1999 Air Quality Trends in Washington

Washington State Department of Ecology Air Quality Program

Publication #00-02-011

If you require this document in an alternative format, please contact Tami Dahlgren at (360) 407-6830 (voice) or (360) 407-6006 (TDD only).

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Prepared by:
Washington State Department of Ecology
Air Quality Program

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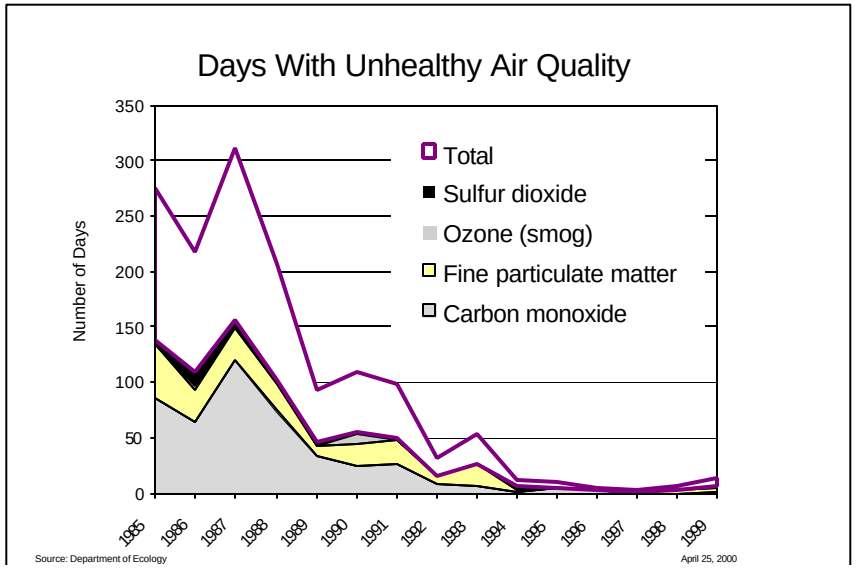
What does the Department of Ecology's Air Quality Program do?

- *Characterize air quality* – Gather information on the amount and sources of pollution and how it moves in the air.
- *Design solutions* – Provide cost-effective solutions in the right places at the right time.
- *Implement solutions* – Ensure that clean air solutions are carried out equitably and fairly, and that people are complying with regulations.
- *Measure effectiveness* – Track results of decisions and strategies and modify them to better meet priorities, objectives, and changing needs of society.

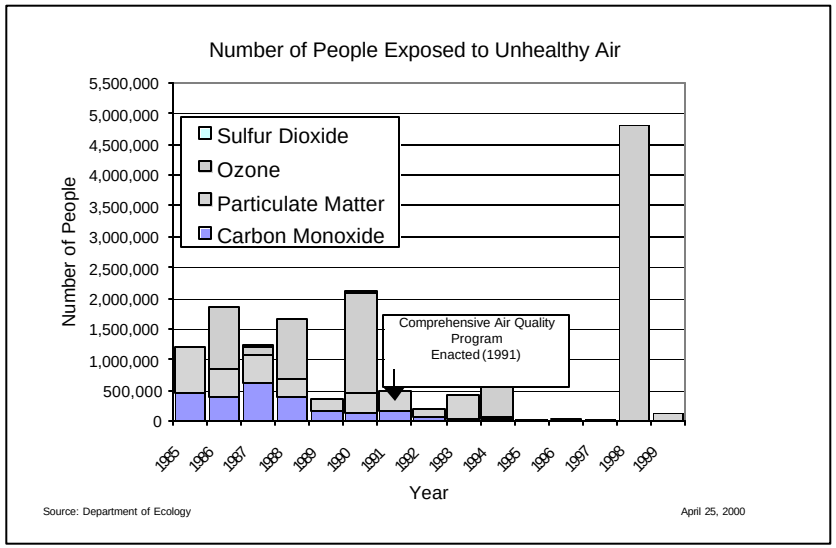
How effective is the Air Quality Program in keeping the air clean?

The data speaks for itself. The number of days Washington violated air quality standards has seen a dramatic decrease over the years, from 150 days in 1987 to seven days in 1999.



In addition, the number of people exposed to unhealthy air (air containing levels of pollutants that do not meet federal health standards) in Washington has dropped from a high of more than two million people in 1990 to about 112,000 people in 1999.

(Note: The high "spike" that appears in the chart below for 1998 actually reflects a relatively small number of high ozone concentrations. The high ozone concentrations shown in the chart occurred over one hot, three-day period in the summer of 1998; however, because ozone travels over a wide area, a fairly high number of people can be exposed through relatively few exceedences of the standard. *See page10 for more information about ozone)*



As reflected in the data shown on this page and elsewhere in this report, 1999 saw a great deal of progress for air quality in Washington. But the year also brought a few bumps in the road. Initiative 695, passed by Washington voters in November 1999, eliminated the two-dollar per year clean air excise tax that would have provided nearly $15 million to Ecology's air quality activities.

Who is responsible for air quality in Washington?

Air quality in Washington is a combined effort and shared responsibility of the Department of Ecology (Ecology), seven local air quality agencies, and the Environmental Protection Agency (EPA).

Ecology has sole responsibility for air quality in 19 of Washington's 39 counties. Ecology is responsible for issuing permits for pulp mills and aluminum smelters, administering the motor vehicle emission check program, quality assurance of ambient air monitoring data, and issuing federal "prevention of significant deterioration" (PSD) permits. Ecology is the repository of statewide air quality expertise for dispersion modeling, state implementation plan development, toxicological assessments, federal delegation and grants processing, and other specialized programs.

Local air quality authorities represent 20 counties in Washington. They have primary responsibility for enforcement, compliance, and most industrial permitting and complaint response within their jurisdictions. They also provide public education and public involvement in the decision-making process, provide technical assistance to citizens and businesses, adopt and implement clean air strategies to meet local concerns and conditions, and monitor ambient air quality.

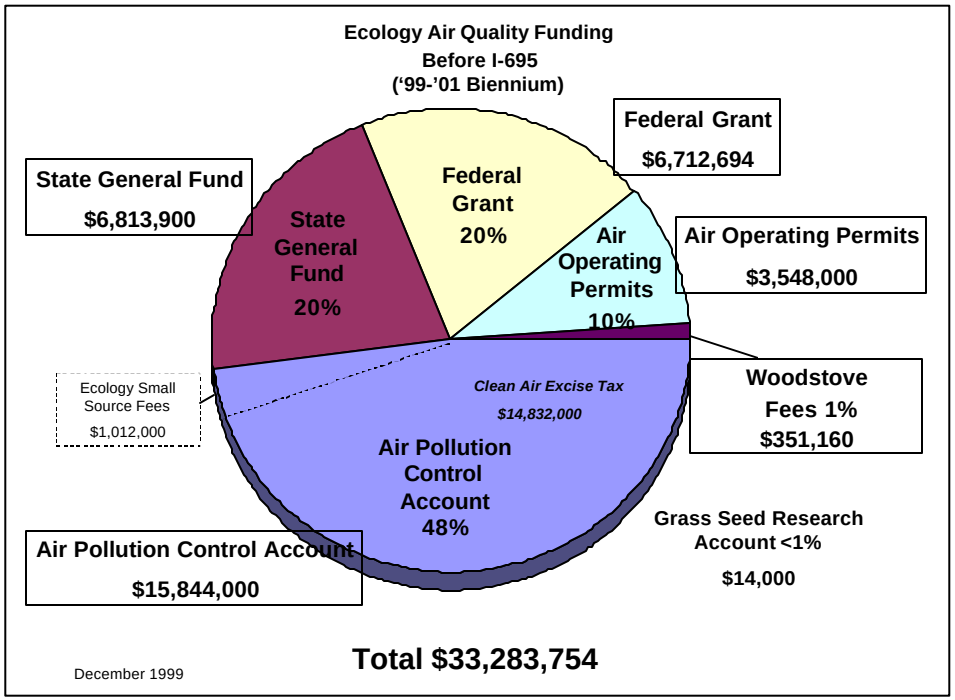
EPA is responsible for ensuring that air quality concerns are being addressed on tribal lands; issuing grants; and reviewing selected permits, state implementation plans, and air quality and enforcement data submitted by the state. EPA primarily provides oversight and guidance to the state to ensure federal requirements and obligations are being met.

How is Ecology's Air Quality Program funded?

All budget information in this report reflects pre-Initiative 695 funding.

Funding sources for the Ecology Air Quality Program during 1999 included Washington's Air Pollution Control Account, which receives state funds through the two-dollar per vehicle clean air excise tax included in the vehicle license tab renewal fee. This account has historically provided nearly half of the program's funding. Other funding sources include motor vehicle emission test fees, air operating permit fees, wood stove fees, Environment Protection Agency (EPA) grants, and grass seed burning permit fees.

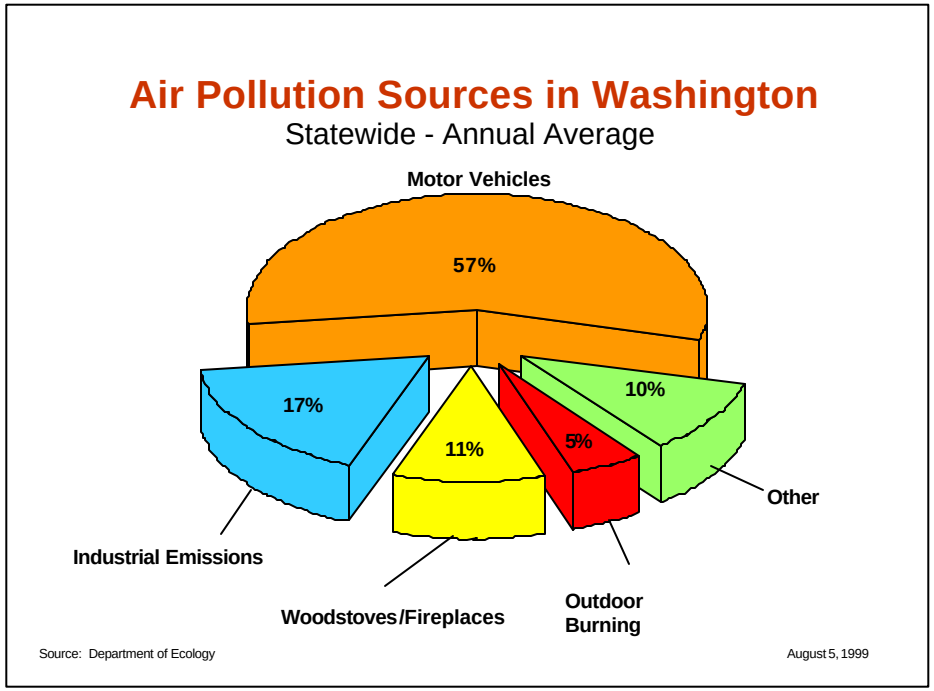
Initiative 695 eliminated the clean air excise tax that funded the Air Pollution Control Account. Because the initiative took effect six months into the 1999-1002 Biennium, Ecology is experiencing a revenue loss of about $11.7 million.
As of December 1999, the legislature was considering an approximate 87 percent restoration of Air Quality Program funding.



What causes Washington's air pollution?

In 1999, the main sources of air pollution in Washington were motor vehicles, industry, wood stoves and fireplaces, and outdoor burning. Other sources include lawnmowers, boats and other recreational vehicles, aircraft, and trains.

Although these sources have remained largely the same over the years, the amount of air pollution contributed by the different sources has changed. For example, just eight years ago, in 1991, motor vehicles caused 43 percent of Washington's air pollution, and industrial emissions were responsible for 25 percent. Wood stoves contributed 20 percent, and outdoor burning 10 percent. Compare those figures to 1999's emission percentages (right), and you'll notice a significant increase in air pollution from motor vehicles and a decline in pollution caused by industry, wood stoves, and outdoor burning.



How do we measure and track air pollution?

Ecology's Air Quality Program and local air quality agencies monitor around the state for six air pollutants: particulate matter, carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, and lead. These are the "criteria" air pollutants for which the Environmental Protection Agency has set human health standards. A description of these six pollutants is given on the following page.

Coldwater Ridge air monitoring site, near Mount St. Helens

The black dots on the map above show the location of monitoring sites around the state. Some sites monitor for more than one type of air pollutant. The number and location of air monitors may change each year based on measured pollution levels, changes in air pollution sources, federal and state priorities, and available resources.

Criteria Air 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 more affected than adults.

Ambient Air Quality 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
Particulates			
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
$PM_{2.5}$			
Annual Arithmetic Mean	15 µg/m^3	15 µg/m^3	No standard
24 – Hour Average	65 µg/m^3	65 µg/m^3	No Standard
Sulfur Dioxide (SO_2)			
Annual Average	0.03 ppm	No standard	0.02 ppm
24 – Hour Average	No standard	0.50 ppm	0.10 ppm
3 – Hour Average	0.14 ppm	No standard	No standard
1 – Hour Average	No standard	No standard	0.40 ppm [A]
Carbon Monoxide (CO)			
8 – Hour Average	9 ppm	9 ppm	9 ppm
1 – Hour Average	35 ppm	35 ppm	35 ppm
Ozone (O_3)			
1 - Hour Average	0.12 ppm	0.12 ppm	0.12 ppm
8 - Hour Average [B]	0.08 ppm	0.08 ppm	No standard
Nitrogen Dioxide (NO_2)			
Annual Average	0.053 ppm	0.053 ppm	0.05 ppm

[A] - 0.25 not to be exceeded more than two times in any 7 consecutive days.
Primary standards are listed in this table as they appear in the federal regulations.

[B] - Eight-hour ozone standard went into effect on September 16, 1997. But implementation is limited.

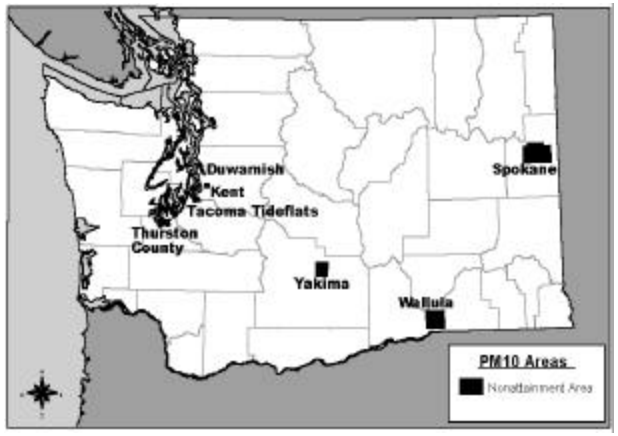
- ppm = parts per million
- µg/m^3 = micrograms per cubic meter
- Ambient concentrations are rounded using the next higher decimal place to determine whether a standard has been exceeded. The data charts in this report are shown with these unrounded numbers.
- Details of the National Standards are available in 40 CFR Part 50.
  Available on-line at: http://www.access.gpo.gov/nara/cfr/waisidx_99/40cfr50_99.html

What happens if we don't meet air quality standards?

When an area of the state violates one of the National Ambient Air Quality Standards (NAAQS) shown on the previous page, EPA designates the area as nonattainment for that standard. A nonattainment area must develop and implement a plan that meets the requirements of the Clean Air Act to attain and maintain the specific standard. When a nonattainment area has achieved attainment, it is eligible to be redesignated to attainment. One of the most important requirements for redesignation is a plan to maintain the standard for at least a ten-year period.

Washington's nonattainment and "maintenance" areas (areas that have been redesignated to attainment provided they can maintain the standard) as of 1999 are shown at right. Carbon monoxide nonattainment areas are Spokane and Yakima, and maintenance areas are Vancouver and Puget Sound. Ozone maintenance areas are Vancouver and Puget Sound. Particulate matter nonattainment areas are Thurston County, Tacoma Tideflats, Kent Valley, Seattle Duwamish, Yakima, Wallula, and Spokane.

A nonattainment designation has serious consequences, aside from unhealthy air. For example, new or expanding businesses that release air pollution in nonattainment areas must apply the most stringent and costly controls available. This often results in higher costs, less likelihood of investment in new facilities, and a slower economic climate. And it isn't just the business community that is affected. A return to ozone nonattainment in central Puget Sound, for example, would require the use of cleaner gasoline, costing consumers an extra one cent per gallon – more than $10 million per year, altogether.



Is our air quality getting better?

Although we still have some nonattainment areas, air quality in Washington has been steadily improving. Washington's success in meeting and maintaining the National Ambient Air Quality Standards is reflected by EPA's redesignation to attainment of two carbon monoxide and ozone nonattainment areas (central Puget Sound and Vancouver).

Carbon monoxide areas

Washington's two remaining carbon monoxide nonattainment areas -- Yakima and Spokane -- are currently meeting the carbon monoxide standard. EPA exempted Yakima from almost all nonattainment requirements under the 1990 Amendments to the Clean Air Act because it was not violating the standard at the time. Although Spokane is now meeting the standard, it did not do so within the timeframe laid out by the Clean Air Act. Because of this, Spokane was recently reclassified as a "serious" nonattainment area. Local agencies and Ecology are working to assure that Spokane will continue to meet the standard, which will allow the state to request redesignation to attainment.

The development of the "serious" attainment plan for the Spokane carbon monoxide nonattainment area was the chief focus of attainment planning at the state level during 1999. The plan proved to be more technically challenging than expected, with a great deal of cooperation needed between the three agencies cooperating on plan development -- the Spokane Air Pollution Control Authority (SCAPCA), the Spokane Regional Transportation Council, and Ecology -- and EPA. Several issues remained in discussion at the end of 1999.

Particulate matter areas

At the national level, an adverse decision from a panel of the U.S. Court of Appeals had a major impact on the revised particulate matter and ozone standards EPA issued in 1997. This decision also affected Washington's course of action in getting particulate matter nonattainment areas redesignated to attainment.

The decision, handed down on May 14, 1999 by a panel of the U.S. Court of Appeals, allowed the new eight-hour ozone standard and the $PM_{2.5}$ standard to remain in effect, but strongly limited EPA's ability to implement them. After an unsuccessful appeal to the full Court of Appeals, EPA appealed the decision to the U.S. Supreme Court.

The decision by the Court of Appeals invalidated the revised 24-hour and annual PM_{10} standards EPA issued in 1997. This action left the former PM_{10} standards in effect. (See the chart on page 7 for a description of the standards.) As a result of this court decision, EPA no longer had the option to revoke the former standards in areas that had satisfied certain criteria. Revoking the standards would have meant that some areas would have achieved attainment status. Washington had withdrawn its PM_{10} maintenance plan for Thurston County in favor of this simpler method of achieving attainment status. Now, however, a PM_{10} nonattainment area must complete a redesignation request and maintenance plan and have them approved by EPA in order to be redesignated attainment. So Washington has resubmitted the Thurston County plan to EPA. Ecology and local agencies await a determination on PM_{10} redesignation for that area, as well as for the Tacoma Tideflats, Kent Valley, and Seattle Duwamish areas. The Yakima, Wallula, and Spokane areas remain nonattainment for PM_{10} at this time.

Washington is working with EPA and other interested states to see if there are options to make redesignation easier for areas that have maintained the standard for a long period of time and have minimal risk of nonattainment.

What is the air quality like in the area of the state where you live?

Ecology collects data on air quality trends in different areas of the state for the criteria pollutants carbon monoxide, ozone, particulate matter, and sulfur dioxide. Local air quality agencies also collect data in specific areas. See page 2 to find out who to contact in your area of the state. Visit the Air Quality Program's site at http://airr.ecy.wa.gov/Public/aqn.html for unofficial data on air quality in monitored areas.

Over time, some trends in air quality become apparent in certain areas. In other areas, patterns are less noticeable. This may be due to the types of pollutants monitored in specific areas, weather patterns, topography, and other circumstances.

Carbon monoxide: Carbon monoxide in the Puget Sound and Spokane areas continued its downward trend. Both the Vancouver and Spokane areas experienced an increase in maximum values, which may or may not signal a changing trend. The data over the next few years will further define whether this is a trend change or simply a higher than normal value for this year.

