Jan	2300	0	0
Seattle	8.0	6 Jan	2300	4.4	10 Jan	0100		
1 Jan-31 Dec	7.8	6 Jan	2000	4.4	19 Dec	0100		
	7.7	6 Jan	1800	4.1	11 Jan	0100		
	7.3	6 Jan	2200	4.0	22 Dec	2300		
	6.6	6 Jan	1900	4.0	6 Jan	1500		
1424 4th Ave	8.0	14 Jan	0900	3.0	23 Dec	0100	0	0
Seattle	5.0	28 Aug	1000	2.9	19 Dec	0400		
1 Jan-31 Dec	4.5	8 May	1900	2.8	6 Jan	1200		
	4.1	18 Dec	2300	2.5	7 Nov	2000		
	3.9	7 Jan	1000	2.4	10 Jan	1600		
	3.8	22 Dec	1900	2.4	7 Jan	1600		
Beacon Hill, 15th S and Charlestown	2.8	6 Jan	1000	1.9	6 Jan	1600	0	0
Seattle	2.6	19 Dec	0900	1.9	19 Dec	1400		
1 Jan- 31 Dec	2.6	19 Dec	1100	1.7	13 Jan	1700		
	2.5	6 Jan	1200	1.6	17 Dec	2400		
	2.3	13 Jan	1700	1.5	7 Jan	2200		
	2.2	22 Dec	1100	1.5	18 Dec	1400		
1101 Pacific Ave	10.1	12 Jul	1500	5.7	7 Jan	2300	0	0
Tacoma	9.1	7 Jan	1800	4.8	18 Dec	2300		
1 Jan-31 Dec	7.8	7 Jan	1900	4.3	6 Jan	2400		
	7.7	10 Jan	1800	4.0	13 Feb	2000		
	6.6	18 Dec	1900	3.7	13 Feb	0100		
	6.4	6 Jan	1800	3.5	14 Nov	1900		

Notes

(1) All carbon monoxide stations operated by the Washington State Department of Ecology.
(2) Ending times are reported in Pacific Standard Time.
(3) For equal concentration values the date and time refer to the earliest occurrences.
(4) Continuous sampling periods are those with fewer than 10 consecutive days of missing data.
(5) At all stations carbon monoxide was measured using the continuous nondispersive infrared method.

SULFUR DIOXIDE
(Parts per Million)
2003

Monthly and Annual Arithmetic Averages

Location	Monthly Arithmetic Averages												No of 1 Hour Samples	Year Arith Mean
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Beacon Hill, 15th S & Charlestown, Seattle	.003	.003	.002	.002	.002	.002	.003	.003	.003	.003	.002	.002	8760	.002

Maximum and Second Highest Concentrations for Various Averaging Periods

Location / Continuous Sampling Periods(s)	1 Hour Average			3 Hour Average			24 Hour Average		
	Value	Date	End Time	Value	Date	End Time	Value	Date	End Time
Beacon Hill, 15th S & Charlestown, Seattle	.089	26 Aug	0900	.030	6 Jan	1300	.011	4 Sep	1300
1 Jan-31 Dec	.080	18 Sep	0900	.027	18 Sep	1000	.010	13 Feb	0800

Notes
(1) Ending times are reported in Pacific Standard Time.
(2) For equal concentration values the date and time refer to the earliest occurrences.
(3) Continuous sampling periods are those with fewer than 10 consecutive days of missing data.
(4) Sulfur dioxide was measured using the continuous ultraviolet fluorescence method.

NITROGEN DIOXIDE
(Parts per Million)
2003

Monthly and Annual Arithmetic Averages

Location	Monthly Arithmetic Averages												No of 1 Hour Samples	Year Arith Mean
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Beacon Hill, 15th S & Charlestown, Seattle	.026	.021	.015	.016	.016	.015	.016	.020	.020	.019	.021	.019	8783	.019

Maximum and Second Highest Concentrations

Location / Continuous Sampling Periods(s)	1 Hour Average		
	Value	Date	End Time
Beacon Hill, 15th S & Charlestown, Seattle	.076	6 Jan	1300
1 Jan-31 Dec	.075	18 Jun	0900

Notes
(1) Ending times are reported in Pacific Standard Time.
(2) For equal concentration values the date and time refer to the earliest occurrences.
(3) Continuous sampling periods are those with fewer than 10 consecutive days of missing data.
(4) At all stations nitrogen dioxide was measured using the continuous chemiluminescence method.

ATMOSPHERIC PARTICLES

Method: Light Scattering by Dry Particles with Heated Nephelometer Units: $(b_{sp} \times 10^{-4})$/Meter

