WASHINGTON STATE DEPARTMENT OF ECOLOGY

1998 Washington State Air Quality Annual Report

Publication Number 98-213

Prepared by:
Washington State Department of Ecology
Air Quality Program

April 1999
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This report is dedicated to the memory of Carolyn Peterson, who died of breast cancer on August 13, 1998.

Carolyn never lost her positive attitude during her long struggle. She contributed much to the Air Quality Program and to everyone who had the privilege of working with her. She is greatly missed.

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Introduction

Washington State continues to make good progress in meeting and maintaining federal air pollutant standards sets by the Environmental Protection Agency (EPA) to protect public health. Some significant air quality-related events and accomplishments in Washington during 1998 included:

- The state began a phase-out of the old ozone and particulate matter standards to allow implementation of new standards adopted in 1997.
- Air Quality Program staff completed an evaluation of the motor vehicle Emission Check Program and recommendations for changing the program.
- State and local agencies and other organizations worked in partnership to address driving behaviors that contribute to air pollution and traffic congestion.
- Air Quality Program staff continued work begun in 1997 on reducing toxic air pollutant emissions and protecting visibility.
- Air Quality Program staff and an advisory committee proposed changes to Ecology's outdoor burning regulations.
- Ecology certified an alternative to grass seed field burning, virtually eliminating this type of agricultural burning in Washington.

This report provides information in four sections.

(1) It provides background information on Washington's air quality agencies, air pollution sources and their contributions to pollution levels, and air pollutants of concern in Washington and how they are measured.

(2) It gives an air quality status report that shows Washington's nonattainment and maintenance areas, describes progress made in these areas during 1998, and includes graphs showing air quality trends in Washington and Emission Check Program results.

(3) It highlights significant activities and accomplishments of 1998.

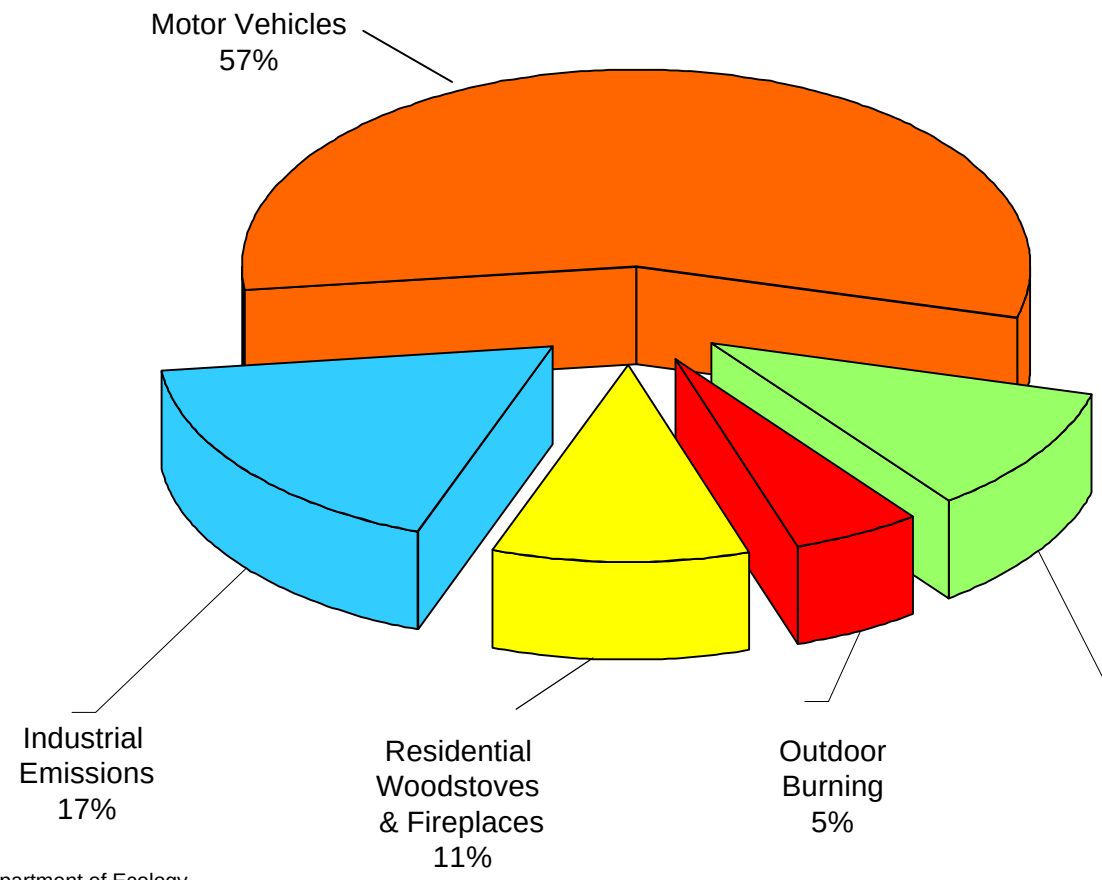
(4) It describes future challenges facing the Department of Ecology's Air Quality Program.

Air Quality Background Information

Washington's Air Quality Agencies

Ecology and seven local air pollution control authorities around the state work together to control and prevent air pollution. The primary responsibility for improving air quality lies with local agencies; in areas where there is no local air agency, Ecology fulfills the role. The map below shows the jurisdictions of Ecology and local agencies.

Air Pollution Sources in Washington



Source: Department of Ecology

February 2, 1

Air Pollutants of Concern

Criteria Pollutants			
Pollutant	**Description**	**Sources**	**Health Effects**
Particulate Matter	Particles of soot, dust, and unburned fuel suspended in the air.	Wood stoves, Industry, Dust, Construction, Street sand application, Open burning.	Aggravates ailments such as bronchitis and emphysema; especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.
Carbon Monoxide (CO)	An odorless, tasteless, colorless gas which is emitted primarily from any form of combustion.	Mobile sources (autos, trucks, buses), Wood stoves, Open burning, Industrial combustion sources.	Deprives the body of oxygen by reducing the blood's capacity to carry oxygen; causes headaches, dizziness, nausea, listlessness and in high doses, may cause death.
Ozone (O_3)	Formed when nitrogen oxides and volatile organic compounds react with one another in the presence of sunlight and warm temperatures. A component of smog.	Mobile sources, Industry, Power plants, Gasoline storage and transfer, Paint.	Irritates eyes, nose, throat and respiratory system; especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.
Nitrogen Dioxide (NO_2)	A poisonous gas produced when nitrogen oxide is a by-product of sufficiently high burning temperatures.	Fossil fuel power, Mobile sources, Industry, Explosives manufacturing, Fertilizer manufacturing.	Harmful to lungs, irritates bronchial and respiratory systems; increases symptoms in asthmatic patients.
Sulfur Dioxide (SO_2)	A gas or liquid resulting from the burning of sulfur-containing fuel.	Fossil fuel power plants, Non-ferrous smelters, Kraft pulp production.	Increases symptoms in asthmatic patients; irritates respiratory system.
Lead (Pb)	A widely used metal, which may accumulate in the body.	Leaded gasoline, Smelting, Battery manufacturing and recycling.	Affects motor function and reflexes and learning; causes damage to the central nervous system, kidneys and brain. Children are affected more than adults.

Air Quality Standards

EPA has set health-based standards for the criteria air pollutants described on page 7. New standards for particulate matter smaller than 2.5 microns in size ($PM_{2.5}$) and ozone were adopted by EPA in 1997, and replace the previous particulate matter and ozone standards.

Pollutant	National Primary	National Secondary	Washington State
Total Suspended Particulates			
Annual Geometric Mean	No Standard	No Standard	60 µg/m^3
24 - Hour Average	No Standard	No Standard	150 µg/m^3
Lead (Pb)			
Quarterly Average	1.5 µg/m^3	1.5 µg/m^3	No standard
Particulate Matter (PM_{10})			
Annual Arithmetic Mean	50 µg/m^3	50 µg/m^3	50 µg/m^3
24 - Hour Average	150 µg/m^3	150 µg/m^3	150 µg/m^3
Particulate Matter ($PM_{2.5}$)[a]			
24-Hour	65 µg/m^3	65 µg/m^3	65 µg/m^3
Annual Arithmetic Mean	15 µg/m^3	15 µg/m^3	15 µg/m^3
Sulfur Dioxide (SO_2)			
Annual Average	0.03 ppm	No Standard	0.02 ppm
24 - Hour Average	0.14 ppm	No Standard	0.10 ppm
3 - Hour Average	No Standard	0.50 ppm	No Standard
1 - Hour Average	No Standard	No Standard	0.40 ppm[a]
∗Carbon Monoxide (CO)[b]			
8 - Hour Average	9 ppm	9 ppm	9 ppm
1 - Hour Average	35 ppm	35 ppm	35 ppm
∗Ozone (O_3)[c, d]			
1 - Hour Average[e]	0.12 ppm	0.12 ppm	0.12 ppm
8 - Hour Average	0.08 ppm	0.08 ppm	No standard
Nitrogen Dioxide (NO_2)			
Annual Average	0.053 ppm	0.053 ppm	0.05 ppm

(See previous page)

a = New particulate matter standards went into effect on September 16, 1997.
b = 0.25 not to be exceeded more than two times in any seven consecutive days.
c = Primary standards are listed in this table as they appear in the federal regulations. Ambient concentrations are rounded using the next higher decimal place to determine whether a standard has been exceeded. The data charts in this report are shown with these rounded numbers.
d = New eight-hour ozone standard went into effect on September 16, 1997. One-hour ozone standard was revoked on June 5, 1998.
e = Not to be exceeded on more than 1.0 days per calendar year, as determined under the conditions indicated in Chapter 173-475 WAC.

- ppm = parts per million
- $\mu g/m^3$ = micrograms per cubic meter
- Annual standards never to be exceeded, short-term standards not to be exceeded more than once per year unless noted.

Air Monitoring

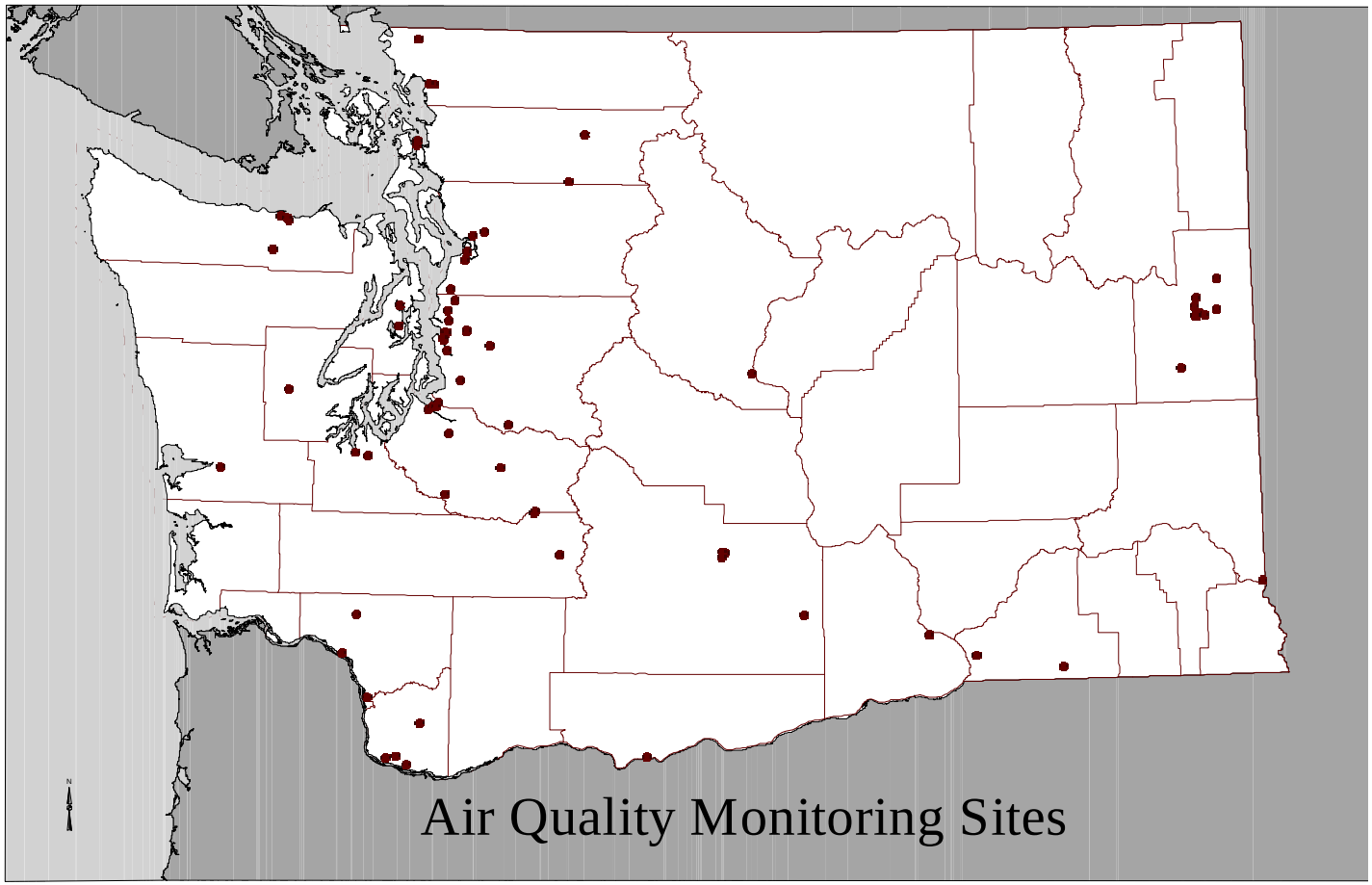
How do we know if we have a problem in our state with one of the criteria air pollutants described on the previous pages? Ecology and local agencies monitor for these pollutants around the state to identify areas where high levels of pollution exist, identify where health risks may exist, and determine if the things we are doing to control air pollution in specific areas of the state are working. Monitoring for particulate matter smaller than 2.5 microns in size ($PM_{2.5}$) is being phased in over the next two years.

In addition to this monitoring network, Ecology and local agencies conduct special monitoring studies for toxic air pollutants, fine particles, carbon monoxide, and ozone.

The number and location of air monitors may be adjusted each year based on measured pollution levels; changes in the number, type or characteristics of sources that cause air pollution; federal and state priorities; and available resources. Pollution levels are compared over time to determine air quality trends.

During 1998, several changes to Washington's air monitoring network were made. These changes were based on measured pollution levels or changes in pollution sources in different areas of the state. New monitoring sites were established in King, Pierce, Snohomish, Thurston, Spokane, and Yakima counties for nitrogen oxides, ozone, carbon monoxide, and particulate matter. Sites for sulfur dioxide, nitrogen oxides, ozone, and particulate matter were discontinued in Clallam, Clark, Cowlitz, Chelan, Pierce, Spokane, Snohomish, and Thurston counties.

The map on the following page shows the locations of Washington's air monitoring sites during 1998. Many of these sites monitor for multiple pollutants.


Air Quality Monitoring Sites

Air Quality Status Report

Progress on Nonattainment and Maintenance Areas

When an area violates one of the federal air quality standards, EPA designates the area as nonattainment for that pollutant. A nonattainment area must have a plan to meet and maintain federal Clean Air Act standards. When it again meets the standard, an area can be redesignated to attainment as a "maintenance area." Washington State continues to have great – though not complete – success in meeting and maintaining the federal air pollutant standards set by EPA to protect public health. This success is reflected in the phase-out of the one-hour standard for ozone pollution, the expected phase-out of the existing standard for particulate matter, and the redesignation to attainment of two of the state's four carbon monoxide nonattainment areas (the Puget Sound and Vancouver areas). Even Spokane, which was reclassified as a "serious" carbon monoxide area for failing to meet the standard on the schedule laid out by the federal Clean Air Act, is currently meeting the standard. Local agencies and Ecology are working to assure that Spokane will continue to meet the standard and allow the state to request redesignation to attainment. The other remaining carbon monoxide nonattainment area, Yakima, remains "unclassified," meaning it has not been designated as either moderate or serious. This is because, although Yakima has recently been maintaining the standard, the area experienced numerous carbon monoxide violations in the 1980s.

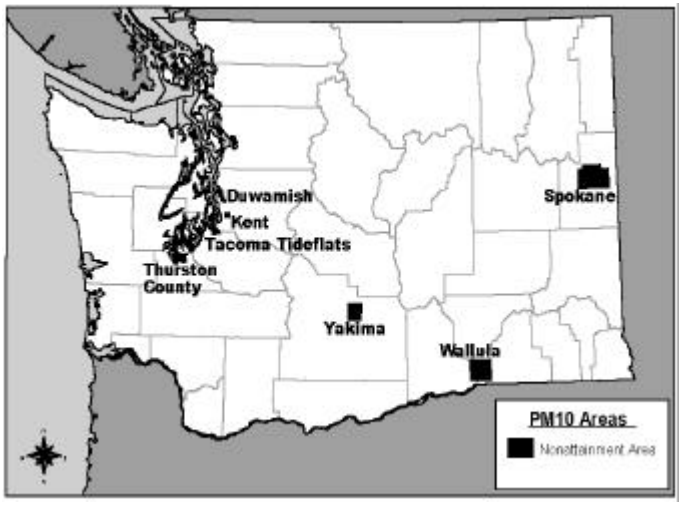
During 1998, the most significant events regarding Washington's nonattainment areas were related to Spokane's continuing carbon monoxide nonattainment status and the revised ozone and particulate matter standards.

Carbon monoxide: Spokane was reclassified by EPA from a moderate to a serious carbon monoxide nonattainment area effective April 13, 1998. The reclassification is a result of EPA's finding that Spokane did not attain the carbon monoxide standard by the December 31, 1995 federal Clean Air Act deadline. The Spokane Air Pollution Control Authority (SCAPCA), the Spokane Regional Transportation Council, and Ecology are coordinating on the development of an attainment plan that meets the federal Clean Air Act's requirements for serious areas. At the same time, all three agencies are also working on a maintenance plan that will allow EPA to reclassify Spokane to attainment

Ozone: The entire state of Washington has been determined by EPA to have met the one-hour ozone standard. The one-hour standard no longer applies anywhere in Washington (or in the rest of the nation). Washington's ozone standard is now the new eight-hour standard adopted in 1997. EPA will use monitoring data from 1997-1999 to determine whether any area of the state should be designated as nonattainment under this new standard.

Particulate matter: In 1998 the Ecology Director, on behalf of the Governor, submitted a formal request that EPA phase out the existing particulate matter standard throughout the entire state of Washington. EPA has established three criteria for phasing out the existing standard and implementing the new particulate matter standard adopted in 1997: areas must monitor attainment in 1994-1996; have a federally enforceable SIP that includes control measures needed to meet the old standard; and have adequate legal authority and infrastructure to implement the new standard.

All areas of Washington meet these criteria, with one special note: although two of Washington's particulate matter nonattainment areas, Spokane and Wallula, did not meet the standard in 1994-1996 because of windblown dust issues, they meet the required criteria under EPA's Natural Events Policy adopted in 1996. This policy provides that exceedances of the standard due to dust storms are not used in evaluating attainment for an area. Ecology submitted a Natural Events Action Plan for the Columbia Basin to EPA in March 1998. If EPA approves the request to phase out the existing particulate matter standard, all areas of the state will be in attainment for particulate matter. Because of this, and at the request of the Olympic Air Pollution Control Authority, Ecology withdrew its request this year for EPA to approve a maintenance plan for the Thurston County particulate matter nonattainment area. EPA is expected to take action in 1999 on the request to phase out the existing standard.



1998 Air Quality Trends

The charts on the following pages show air quality trends through 1998 in Washington's nonattainment and maintenance areas. Trends data is collected for carbon monoxide, ozone, particulate matter, and sulfur dioxide. A summary of the trends for these pollutants is as follows:

Carbon monoxide trends: The statewide trend for carbon monoxide continues to show decreasing levels of this air pollutant. Ecology and local agencies have not monitored levels of carbon monoxide exceeding the standard since 1996 in Spokane (see page 11, "Progress on Nonattainment and Maintenance Areas," for a more detailed discussion of carbon monoxide in Spokane). Although the downward trend is expected to continue, growth in population and motor vehicle use will continue to pose challenges in controlling carbon monoxide.