Ozone: Both the Puget Sound and the Vancouver ozone areas continued their downward trend for ozone. The up-and-down pattern in the Puget Sound area is most likely an effect of the weather. A hot year can cause ozone levels to rise and a cool year can cause them to go back down.

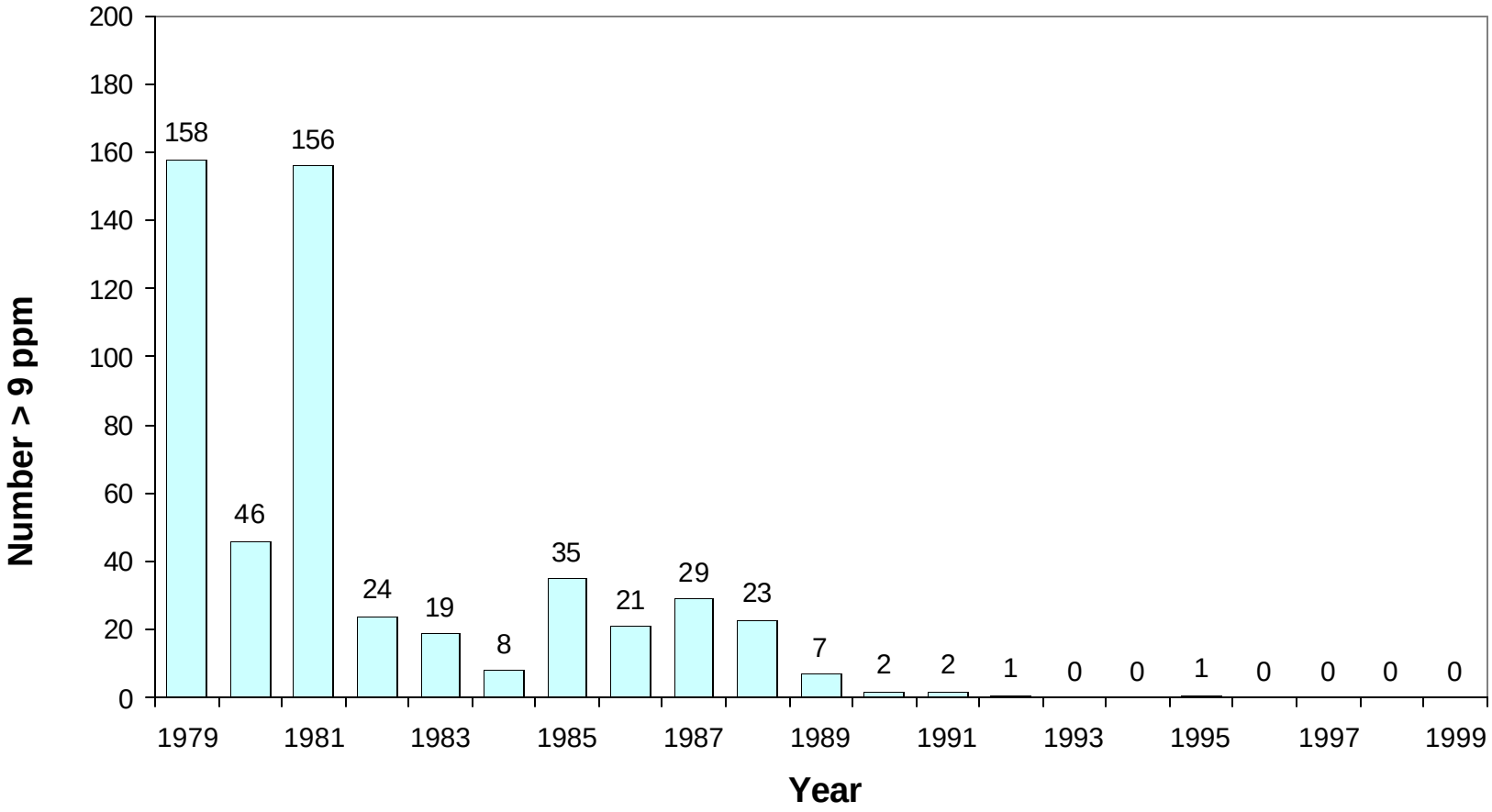
Particulate matter: The PM_{10} trend for western Washington continued downward this year. The eastern Washington areas continued to show their unpredictability, with all sites showing increased levels of high observations for 1999, although the trend tended to decrease or remain constant.

Sulfur dioxide: Sulfur dioxide levels have not been near the standard in any area of Washington since 1994. Washington has no nonattainment areas for sulfur dioxide.

These trends in carbon monoxide, ozone, particulate matter, and sulfur dioxide are shown in the charts on pages 11-39.

Puget Sound Carbon Monoxide

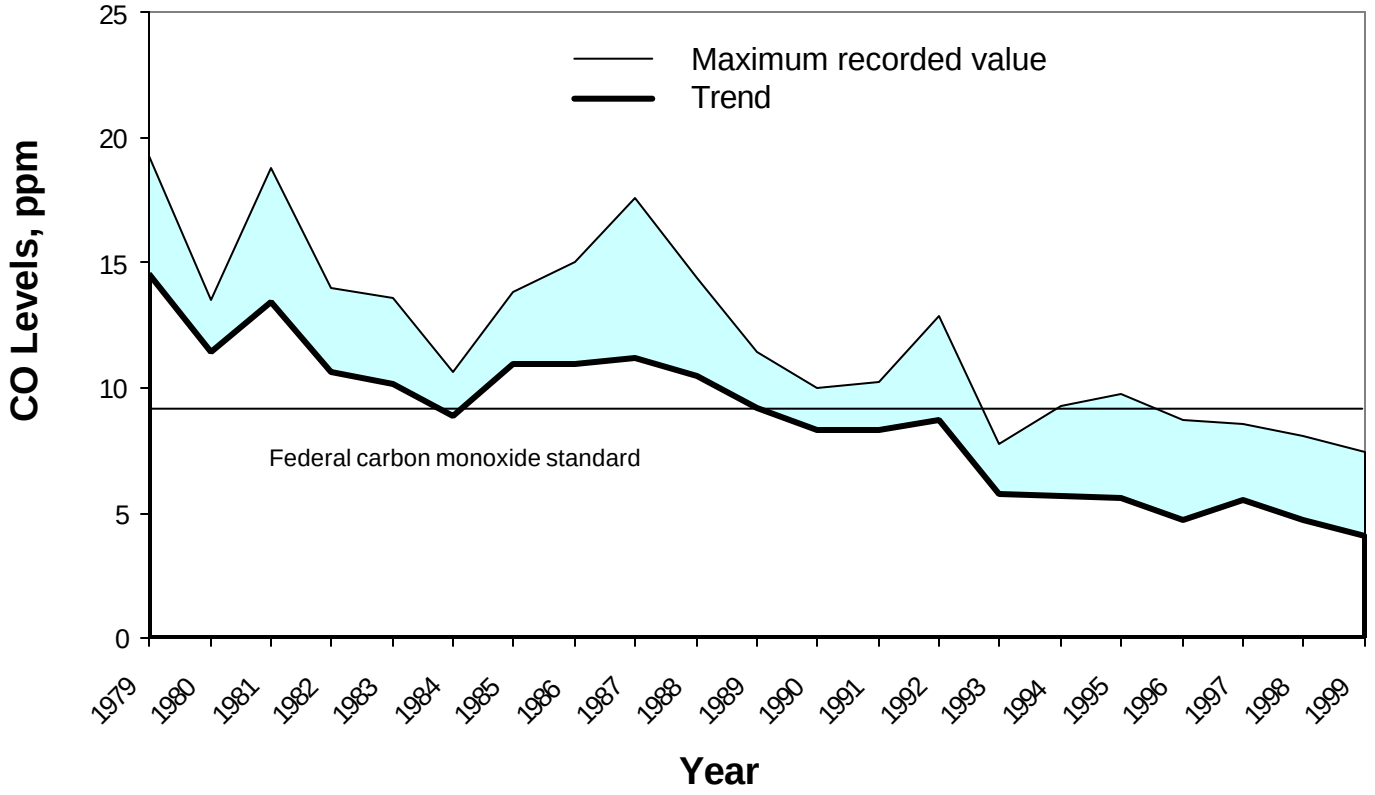
Number of Observations Above Standard: 1979 - 1999



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

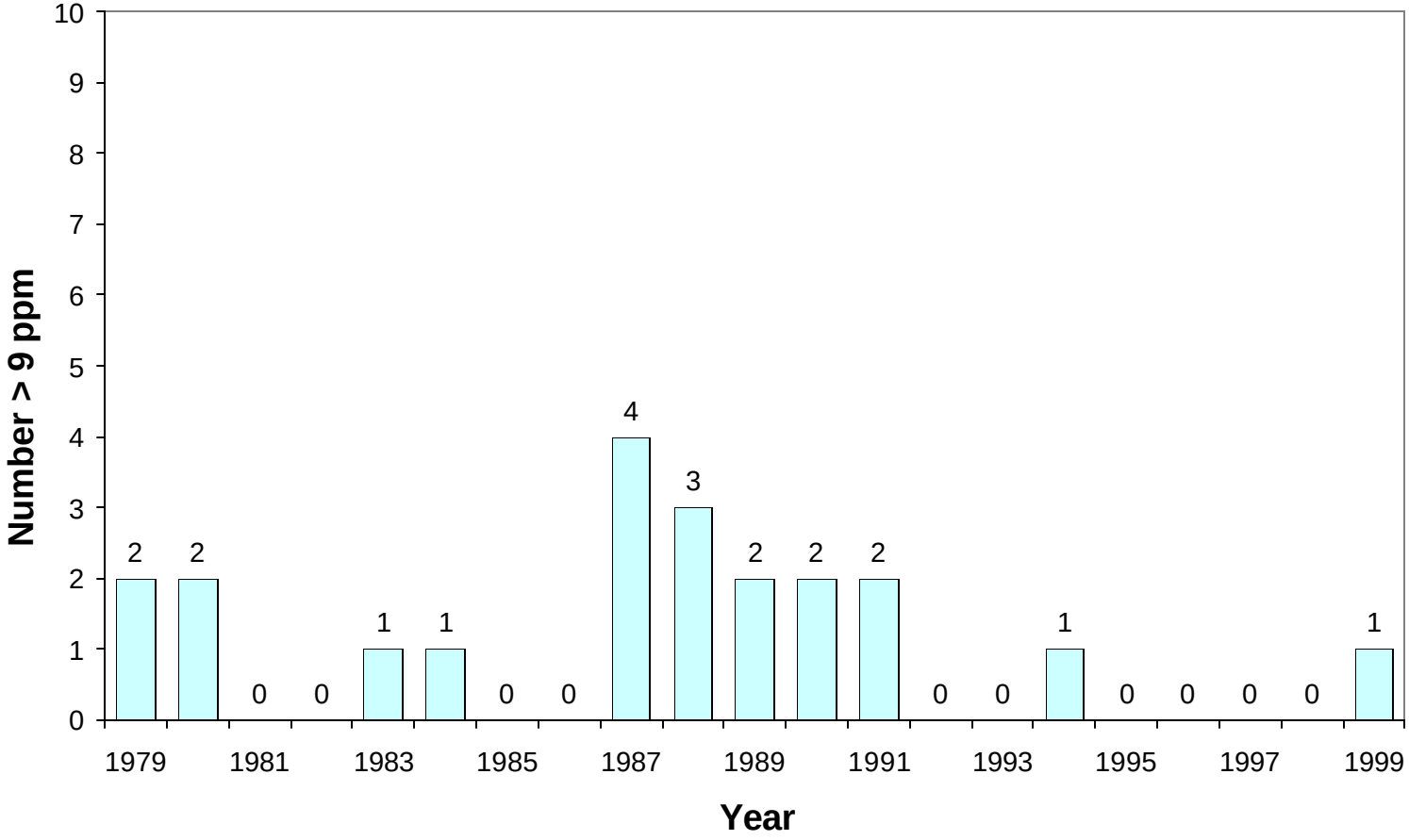
CO Levels: 1979 - 1999



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

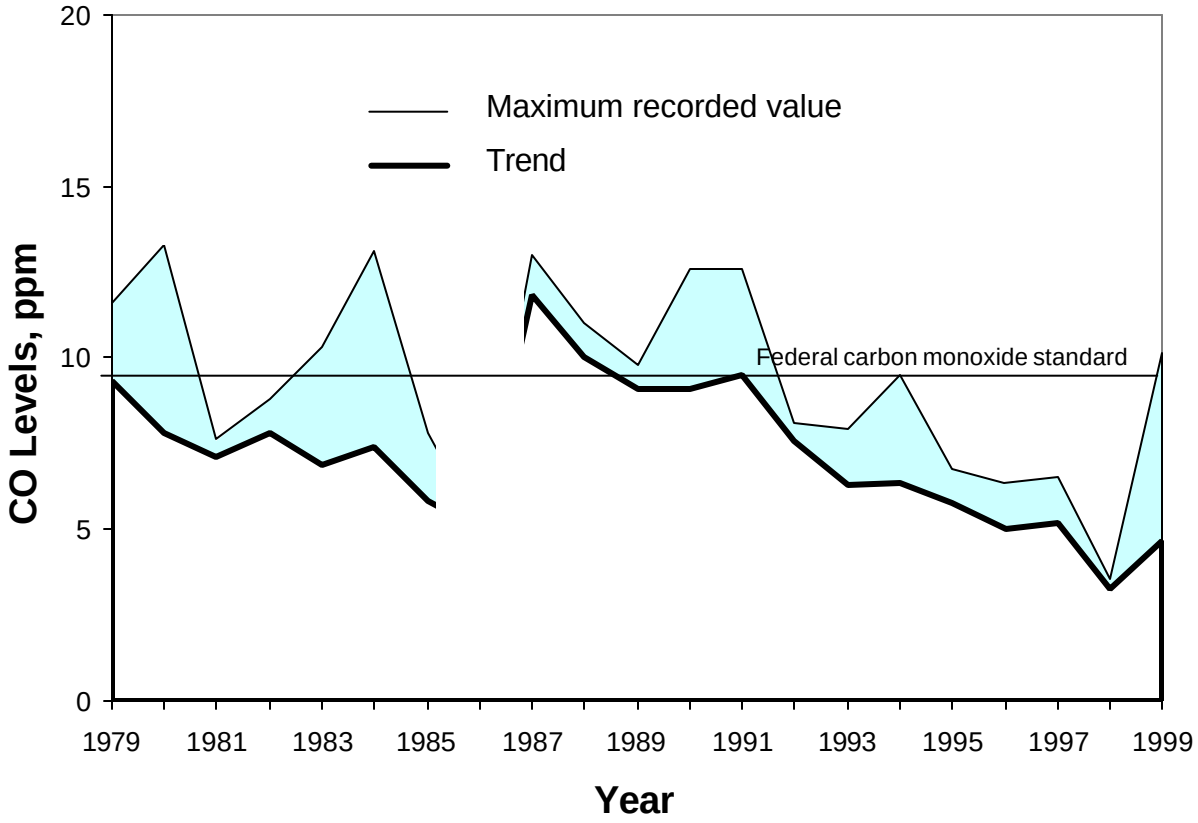
Number of Observations Above Standard: 1979 - 1999