2003

Location	Monthly Arithmetic Averages												No of 1 Hour Samples	1 Hour Max	Year Arith Mean
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Marysville JHS, 1605 7th St, Marysville	.76	.65	.24	.23	.31	.29	.25	.29	.32	.52	.81	.44	8466	4.29	.43
6120 212th St SW, Lynnwood	.48	.52	.20	.18	.24	.23	.20	.24	.21	.38	.56	.36	8736	3.33	.32
17171 Bothell Way NE, Lake Forest Park	.51	.57	.23	.18	.25	.24	.20	--	.20	.39	.62	.34	8324	3.11	.33
Queen Anne Hill, Seattle	.30	.34	.17	.18	.26	.23	.19	.26	.24	.35	.32	.19	8702	1.77	.25
Olive & Boren, Seattle			.23	.19	.24	.24	.20	.25	.25	.40	.39	.28	7541	1.65	.27
Beacon Hill, 15th S & Charlestown, Seattle	.28	.34	.14	.16	.23	.21	.20	.24	.20	.32	.30	.17	8511	1.59	.23
Duwamish, 4752 E Marginal Way S, Seattle	.43	.39	.23	.21	.29	.26	.24	.29	.24	.36	.43	.29	8612	2.31	.30
South Park, 8025 10th Ave S, Seattle	.52	.48	.21	.20	.26	.25	.22	.28	.29	.42	.49	.34	8596	2.11	.33
City Hall, 15670 NE 85th, Redmond	.29	.35	.15	.17	.24	.23	.19	.24	.23	.36	.33	.19	8710	2.21	.25
601 143rd Ave NE, Bellevue	.28	.35	.13	.15	.24	.23	.18	.25	.22	.35	.34	.19	8727	2.17	.24
305 Bellevue Way NE, Bellevue	.36	.43	.16	.19	.25	.24	.19	.24	.21	.36	.38	.23	8718	2.18	.27
42404 SE North Bend Way, North Bend	.09	.21	.08	.14	.20	.23	.19	.25	.19	.17	.22	.10	8469	4.17	.17
James St & Central Ave, Kent	.50	.53	.20	.22	.30	.29	.26	.30	.28	.43	.47	.37	8732	2.79	.35
Port of Tacoma, 2301 Alexander Ave, Tacoma	.60	.52	.20	.23	.28	.27	.25	.31	.29	.38	.47	.44	8732	2.05	.35
7802 South L St, Tacoma	.78	.73	.22	.24	.27	.25	.22	.26	.26	.45	.69	.51	8679	4.82	.41
South Hill, 9616 128th St E, Puyallup	.58	.59	.19	.21	.27	.26	.24	.28	.25	.43	.60	.50	8685	3.97	.37

VISUAL RANGE

Method: Light Scattering by Dry Particles with Heated Nephelometer Units: Miles

2003

Location	Monthly Arithmetic Averages												No of 1 Hour Samples	1 Hour Min	Daily Min	Year Arith Mean
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Marysville JHS, 1605 7th St, Marysville	53	53	88	79	60	63	71	64	64	59	48	68	8466	5	17	64
6120 212th St SW, Lynnwood	58	59	95	89	70	72	81	73	79	65	54	69	8737	7	22	72
17171 Bothell Way NE, Lake Forest Park	56	53	87	87	68	71	81	--	81	66	53	69	8325	7	21	71
Queen Anne Hill, Seattle	68	67	93	88	67	73	82	69	71	67	66	85	8678	13	21	75
Olive & Boren, Seattle			80	81	70	70	79	72	70	59	55	68	7205	14	18	70
Beacon Hill, 15th S & Charlestown, Seattle	74	69	102	93	74	78	84	74	82	75	71	95	8511	14	20	81
Duwamish, 4752 E Marginal Way S, Seattle	55	60	76	76	62	67	71	64	71	61	54	71	8612	10	24	66
South Park, 8025 10th Ave S, Seattle	51	56	86	83	68	71	76	66	65	60	55	69	8594	11	18	68
City Hall, 15670 NE 85th, Redmond	75	65	100	91	72	74	83	74	75	68	71	89	8707	10	16	78
601 143rd Ave NE, Bellevue	76	67	109	96	71	75	87	72	79	76	69	90	8727	11	16	81
305 Bellevue Way NE, Bellevue	64	59	95	86	69	72	83	75	79	71	62	82	8718	10	15	75
42404 SE North Bend Way, North Bend	119	93	125	102	81	74	82	75	89	96	90	117	8469	6	31	95
James St & Central Ave, Kent	54	55	87	79	62	64	69	63	66	60	54	66	8731	8	17	65
Port of Tacoma, 2301 Alexander Ave, Tacoma	48	55	85	77	63	65	70	62	65	61	57	61	8731	11	17	64
7802 South L St, Tacoma	50	55	91	83	67	71	80	72	73	65	53	62	8678	5	13	68
South Hill, 9616 128th St E, Puyallup	58	57	101	87	67	70	74	69	73	66	58	66	8685	6	14	71

Summary of Minimum Observed Daily Values and Values <20

Location	Jan 6 Mon	Jan 7 Tue	Jan 9 Thu	Jan 15 Wed	Jan 18 Sat	Feb 6 Thu	Feb 7 Fri	Feb 12 Wed	Feb 13 Thu	Oct 1 Wed	Oct 3 Fri	Oct 4 Sat	Nov 7 Fri	Nov 9 Sun	Nov 12 Wed	Nov 13 Thu	Dec 23 Tue
Marysville			18	19	17		19				19			17			
Lynnwood											22						
Lake Forest Park	--	--									21						
Queen Anne Hill, Seattle											21						
Olive & Boren, Seattle	--	--	--	--	--	--	--	--	--	19	18						
Beacon Hill, Seattle								--	--	20	20						
Duwamish, Seattle	24	24				--	--			24	24						
South Park, Seattle	--									19	18						
Redmond											19	16					
Bellevue, 143rd Ave											18	16					
Bellevue Way										19	17	15					
North Bend										--	--	--		31			
Kent						19		18			17	18					
Port of Tacoma		17							19								19
South L St, Tacoma	17		18		15	17		16			13		14		18	17	
Puyallup											14	17					

-- Indicates no sample on specified day