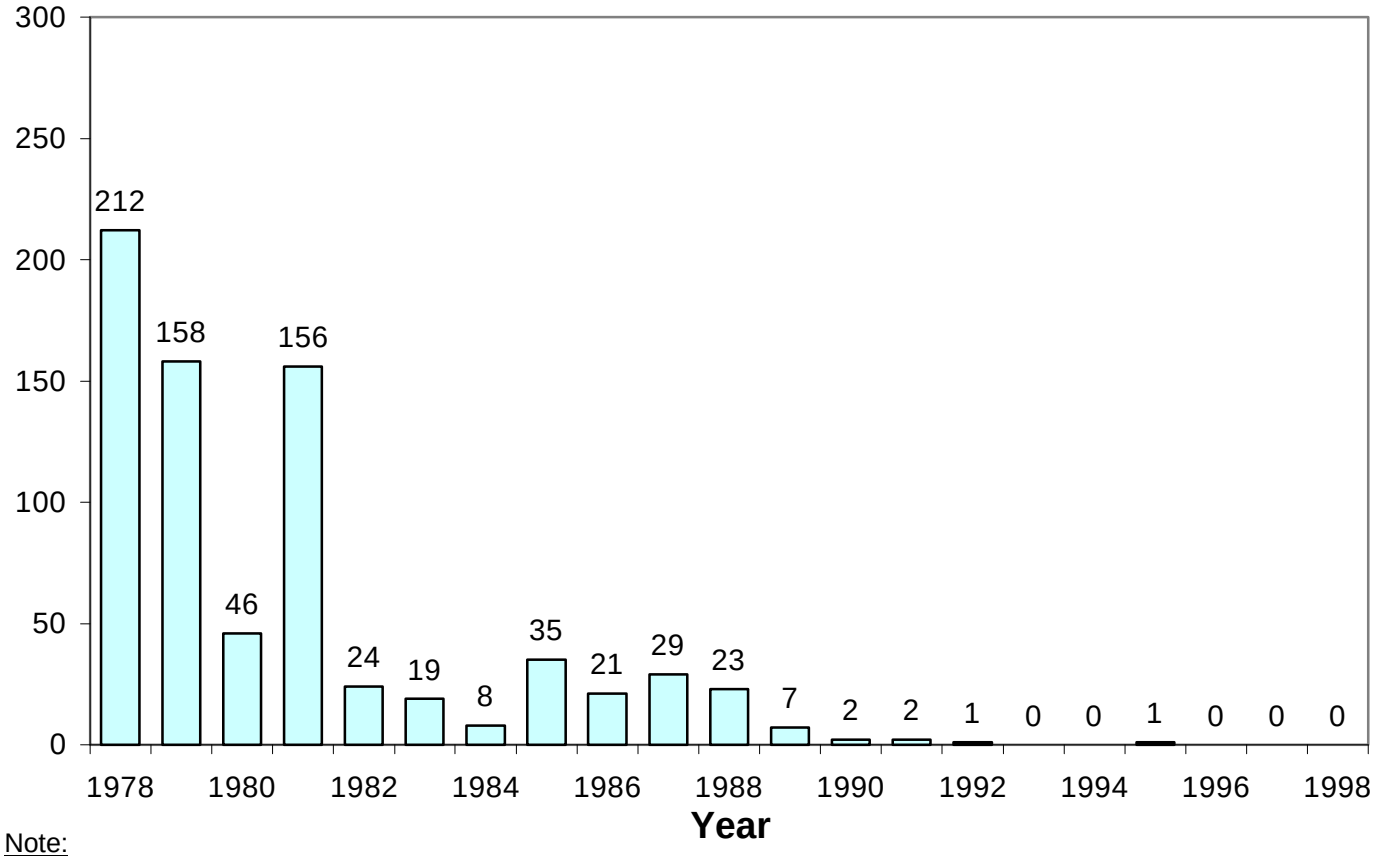
Ozone trends: The trend for ozone in Washington is less clear than for that of other air pollutants. Ozone levels are affected by the weather; a hot summer can send levels up one year and a mild summer can send them back down the next. In 1998, the Vancouver area continued to have decreasing ozone levels while the Puget Sound area continued its unstable rise/fall pattern. The ozone trends charts show the point at which the new eight-hour standard went into effect, replacing the former one-hour standard. Although ozone levels were above the standard for the Puget Sound area, the new standard is based on an average of three years of data to determine attainment. The first three complete years of data under the new standard will be 1998-2000.

Particulate matter trends: Statewide trends for particulate matter show continued decreasing levels of PM_{10}, with two exceptions: Spokane exceeded the standard in 1996, and Wallula exceeded it in 1997 and 1998. In both of these areas, the high PM_{10} levels were caused by natural events (dust storms), and do not affect attainment status. Ecology only recently began monitoring for $PM_{2.5}$ as part of the implementation of the new particulate matter standard (see page 45 for a more detailed discussion). Not enough of this data is available yet to be reflected in the trends charts.

Sulfur dioxide trends: Although Washington has no nonattainment areas for sulfur dioxide, the Air Quality Program monitors for this pollutant because relatively high levels have occurred in some areas of the state. No levels approaching the standard have occurred in Washington since 1994.

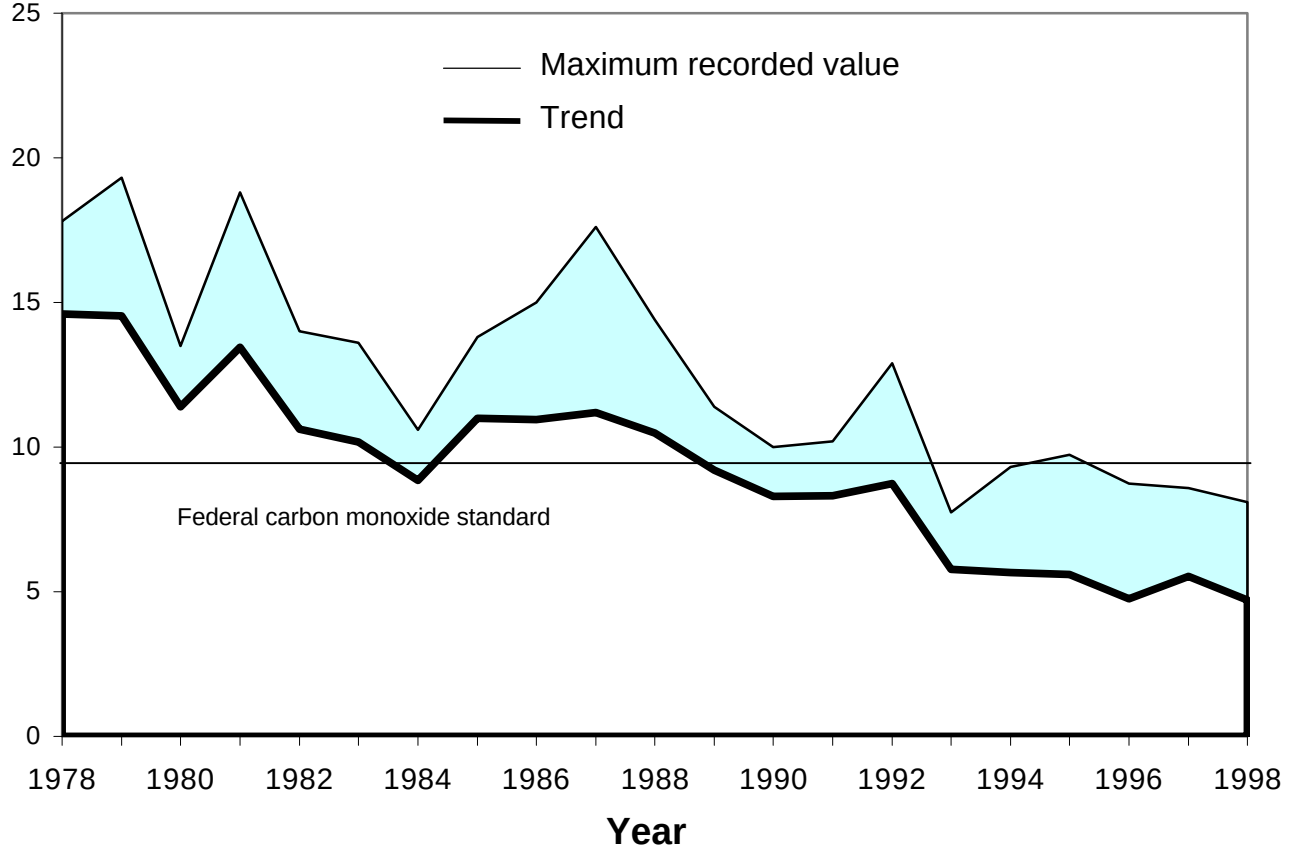
Puget Sound Carbon Monoxide

Number of Observations Above Standard: 1978 - 1998



Note:
More than one exceedance during a single year is a violation of the federal carbon monoxide standard of 9 ppm.

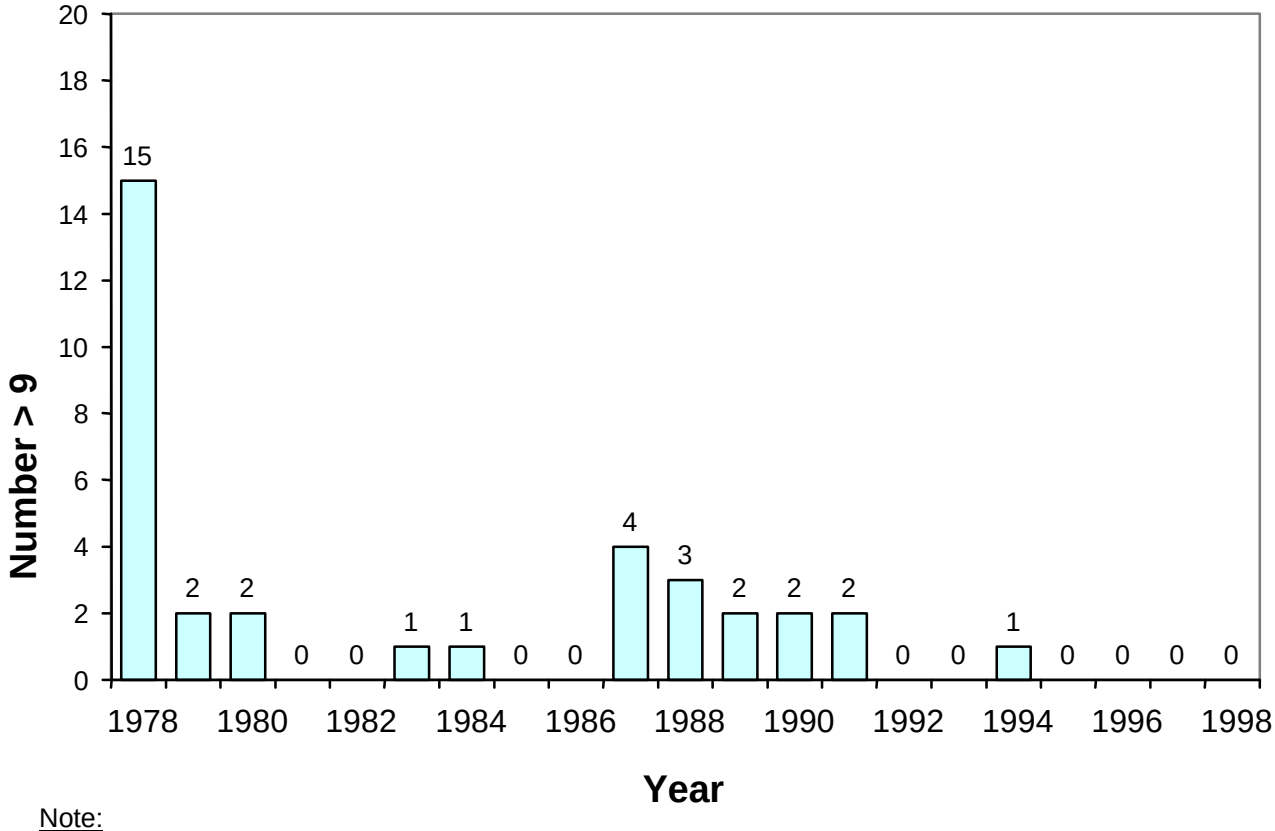
Puget Sound Carbon Monoxide Trends
CO Levels: 1978 - 1998



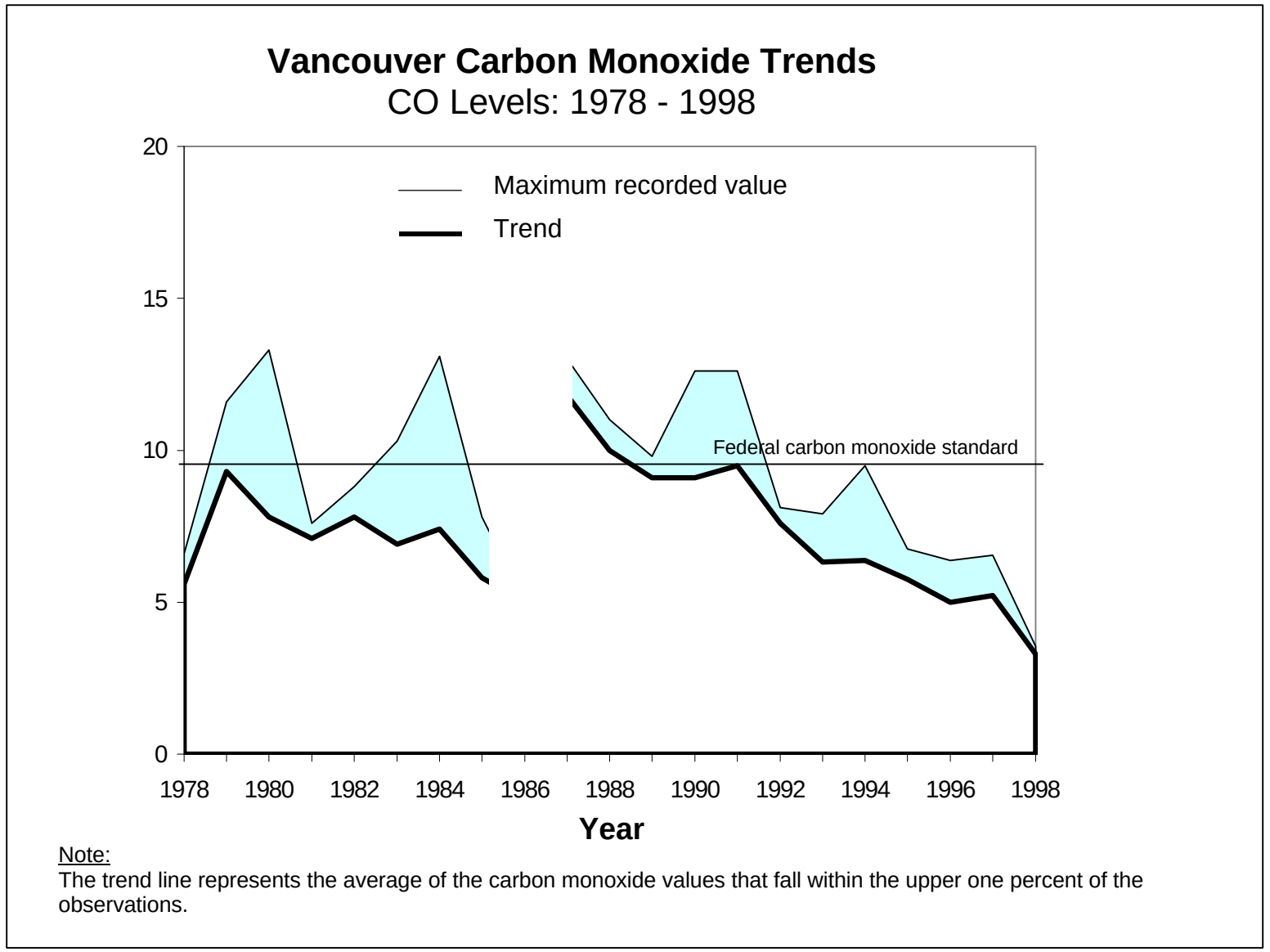
Note:
The trend line represents the average of the carbon monoxide values that fall within the upper one percent of the observations.

Vancouver Carbon Monoxide

Number of Observations Above Standard: 1978 - 1998



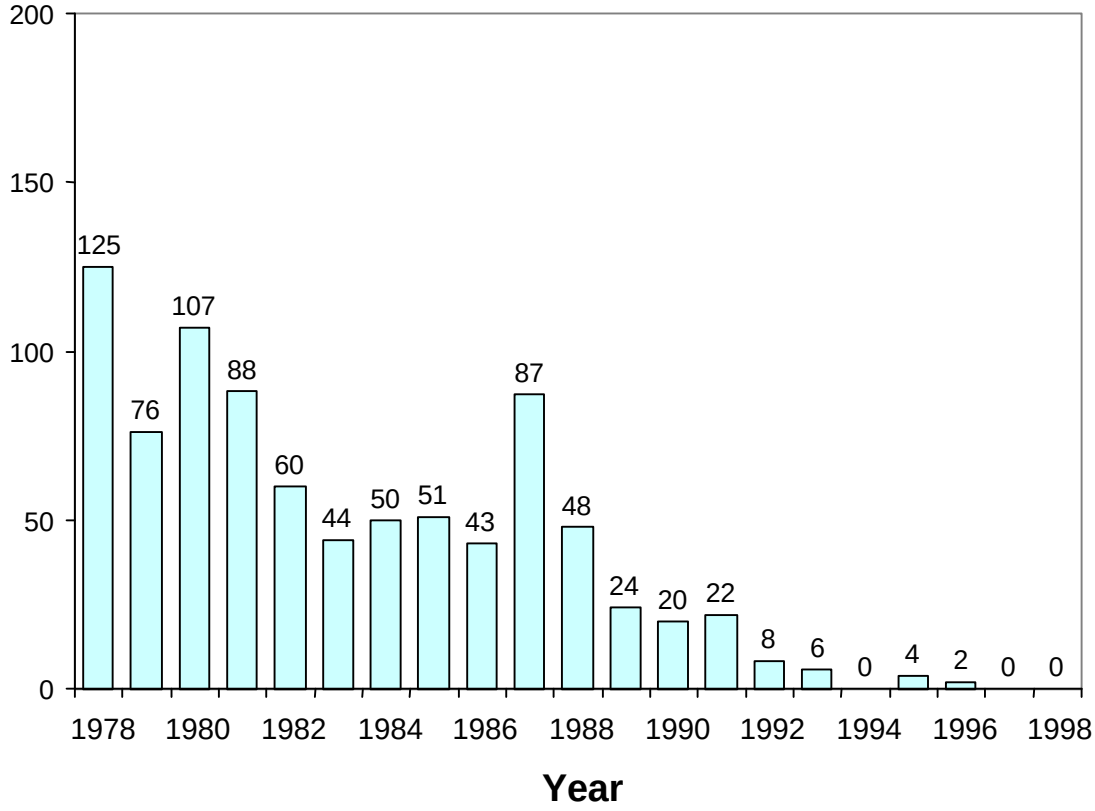
Note:
More than one exceedance during a single year is a violation of the federal carbon monoxide standard of 9ppm.



Note:
The trend line represents the average of the carbon monoxide values that fall within the upper one percent of the observations.

Spokane Carbon Monoxide

Number of Observations Above Standard 1978 - 1998



Note:
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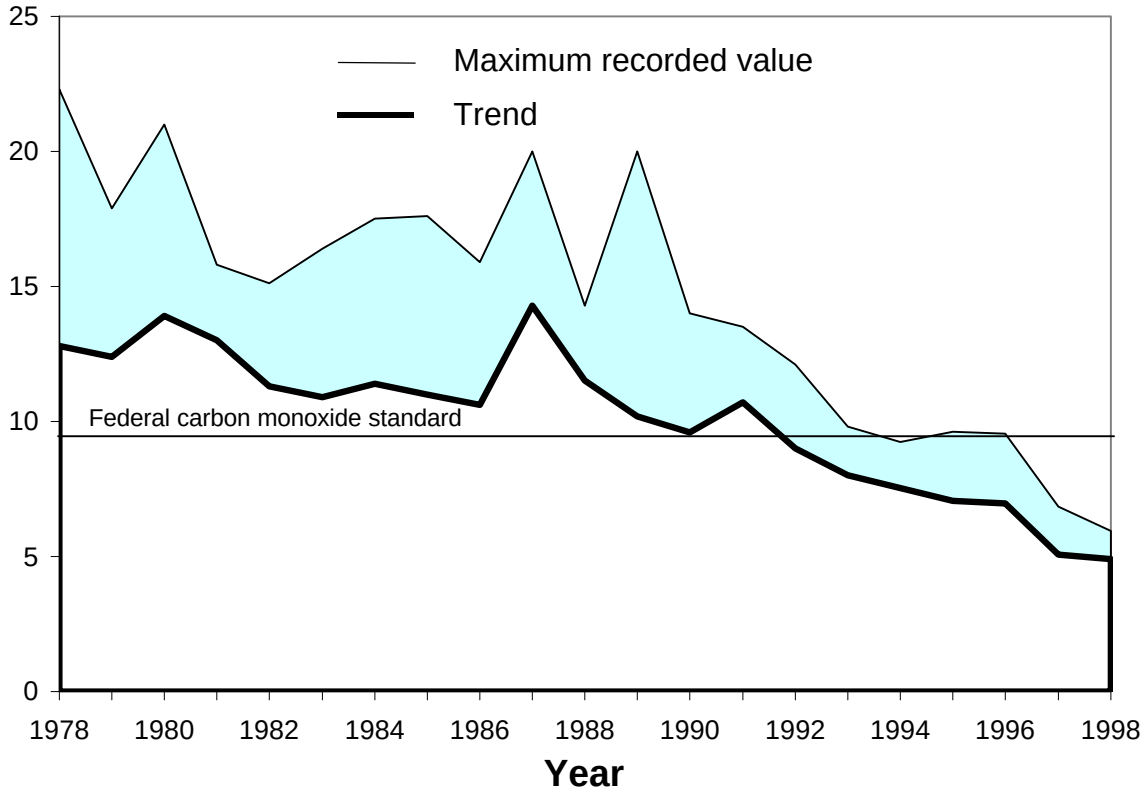
Spokane Carbon Monoxide Trends

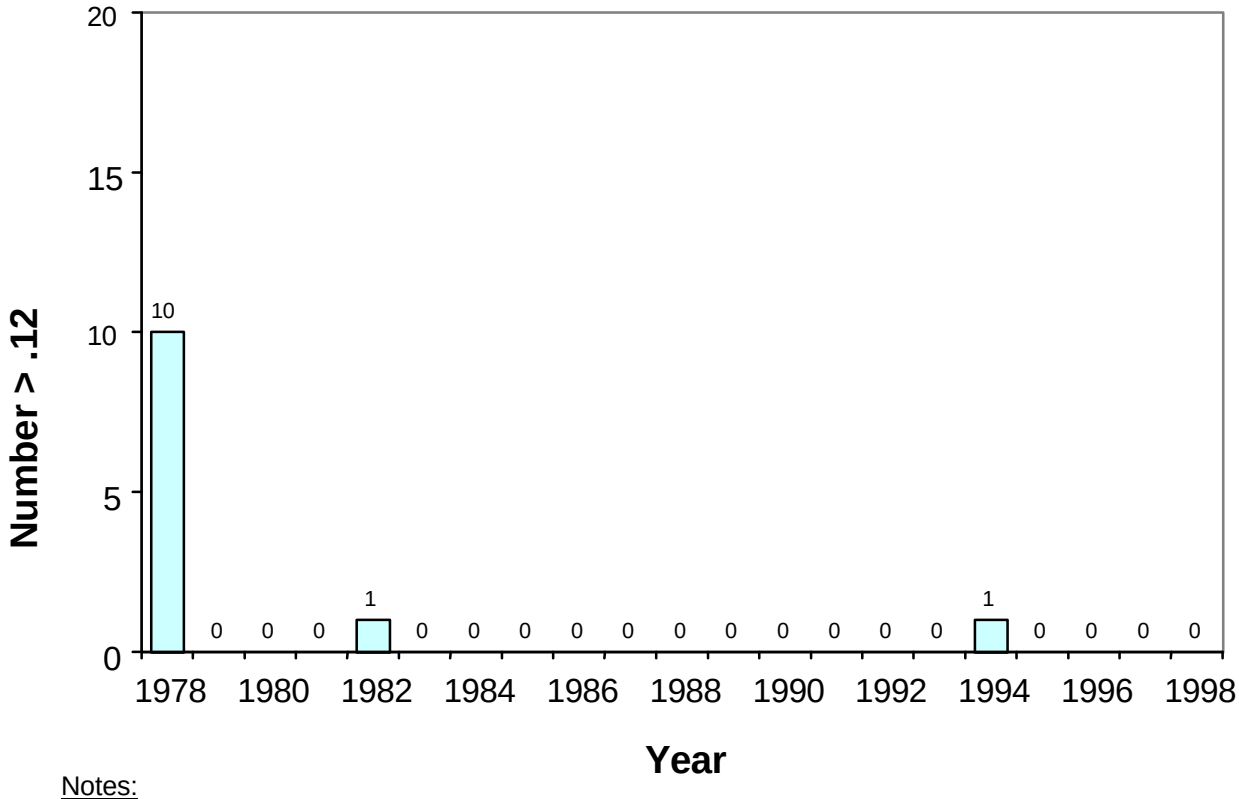
CO Levels: 1978 - 1998



Note:
The trend line represents the average of the carbon monoxide values that fall within the upper one percent of the observations.