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

Vancouver Carbon Monoxide Trends

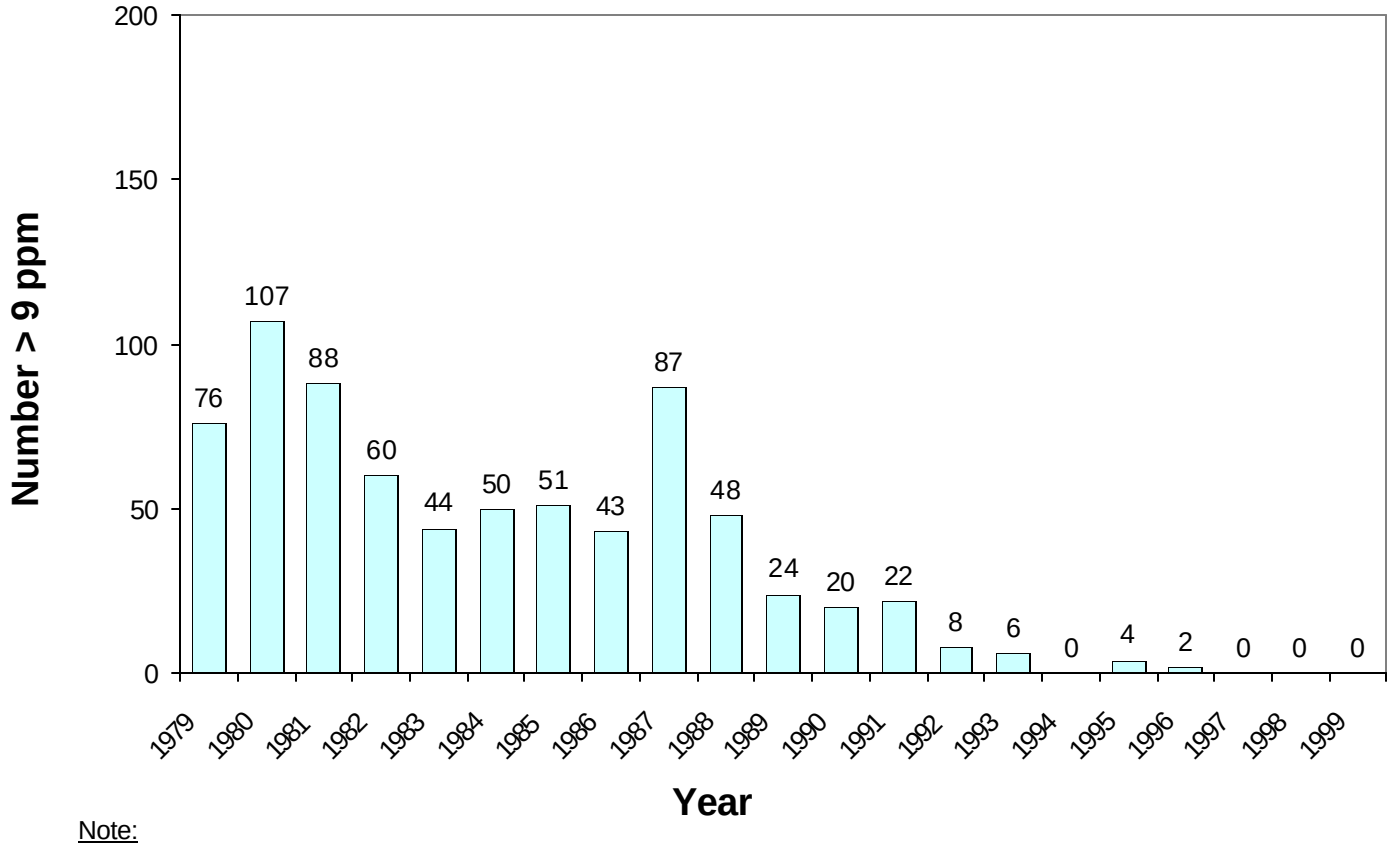
CO Levels: 1979 - 1999



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: 1979 - 1999

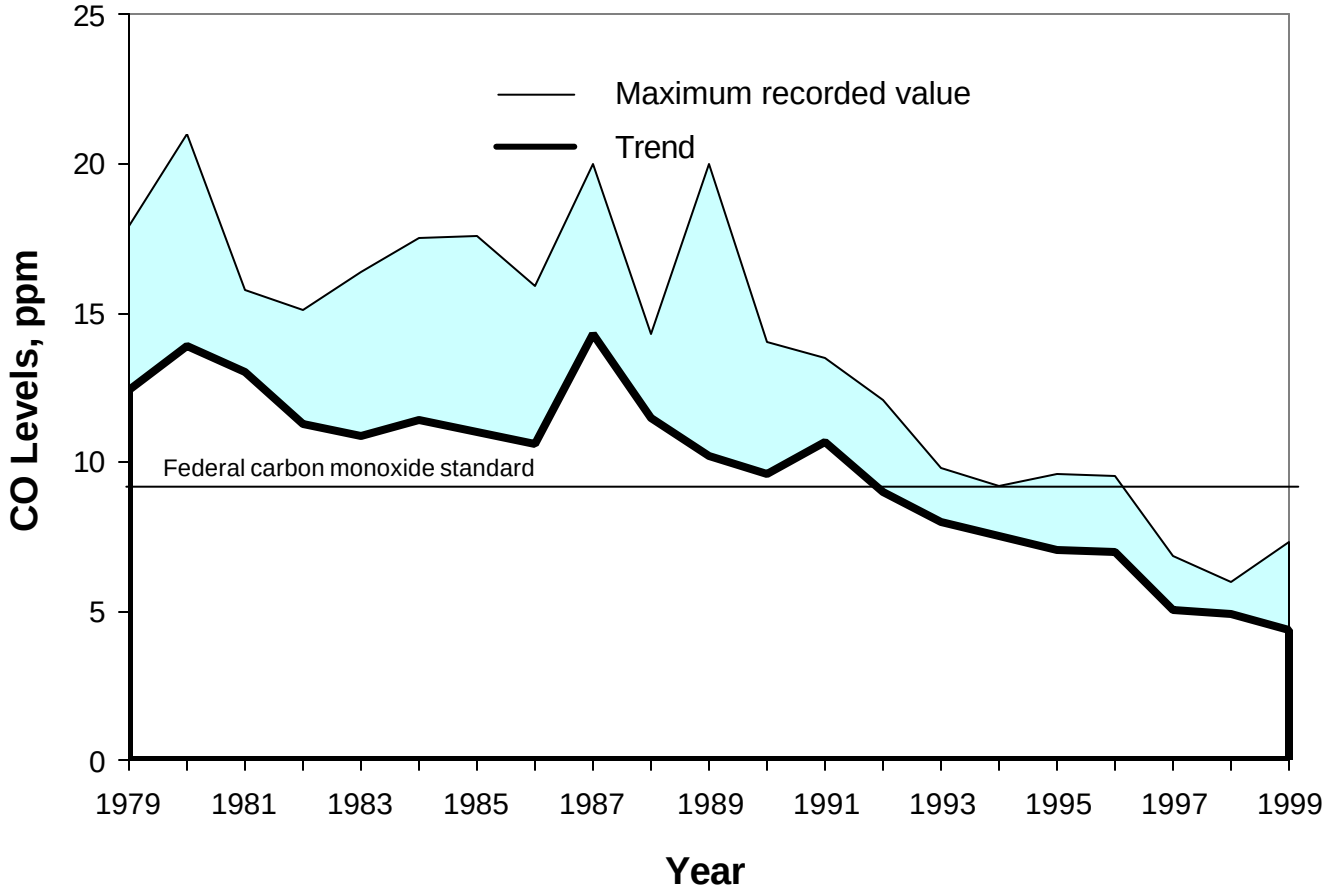


Note:

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

Spokane Carbon Monoxide Trends

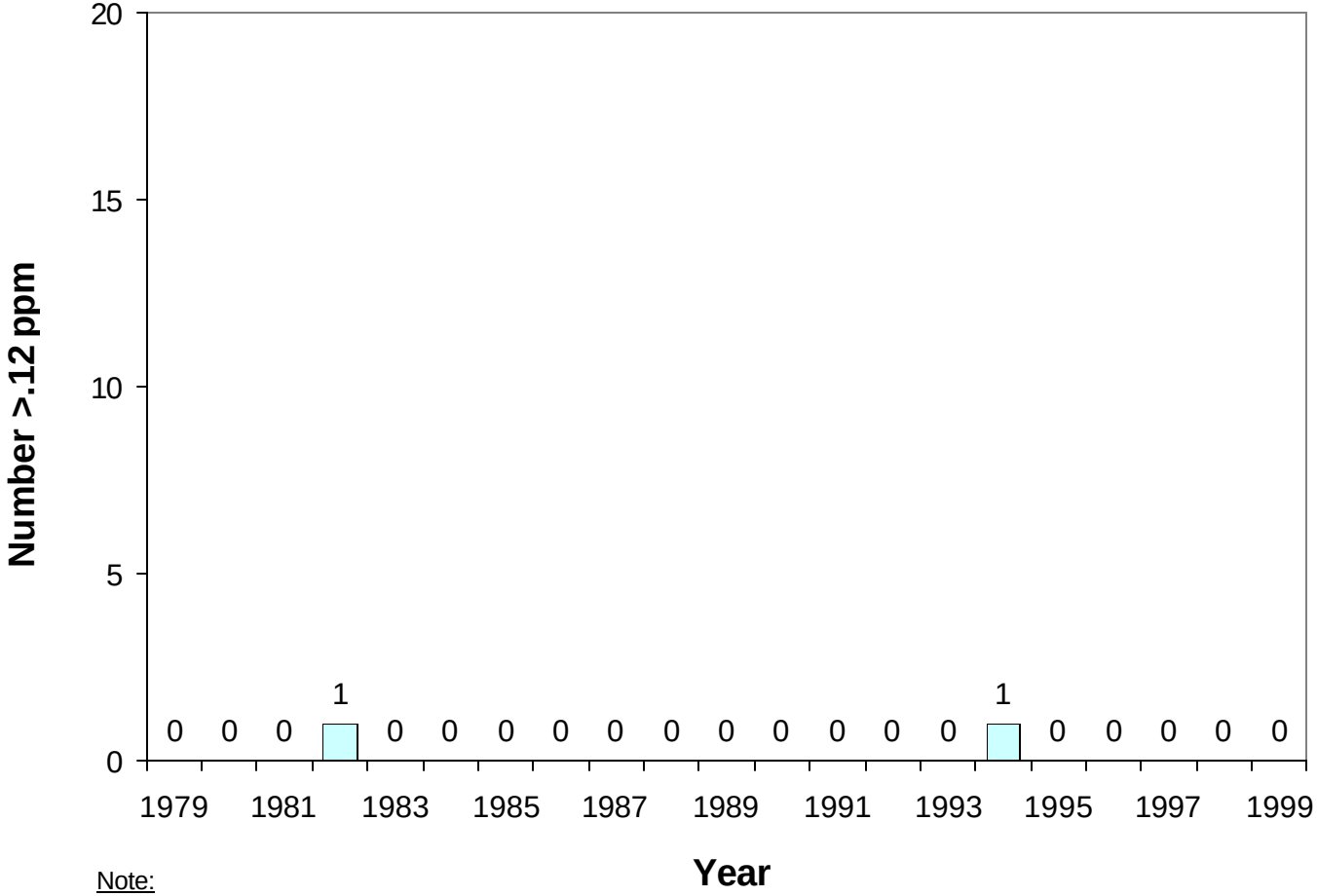
CO Levels: 1979 - 1999



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

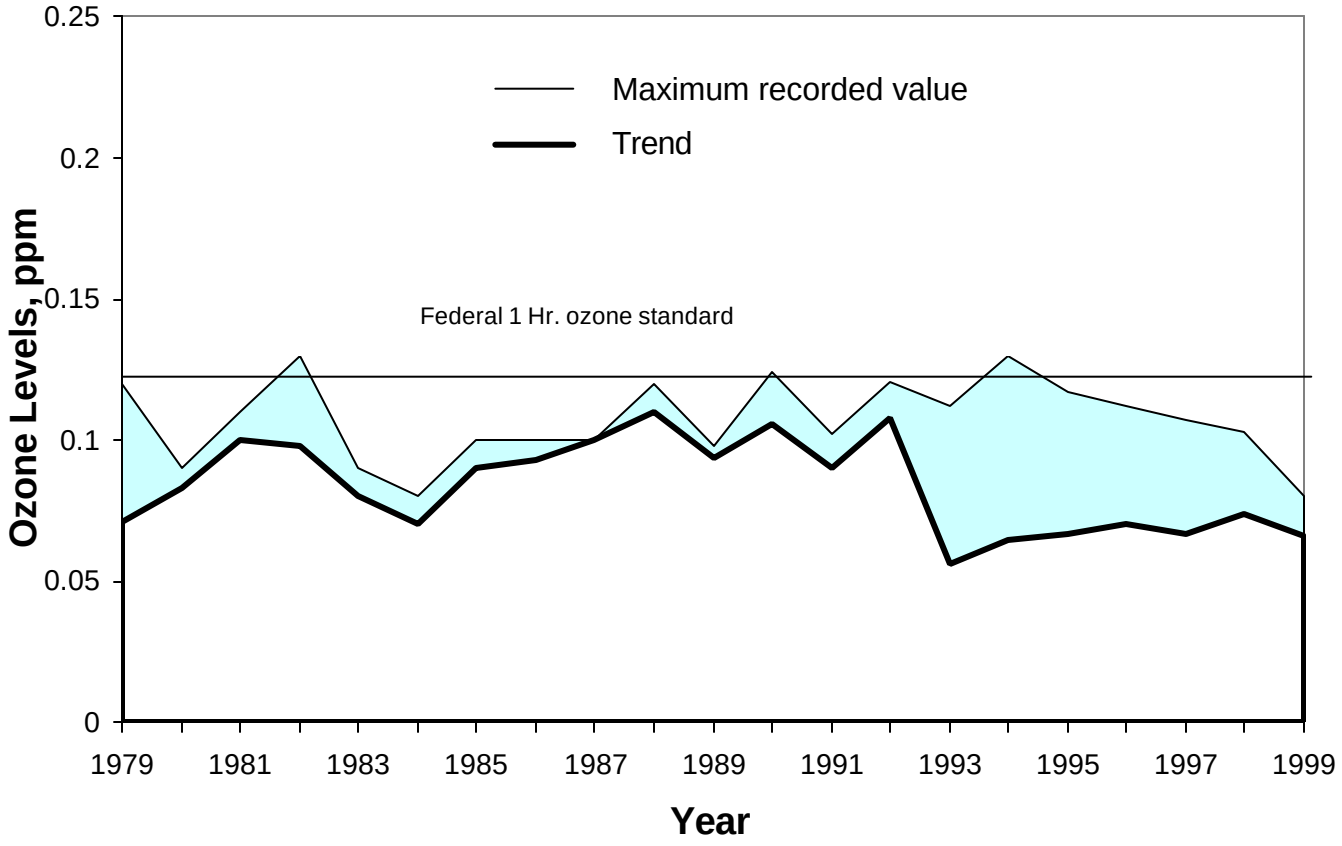
Number of Observations Above Standard: 1979 - 1999



Note:
More than three observations above the .12 ppm during a three-year period is a violation of the federal ozone standard.

Washington Portion of the Vancouver – Portland Ozone

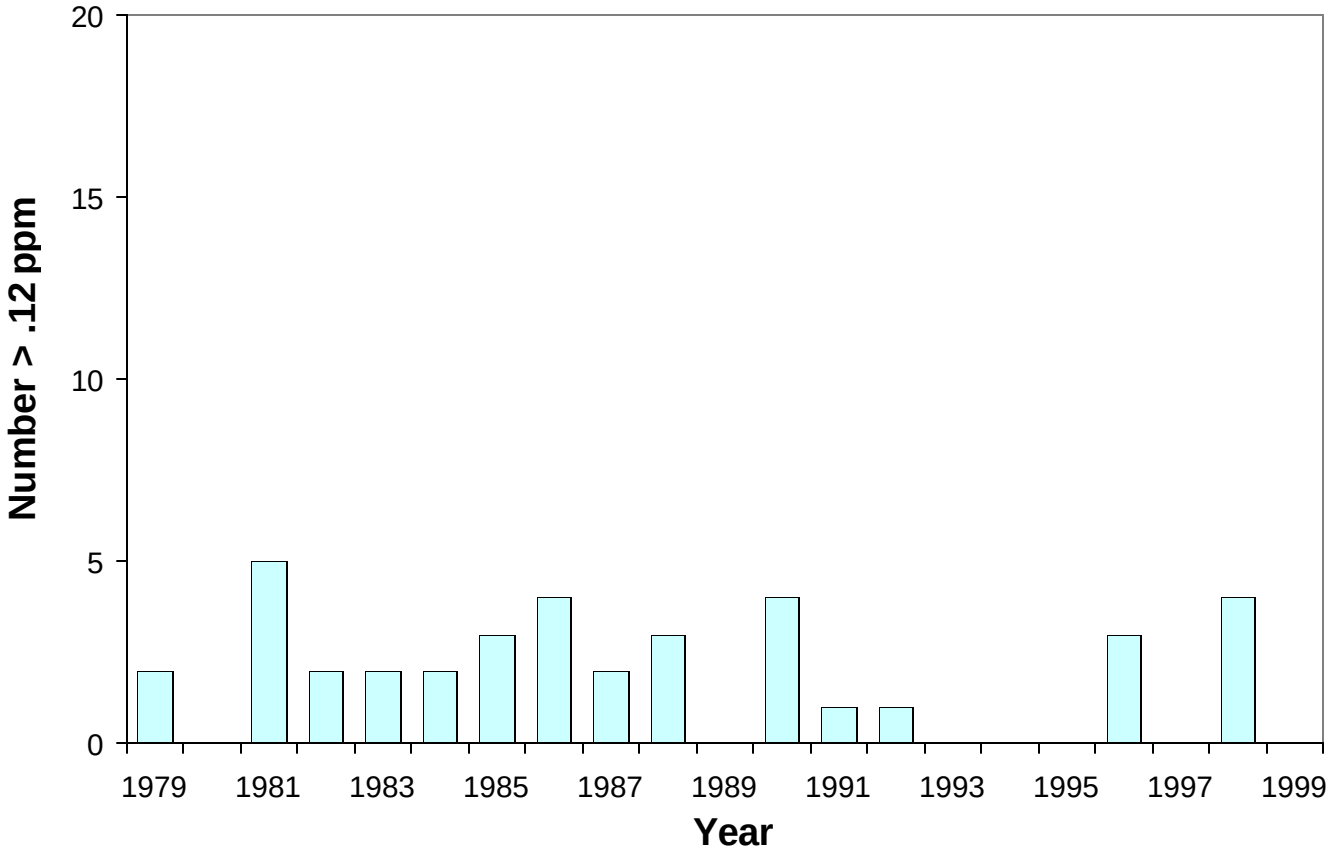
Ozone Levels: 1979 - 1999



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

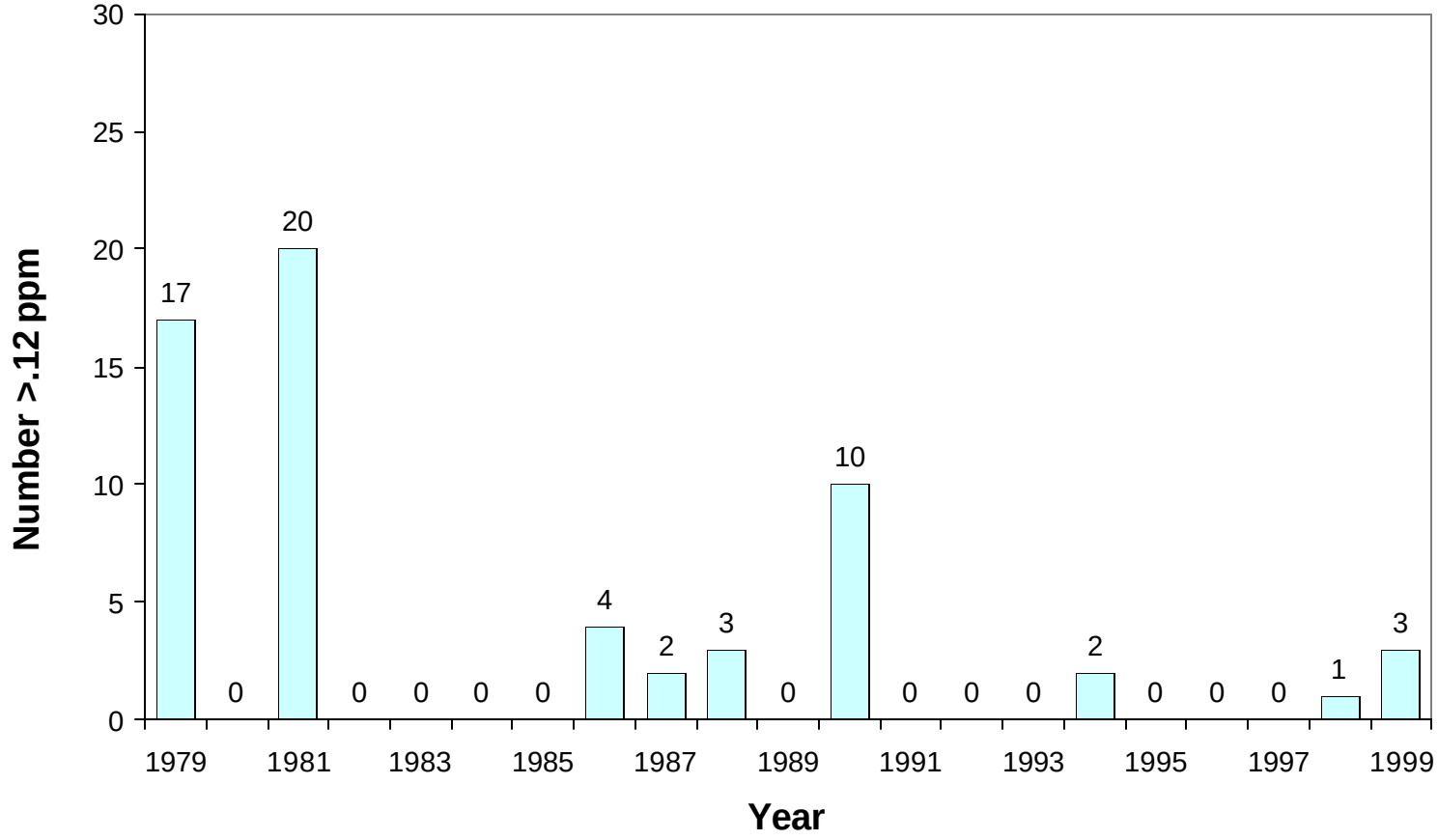
Number of Observations Above Standard: 1979 - 1999



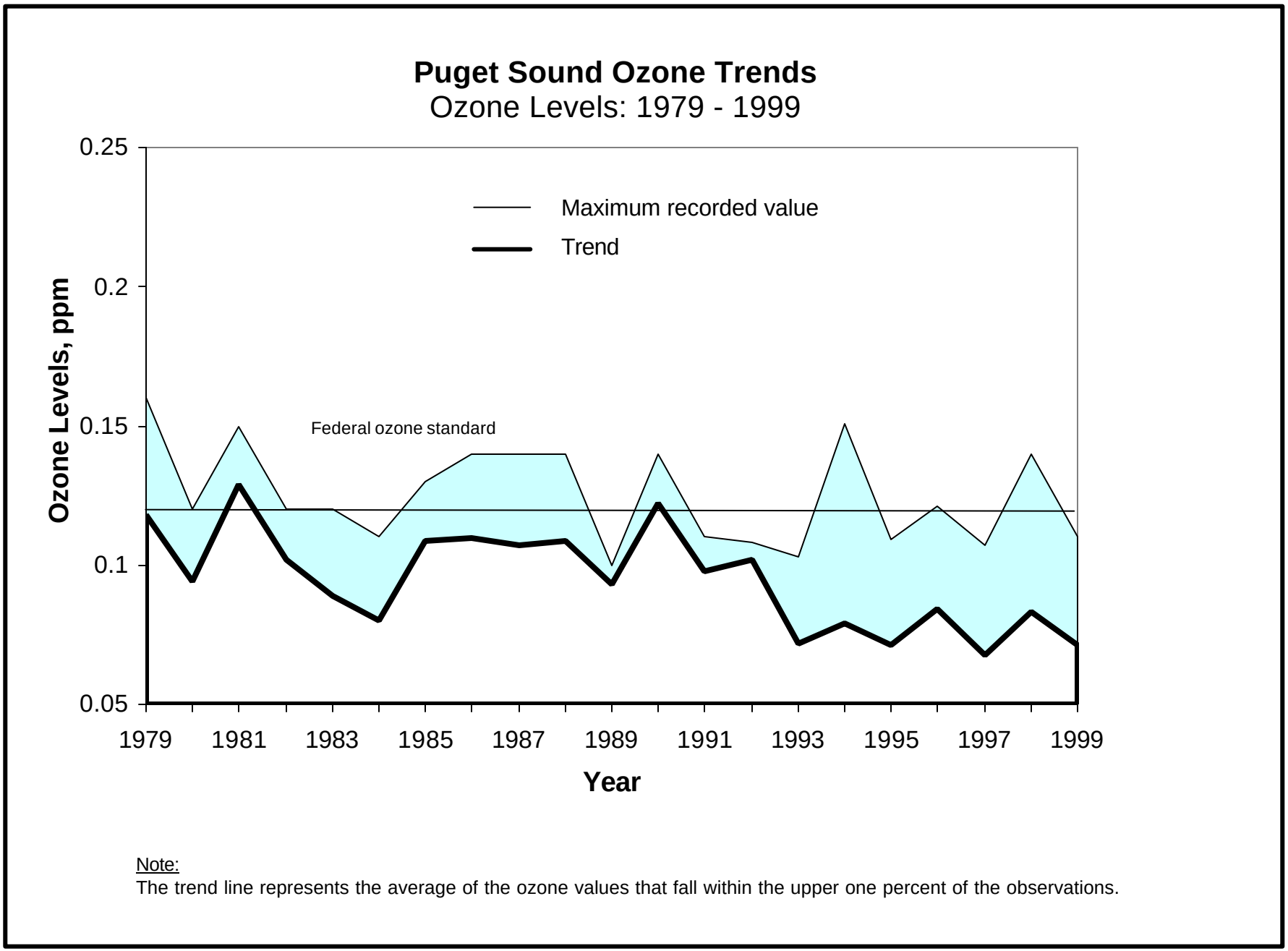
Note:
More than three observations above the .12 ppm during a three-year period is a violation of the federal ozone standard.

Puget Sound Ozone

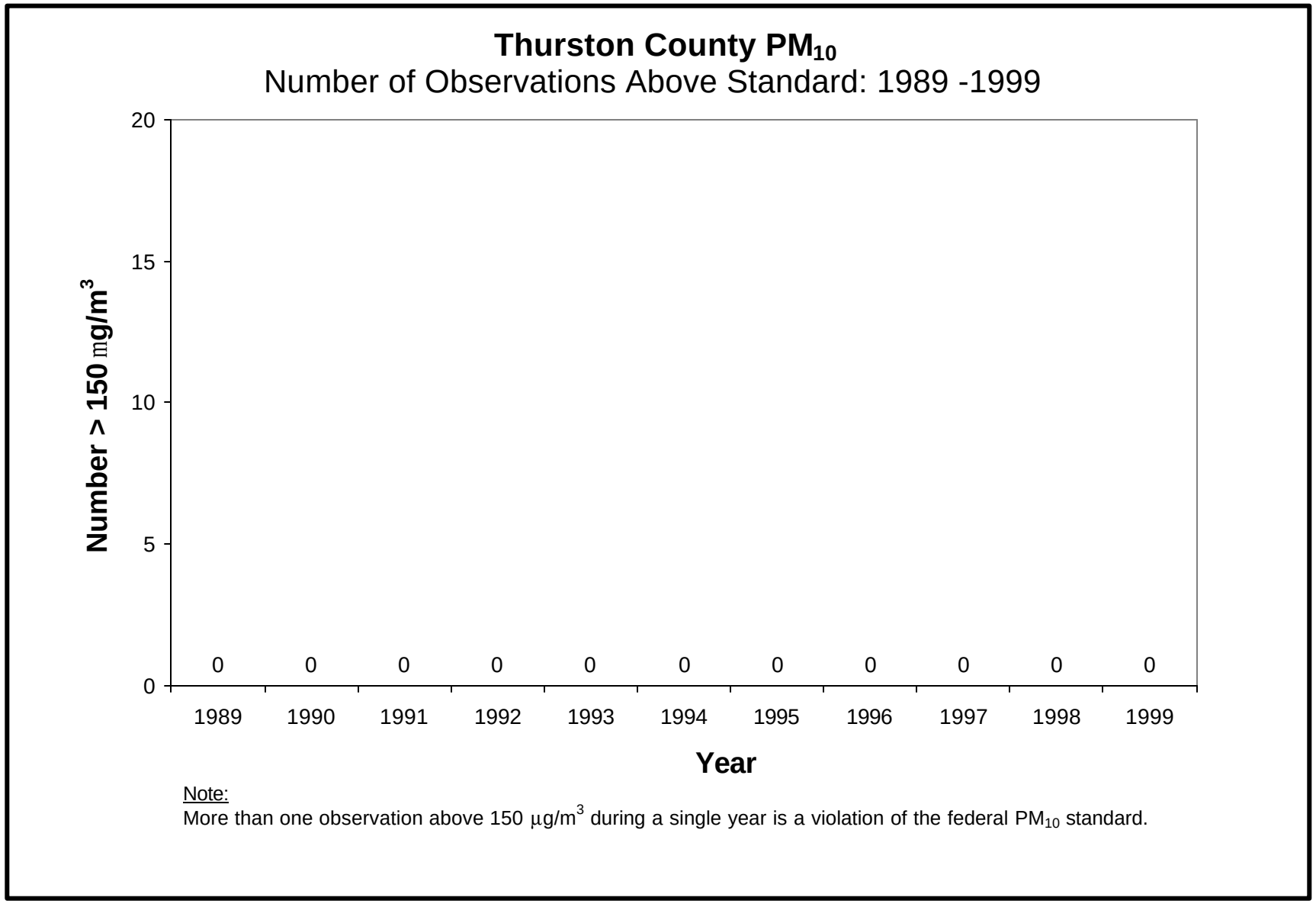
Number of Observations Above Standard: 1979 - 1999

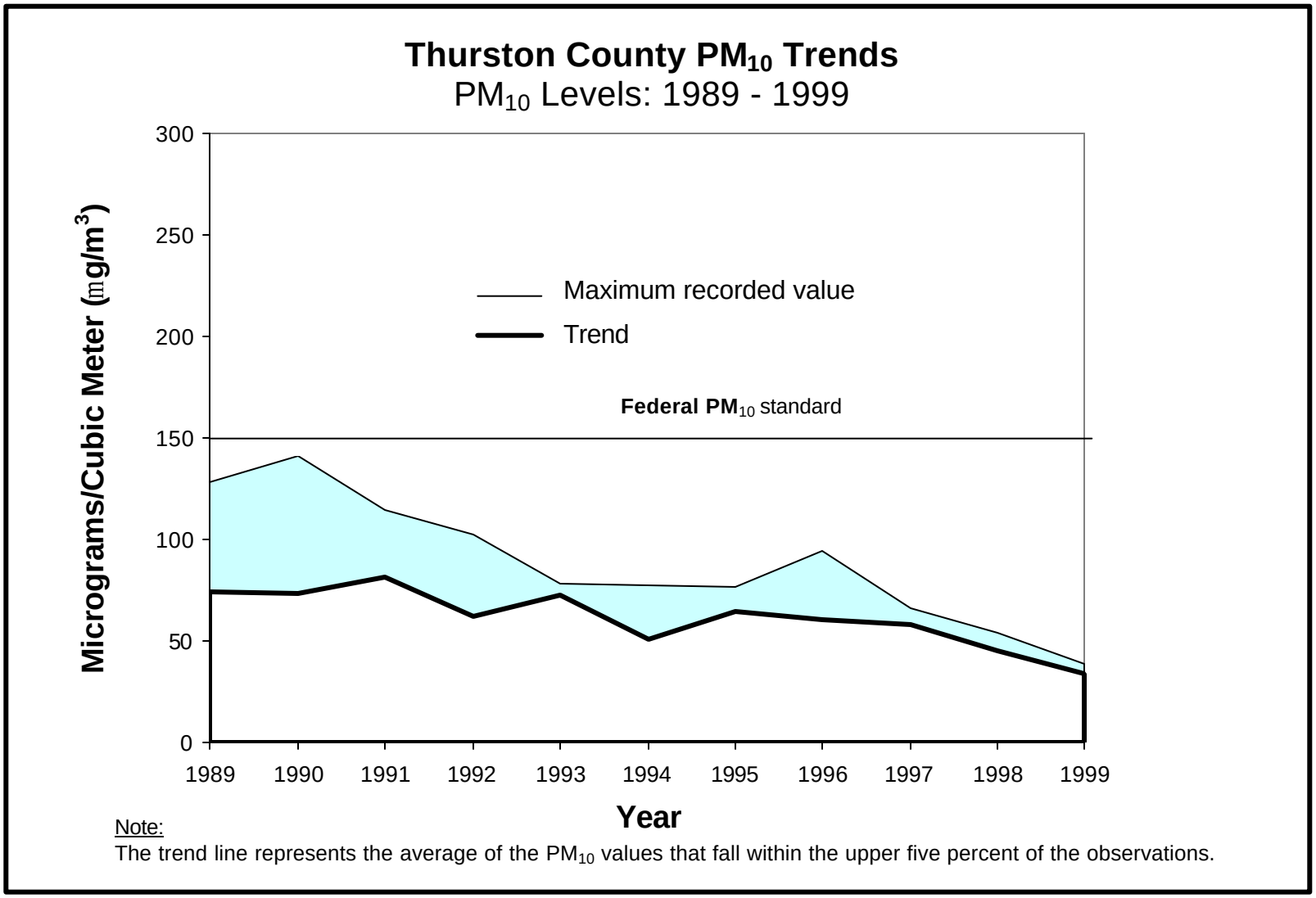


Note:
More than three observations above the .12 ppm during a three-year period is a violation of the federal ozone standard.



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

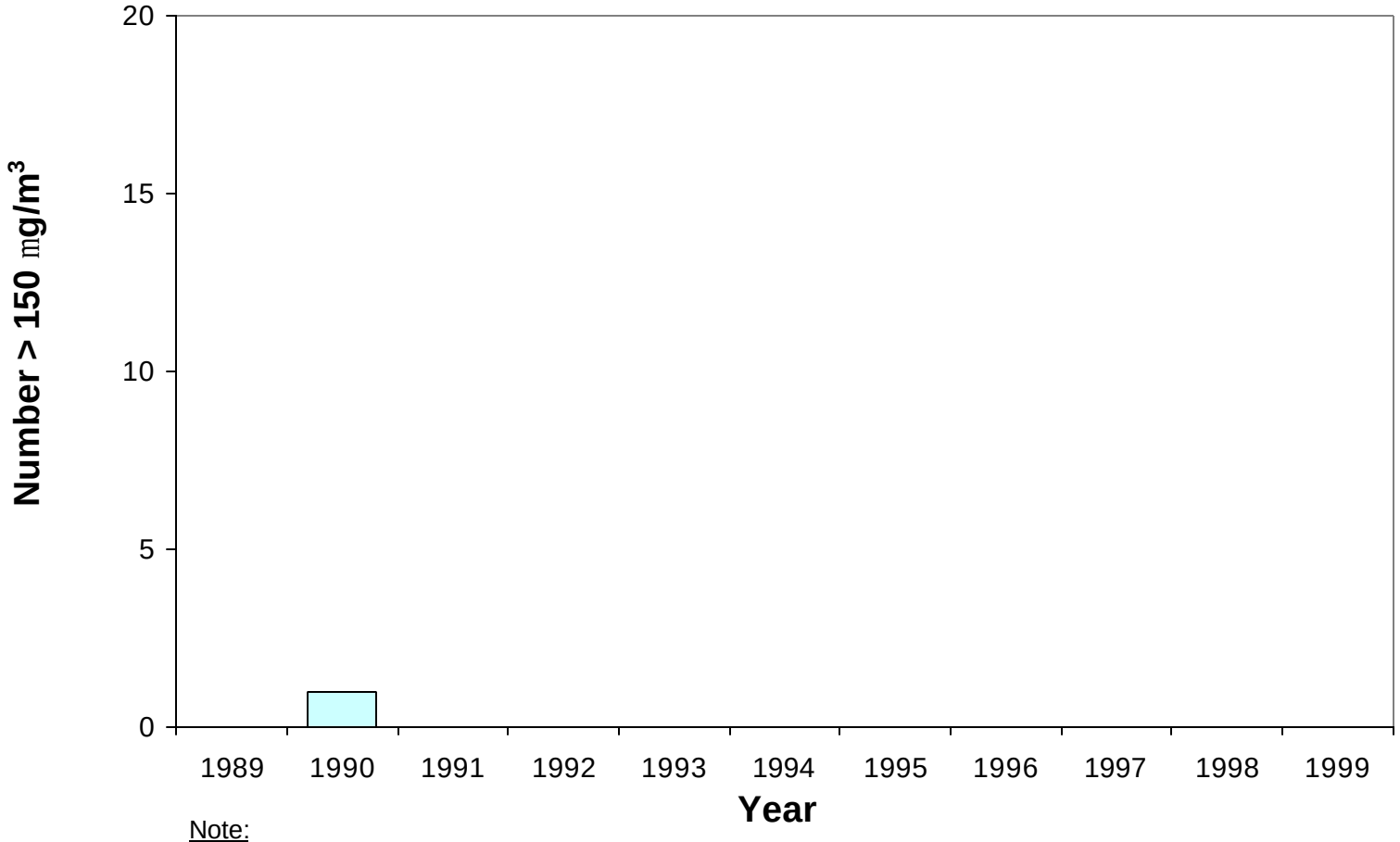

Thurston County PM10
Number of Observations Above Standard: 1989 -1999
Number > 150 mg/m3
20
15
10
5
0
0 0 0 0 0 0 0 0 0 0 0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
Year
Note:
More than one observation above 150 μg/m3 during a single year is a violation of the federal PM10 standard.



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

Tacoma Tideflats PM_{10}

Number of Observations Above Standard: 1989 - 1999

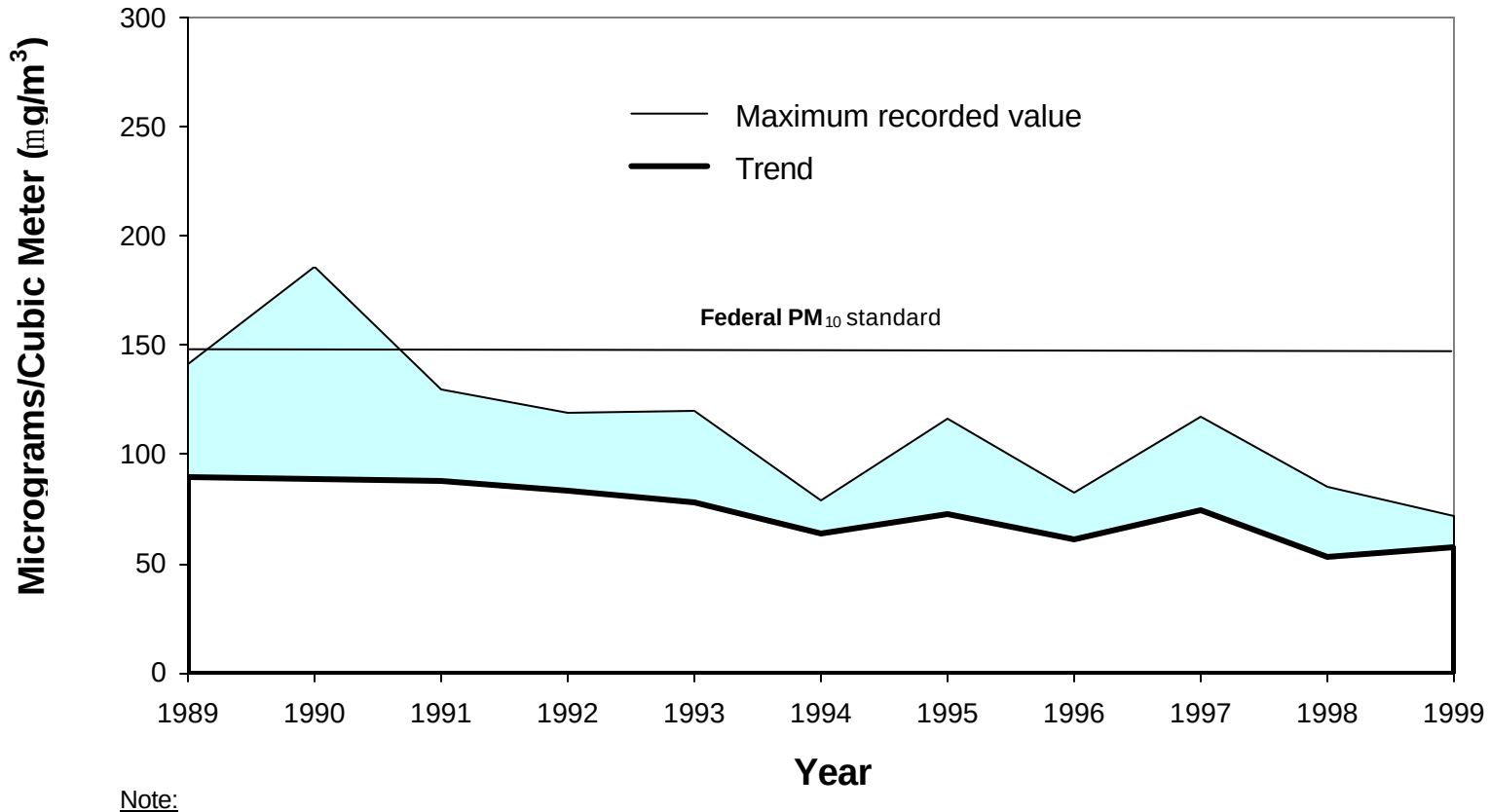


Note:

More than one observation above 150 $\mu g/m^3$ per year is a violation of the federal PM_{10} standard.