Washington Portion of the Vancouver – Portland Ozone

Number of Observations Above Standard: 1978 - 1998

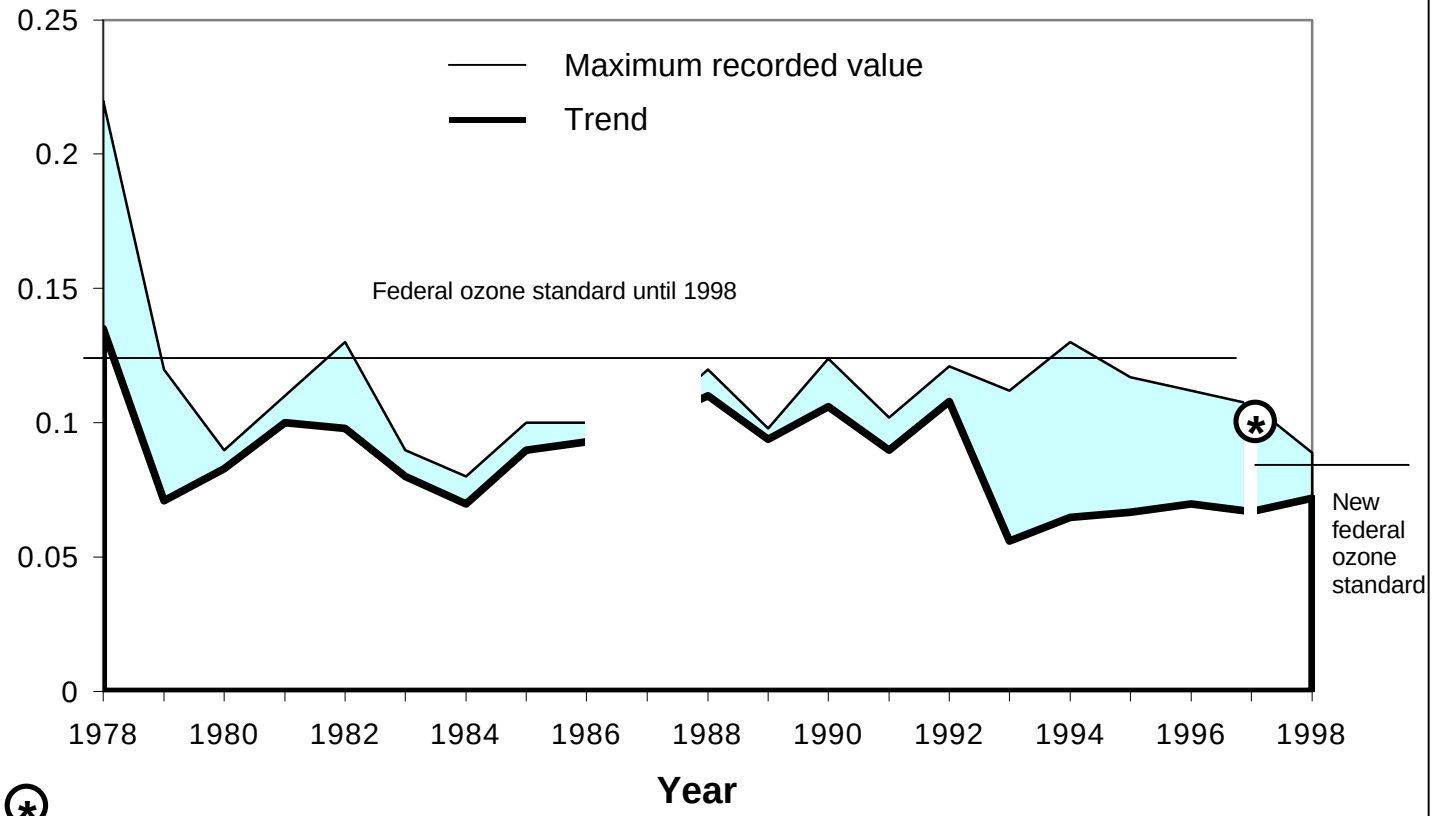


Notes:

More than three observations above the .12 ppm during a three-year period is a violation of the federal ozone standard. The standard prior to 1980 was .08 ppm. The above data was recalculated at the .125 ppm level.
The new 8-hour standard of .08 ppm went into effect on September 16,1997. The 1-hour standard was not revoked for Washington State until June 5, 1998. Although part of the 1997 and 1998 ozone seasons were under two standards, we have decided for the purposes of this graph to show the 1997 ozone as 1-hour averages and the 1998 ozone as 8-hour averages.

Washington Portion of the Vancouver – Portland Ozone

Ozone Levels: 1978 - 1998



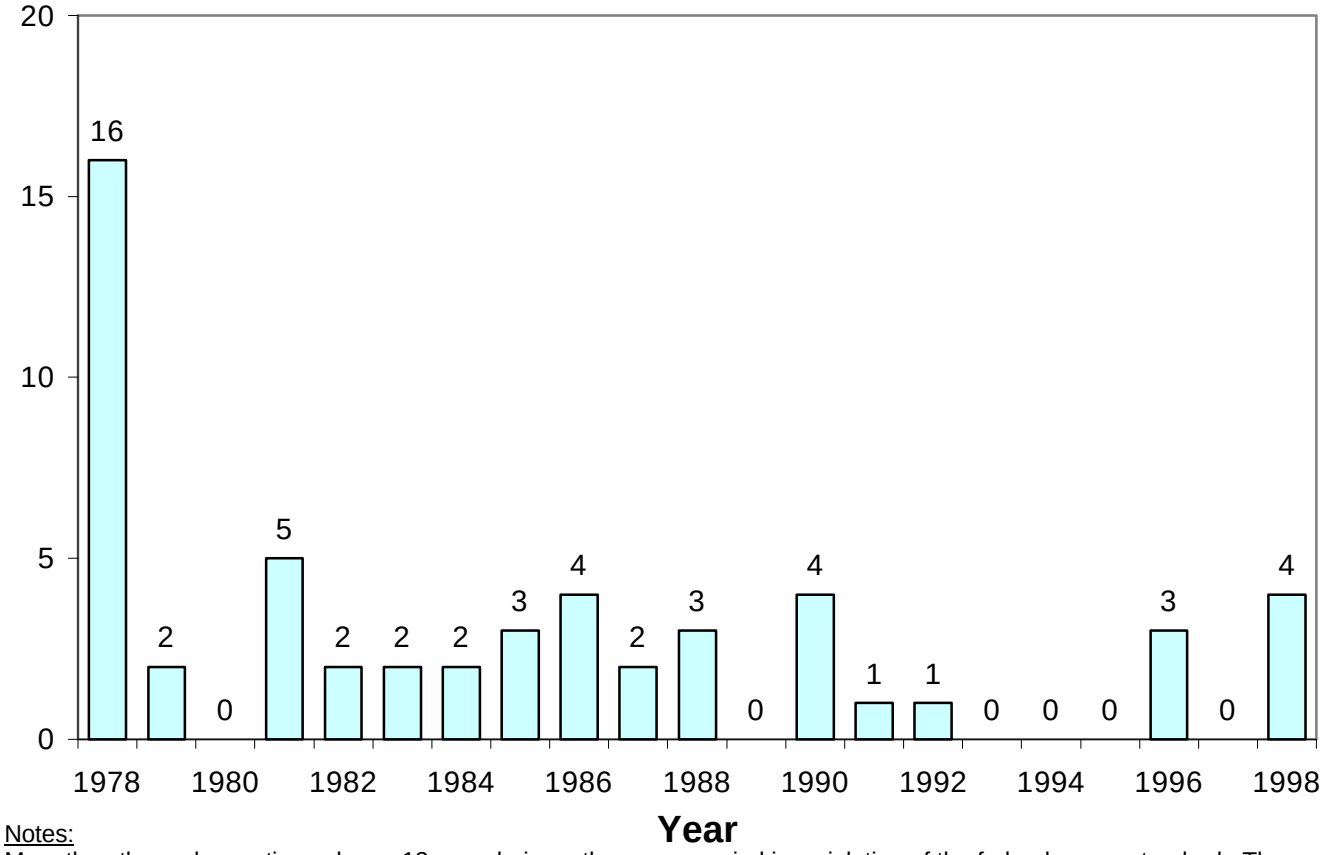
(*) The new 8-hour standard of .08 ppm went into effect on September 16,1997. The 1-hour standard was not revoked for Washington State until June 5, 1998. Although part of the 1997 and 1998 ozone seasons were under two standards, we have decided for the purposes of this graph to show the 1997 ozone as 1-hour averages and the 1998 ozone as 8-hour averages.

Note:

The trend line represents the average of the ozone values that fall within the upper one percent of the observations.

Oregon Portion of the Portland – Vancouver Ozone

Number of Observations Above Standard: 1978 - 1998



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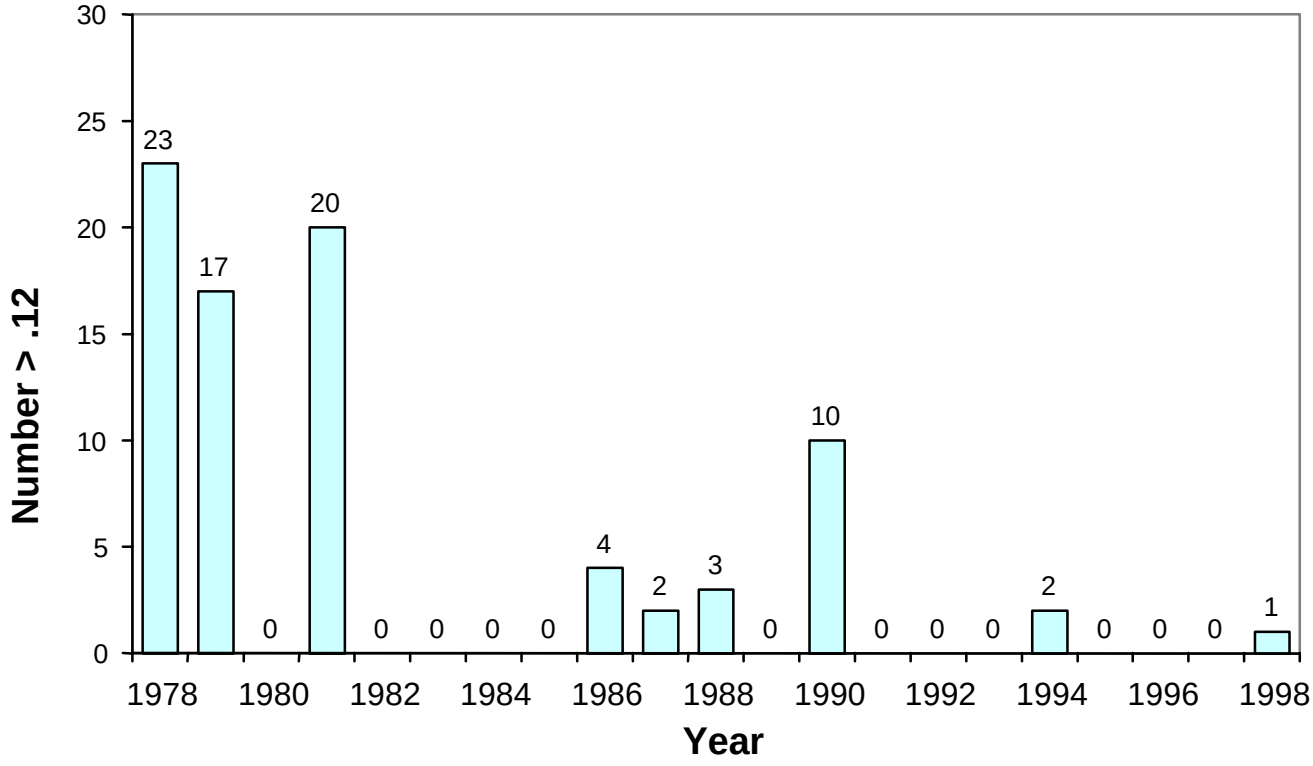

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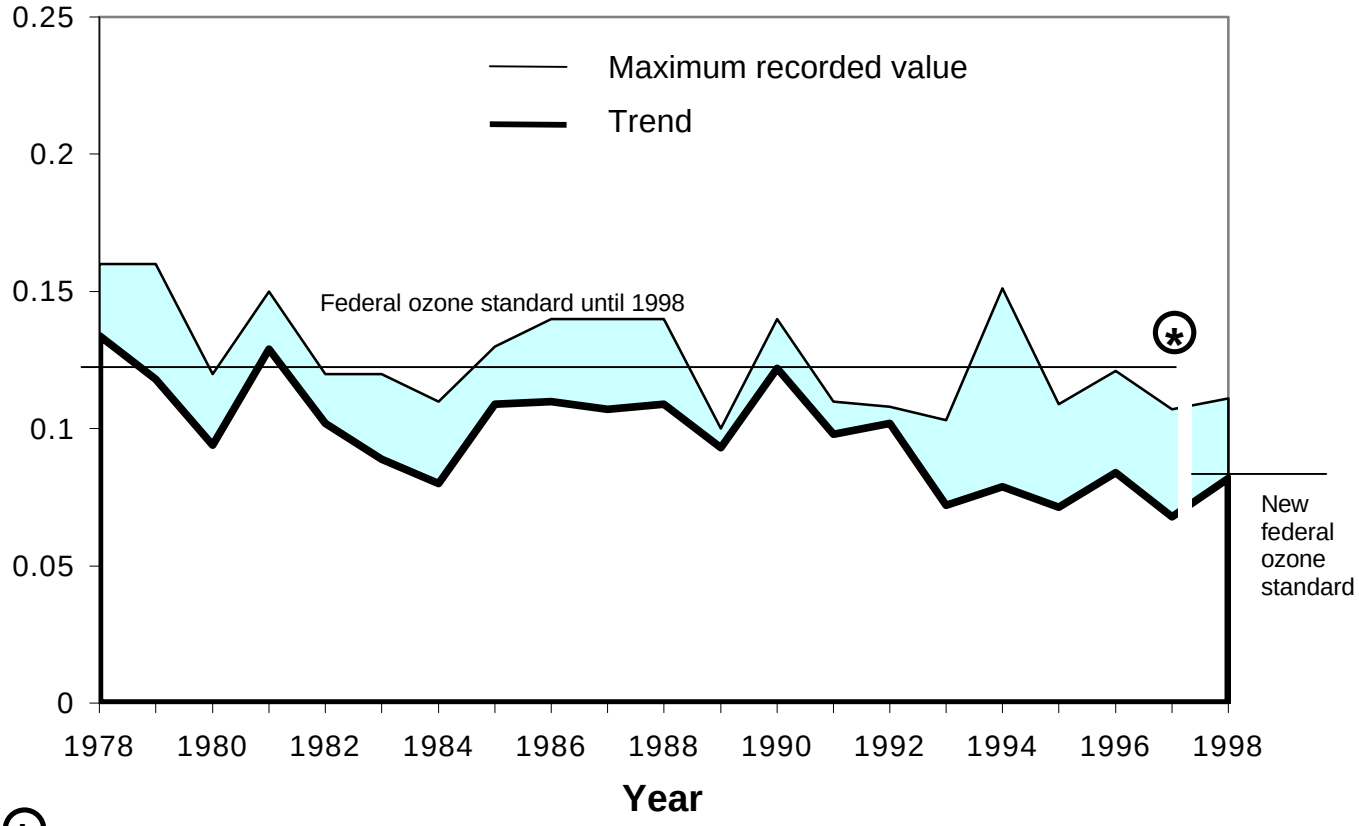
Puget Sound Ozone Trends

Ozone Levels: 1978 - 1998



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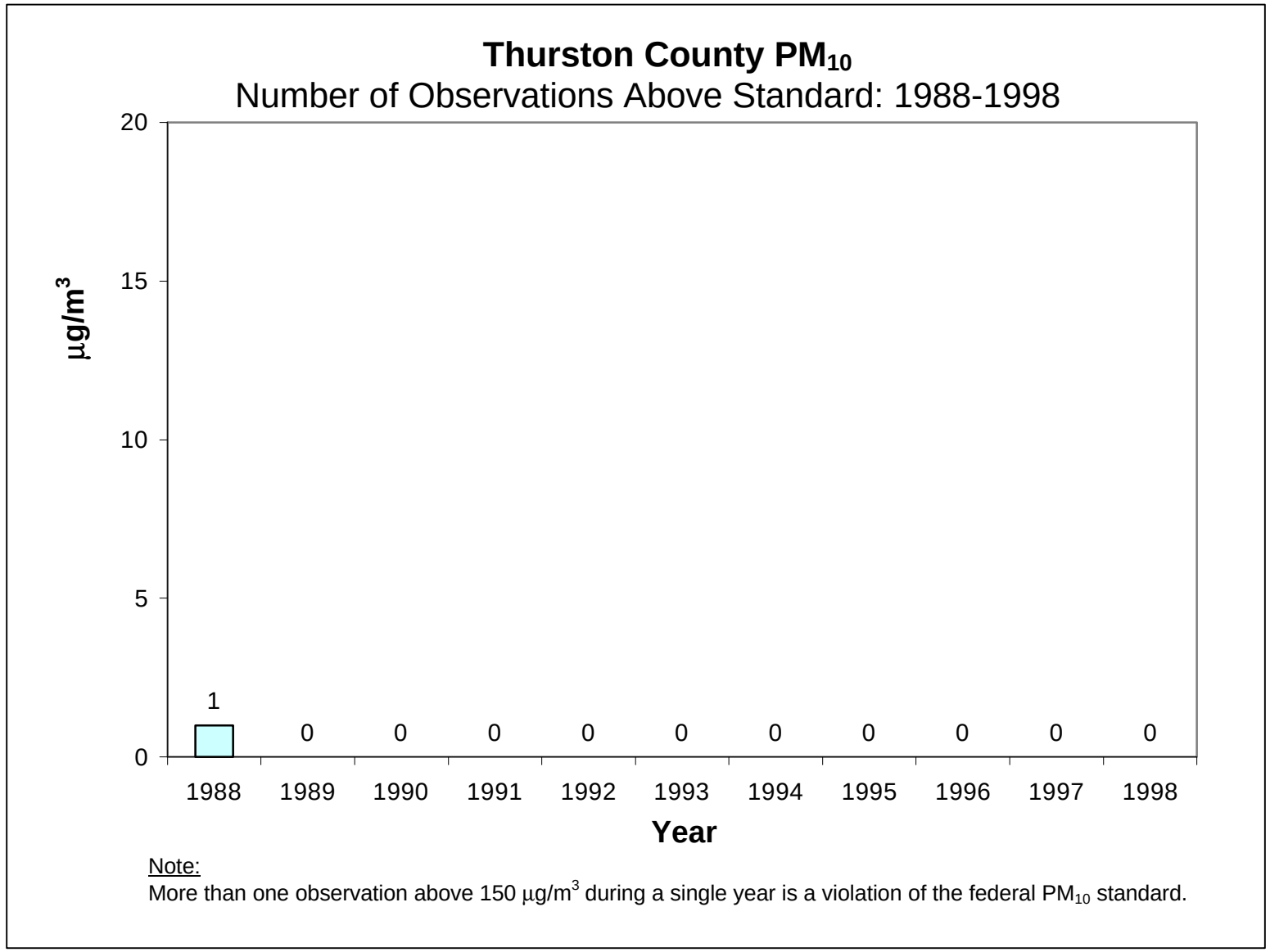
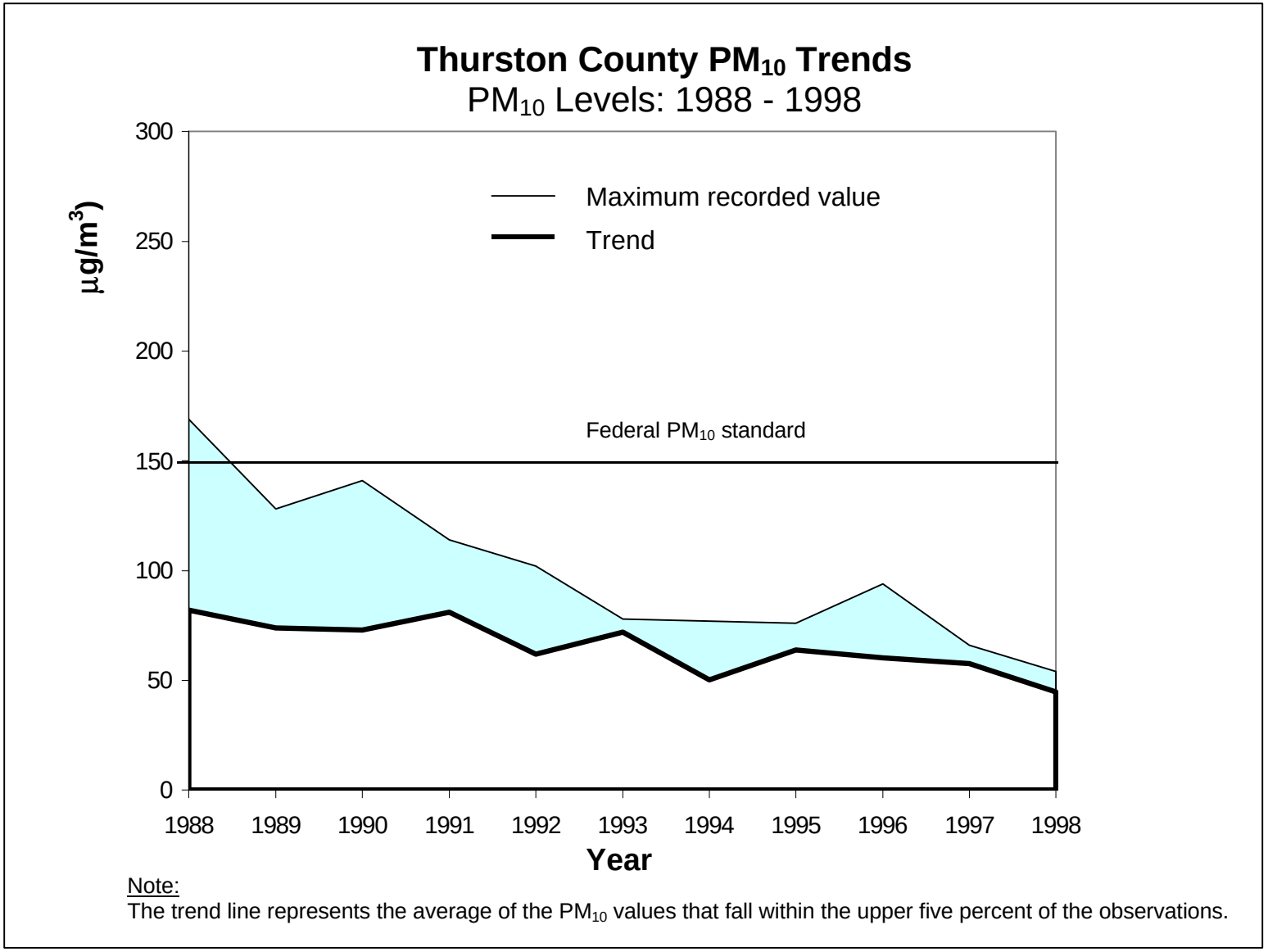
Note:

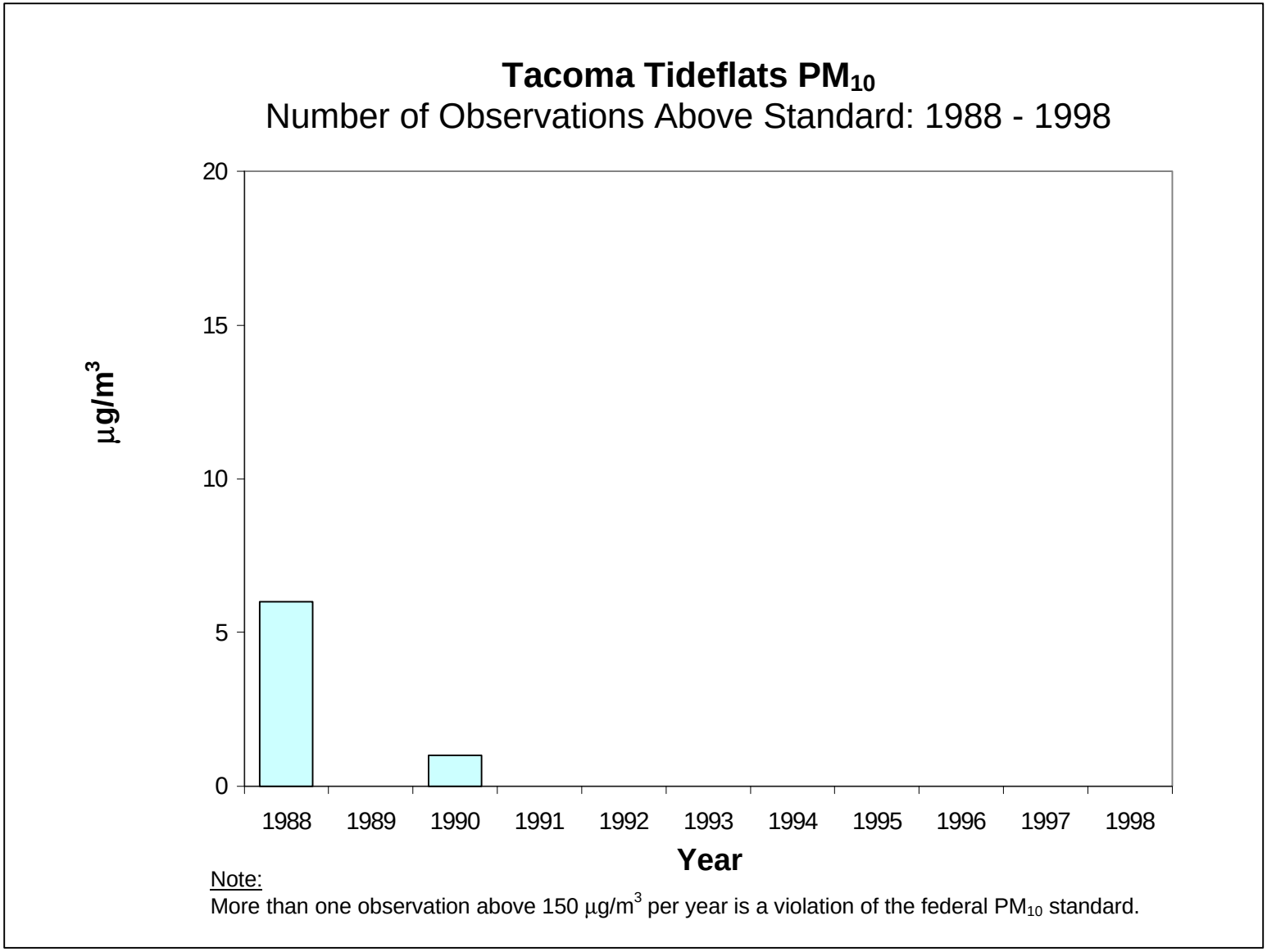
The trend line represents the average of the ozone values that fall within the upper one percent of the observations.



Note:
More than one observation above 150 µg/m^3 during a single year is a violation of the federal PM_{10} standard.

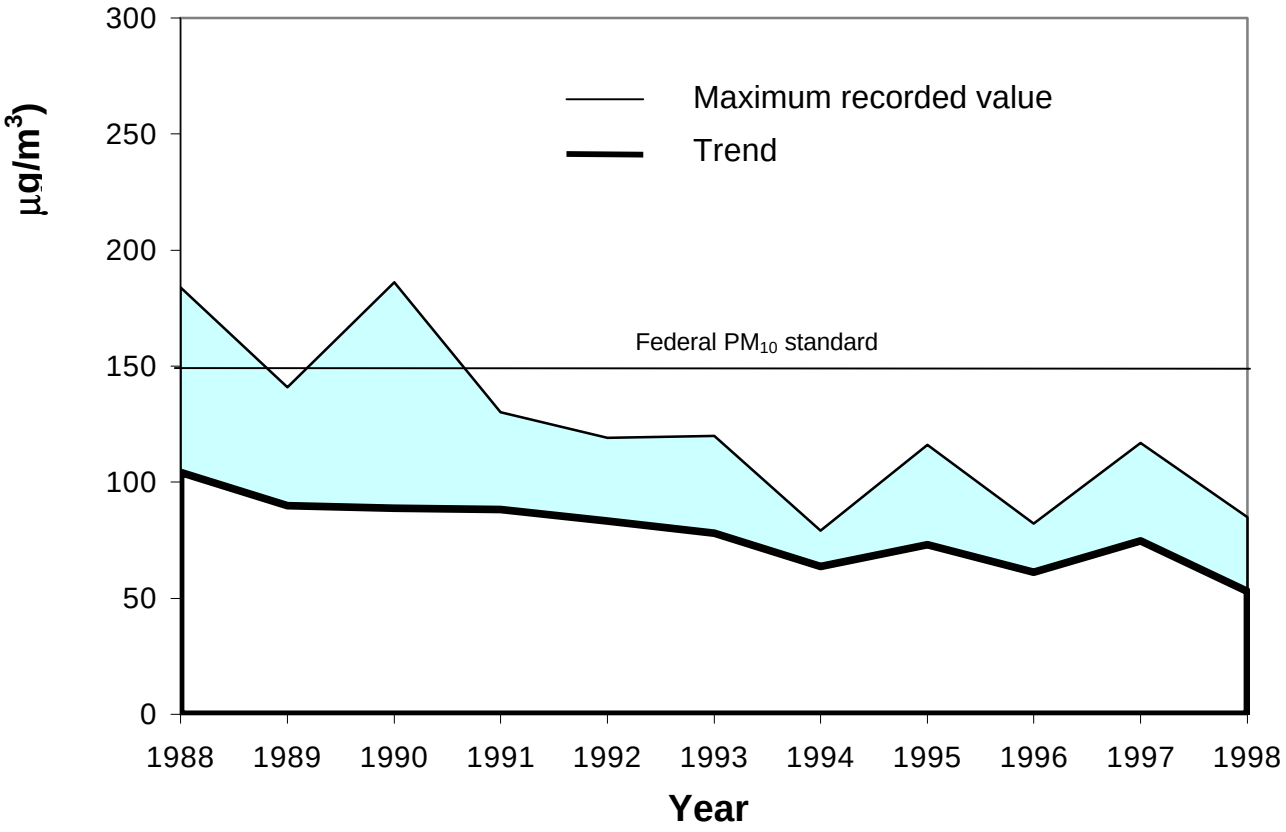


Note:
The trend line represents the average of the PM_{10} values that fall within the upper five percent of the observations.


Tacoma Tideflats PM10
Number of Observations Above Standard: 1988 - 1998
µg/m3
20
15
10
5
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
Year
Note:
More than one observation above 150 µg/m3 per year is a violation of the federal PM10 standard.

Tacoma Tideflats PM_{10} Trends

PM_{10} Levels: 1988 - 1998



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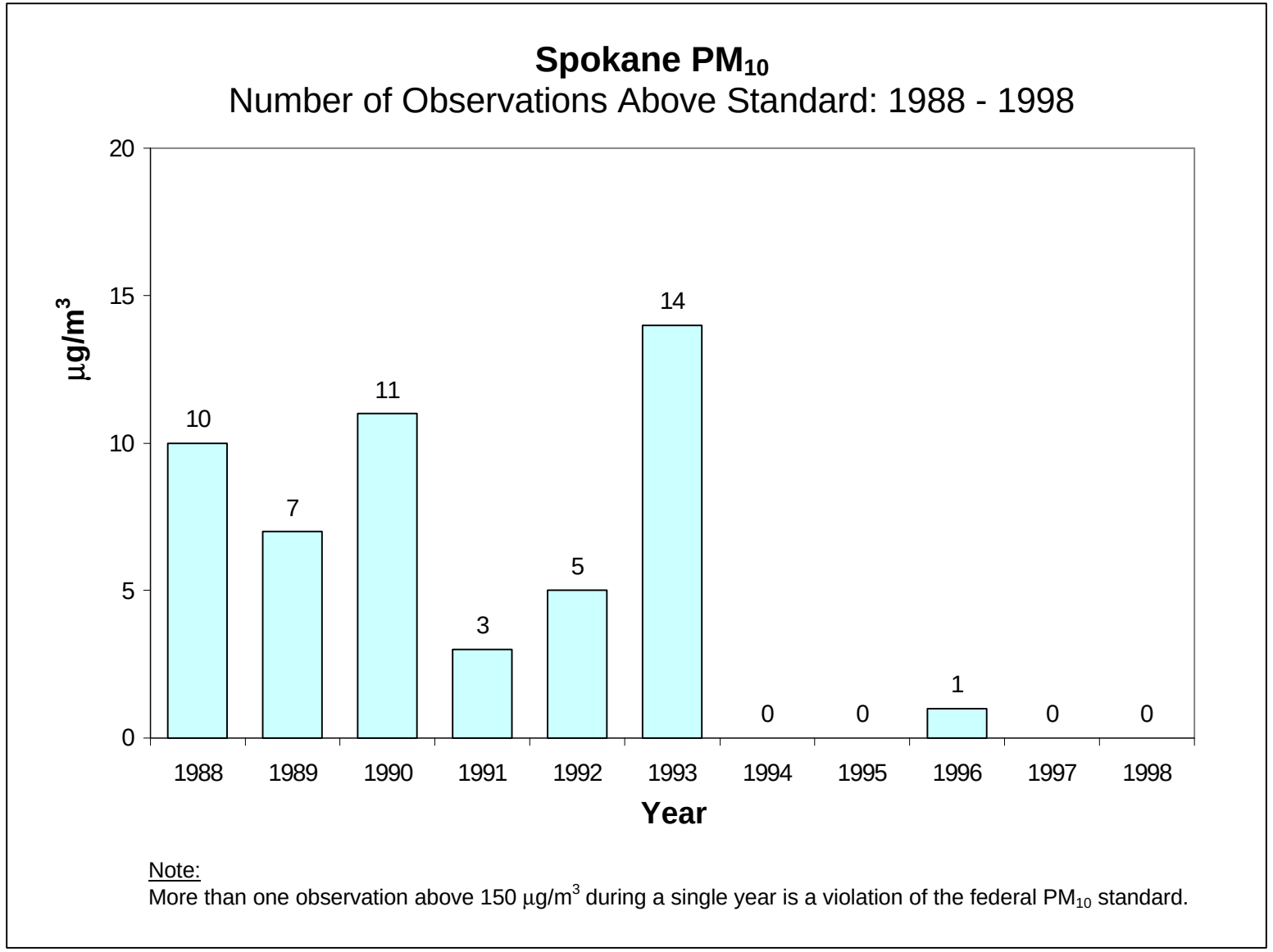

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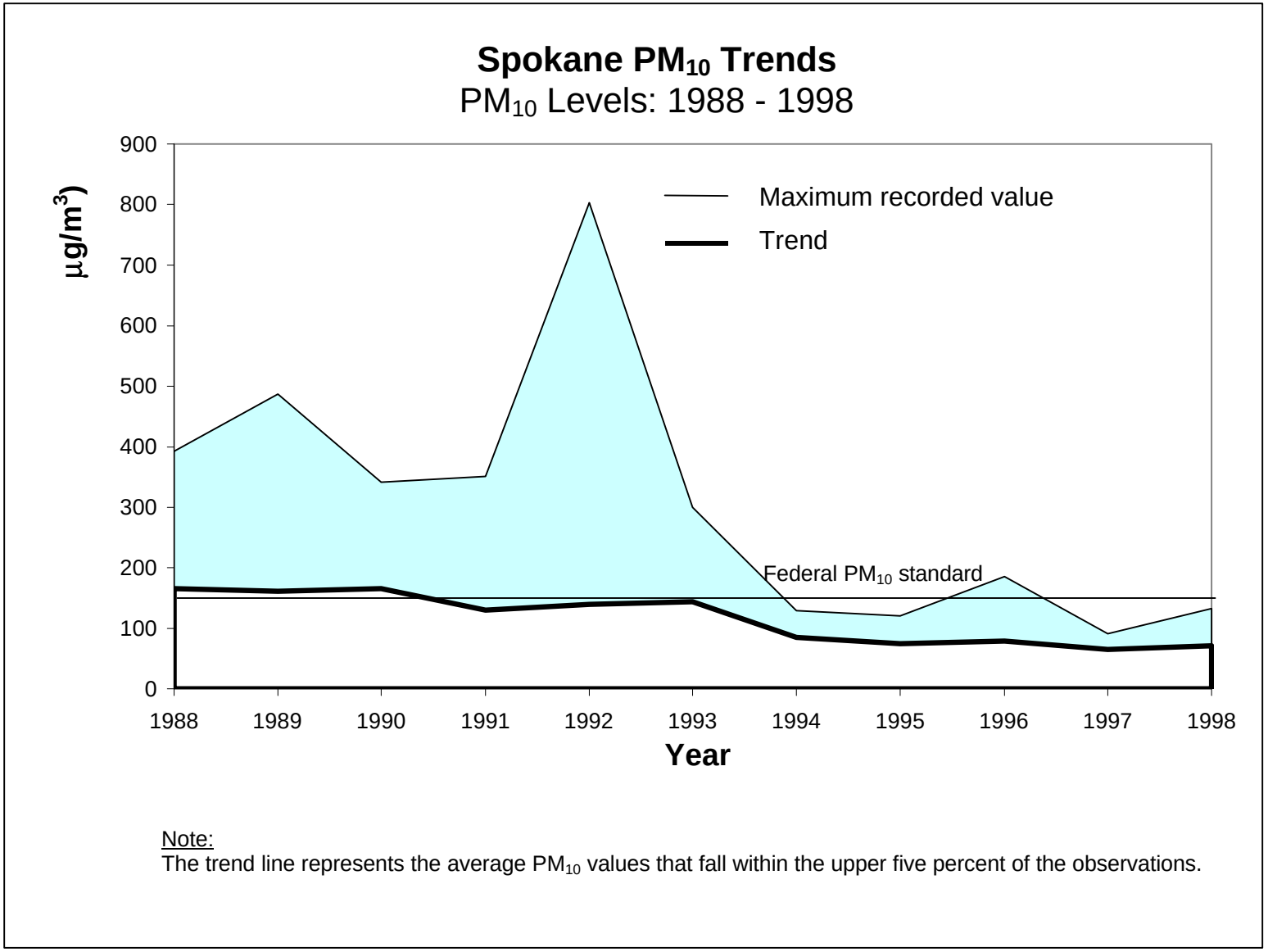

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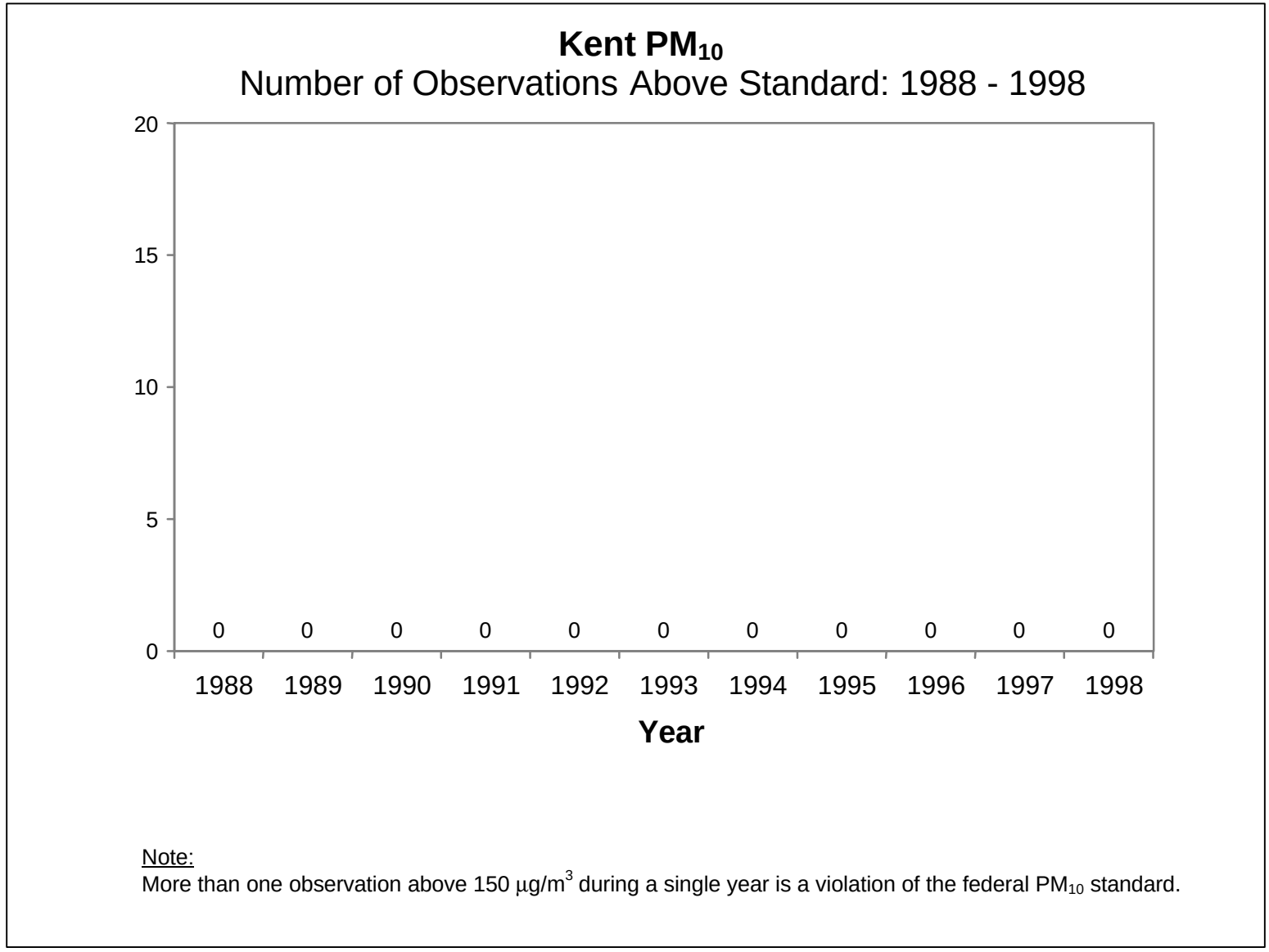