Tacoma Tideflats PM_{10} Trends

PM_{10} Levels: 1989 - 1999

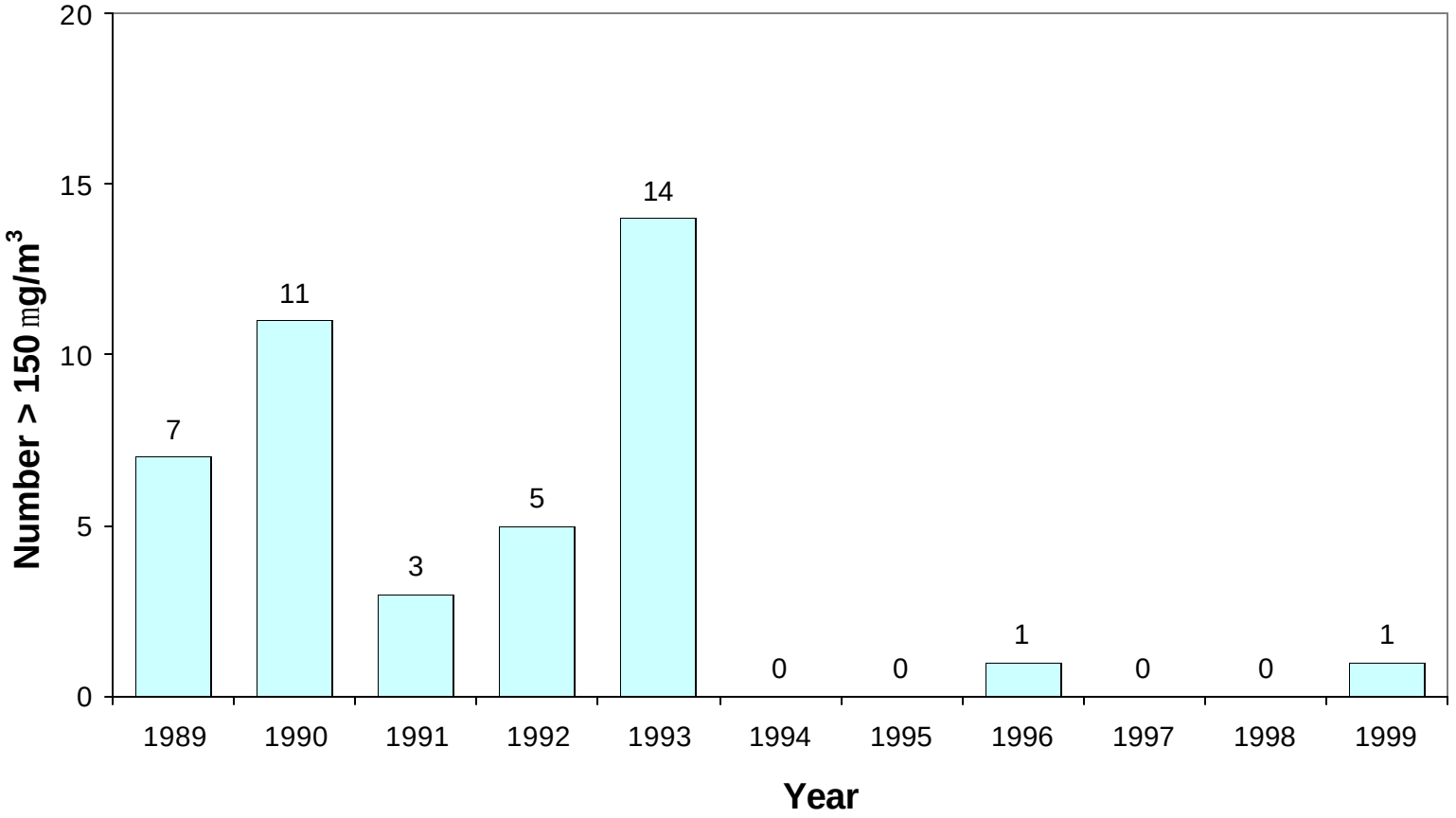


Note:

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

Spokane PM_{10}

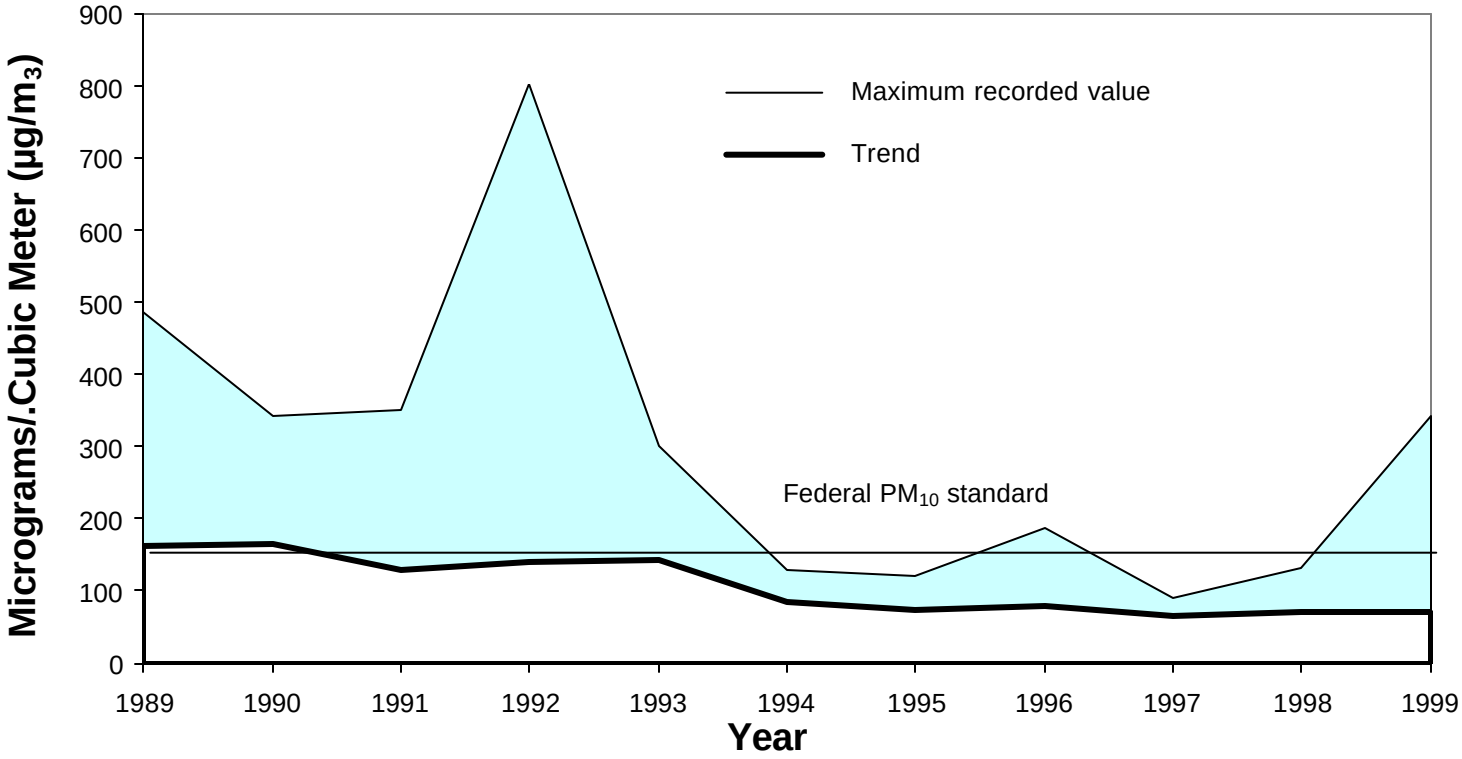
Number of Observations Above Standard: 1989 - 1999



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

Spokane PM_{10} Trends

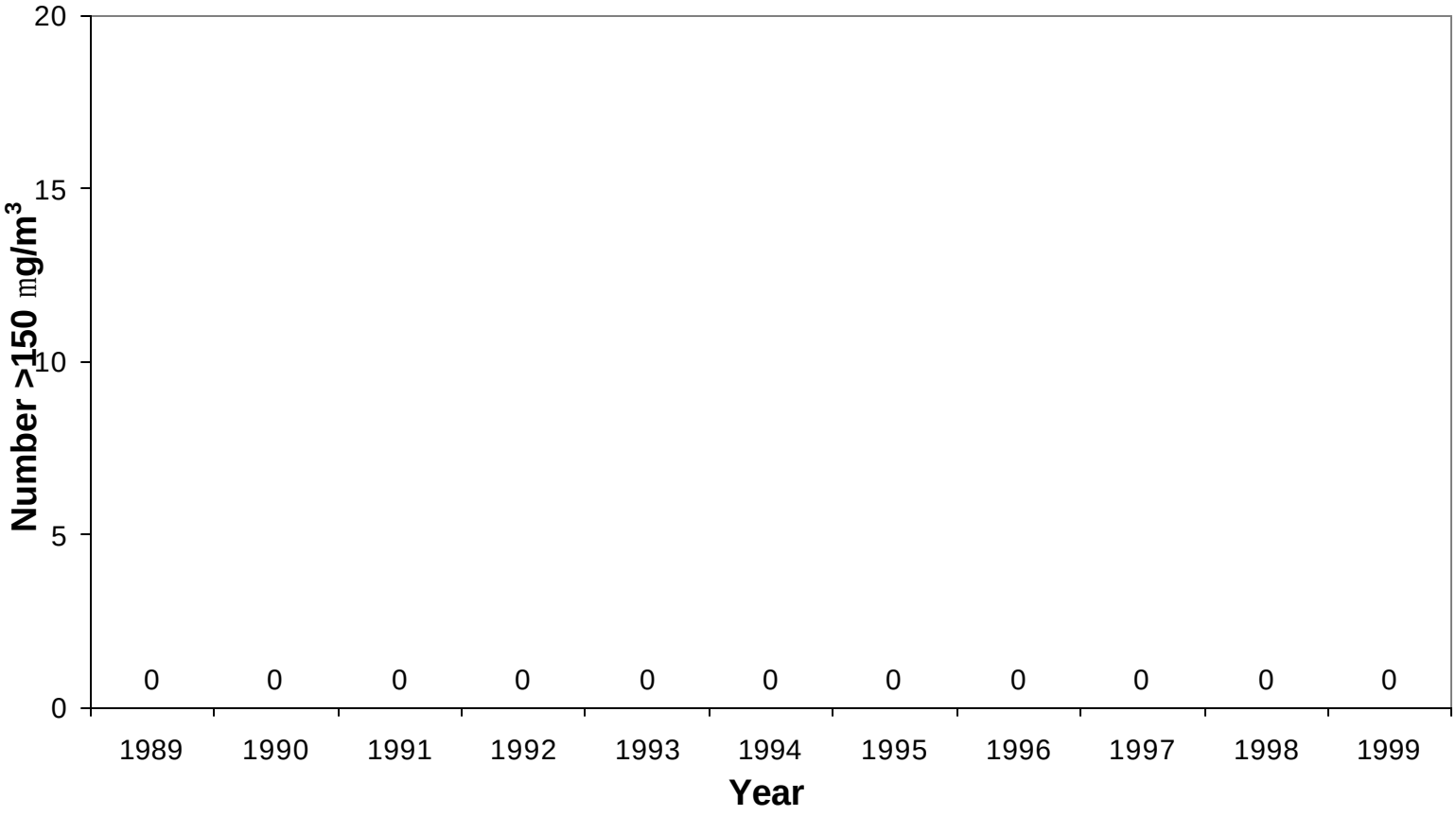
PM_{10} Levels: 1989 - 1999



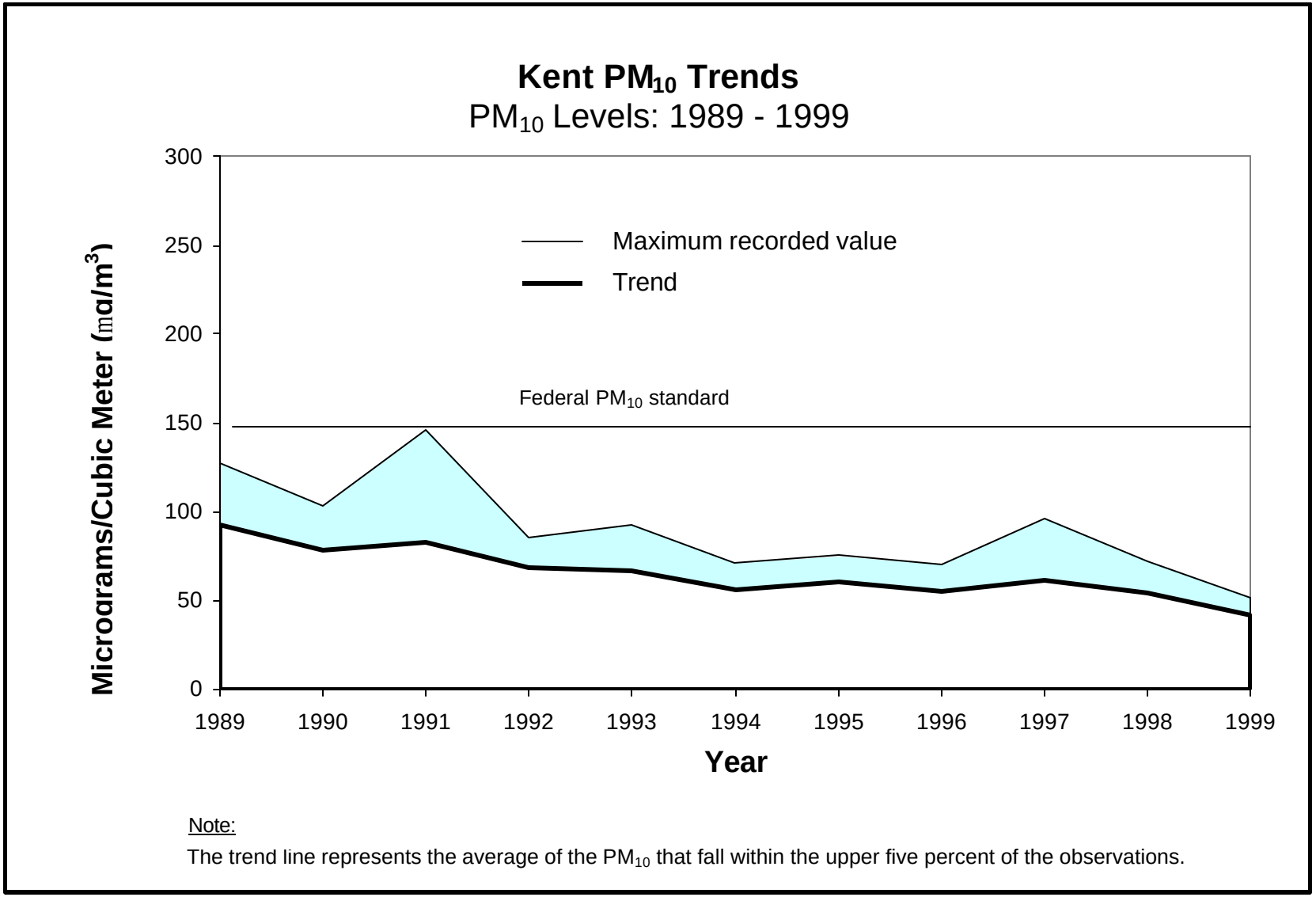
Note:
The trend line represents the average PM_{10} values that fall within the upper five percent of the observations.

Kent PM_{10}

Number of Observations Above Standard: 1989 - 1999



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

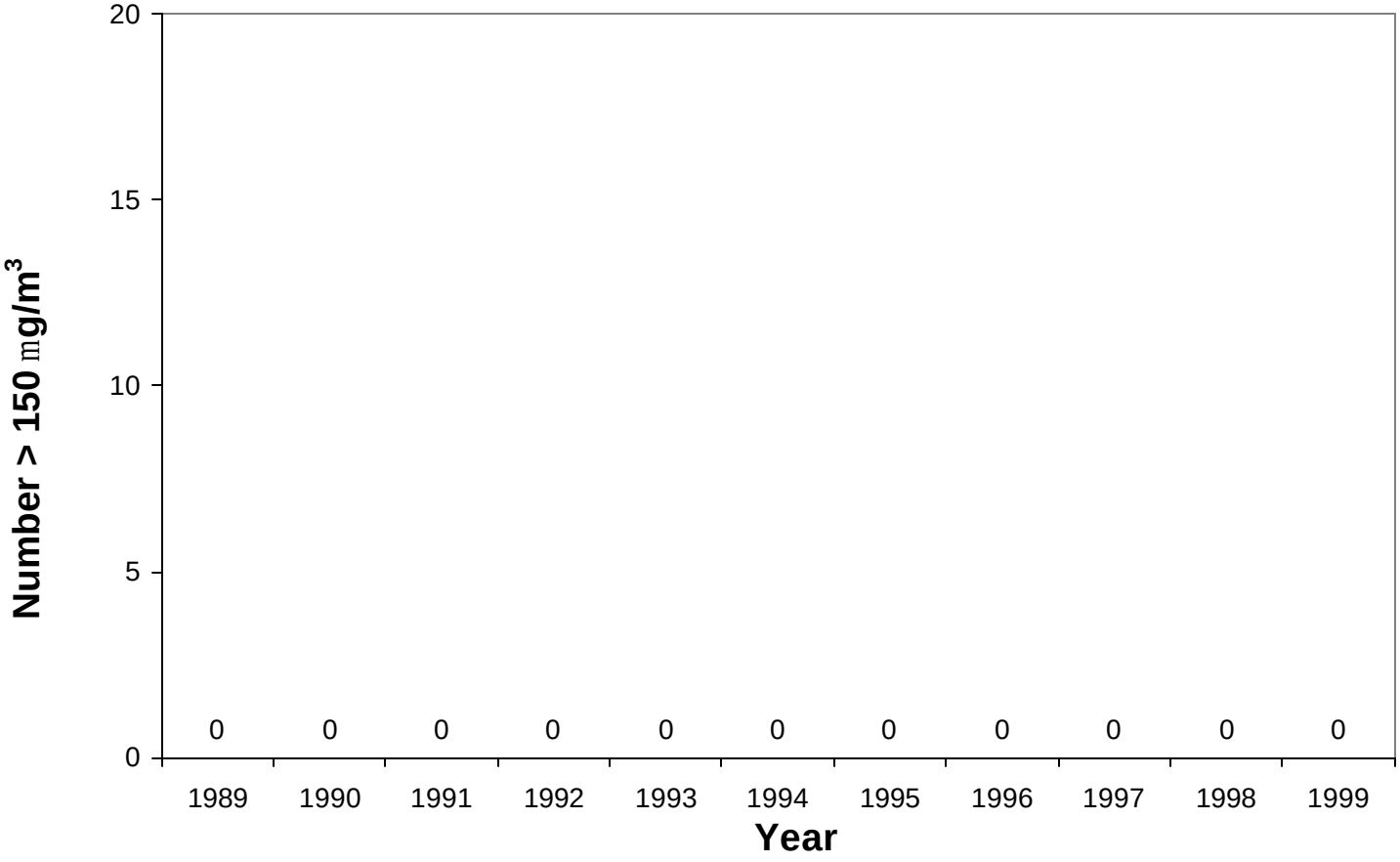


Note:

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

Seattle-Duwamish PM_{10}

Number of Observations Above Standard: 1989 - 1999

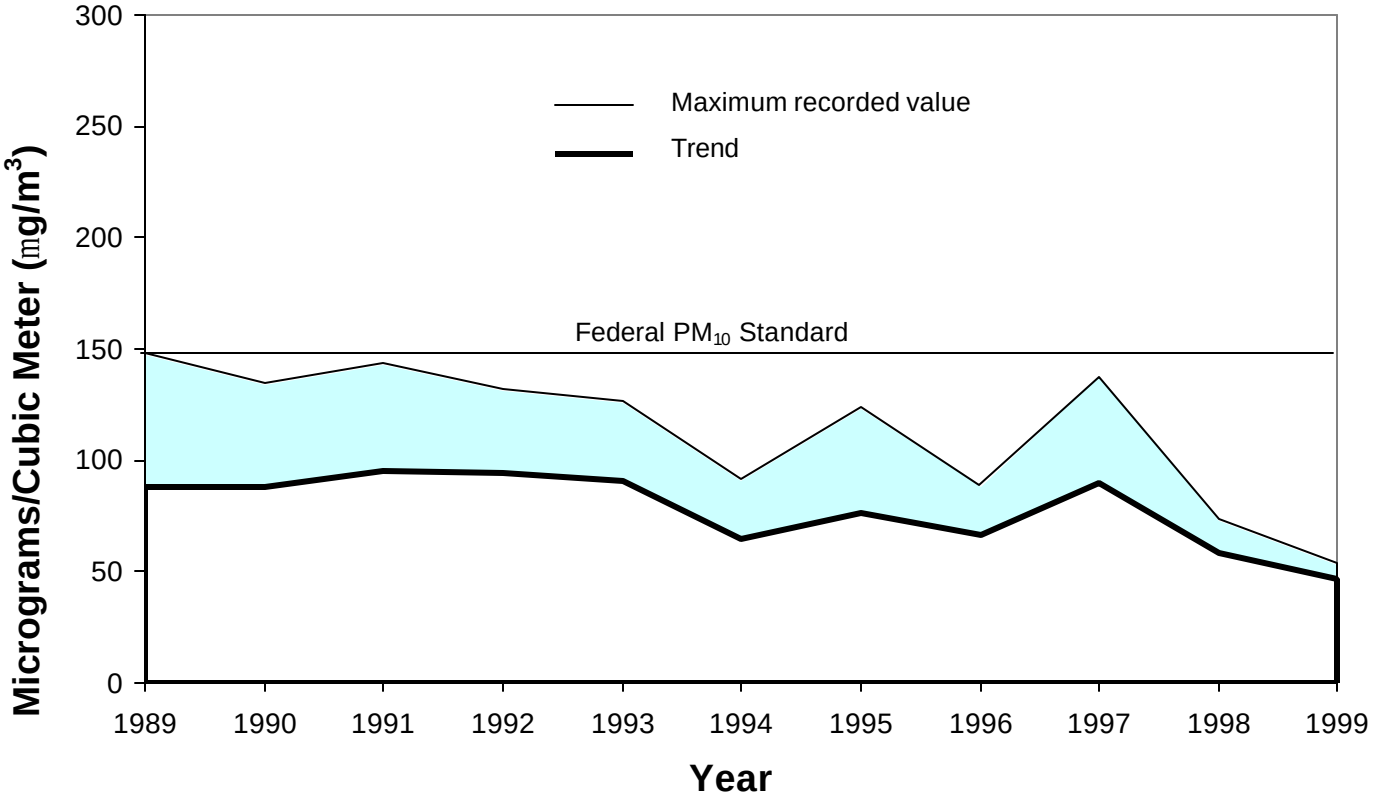


Note:

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

Seattle – Duwamish PM_{10} Trends

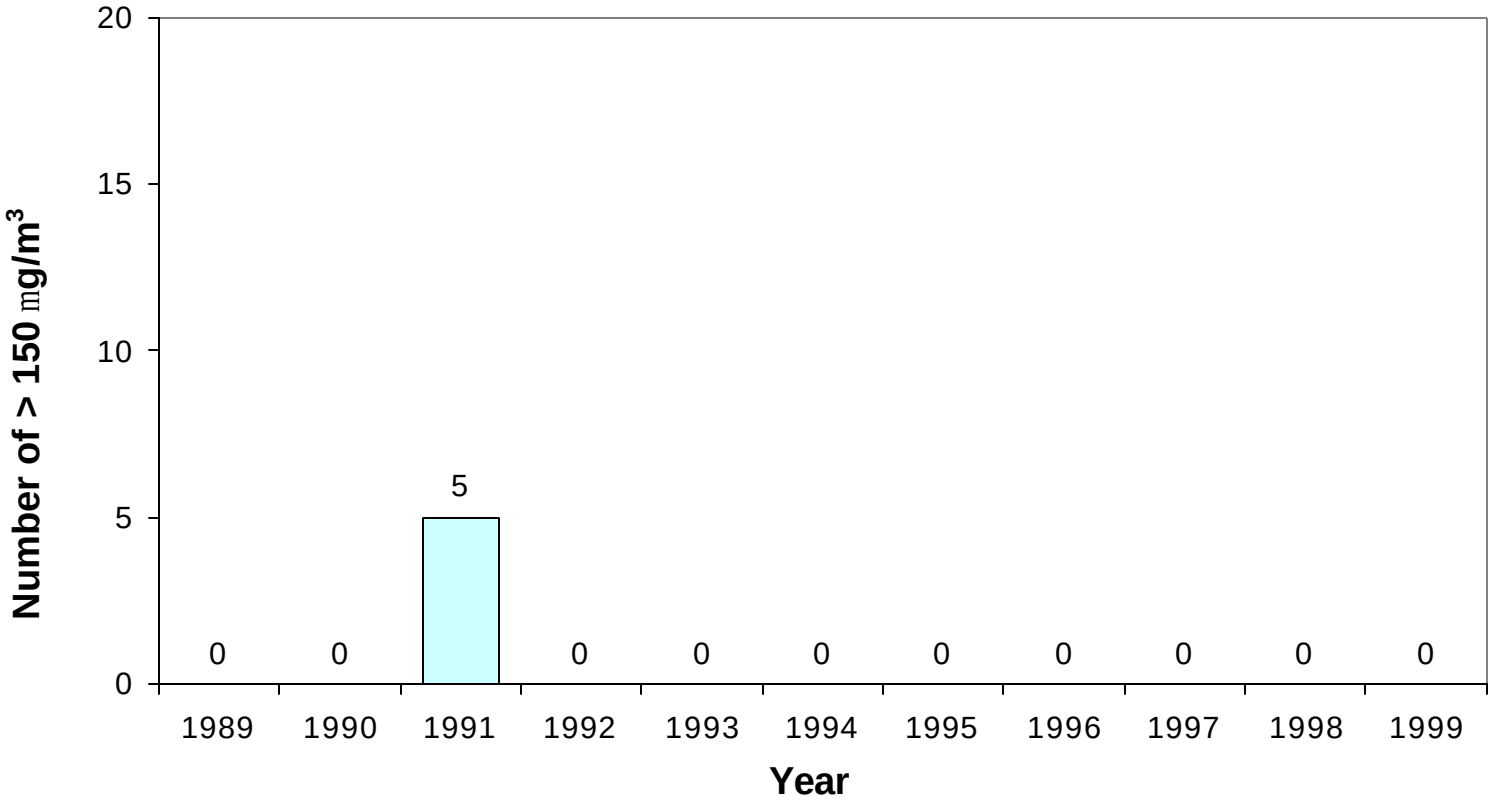
PM_{10} Levels: 1989 - 1999



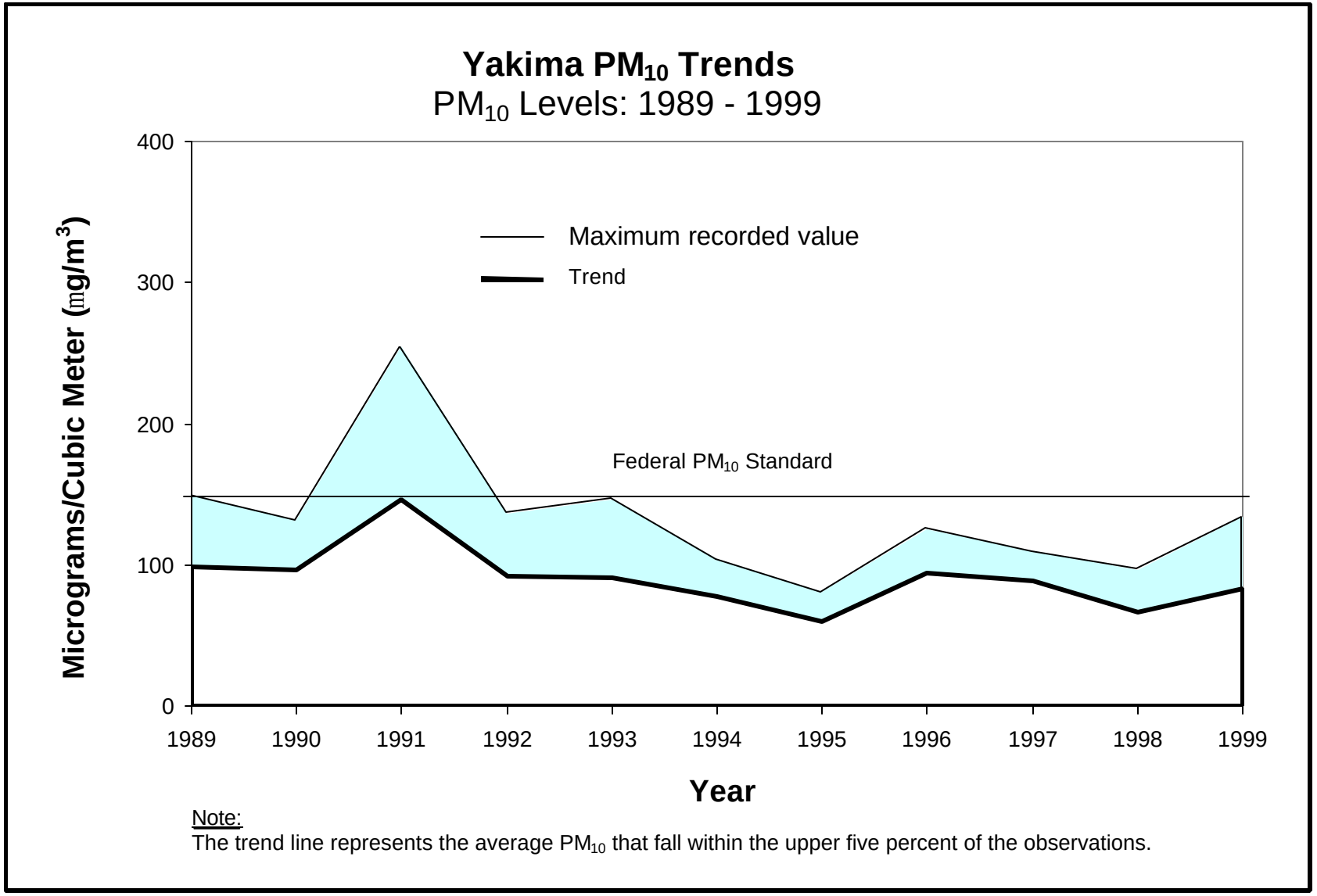
Note:
The trend line represents the average of the PM_{10} that fall within the upper five percent of the observations.

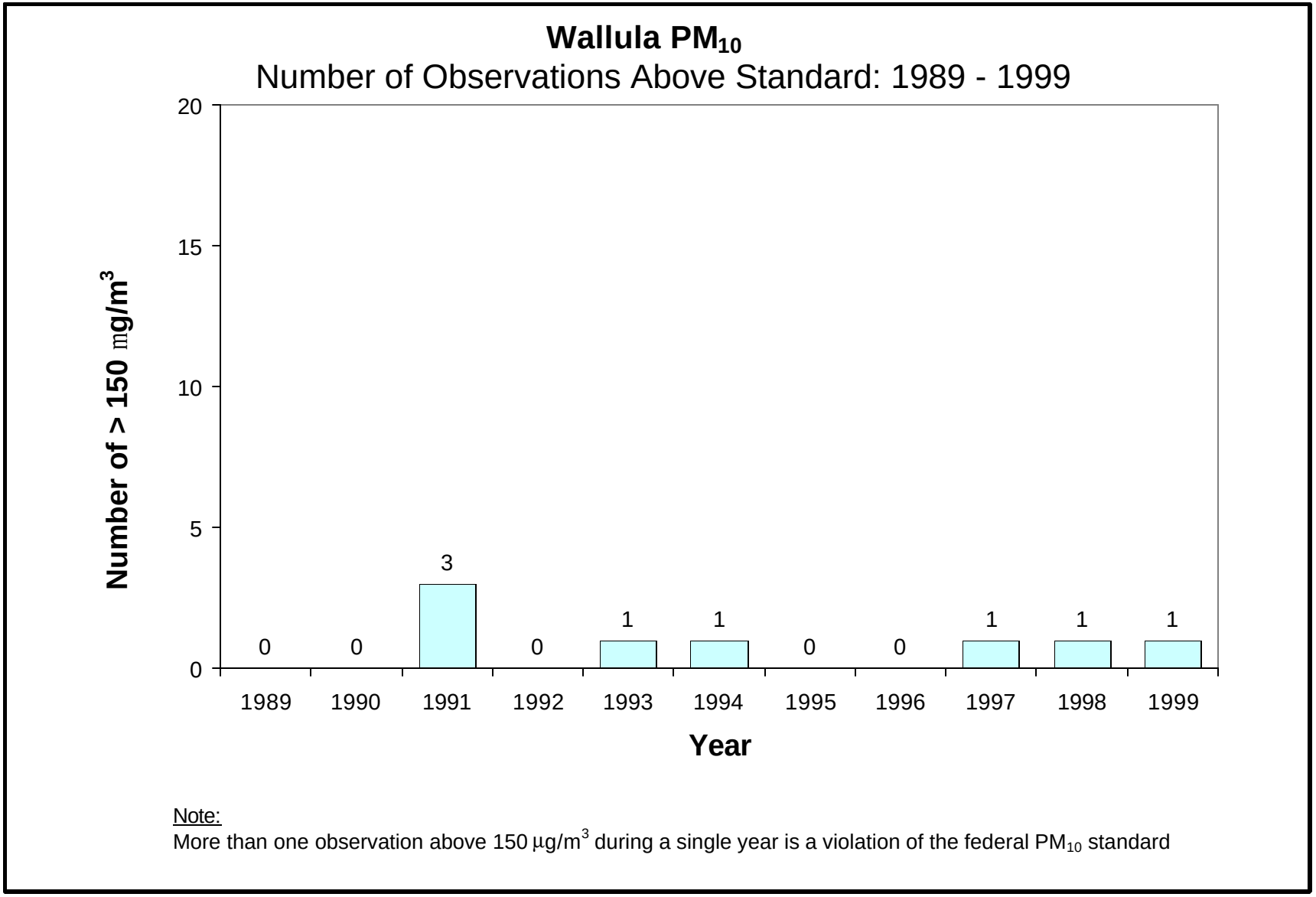
Yakima PM_{10}

Number of Observations Above Standard: 1979 - 1999



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

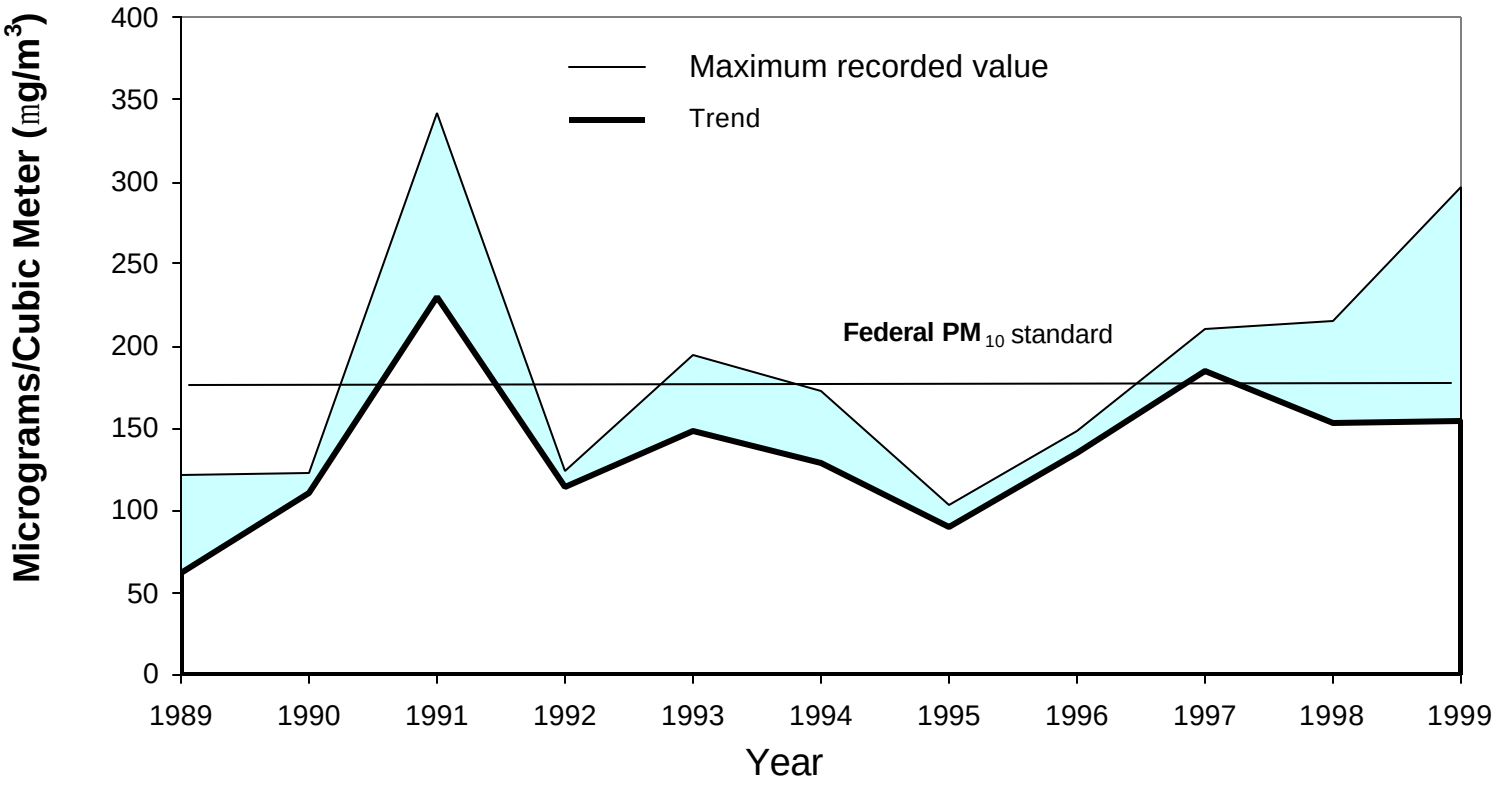

Yakima PM10 Trends
PM10 Levels: 1989 - 1999
Micrograms/Cubic Meter (mg/m3)
400
300
200
100
0
Maximum recorded value
Trend
Federal PM10 Standard
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Year
Note:
The trend line represents the average PM10 that fall within the upper five percent of the observations.



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

Wallula PM_{10} Trends

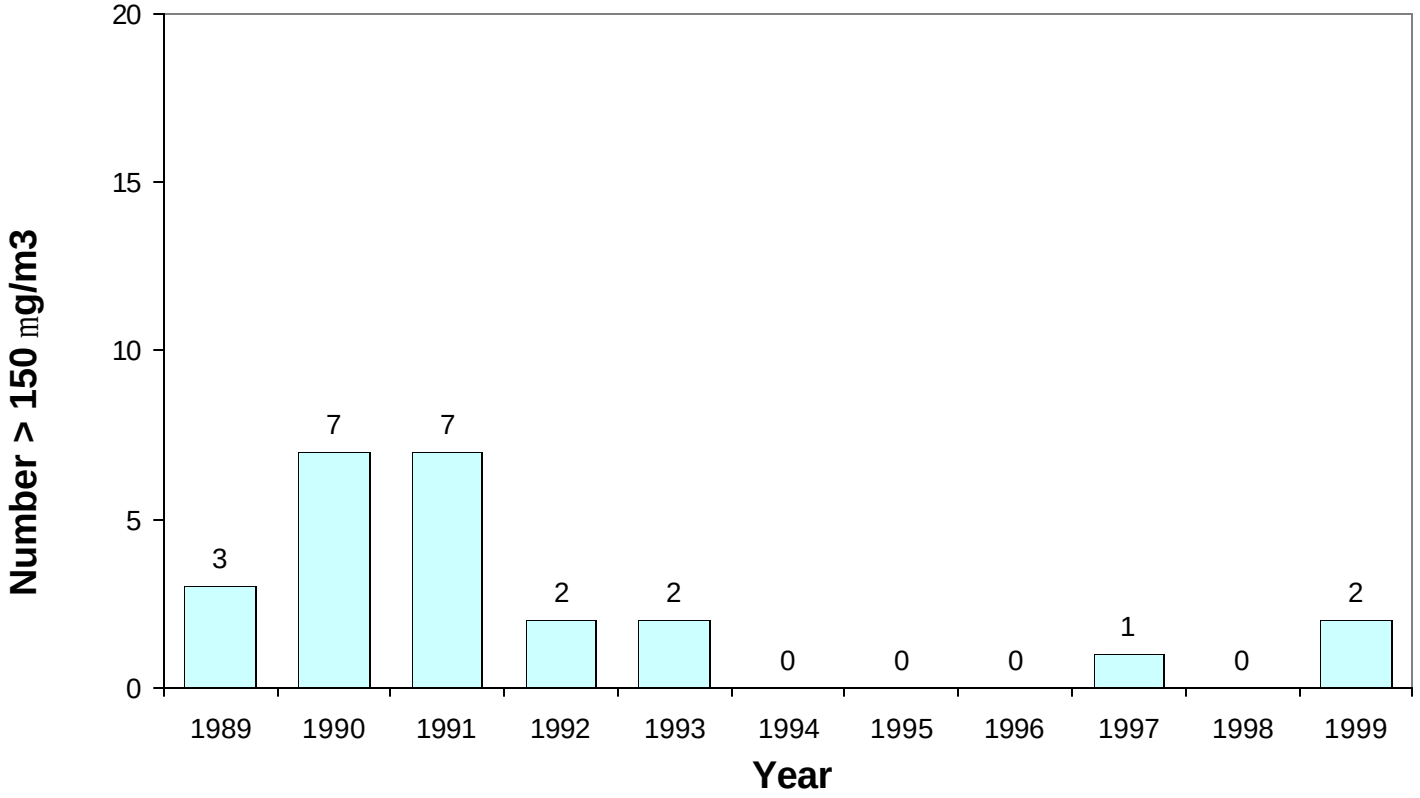
PM_{10} Levels: 1989 - 1999



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

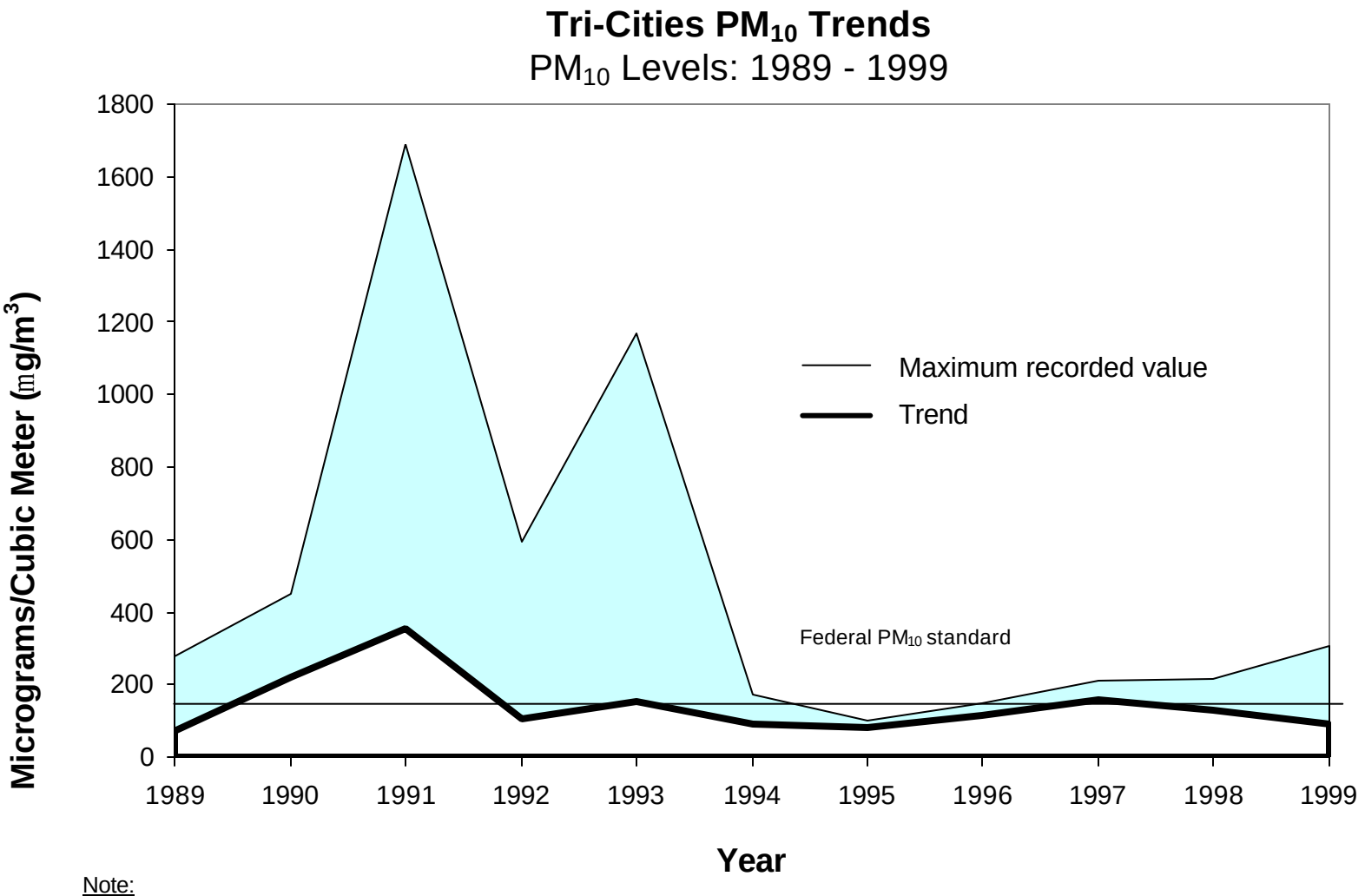
Tri-Cities PM_{10}

Number of Observations Above Standard: 1989 - 1999



Note:

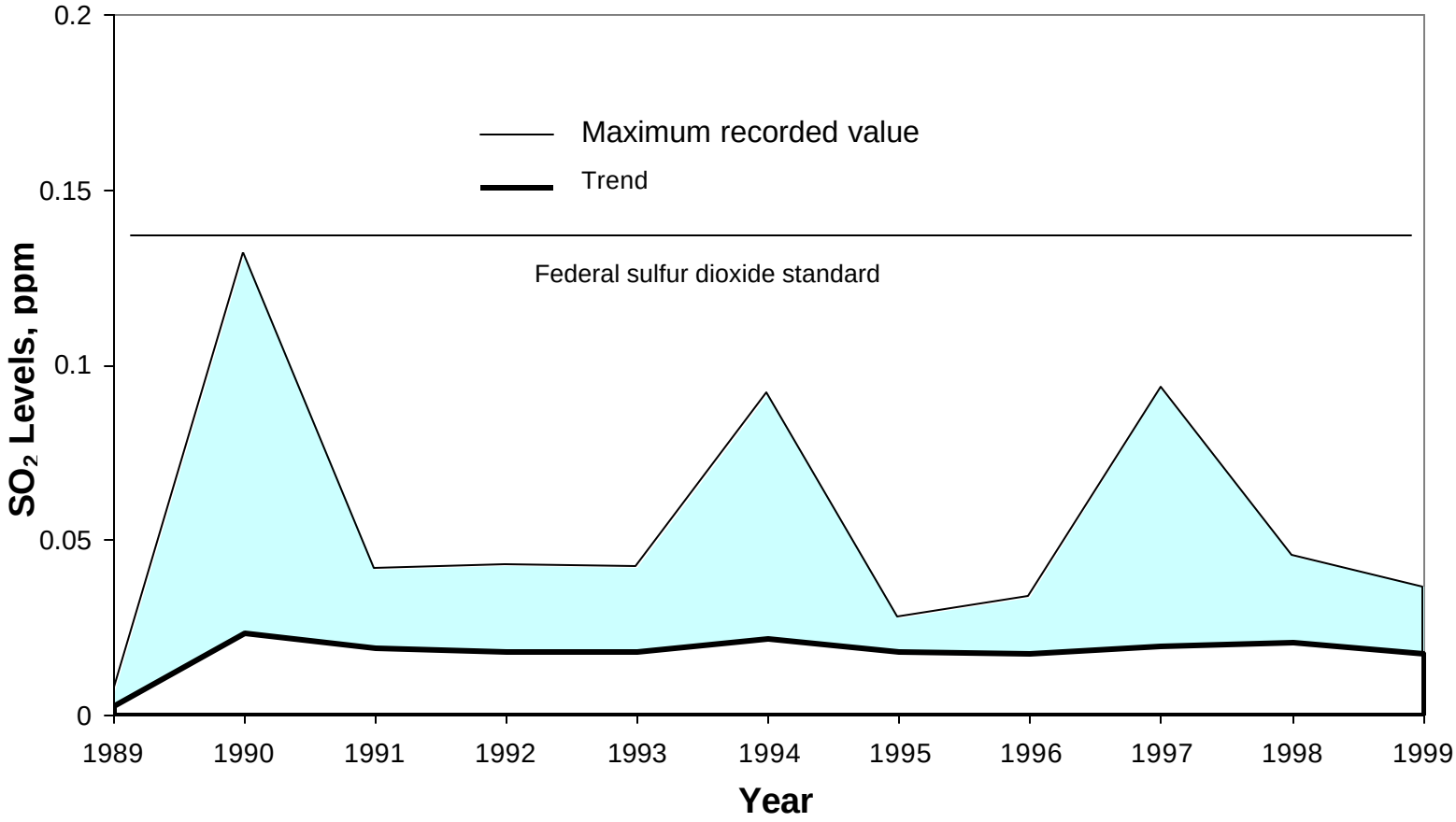
More than one observation above 150 µg/m3 during a single year is a violation of the federal PM_{10} standard.



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

Bellingham-Anacortes Sulfur Dioxide Trends

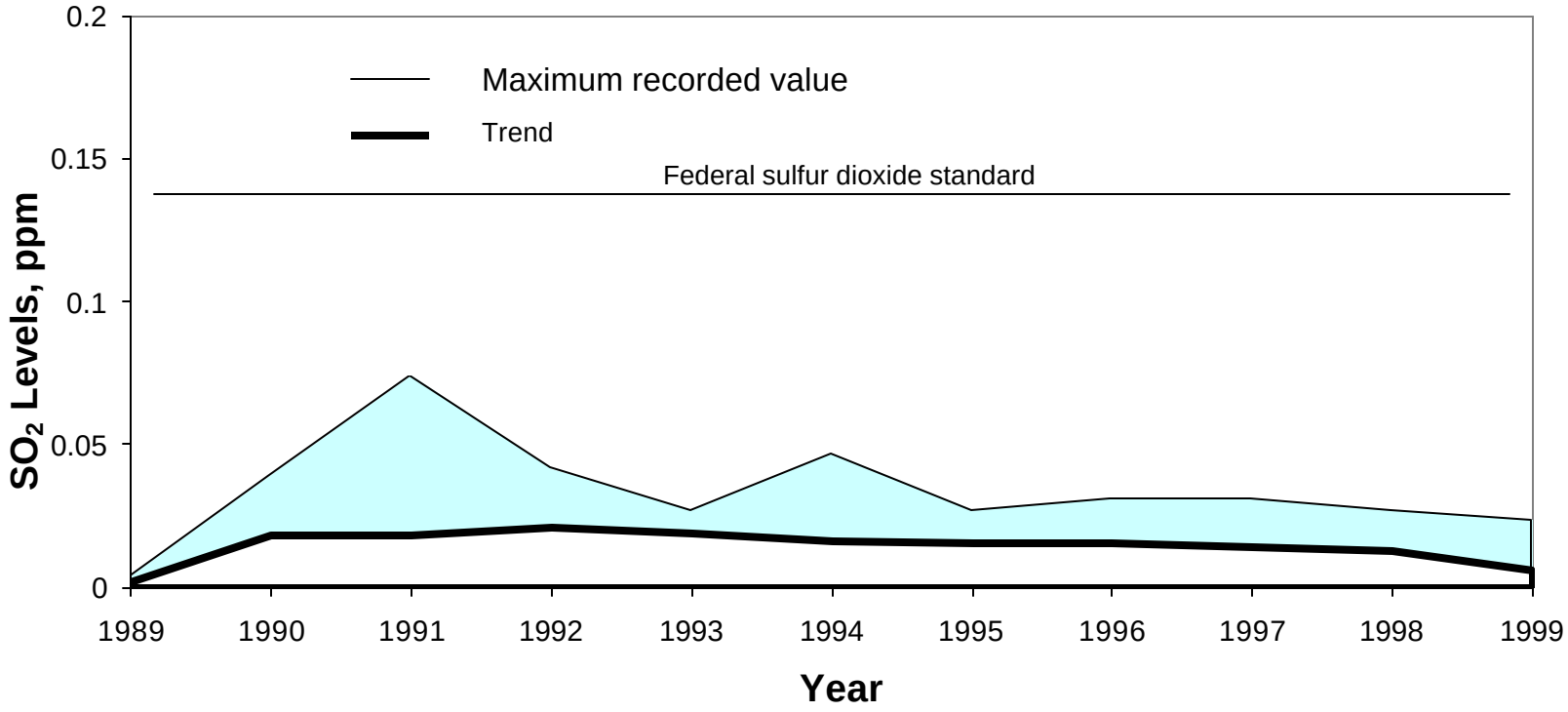
Sulfur Dioxide (SO_2) Levels: 1989 - 1999



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: 1989 - 1999



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

1999 Highlights

Motor Vehicles

The main cause of poor air quality in Washington is motor vehicle exhaust, which contains many toxic pollutants. Motor vehicles are major contributors to carbon monoxide and ozone pollution. Because of this high contribution of pollution from motor vehicles, no action that we take on a daily basis carries more environmental impact in our state than the use and maintenance of our cars. Ecology was involved in several efforts during 1999 focusing on preventing and reducing air pollution from motor vehicles.

The Emission Check Program

Washington's Emission Check Program applies to vehicles registered in areas that have experienced carbon monoxide or ground-level ozone problems largely due to motor vehicles. This includes urban areas of King, Pierce, Snohomish, Spokane, and Clark counties. The Emission Check Program helps reduce air pollution from motor vehicles by identifying the most polluting vehicles and requiring their repair. An emission check measures carbon monoxide and hydrocarbons (partially burned gasoline) from gasoline vehicles and smoke levels from diesel vehicles. If excessive levels of these pollutants are found the vehicle must be repaired.

Cars await testing at one of Washington's 20 Emission Check stations.

Program changes in 1999

In 1999, in response to a law passed by the 1998 legislature, Ecology changed the Emission Check Program to exempt vehicles less than five and older than 25 years old from testing. Since newer cars now have much more efficient air pollution controls, they don't usually need to be tested. And cars older than 25 years old are often unable to meet emission standards without costly repairs. As a result of this change to the program, about 15-20 percent fewer paid emission tests are now being conducted. This translates into less revenue for running the Emission Check Program. Because state law requires that the funds Ecology uses to administer the program be recovered from the test fees collected, Ecology needed to offset this loss of test revenue by increasing the test fee from $12 to $15 effective December 31, 1999.

Also in 1999, Ecology successfully negotiated a contract extension with the test contractor, Envirotest, for operation of Washington's Emission Check stations. The amended contract allows Envirotest to retain a larger portion of the test fee. The additional money Envirotest receives helps pay for wage increases for test station employees to help reduce staff turnover and improve customer service. However, because this increase was not enough to cover all of the contractor's additional costs, it was necessary to reduce operating days and hours at the test stations, as well as the number of lanes available for testing. The amended contract will be in effect through June 2002.

How is the public affected by these changes?

The air quality benefits we receive from the Emission Check Program have not changed. Better staff retention, replacement and repair of testing equipment, and use of fewer and faster tests will help assure prompt service. However, customers now pay slightly more for an emission check. In addition, test stations are open for fewer hours and fewer lanes are available for testing. To date, these changes have not appeared to significantly affect customers because the hours that were cut were those when the fewest vehicles were typically tested. Similarly, the decreased number of lanes does not appear to be resulting in longer wait times since the tests that are now used are quicker than the tests previously used.

Program results

The Emission Check program reduces air pollution levels in Washington by about 146,400 tons each year. During 1999, the contractor that conducts emission tests in Washington conducted a total of 1,213,353 tests. A total of 1,027,523 vehicles passed, either on the initial test or on a retest.

For more Emission Check Program data, see the charts in the Appendices.

Travel and land use

Today's cars are much cleaner than the cars of 30 years ago, due to improvements in emission control technologies. Despite this progress, along with the air quality benefits we receive from the Emission Check Program, motor vehicles remain the top polluter of our air in Washington. Each year we see more cars on the road, traveling more miles. Cars have to pollute less per mile just to offset this growth.

Transportation systems and the types of communities we live in can have a significant influence on how much and how efficiently we drive. They are, in turn, dictated by land use philosophies, particularly in urban areas. Picture your community: are workplaces, schools, banks, and grocery stores compact, close, and easily accessible to residential areas? Or are services and places of employment sprawled over a wide area, requiring you to drive almost everywhere you need to go? Land use measures such as curbing sprawl and increasing the density of residential areas can be an effective way to reduce the amount of driving people do and, ultimately, the amount of air pollution contributed by motor vehicles.

In 1999, Ecology participated in the "Land Use, Travel Behavior and Vehicle Emissions Project," which successfully identified that urban land use decisions have a direct and significant impact on travel behavior and vehicle emissions. As a result of this project, information is being provided to state, regional, and local transportation and growth management agencies on making air quality a part of growth management and regional transportation planning.

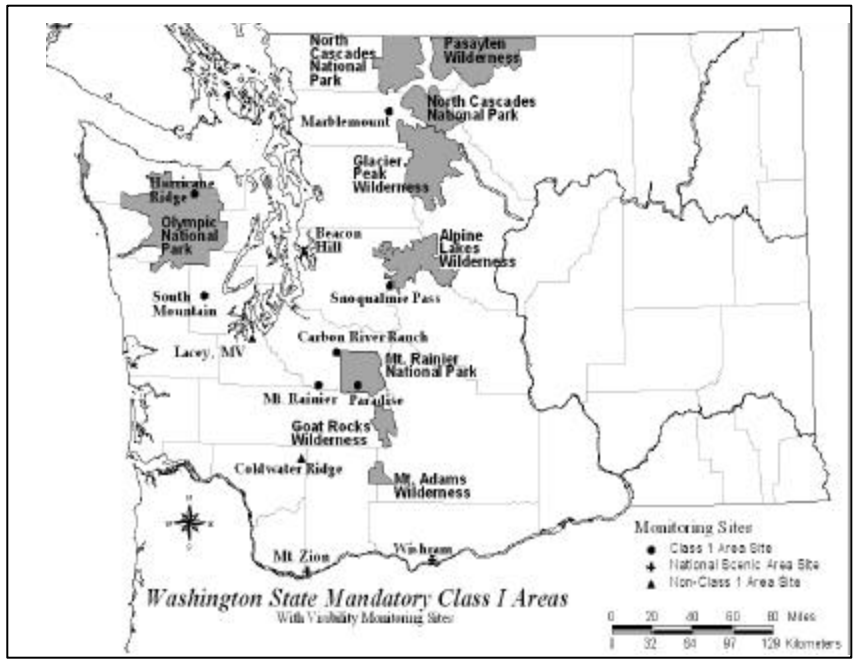
Ecology also completed an assessment of Washington's program to ensure that transportation plans, programs, and projects do not worsen air quality in the state. The assessment determined that transportation programs in Washington for 2001-2002 will not affect air quality.

Visibility

Is what you see really what you get? You can't always tell whether or not the air is clean just by the way it looks. However, on a cloudless day, one easy way to judge air quality is to look at how clearly scenic views or landmarks can be seen. The clarity of the air, or visibility, is affected by natural and human-caused materials in the air such as fine particles of soot or dust, sulfates, and nitrates. These materials alter visibility by changing the way light is transmitted through the atmosphere. Distant objects appear veiled by a haze that reduces both color and brightness. Even the gases that make up the air we breathe can affect visibility by scattering light this way.

The federal Clean Air Act created eight mandatory "Class 1" areas and requires that visibility in these areas be protected. In Class 1 areas (usually national parks and wilderness areas), there are restrictions on use of land and resources to prevent damage to visibility, plants and soil, and other resources. Washington's mandatory Class 1 areas are shown in the map, opposite. Federal strategy calls for a two-phased approach to protecting visibility: Phase 1 addresses impaired visibility in mandatory Class 1 areas resulting from distinct plumes from large, easily identifiable sources. Phase 2 addresses regional haze, which is the widespread impairment of visibility resulting from combined emissions of all sources.