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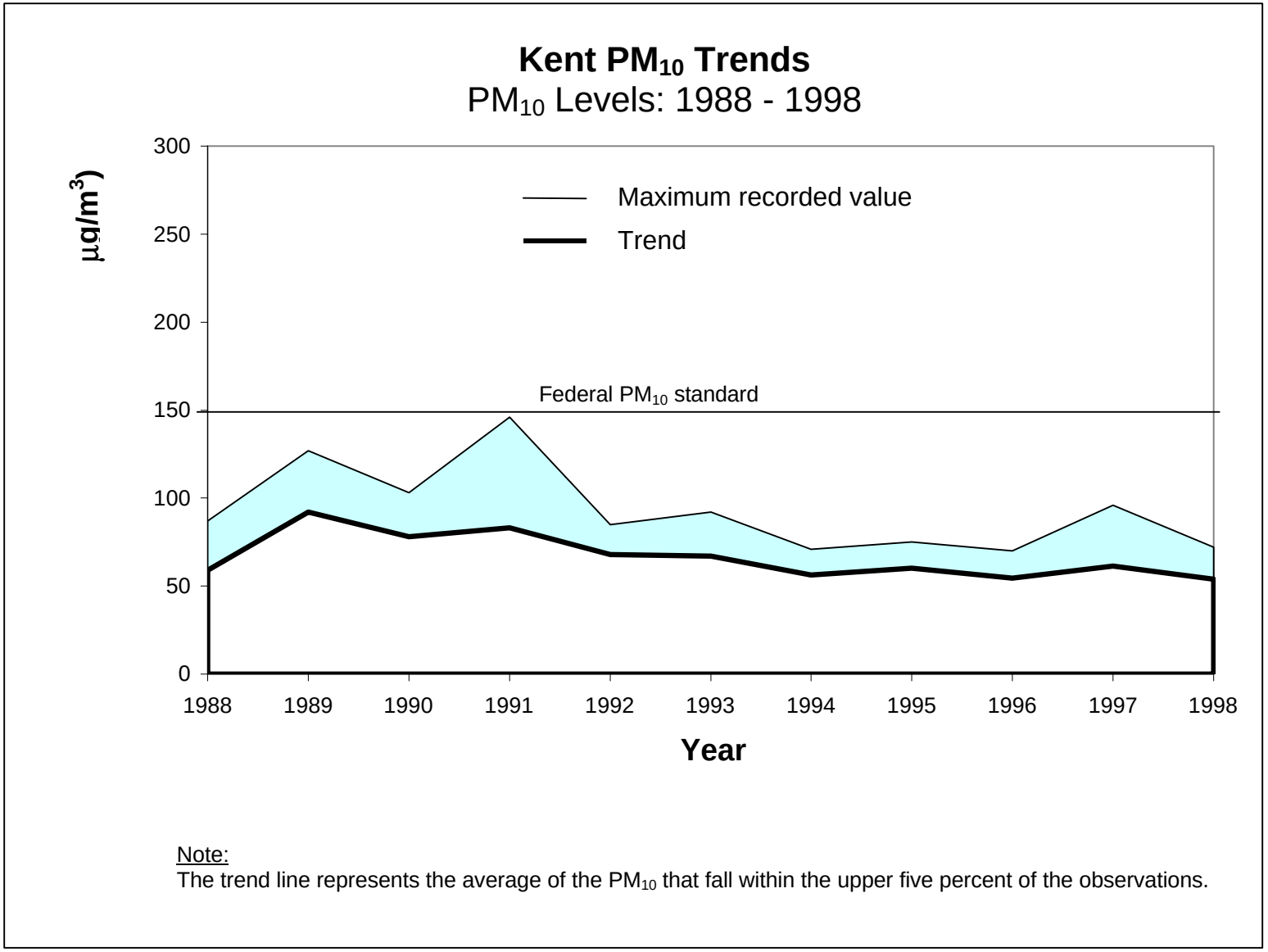
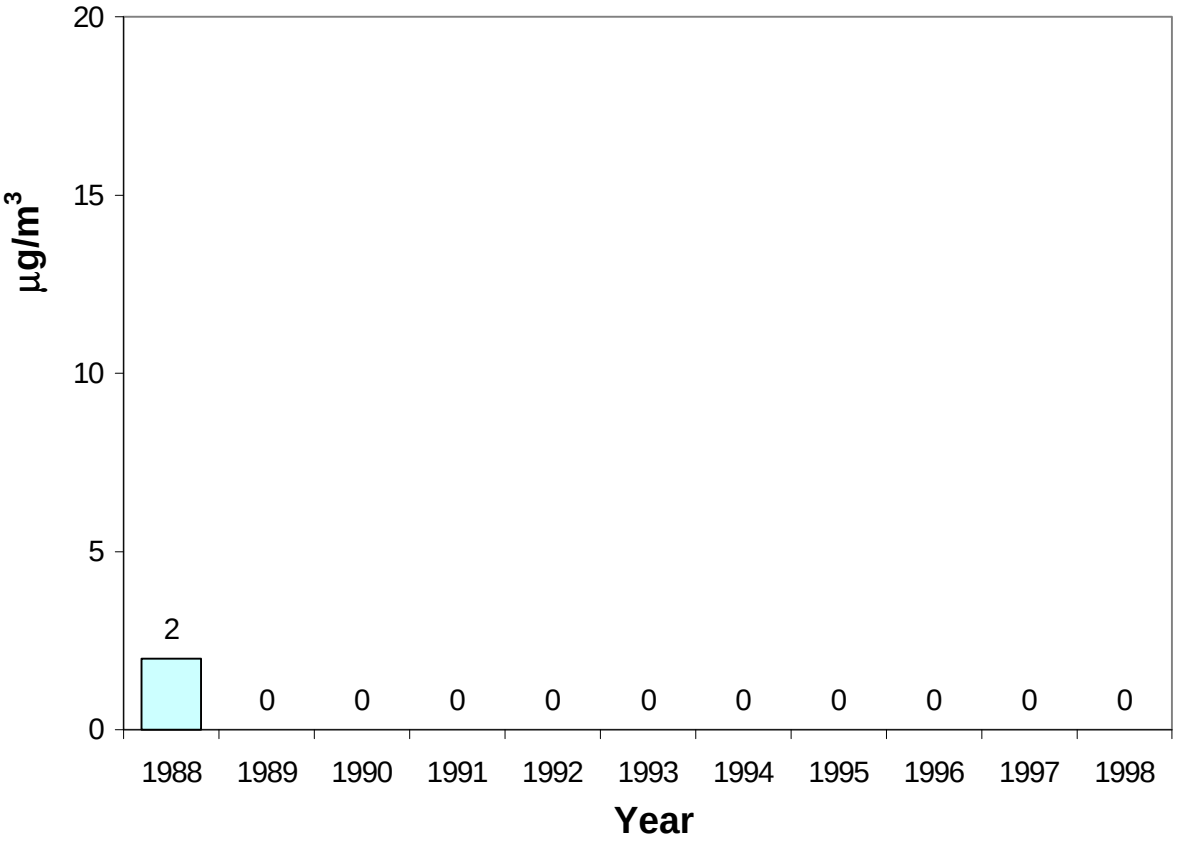


Note:
The trend line represents the average of the PM_{10} that fall within the upper five percent of the observations.

Seattle-Duwamish PM_{10}

Number of Observations Above Standard: 1988 - 1998

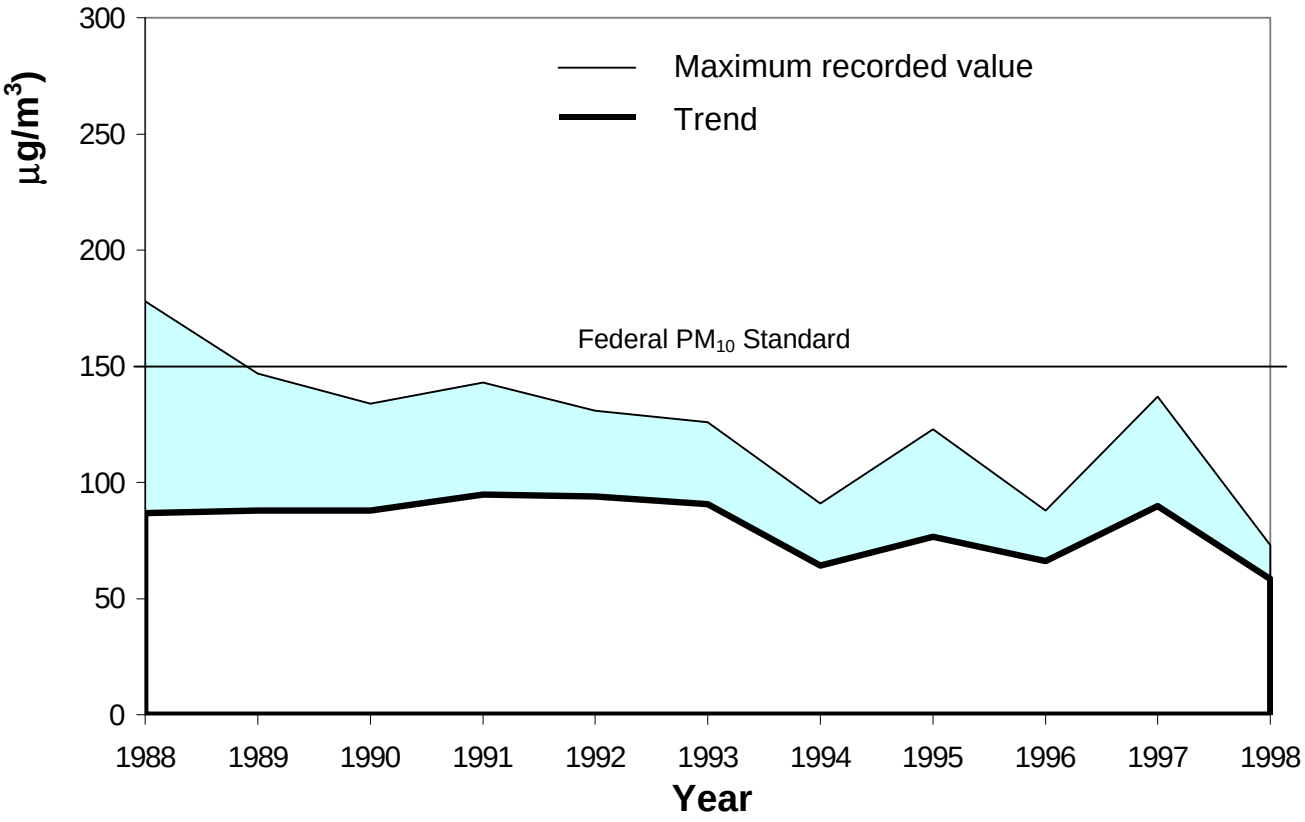


Note:

More than one observation above 150 µg/m^3 during a single year is a violation of the federal PM_{10} standard.

Seattle – Duwamish PM_{10} Trends

PM_{10} Levels: 1988 - 1998



Note:
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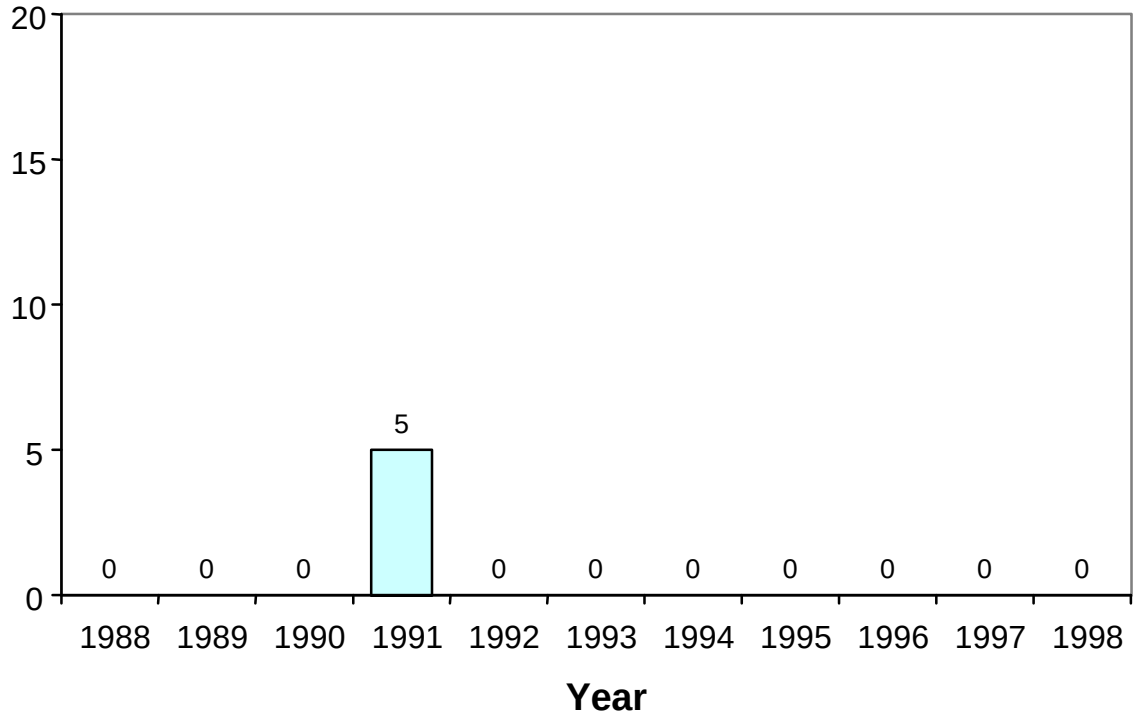
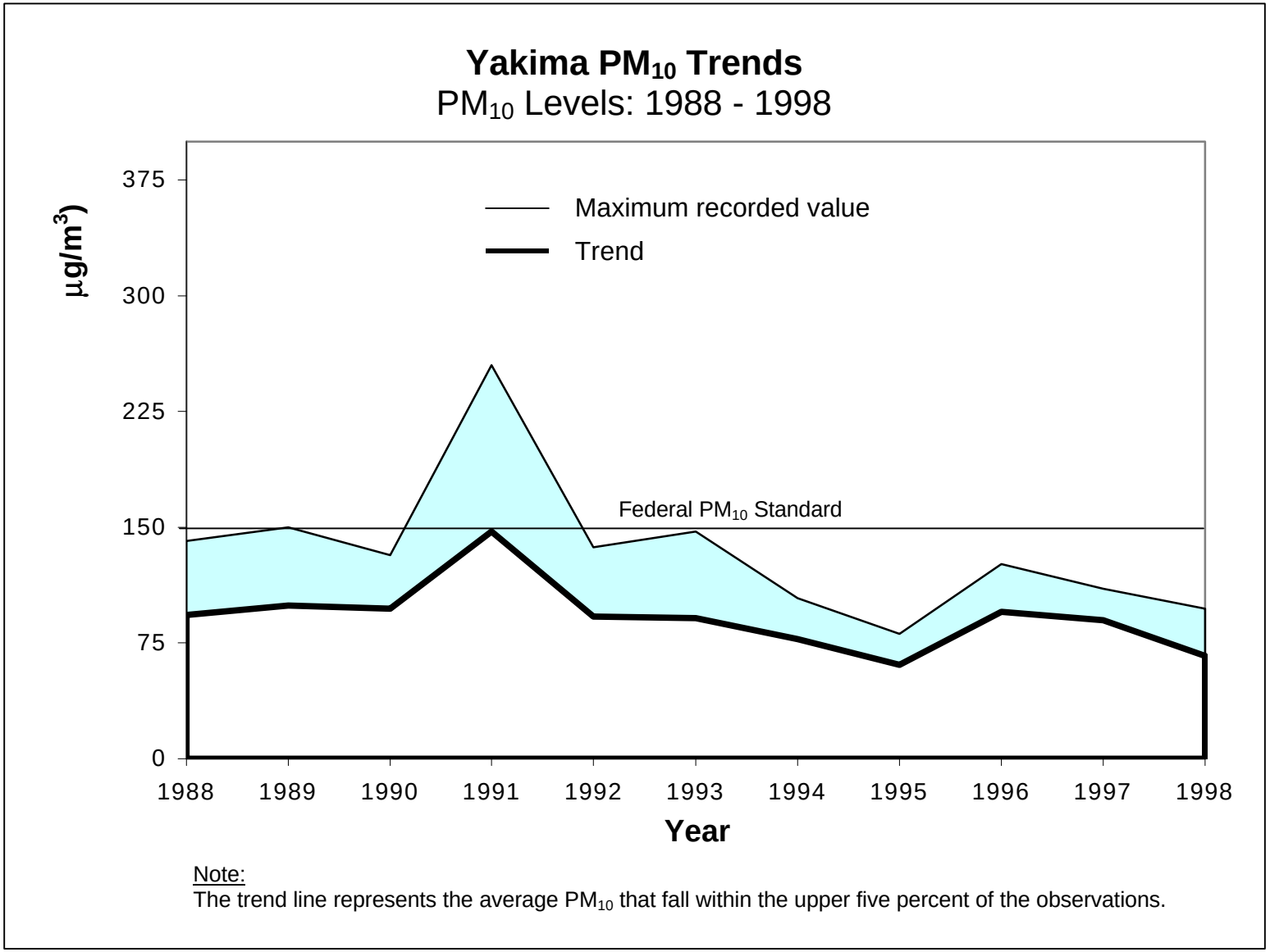
Yakima PM_{10}
Number of Observations Above Standard: 1978 - 1998



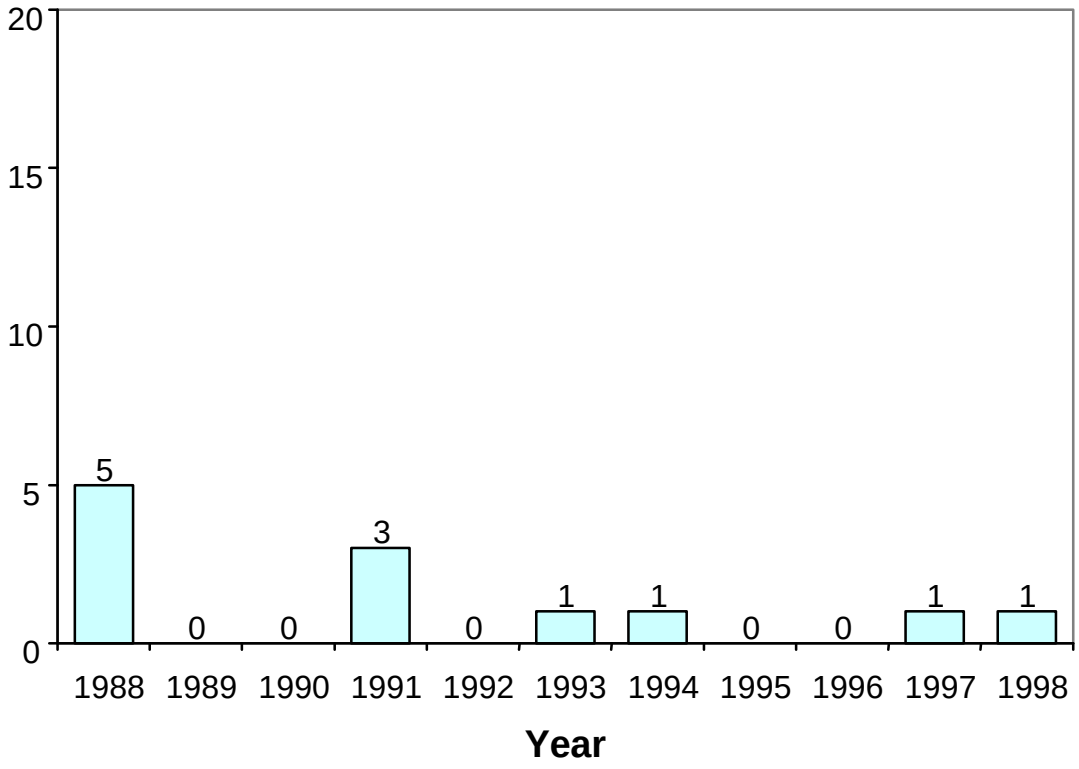
Note:
More than one observation above the 150 μg/m^3 during a single year is a violation of the federal PM_{10} standard.



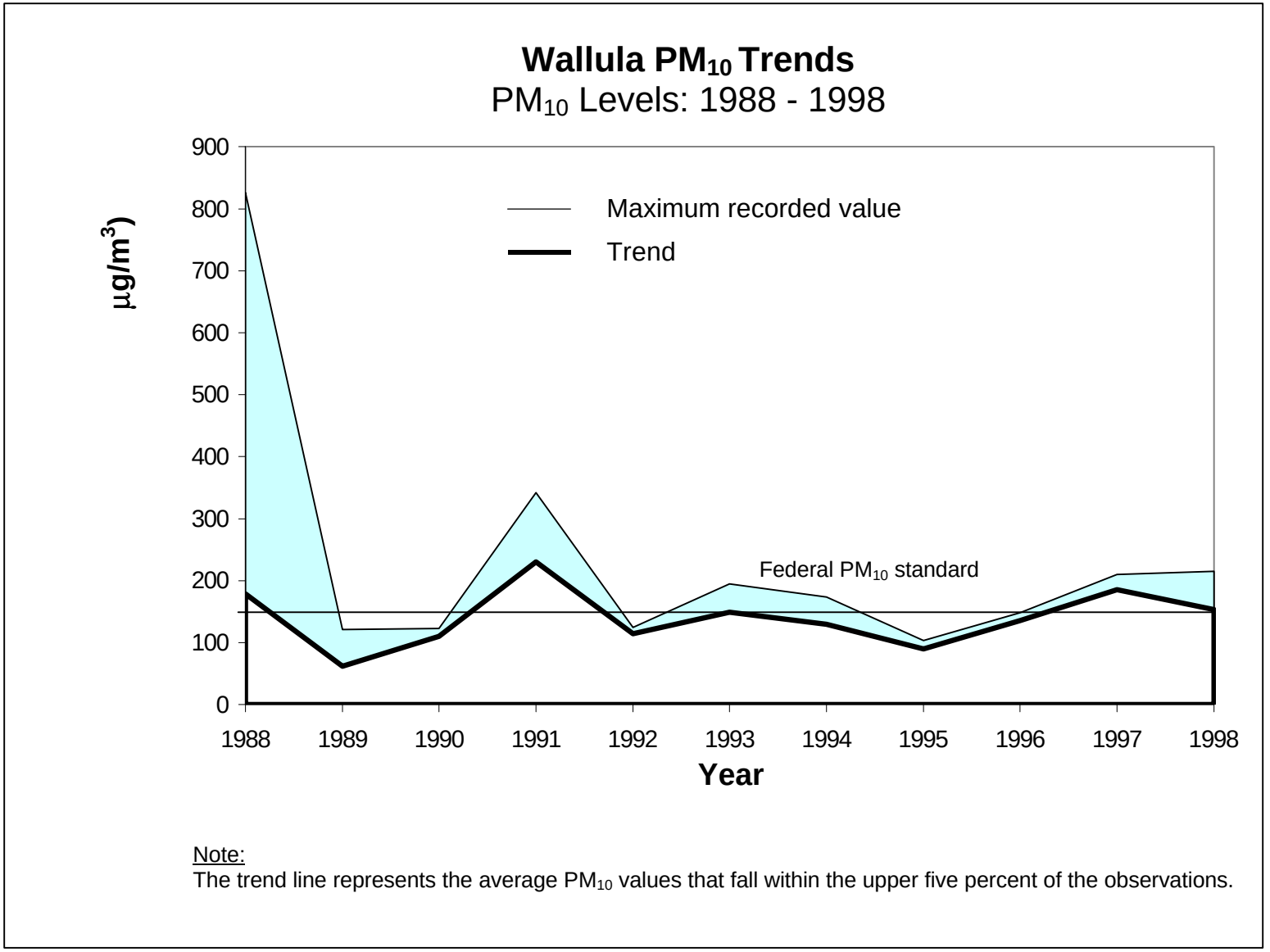
Note:
The trend line represents the average PM_{10} that fall within the upper five percent of the observations.

Wallula PM_{10}

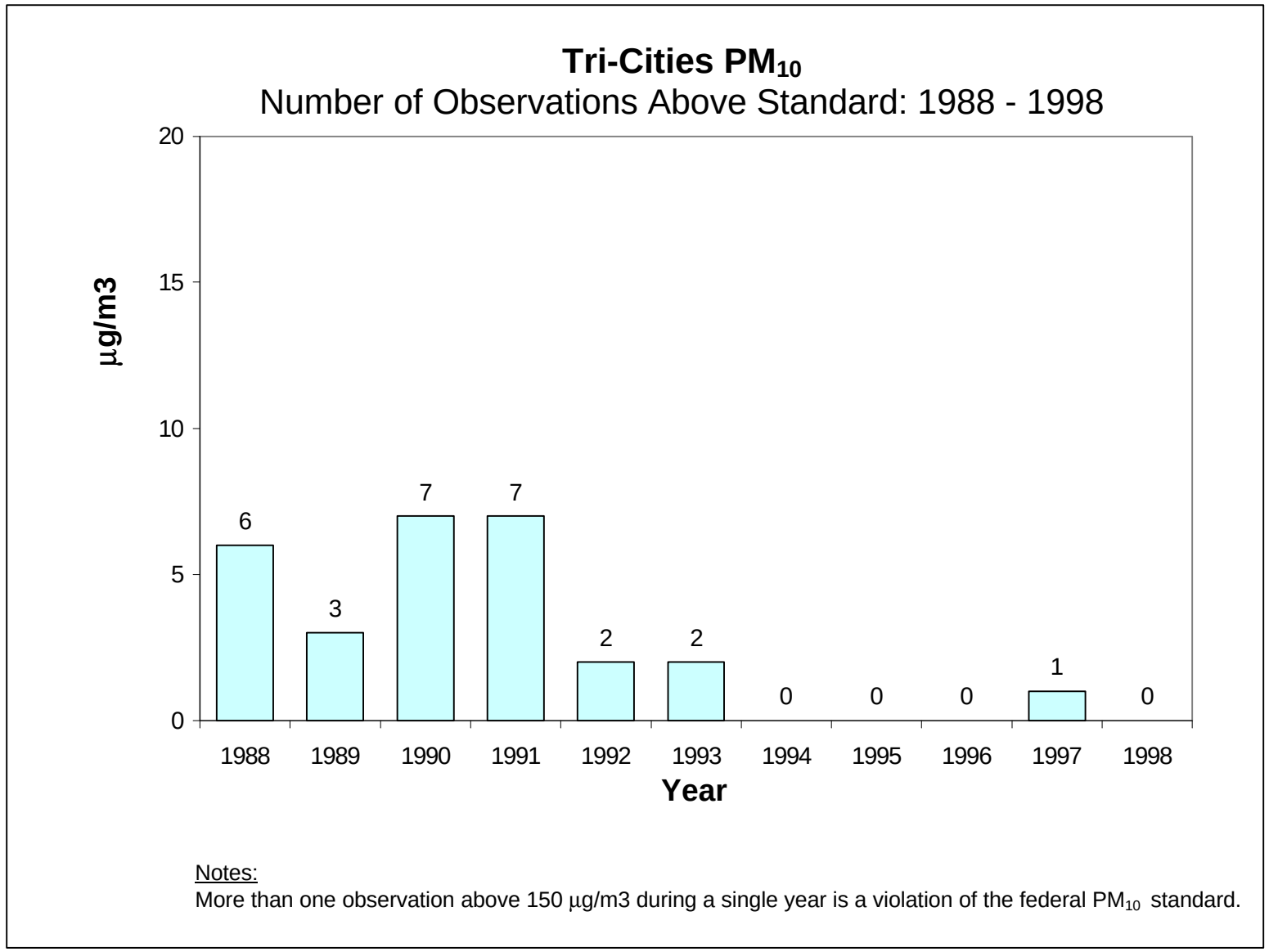
Number of Observations Above Standard: 1988 - 1998



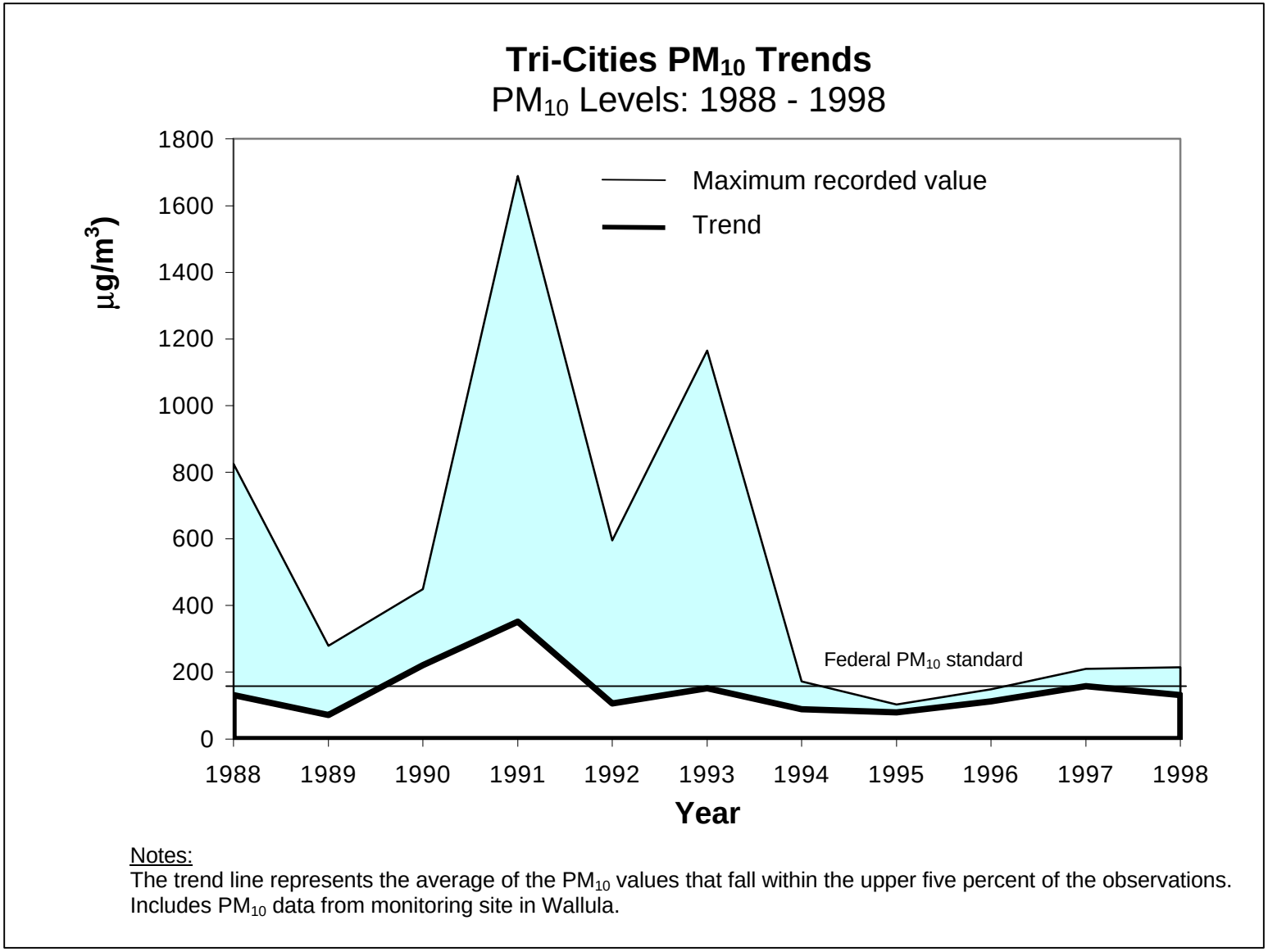
Note:
More than one observation above 150 μg/m^3 during a single year is a violation of the federal PM_{10} standard



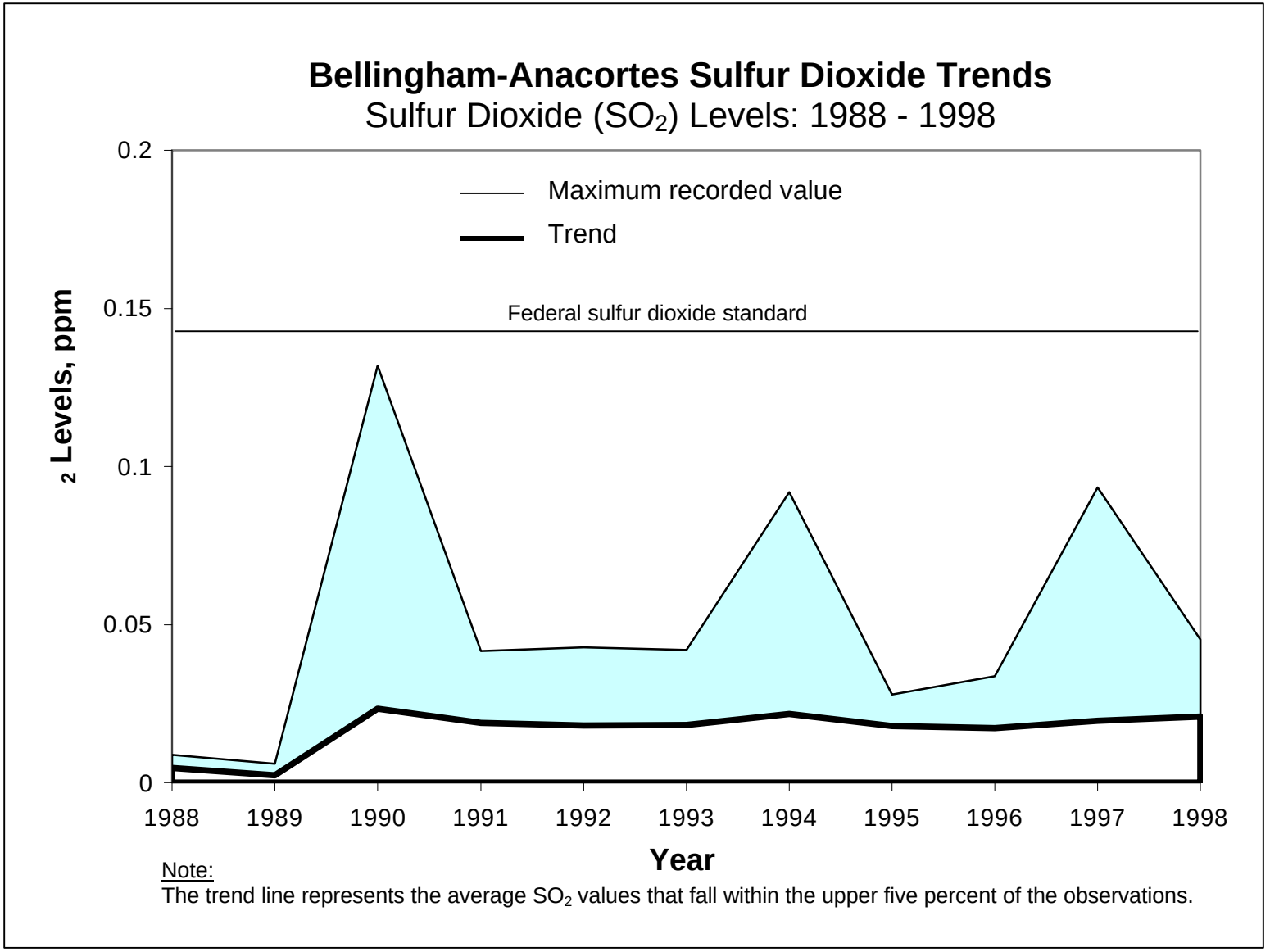
Note:
The trend line represents the average PM_{10} values that fall within the upper five percent of the observations.



Notes:
More than one observation above 150 µg/m3 during a single year is a violation of the federal PM_{10} standard.

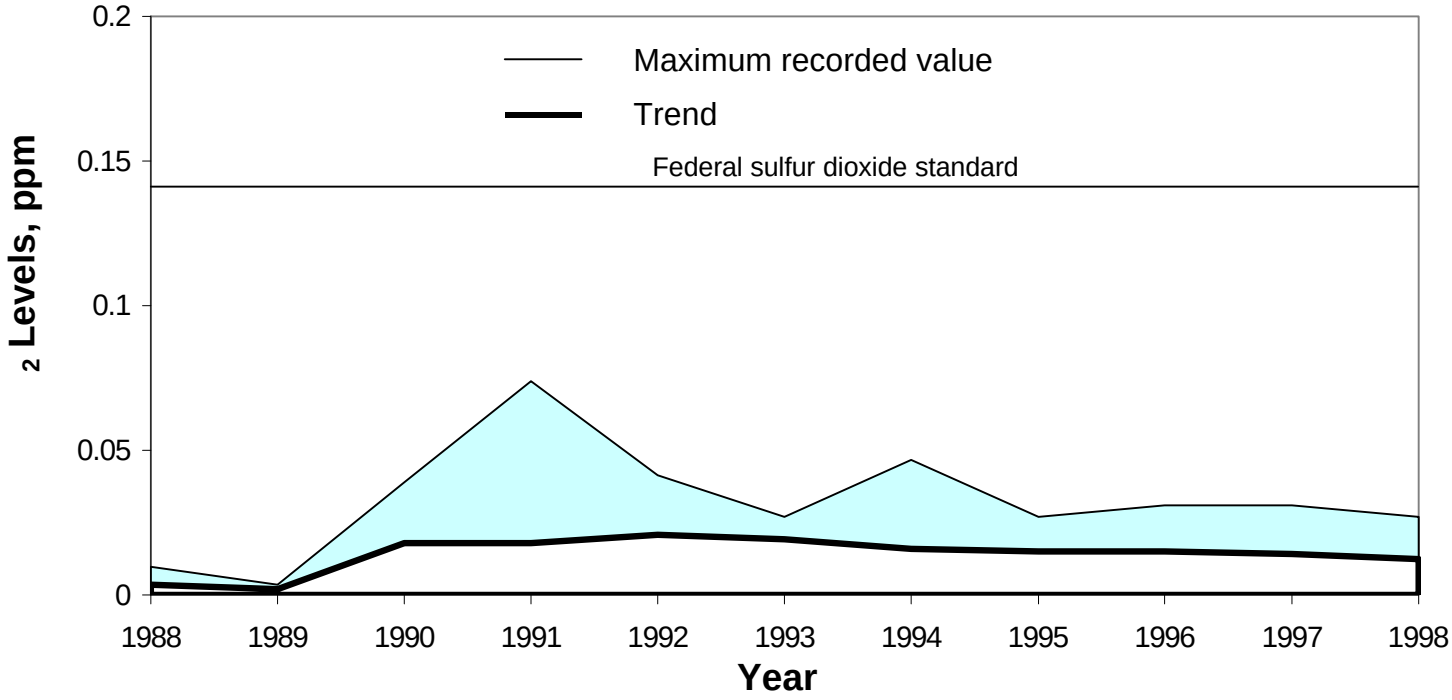


Notes:
The trend line represents the average of the PM_{10} values that fall within the upper five percent of the observations.
Includes PM_{10} data from monitoring site in Wallula.

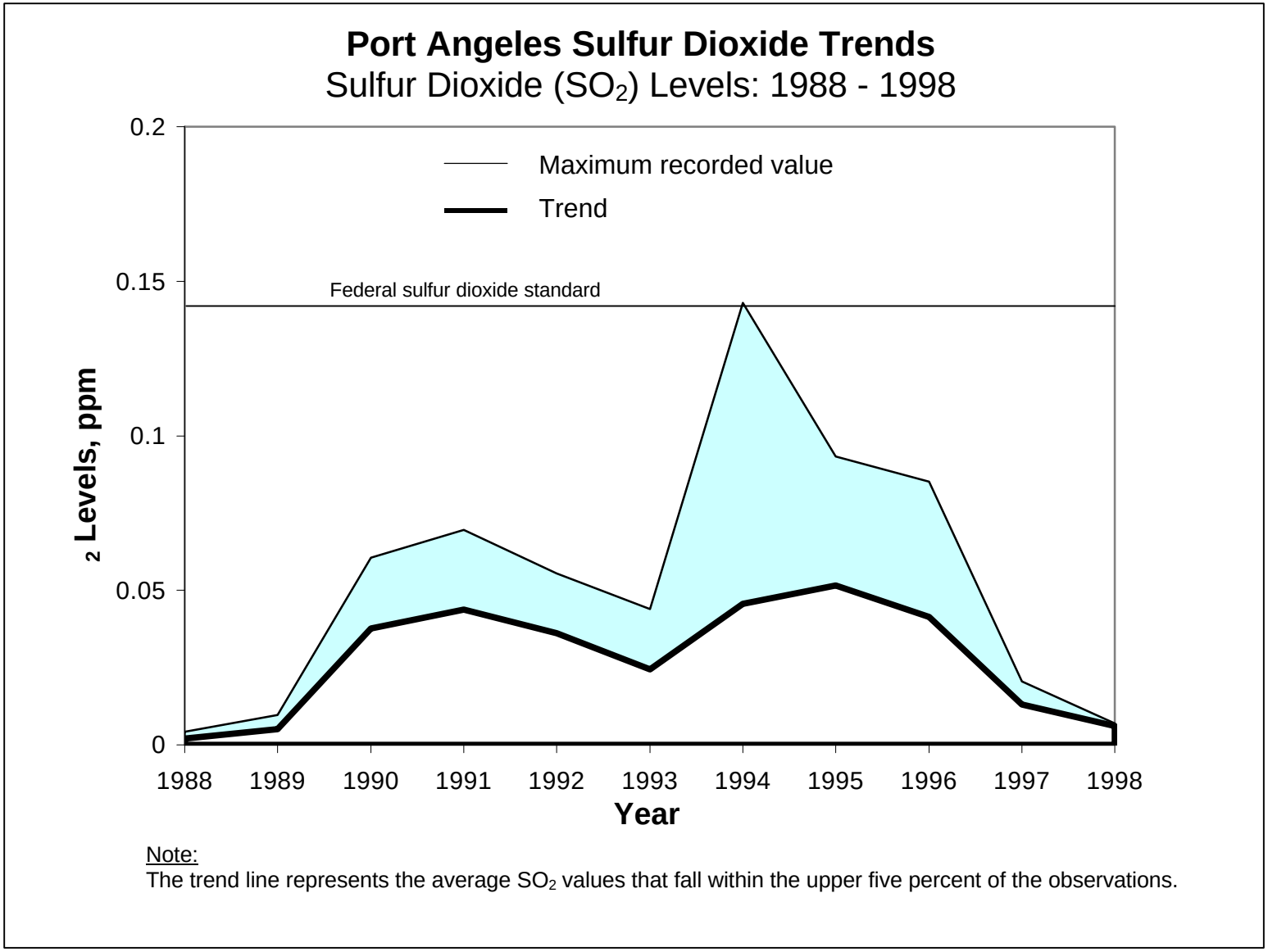

Bellingham-Anacortes Sulfur Dioxide Trends
Sulfur Dioxide (SO_2) Levels: 1988 - 1998
Maximum recorded value
Trend
Federal sulfur dioxide standard
$_2$ Levels, ppm
0.2
0.15
0.1
0.05
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
Year
Note:
The trend line represents the average SO_2 values that fall within the upper five percent of the observations.

Seattle-Tacoma Sulfur Dioxide Trends

Sulfur Dioxide (SO_2) Levels: 1988 - 1998



Note:
The trend line represents the average SO_2 values that fall within the upper five percent of the observations.



Note:
The trend line represents the average SO_2 values that fall within the upper five percent of the observations.

1998 Highlights

Implementing the New Particulate Matter Standard

During 1998, Ecology designed a monitoring network for the new federal air quality standard for particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$). (EPA issued this new standard, along with a new standard for ozone, in 1997.) Ecology's network is comprised of about 30 sites covering the most densely populated areas of the state. The network will be phased in over two years to match availability of federal funding. EPA approved the network design in July 1998 and provided funding for the first phase of the network. Ecology purchased monitors and installed monitoring stations, and is now in the process of testing the equipment. Data collection will begin January 1, 1999. As a part of the $PM_{2.5}$ program, Ecology and EPA cooperatively funded the construction of a new weighing room for $PM_{2.5}$ filters to be used by both agencies.

The new standard limits $PM_{2.5}$ to 65 micrograms per cubic meter of air ($\mu g/m^3$), averaged over 24 hours; and 15 $\mu g/m^3$ averaged over a calendar year. Violations of the standard will be based on an average of three years of data.

The stricter standard is expected to better protect human health. The standard was changed in response to research findings that particulate matter is harmful to human health at levels previously considered safe.

Limiting Emissions of Toxic Air Pollutants

Toxic air pollutants are known to cause specific, long-term health effects such as cancer, nerve damage, and reproductive defects. Because some of them also have the physical properties of being volatile organic compounds or fine particulate matter, there is some overlap between toxic air pollutants and the criteria pollutants for which EPA sets standards. The regulations and controls that limit people's exposure to criteria pollutants also reduce exposure to these toxic pollutants. However, setting health-based standards for exposure to toxic air pollutants and monitoring their presence in the air effectively is both expensive and difficult. This is due to the lack of a good understanding of where they come from, their concentrations in the air, and their effects in combination with each other. As a result, instead of having federal standards for these pollutants similar to those for the criteria pollutants, both state and federal regulations set standards for control technologies to limit their emissions.

During 1998, Ecology worked with EPA to implement existing federal standards for Maximum Achievable Control Technology (MACT) at industrial sources of toxic air pollutants. We also worked with EPA to develop new MACT standards as needed. Ecology received formal delegation from EPA to implement programs to reduce source emissions. Under state law, we are developing Reasonably Available Control Technology (RACT) standards for existing sources of both toxic and criteria air pollutants. Examples include RACT for wood-fired boilers and aluminum smelters.

Also during 1998, Ecology revised and updated its methodology for estimating emissions from point sources with the intent of learning more about what is in the air and how it gets there. We analyzed existing air toxics emissions inventory data to see what might be missing and how the inventory could be improved. We are also working with EPA on a number of national-level initiatives to ensure that we can use them to complement the way Washington regulates toxic air pollutants.

Although it is difficult to quantify the environmental outcomes of these measures, we know that as sources of air pollution control their emissions better, levels of pollution in the air should decrease. As our understanding of where toxics come from and where we should check for high levels continues to improve, air quality will benefit.

Improving Visibility Protection

Washington's State Implementation Plan for air quality contains provisions for protecting and enhancing visibility in the state's mandatory Class I areas. Class 1 areas are shown in the map on the following page.

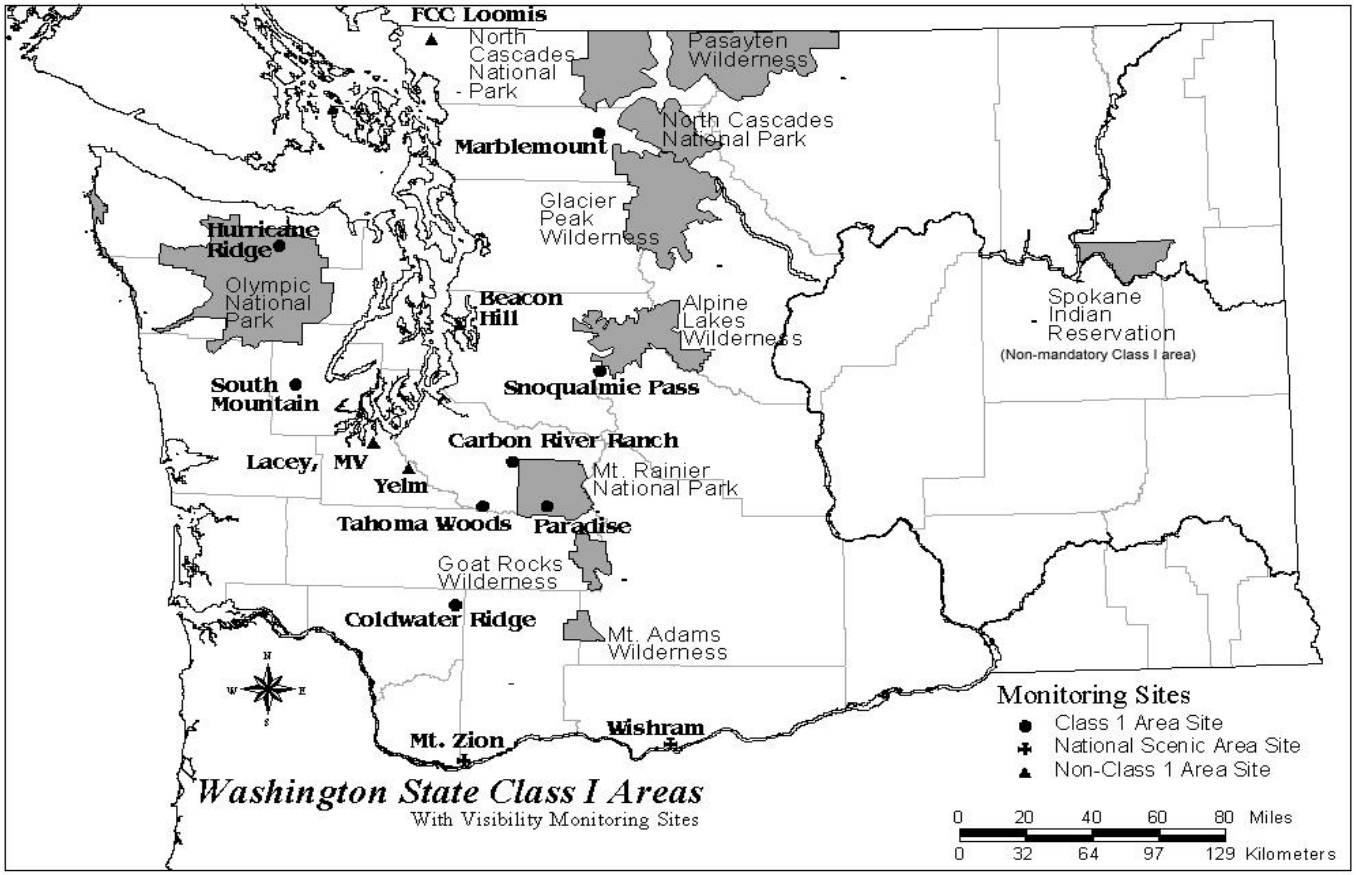
One of the plan's requirements is for Ecology to conduct periodic reviews of the state's strategy for protecting visibility to demonstrate if reasonable progress is being made. In the state's last review, the technical protocol used to evaluate and demonstrate progress on visibility was the subject of substantial controversy. A team consisting of staff from Ecology, EPA, and state and federal land managers met on a periodic basis throughout the review process to discuss analysis requirements and other related issues. However, the team was unable to formalize an agreement on a technical analysis protocol, and progress on visibility could not be evaluated.

During 1998, Ecology began another review of the visibility strategy, which will be completed by May 1999. To avoid the problems of the last review, staff from Ecology, EPA, and the federal land managers have joined in a series of meetings to reach agreement on the types of analysis and methodologies that will be used for this review. As a result of these meetings, a technical analysis protocol (or TAP) was developed before beginning any of the technical work for the review.

The TAP spells out how Ecology will use monitoring and emission data to: (1) determine best, median, and worst-case visibility in Class I areas; (2) determine the sources whose emissions are causing visibility problems and where they are located; (3) determine past trends in these sources; and (4) make emission trend projections for these sources.

This technical analysis will help Ecology determine if additional emission reductions are needed to meet the state's goals for protecting visibility. It will also help determine what sources may need additional controls on their emissions. If additional emission reductions are needed to protect visibility, Ecology will revise the strategies in the State Implementation Plan.

Visibility Monitoring Sites



Mount Rainier Air Quality Monitoring Site and Display

One of the most famous icons for visibility in our state is Mount Rainier. In fact, many western Washington residents judge the cleanliness of the air by how clearly they can see the mountain. The fact that so many people are both fascinated by and concerned about the mountain and the surrounding Mount Rainier National Park provides an excellent opportunity to inform and educate them about visibility problems and their role in preventing them.

In 1998, Ecology's Air Quality Program, Mount Rainier National Park, the Puget Sound Air Pollution Control Agency, and the Pierce County Air Quality Committee worked in partnership to create an air quality display for the Jackson Visitor Center at Paradise in Mount Rainier National Park. The interpretive display includes information on visibility, ozone pollution and its sources, and solutions to the problem. Ozone and visibility monitoring equipment was moved into the Jackson Visitor Center and the display was installed during the summer of 1998. Visitors can now observe continuous monitoring of ozone and visibility, and read about air quality issues in the Park.

The goal of the agencies involved is to increase awareness of the ways each individual contributes to air pollution throughout Washington, and particularly in Mount Rainer National Park. The display's new location gives us the opportunity to reach nearly two million visitors to the Park each year with messages about air pollution prevention.

Making the Emission Check Program Better

Recommended Changes to the Emission Check Program

Ecology staff evaluated the motor vehicle Emission Check Program during 1997 and part of 1998. The goal of the evaluation was to identify how to improve customer service while ensuring that needed emission reductions from motor vehicles will still be achieved. Teams evaluated the program and recommended options for program changes in the areas of selecting vehicles for testing; inspection fees; testing procedures and standards; vehicle repairs; customer service; compliance; and contractor performance.

In 1998, as a result of the evaluation findings, staff developed a preferred package of program changes. The main changes proposed in this package are:

- Eliminate testing of vehicles less than five and more than 25 years old. This change would reduce by number of motorists needing to test their vehicles by 21 percent; however, it would also result in a six percent loss in air quality benefits from the Emission Check Program.
- Require testing of used vehicles sold by dealers within Emission Check Program areas. This change would offset the loss in air quality benefits from exempting older and newer vehicles.
- Pay for testing when renewing a vehicle license, rather than paying cash at the time of the emission check. This would be more convenient for vehicle owners and speed up the testing process, while reducing cash handling and security issues at the test stations. (This proposal was subsequently dropped.)

Ecology staff presented the proposed changes to affected local air quality agencies, the Department of Licensing, Auto Dealers Association, Automotive Service Association, and other interested groups, as well as to focus groups in Clark, Pierce, and King counties.

Ecology will recommend to the legislature in January 1999 that the three main elements of the package be made legislative changes to the Emission Check Program. A complete report on the evaluation, options for changes to the program, and recommended changes is available from the Air Quality Program, (360) 407-6830; or on our web site at http://www.wa.gov/ecology/air/airhome.html.

Car Care Education

Based on a recommendation in the Emission Check Program Evaluation Report, Ecology staff designed classes to educate employees of Pierce County businesses and universities about car maintenance and how it benefits air quality. Classes and courtesy vehicle inspections were conducted in October, November, and December 1998. Instructed by Emission Check Program staff, the classes included information on oil recycling, basic car maintenance, working with a repair technician, and ways to reduce commute trips made in single occupant vehicles. The courtesy vehicle testing was done at employee work sites, and included both an emission check and a gas cap check.

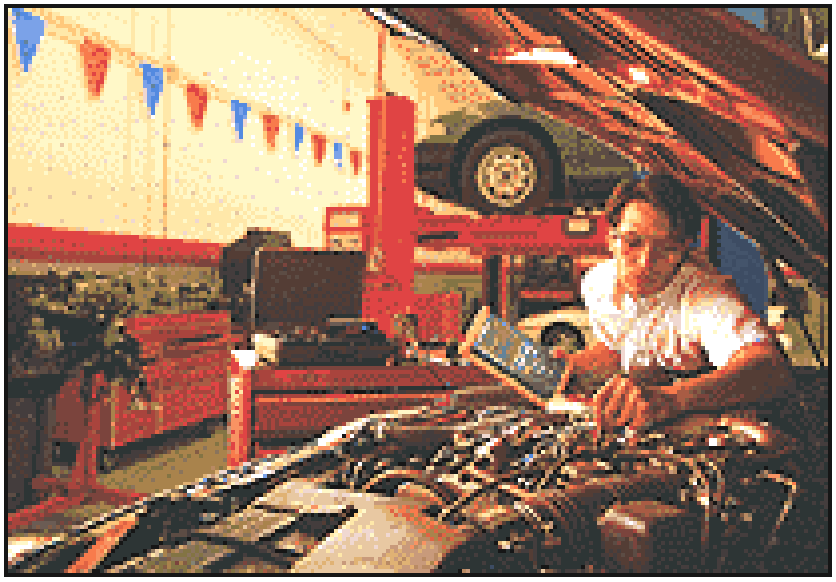
The purposes of the project were to increase awareness of how car maintenance prevents pollution; develop partnerships between Ecology, businesses, and the community with the goal of improving air quality; provide education about pollution prevention to commuters from outside the emission testing area who are not required to participate in the Emission Check Program; and improve customer relations with those who must have their vehicles tested.

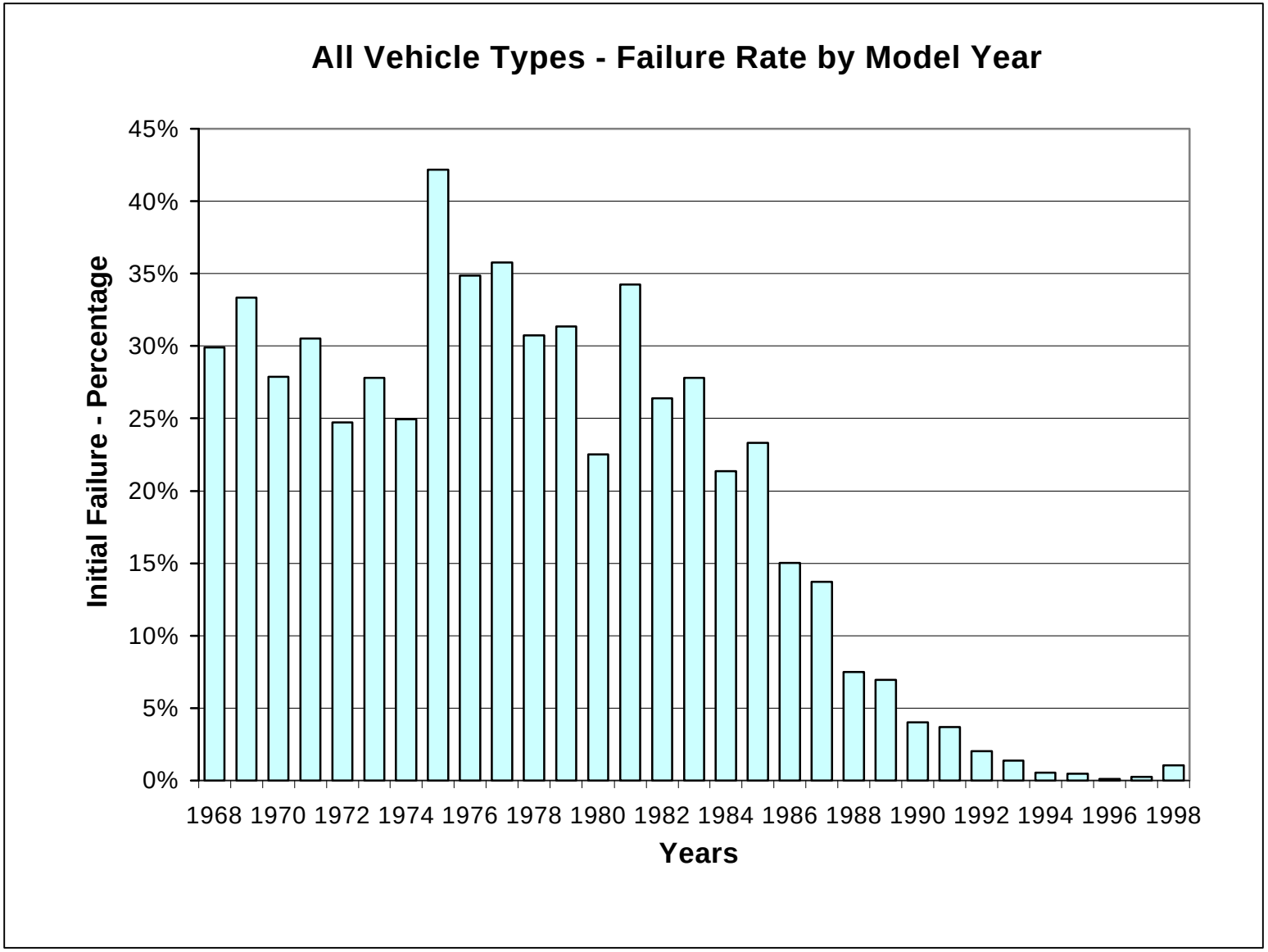
Car Repair Assistance for Low Income Motorists

Low income vehicle owners in emission test areas whose cars fail an emission check may not be able to afford the repairs needed for their cars to pass the test. In Clark County, a team made up of staff from Ecology, Southwest Washington Pollution Control Authority, Clark County Department of Community Services, the Salvation Army, and a project consultant worked together on a pilot project to resolve this issue. The local automotive repair industry was also an active participant. The project began in August 1997 and continued into the spring of 1998.

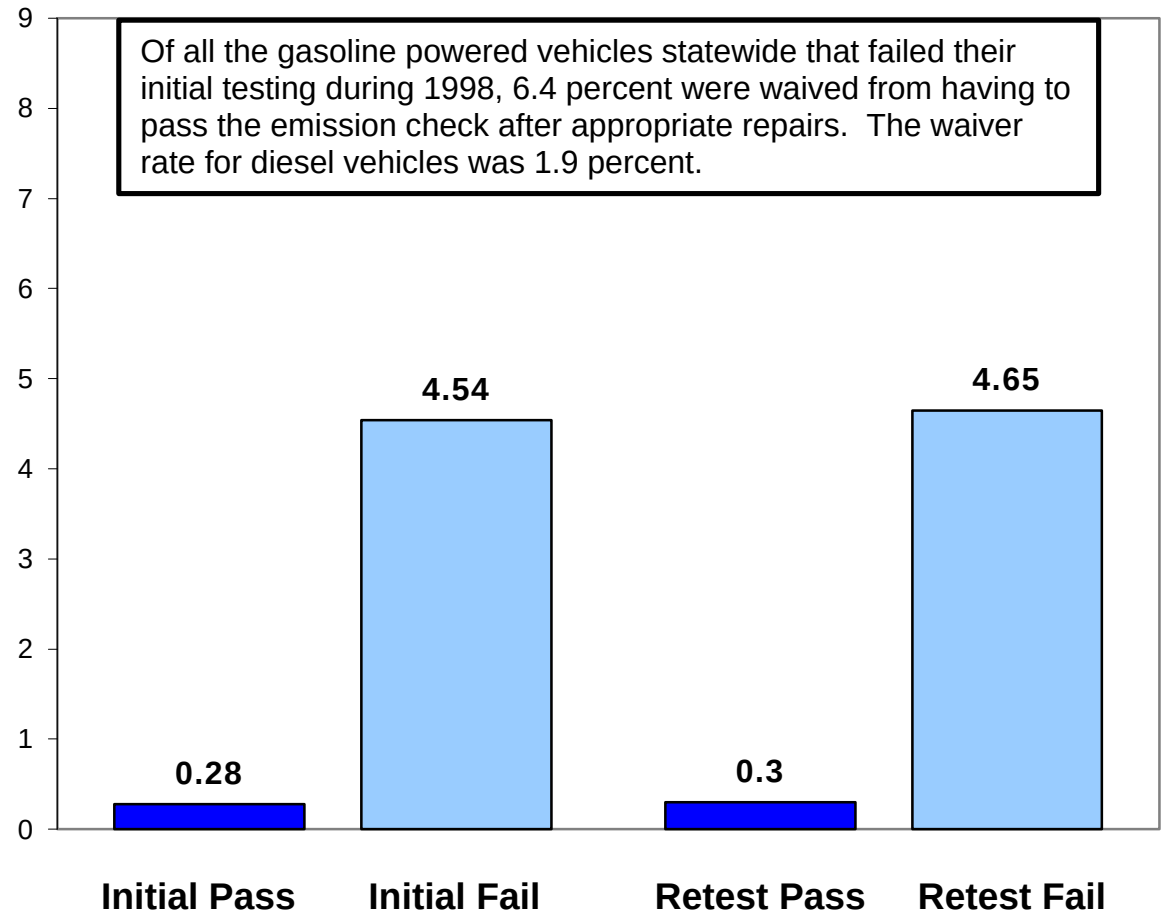
The Salvation Army screened project applicants and arranged for up to $450 in repairs for eligible vehicle owners. The owners could select a repair shop from a list of participating shops and were provided a voucher for the repairs needed.

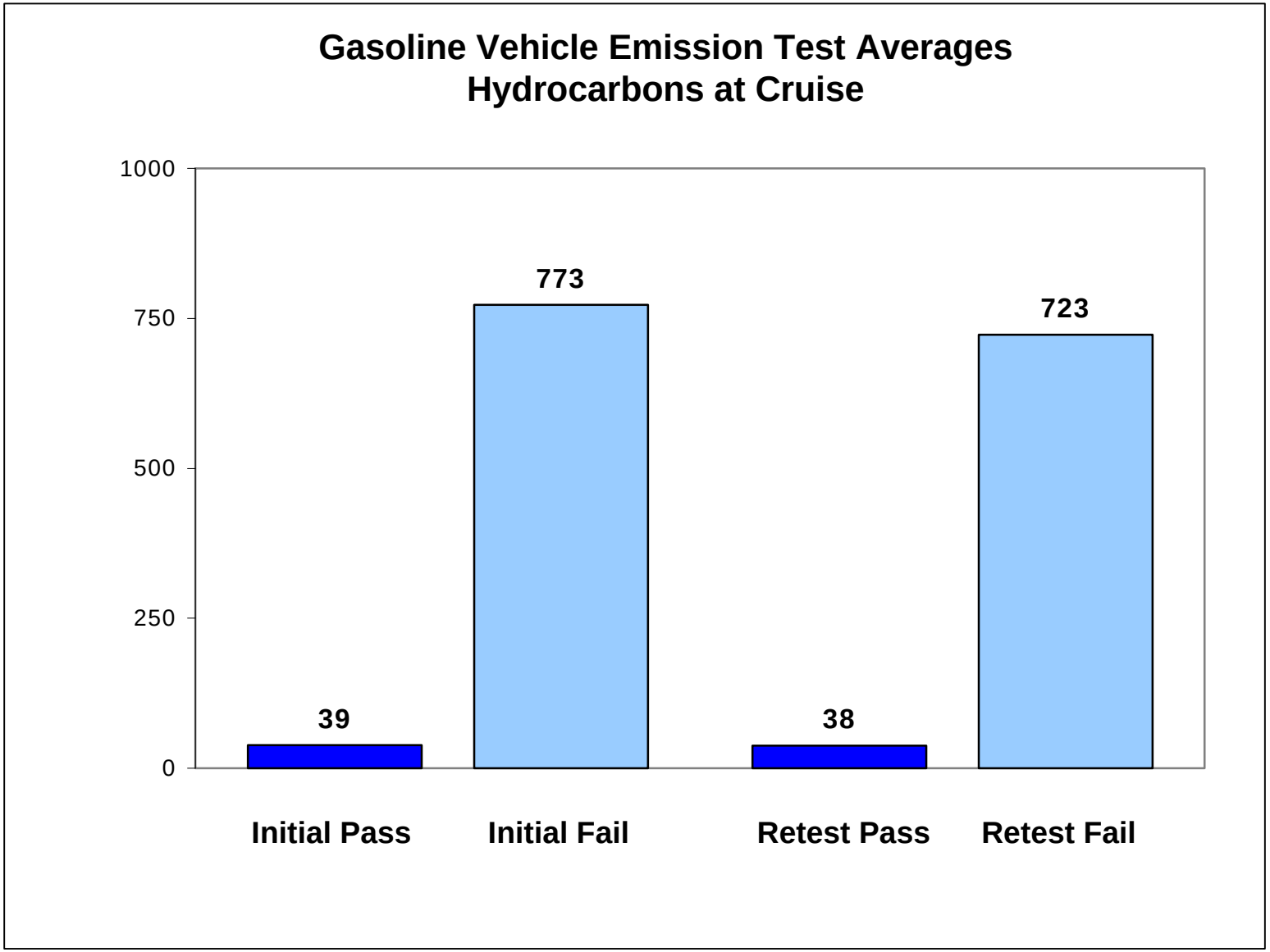
As a result of this project, in addition to preventing a financial burden on individuals and families, the repairs made to vehicles achieved significant reductions in hydrocarbon and carbon monoxide emissions. Project results indicate that similar programs could probably be successfully implemented in other areas as well.

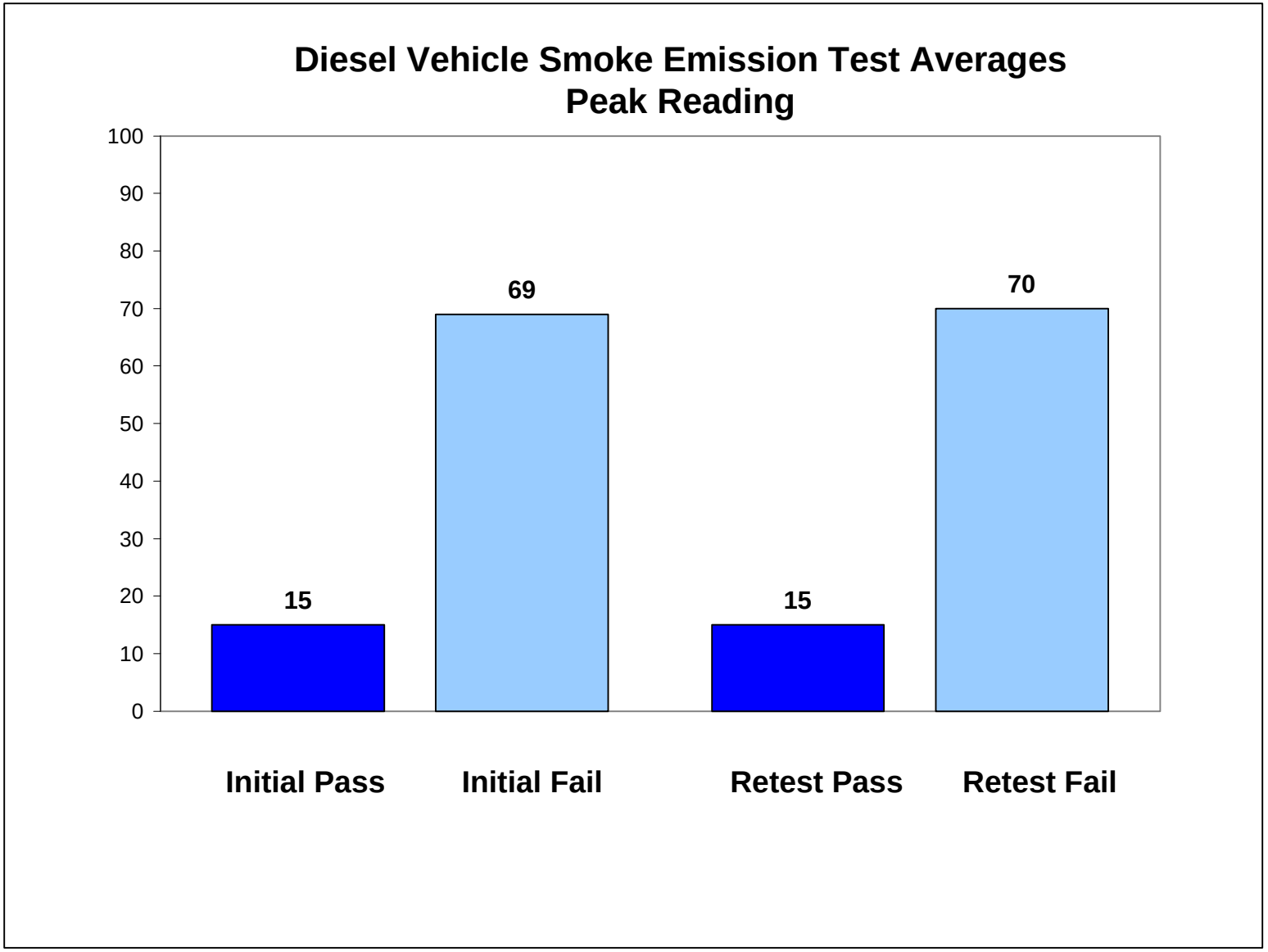



All Vehicle Types - Failure Rate by Model Year
Initial Failure - Percentage
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998
Years

Gasoline Vehicle Emission Test Averages
Carbon Monoxide at Cruise




Gasoline Vehicle Emission Test Averages
Hydrocarbons at Cruise
1000
750
500
250
0
773
723
39
38
Initial Pass
Initial Fail
Retest Pass
Retest Fail


Diesel Vehicle Smoke Emission Test Averages
Peak Reading
100
90
80
70
60
50
40
30
20
10
0
15
69
15
70
Initial Pass
Initial Fail
Retest Pass
Retest Fail

"Un-Jamming" Our Roads

No need to check the cover page to make sure this isn't a Department of Transportation publication – Ecology has a stake in traffic congestion, too. In fact, traffic congestion is at the core of the challenge to maintain good air quality. There are many factors in this relationship: fuel characteristics; engine efficiency; weather conditions; and our own driving behaviors, which are influenced by transportation systems and the types of communities we live in. It is these driving behaviors that can result in traffic congestion. And since motor vehicles are our number one source of air pollution, high concentrations of vehicles on the road all at the same time definitely affects air quality.

Our state's air quality has been improving for a number of years, due in part to reduced motor vehicle emissions, cleaner fuels, and improved efficiency of the transportation system. However, keeping the air clean into the 21st century is only going to get more difficult as population continues to grow and the amount of driving we do grows even faster. Ecology staff participated in a project during 1998 that showed urban land use patterns have a direct and significant impact on travel behavior and vehicle emissions. Reducing the number of vehicles on our roads is key to ensuring we don't lose all the air quality gains we have made. But in a 1997 survey, almost 30 percent of the respondents did not clearly link traffic congestion and highway adequacy to air pollution. To improve public awareness of the link between transportation and the air we breathe, Ecology undertook several activities during 1998:

"Moving Through Cascadia" Symposium: Ecology developed a symposium on the growth in population and traffic in Washington to facilitate partnerships for addressing air quality and other environmental impacts. This symposium has been combined with a workshop on traffic congestion developed by the Washington State Department of Transportation. The combined workshop will be offered in 1999.

"Washington Clean Air Campaign:" Ecology, local air quality agencies, the Washington State Department of Transportation, and others funded public service announcements with the message "Drive a Little Less; Make a Big Difference." Three television, radio, and print ads were distributed during 1998. One of the ads received a 1998 Telly Award, a national award honoring non-network television commercials and non-broadcast video and film production; and a 1997 Summit Creative Award honoring creative excellence for public service television ads.

Ecology also completed an assessment of Washington's transportation conformity program from 1993-1998. (Conformity is an ongoing program that ensures transportation plans, programs, and projects do not worsen air quality.) Transportation plans and programs for 1999-2001 are expected to meet conformity requirements to maintain air quality in Washington's nonattainment and maintenance areas. However, staff foresee increased difficulty in meeting conformity requirements because of continuing population growth and growth in vehicle miles traveled.

Making Federal Rules Work For Us

Sometimes the most effective way to get something done is to use someone else's ideas, rather than reinventing the wheel. Similarly, sometimes the most effective way for a state to manage air pollution is to find a way to make federal programs do the job. It is in a state's best interest to encourage cost-effective national control strategies. Some examples of how this has worked successfully in the past are the elimination of lead as an additive to gasoline, and emission limits on cars and trucks.

The latest federal control strategy to emerge as potentially beneficial to states is the federal standards for motor vehicle emissions and fuel quality. Growth in both population and vehicle miles traveled continue to threaten past improvements in air quality, as well as increase traffic congestion. The Environmental Protection Agency (EPA) has recommended regulatory changes to emissions and fuel standards. The changes are likely to require a combination of low sulfur fuel and more stringent emission standards. The cleaner low sulfur fuel has an immediate impact on emissions for all vehicles; new automotive emissions technology reduces emissions through fleet turnover, as newer vehicles replace older ones. These measures would address the source of the air pollution problem, as well as being cost-effective compared to other alternatives.

Since in most cases the federal Clean Air Act does not allow states to establish their own standards for vehicle emissions and fuels, EPA's regulations will determine the impact of these sources on Washington's air pollution for years to come. Ecology's Air Quality Program has been monitoring the regulations EPA is considering. During 1998, staff used computer modeling to project the impact of motor vehicles on air pollution for the Puget Sound, Spokane, and Vancouver areas through 2010. Using this modeling, staff determined that a combination of cleaner fuels and stricter emission standards is needed to offset increased air pollution resulting from growing population and motor vehicle use. Staff have ensured that Washington's needs will be addressed by providing comments and research studies to EPA; assisting the State and Territorial Air Pollution Prevention Association (STAPPA) and Association of Local Air Pollution Control Officers (ALAPCO) with drafting resolutions on cleaner fuel; encouraging Governor Locke to request that EPA adopt the STAPPA/ALAPCO resolutions; and providing information to the Governor's Office on the benefits of EPA's regulatory changes.

Ecology believes EPA's strategy will help ensure that Washington residents continue to breathe clean air beyond 2010. Ecology will continue to provide input on Washington's needs to EPA through 1999.

Answering Those Burning Questions

Where there's smoke, there's usually air pollution. Except for the amount of smoke produced, it doesn't make much difference what kind of outdoor burning is being done; residential or backyard, land clearing, and agricultural burning can all be a source of health problems for those exposed to the resulting particulate matter. To better address issues specific to each kind of burning, Ecology separates residential and land clearing burning from agricultural burning, and places them in a general category called "outdoor burning." Both outdoor and agricultural burning were the subject of change during 1998.

Outdoor burning

Since Ecology first adopted regulations on outdoor burning in 1992, the legislature has made several changes to the state Clean Air Act. Among other things, these changes:

- exempt residential and tumbleweed burning from the requirement to have a permit to burn in some (mostly rural) areas;
- allow burning of storm or flood debris even in areas where outdoor burning is otherwise prohibited;
- lower the threshold for calling burn bans (this will increase the number of burn bans called);
- extend the deadline for prohibiting burning in urban growth areas of most cities with population under 5,000 to December 31, 2006; and
- make enforcing air quality requirements of the law optional for fire districts.

During 1998, Ecology worked with an Outdoor Burning Advisory Committee to draft proposed changes to its rules on outdoor burning that will make the rules consistent with the amended state law.

Ecology held five public workshops on the revisions drafted by the committee. The proposed revisions include the following changes in addition to those described above.

The rule would prohibit:

- Land clearing burning in areas with a general population density of 1,000 people per square mile.
- Burning of demolition debris.
- Burning of material hauled from one property to another (except within a contiguous ownership).
- Burning when fire danger is moderate or higher (with some exceptions).

Permits would be required:

- For recreational fires with a fuel pile over three feet in diameter and two feet in height, except in certain rural areas.

General requirements of the rule would apply:

- To all outdoor fires (general requirements include those for prohibited materials, hauled materials, burning curtailments, and nuisance fires).

Guidelines for regulators would be established:

- To help identify and deal with nuisance fires.
- To help determine whether alternatives to different types of burning exist (once alternatives to burning are found to exist, that type of burning must be prohibited).

- To help identify the kinds of burning that are prohibited by the regulation.

The work Ecology has done on the outdoor burning issue during 1998 has increased awareness of the health impacts of outdoor burning. Agencies responsible for implementing the rule have also improved or begun to improve their implementation programs as a result.

Agricultural burning

Two types of agricultural burning were most notable during 1998: grass seed field burning and wheat field stubble burning. Burning has traditionally been used to clear fields of excess residue and may be used to help control weeds, disease, and pests. However, it also produces large amounts of smoke containing high levels of particulate matter and other compounds harmful to human health. Many members of the public have reported increased respiratory problems when fields are burned.

Grass Seed

Except in a few special cases, 1998 saw the end of grass seed field burning in Washington State. The Washington State Clean Air Act provides for ending grass seed field burning if an alternative to burning can be certified. In June 1998, following extensive research, public involvement, and economic and environmental analyses, Ecology certified an alternative called "mechanical residue management." This alternative to field burning removes straw from the fields using normal field equipment and practices such as baling and raking. In some cases, the equipment may not be able to reach certain parts of a field (for example, grass planted on steep slopes), so some limited burning may continue to take place. The new rule also contains special consideration for owners of small farms. Growers with a gross income of less than $300,000 could apply for a partial reprieve for one year, to help offset the expense of changing residue management practices.

In July 1998, Ecology was challenged in court and before the Pollution Control Hearings Board (PCHB) to defend its 1996 grass seed field burning restrictions and penalties leveled against growers who burned their grass seed fields illegally. Both the Superior Court and the PCHB found in favor of Ecology.

During the fall of 1998 Ecology and the Spokane County Air Pollution Control Authority received 71 requests to burn 4,515 acres. Upon review of these requests, the agencies approved 646 acres for burning based on the small farm exemption, and 1,170 acres because of extreme conditions or steep slopes. Compliance with the new regulations appears to be high.

The number of grass seed fields burned during the late summer and early fall months went from about 60,000 in 1995 to just over 1,800 acres in 1998. The benefits of these reductions to the environment and public health are substantial. The grass seed industry seems to be adjusting to the restrictions, and research continues to explore alternatives to burning and markets for the grass seed straw residue.

Wheat

By state law, grass seed is the only crop for which burning can be banned if a reasonable alternative is found. However, field burning is also used in production of other crops in Washington, most notably wheat. Ecology administers an agricultural burning perit system to reduce air pollution from wheat and other agricultural field burning. This is accomplished with the help and guidance of a special task force called the Agricultural Burning Practices and Research Task Force. This group includes representatives from growers' groups, university agricultural programs, Ecology and the state Department of Agriculture, and public health and environmental organizations.

During 1998, the task force began reviewing and updating the Best Management Practices that address when burning is needed and when it isn't for each crop. The task force's goal is to decrease the number

of circumstances under which burning is appropriate. Each new Best Management Practice will include information on alternatives to burning that should be considered. The new practices will be completed by March 1999.

The task force has asked Ecology to set a target reduction for air pollution from wheat stubble burning. Ecology and wheat industry representatives began negotiations in 1998 on limiting emissions. The wheat industry has expressed willingness to work cooperatively to reach an agreement.

During the 1998 agricultural burn permitting season three new local permitting authorities were added to the permitting program. This completed delegation of the program in all the major agricultural counties in eastern Washington. In August of 1998 the permit program implemented new requirements for agricultural burning, including a post-burn report and a toll-free agricultural burn hotline. The toll-free hotline includes daily burn/no burn smoke ventilation forecasts for all eastern Washington counties. The response from the agricultural community on both of these new requirements has been very good, with over 200 post-burn reports returned and over 4,000 calls to the hotline during the month of September 1998 alone. This use of burn/no burn information has and will continue to reduce and minimize the impact of agricultural smoke on residents of the Inland Northwest by restricting agricultural burning to only those days when the conditions for smoke dispersal are best.

Air Quality Challenges for 1999

Upcoming Challenges

Agricultural Burning

Over the coming year, the Air Quality Program will work to implement a set of new best management practices (BMPs) for cereal grain stubble burning, most notably wheat stubble. In early 1999, the state's Agricultural Burning Practices and Research Task Force finalized new BMPs that provide stronger, more specific direction on how and when to avoid burning.

The agricultural burning permit program requires using the most current BMPs. Ecology will work with the Cooperative Extension Service, the Department of Agriculture, and others to educate farmers about the BMPs and help put them to use.

The 1999 burning season(s) will be the first year of a seven-year commitment on the part of wheat growers to cut their smoke emissions by 50 percent. Ecology, the Department of Agriculture, and the Washington Association of Wheat Growers signed an agreement in February 1999 calling for emission reductions that average at least seven percent per year. The public will see at least a 21 percent reduction in smoke over the first three years of the new program.

Ecology will be producing educational materials, providing technical assistance, initiating research, and enhancing compliance efforts to ensure that the conditions of the agreement are being met and new BMPs are being closely followed when permits are issued.

Emission Check Program

The major challenge facing the Emission Check Program in 1999 will be to successfully negotiate a contract extension for operation of the emission test stations. The Legislature could be asked to raise the $15 test fee limit in state law so that public service at the test stations is not threatened, and to allow upgrading of the Puget Sound program to help prevent violations of the ozone standard in that area.

Visibility

Because of Washington's complex and varied terrain and climate, it is difficult to interpret visibility monitoring data to the point where we can draw conclusions about the causes and sources of visibility impairment. The Air Quality Program is investing in expanded computer modeling capabilities. Staff will also be integrating visibility modeling and the new $PM_{2.5}$ monitoring data analysis to provide additional support.

In addition, since visibility is not directly related to health, public interest in visibility programs may be not be as high as for issues that impact health. Program staff are working with an advisory committee (Visibility Improvement Efforts in Washington, or VIEW) to gauge public support and plan how to approach the issue.

The federal regional haze program will require substantial regional planning, and eventual commitments from a number of states and tribes, as well as British Columbia. The Air Quality Program is working with the Western Governors Association and the Western States Air Resources Council to define state-to-state relationships, and is working directly with tribes to establish partnerships.

Air Toxics

A major challenge to limiting emissions of air toxics is lack of knowledge about what specific toxics are present in the air. The Air Quality Program is in the process of planning a "survey" air sampling project to get a better idea of what chemicals are in the air and in what concentrations. The sampling would be done in urban residential areas with a mix of sources.

In addition to determining what air toxics are present, staff need the ability to determine where the chemicals are coming from. An improved emissions inventory is needed to identify both the sources of the air toxics and how much pollution they are emitting. The Air Quality Program will be coordinating carefully with other agencies and regions that have jurisdiction within given areas of the state to accomplish these tasks.

Monitoring for $PM_{2.5}$

With about half of the air monitoring network installed for $PM_{2.5}$, the biggest challenge for 1999 is to design and install the second half of the network. In response to feedback from the National Academy of Sciences, EPA is requiring states to change the make-up of their monitoring networks. Washington's new design will include more continuous monitoring sites and five "speciation" sites (sites at which more than one sampler are located for the purpose of conducting more in-depth analysis of pollutant sources).

Transportation

Washington's population is expected to increase by about 2.5 million people over the next 25 years. Traffic is expected to grow as fast as population, and the associated motor vehicle emissions threaten to cancel out air quality gains made in recent years. In response to these challenges, the Air Quality Program plans to concentrate in 1999 on involving communities in reducing their contributions to motor vehicle related air pollution. The program will also continue plans to work in partnership with other transportation and land use agencies to implement land use and transportation strategies beneficial to air quality. Along with other state, local, regional and federal agencies, Ecology will work to increase public awareness about these issues and ways that individuals can reduce their contributions to air pollution.

Glossary of Terms

Air monitoring network: A network of air monitors located around the state to determine levels of criteria pollutants in the air, identify areas with the worst air pollution, identify where health risks may exist, and determine if control strategies are working.

Attainment area: An area that meets federal air quality standards.

Class I area: All international parks, national wilderness areas, and memorial parks which exceed 5,000 acres, and all national parks which exceed 6,000 acres. Class I areas have restrictions on use of land and resources to prevent damage to visibility, plants, soil, and other resources.

Control strategies: Methods used to control emissions of a specific pollutant, usually in a specific area of the state.

Criteria pollutants: A limited set of air pollutants for which federal standards have been set to protect human health. Includes carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, particulate matter, and lead.

Emission inventory: A data bank of air pollution statistics which identifies the type, size, and location of various pollution sources. Categories include point sources (sources such as industrial facilities that are located at a specific geographic point) and area sources (sources not confined to one point but spread out over a wider area, such as automobiles and wood stoves).

Maintenance area: A geographic region redesignated by EPA from nonattainment to attainment as a result of monitored attainment of the standard and EPA approval of a plan to maintain air quality standards for at least a 10-year period.

Maintenance plan: A plan developed by state and/or local air quality agencies to meet air quality standards in an area for at least a 10-year period.

Nonattainment area: A geographic region designated by EPA in which federal air quality standards are not or were not met by a certain date. Areas once designated as nonattainment that now meet air quality standards remain nonattainment until EPA has approved a redesignation request and maintenance plan.

State Implementation Plan (SIP): A plan the state adopts and implements to ensure the state meets federal and state air quality standards and goals.

Toxic air pollutants: Compounds which may cause cancer and/or other health problems at very low concentrations.