Every three years, Ecology is required by federal regulations and the State Implementation Plan (SIP) to assess Washington's visibility protection program. The assessment determines how well the program is working to protect visibility in Class 1 areas. If progress cannot be shown, Ecology must identify additional actions to be taken. Ecology assessed Washington's visibility protection program in 1999, in consultation with the Federal Land Manager. The heart of this assessment was an analysis of monitoring data from mandatory Class 1 areas and emission data from sources; and identification of geographic regions and categories of sources that contribute to impaired visibility in Class 1 areas. The assessment showed that visibility in Washington's Class 1 areas has improved significantly over the past decade, and projected decreases in Phase 1 emissions for the next decade. As a result of these findings, Ecology did not recommend changing the Phase 1 SIP for visibility. However, new federal regional haze regulations, initiated in July 1999, will require a substantial revision to Washington's visibility SIP. The main difference will be the need to monitor, analyze, and plan for achieving progress in visibility improvement considering all sources of impairing pollutants, rather than just Phase 1 sources. Ecology will need to work with the Federal Land Manager to determine levels of natural visibility for each mandatory Class 1 area, determine the existing levels of visibility, and develop a plan to improve visibility from existing levels to natural levels in 64 years.



As part of the regional haze regulation, the national visibility monitoring network is being expanded so that every Class 1 area of the country has a monitoring site that characterizes its visibility. By spring 2001, all eight mandatory Class 1 areas in Washington will have a visibility monitoring site.

A study of ozone in southwestern Washington

Sometimes the area of the state having a problem with a particular air pollutant isn't even where the cause of the pollution is located. Ozone pollution, in particular, typically reaches its highest concentrations far from its urban sources. Breezes blow the "ingredients" of ozone (volatile organic compounds, nitrogen oxides, and other pollutants usually emitted by motor vehicles and industrial sources) toward rural areas and the mountains. Ecology's ozone monitoring program has recorded its highest dosages of ozone in the Cascade foothills, the Columbia River Gorge, and near Mount Rainier. Because of the way ozone moves through the air, people downwind from urban areas during clear weather can experience unhealthful concentrations of this pollutant. Ozone can also harm vegetation. The U.S. Forest Service and the National Park Service report that ozone has damaged trees, moss, and lichens in Mt. Rainier National Park and in Cascade forests and wilderness areas.

Vancouver, Washington and Portland, Oregon are part of a bi-state area that was nonattainment for ozone until it was redesignated as maintenance in 1997. In developing a maintenance plan to keep the area meeting the ozone standard, Ecology and the Southwest Air Pollution Control Agency (SWAPCA) found that industrial sources north of the area, in Longview, could potentially contribute to ozone in the maintenance area. In 1999, Ecology and SWAPCA contracted with Washington State University (WSU) to investigate the impact of emissions from these facilities on the Portland/Vancouver maintenance area.

The major industrial sources in Cowlitz County are two pulp mills, an aluminum smelter, and a synthetic chemical manufacturing facility. The study simulated an occurrence of ozone concentrations using actual emission levels from these facilities and weather patterns that occurred during an ozone episode in July 1996. The simulated event also reflected terrain and wind patterns in the area. Computer modeling was conducted using this data to determine whether reducing emissions from the Longview industrial sources would significantly affect ozone levels in the maintenance area.

Results of the study showed that emissions from the Longview industrial sources did not significantly contribute to ozone in the Vancouver maintenance area. Due to weather and topography conditions, these emissions are more of a factor further south in the Portland area.

In addition to providing information to help determine appropriate pollution control strategies for the Vancouver maintenance area, this study was an example of how a regional modeling system can be used to improve our knowledge about emissions and how they move through the air. This can lead to better air quality decisions.

Some of Washington's highest recorded ozone readings have occurred far from urban areas, in the Columbia River Gorge (top) and near Mount Rainier (bottom).

Outdoor burning restrictions

State law, in the form of the Washington Clean Air Act, has been changed several times since Ecology last revised its regulations for outdoor burning. The Air Quality Program has been working since 1996 to revise the outdoor burning regulations to make them consistent with the law. During 1999, the Outdoor Burning Advisory Committee met for the last time to consider all of the public comments received in five public workshops that were held on the draft rule revisions. Following a final recommendation from the committee, Ecology staff held a total of 12 public hearings on the final proposed regulations, considered comments, and prepared a Concise Explanatory Statement describing how staff addressed the comments received. The regulations were expected to be adopted in early 2000.

Why, when we've been burning outside for hundreds of years, is outdoor burning now such a health problem? Actually, smoke has always been a health problem. But our continuing population growth has made the problem worse because there are both more people burning, and more people breathing – a combination that has increased concerns about how the smoke from burning is affecting our health. Smoke contains carbon monoxide, particulate matter, sulfur dioxides, nitrogen oxides, and other toxic substances that are harmful to health. It also produces tiny particles that are inhaled deep into the lungs. Children, the elderly, pregnant women, and people with respiratory and heart conditions are particularly affected by exposure to smoke from outdoor burning.

As a result of the changes in the regulations, outdoor burning will no longer be allowed in most urban areas, starting in 2001. In rural areas where burning is still allowed, a permit is required. There are restrictions on what can be burned, size of burn piles, and times when burning is allowed. Ecology will be working with local agencies around the state to support them in developing alternatives to burning, such as chipping programs and composting and landfill options.

When the new outdoor burning regulations take effect, it will be illegal to burn in a burn barrel.

Agriculture and air quality

In contrast to previous years when almost 60,000 acres of grass fields were burned each year, only a few thousand acres are now permitted for burning each year. These are in areas with steep slops and other exceptional circumstances where alternatives to burning aren't practical. This reduction in field burning has greatly reduced the amount of smoke released into the air in eastern Washington.

The straw residue that can no longer be burned is baled and removed from the fields. In 1996 and 1997, much of this straw was sold as feed to local domestic markets. In 1998, alfalfa production was very high in relation to demand, and the resulting low price dried up the market for grass straw. A large amount of the 1998 straw was stockpiled for future use in feed export markets and an emerging strawboard production facility. However, substantial quantities have also been stacked on the sides of fields with no clear option for disposal or use.

In late 1998, Ecology formed a Straw Use Workgroup to evaluate options for using this unburned straw, and to promote the use of the most promising options. The evaluation was completed in 1999, and its results were published in a "Status Report on Alternative Uses for Grass Straw" in December 1999. In its evaluation, the workgroup first estimated the amount and location of straw resulting from reduced burning. Next, the group identified options for using straw, including landfills, incinerators, composting, and new markets that can use straw residue in commercial products and processes. The workgroup then identified conclusions and recommended several types of actions. The group also investigated grant and loan opportunities for individual farmers, groups of farmers, private enterprises, and government agencies to help them implement straw use options.

Bales of grass straw that can no longer be burned in the field sit piled at the side of many eastern Washington fields.

Reducing pollution through air quality permits

Ecology and local air quality agencies issue permits to control air pollution emitted by different sources such as plywood mills, aluminum smelters, dry cleaners, incinerators, and many others. Permits can include limits on emissions of specific pollutants, as well as requirements for monitoring, record-keeping, and reporting of compliance.

An air quality permit issued for a new incinerator in Pullman, Washington is an example of how permits can be used to reduce air pollution. Washington State University (WSU) in Pullman has a nationally renowned veterinary science school that conducts animal research, sometimes resulting in wastes that are medical, pathological, and/or radioactive at low levels. These wastes can't be disposed of by typical methods. To dispose of them more safely, WSU installed an incinerator in the late 1970s. When the Environmental Protection Agency (EPA) proposed federal rules covering incinerators in the mid-1990s, WSU applied for a Notice of Construction to construct a new incinerator with multiple air pollution controls. A Notice of Construction, or NOC, is a one-time permit that must be issued to any business or industry that emits air pollution and is being constructed or undergoing major modifications.

Ecology issued an NOC Approval Order, which included requirements for significant emissions testing, monitoring, record-keeping, and reporting. The Order also included the substantive requirements of the federal rule on medical waste incinerators. In 1999, an environmental activist organization appealed the NOC Approval Order to the Pollution Control Hearings Board, but the appeal was settled before being heard by the Board. WSU committed to better educate incinerator users about pollution prevention practices, and to securely store low-level radioactive wastes until their radiation levels decrease, then appropriately dispose of them.

As a result of the air quality permitting process, WSU has been able to install and operate a new, state-of-the-art incinerator that meets specific air quality emission limits. The new incinerator is currently undergoing trials and testing in order to assure its performance and establish appropriate operating conditions.

WSU's new incinerator is currently undergoing operational trials and source testing to assure its performance and establish appropriate operating conditions.

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 that exceed 5,000 acres, and all national parks that 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.

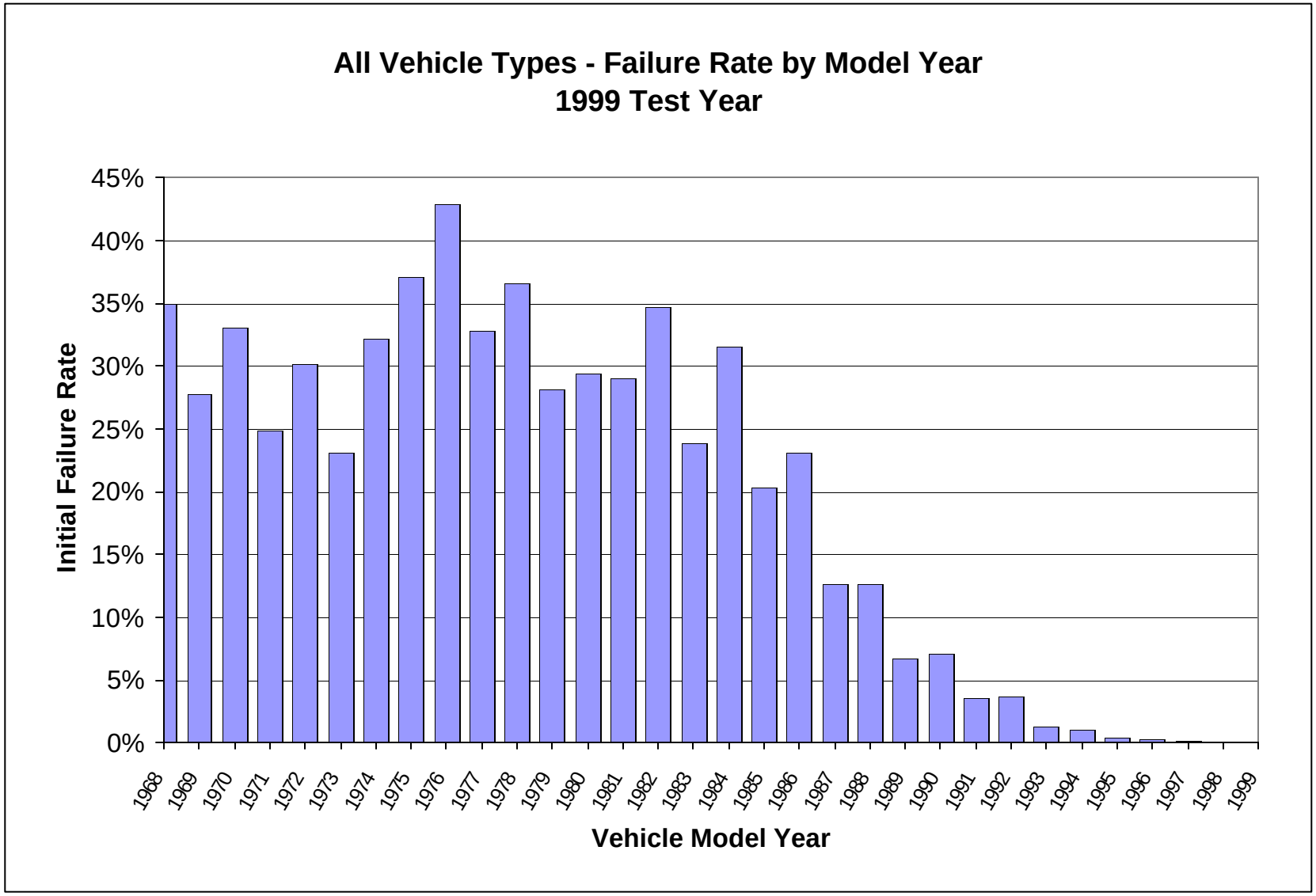
Maintenance plan: A plan developed by state and/or local air quality agencies to meet air quality standards in an area for at least a 10-year period.

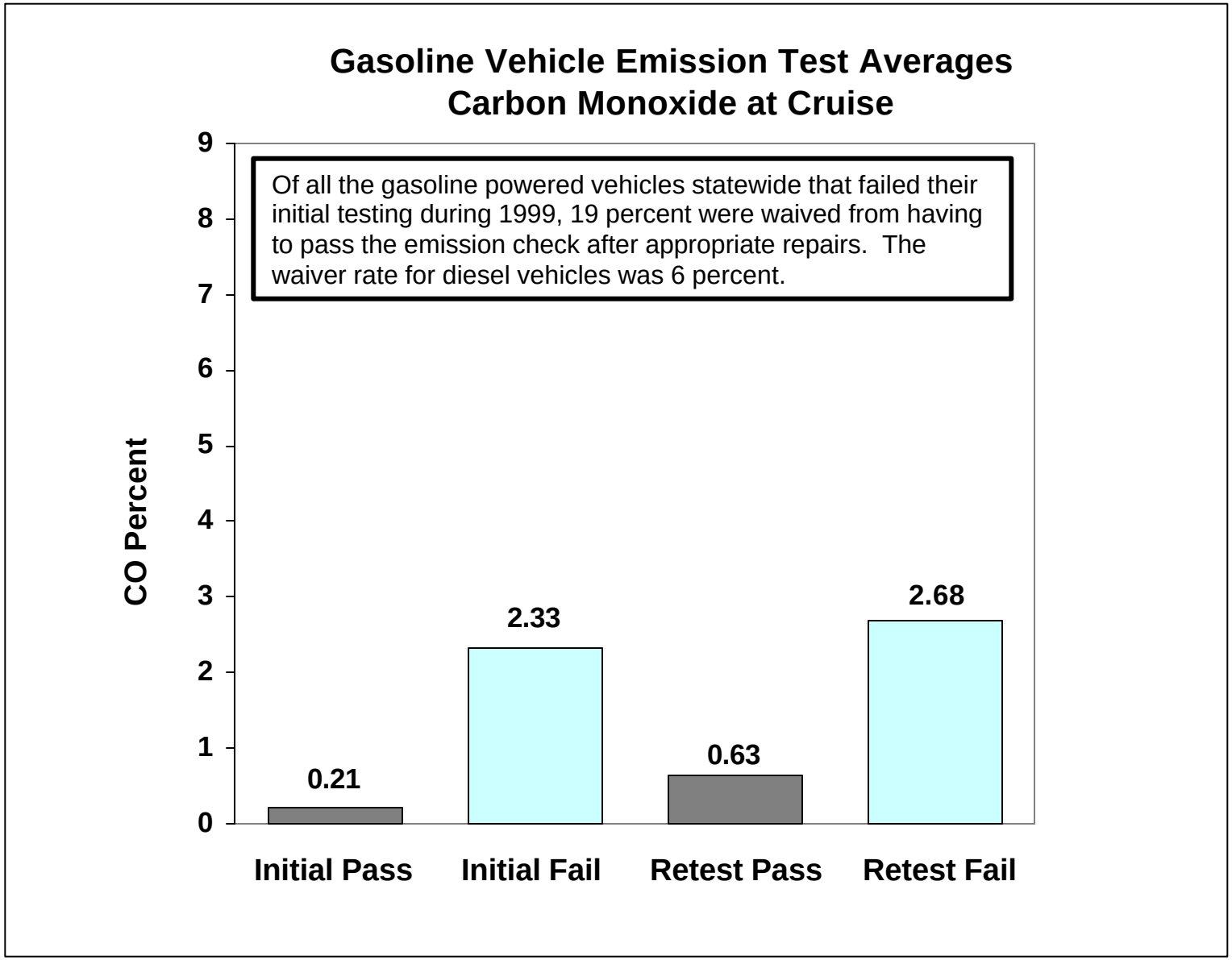
Nonattainment area: A geographic region designated by EPA in which federal air quality standards are not or were not met by a certain date. Areas once designated as nonattainment that now meet air quality standards remain nonattainment until EPA has approved a redesignation request and maintenance plan.

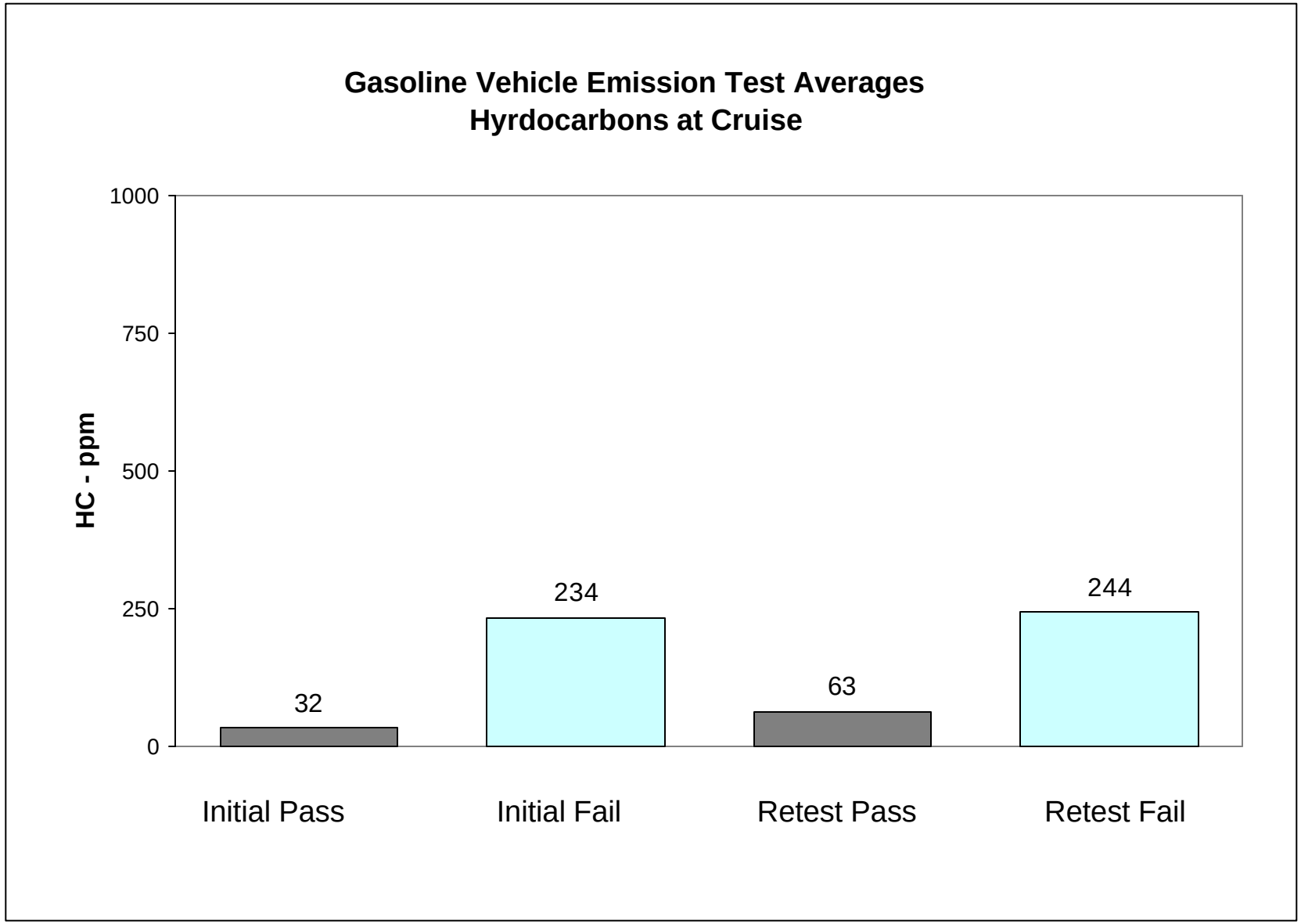
State Implementation Plan (SIP): A plan the state adopts and implements to ensure the state meets federal and state air quality standards and goals.

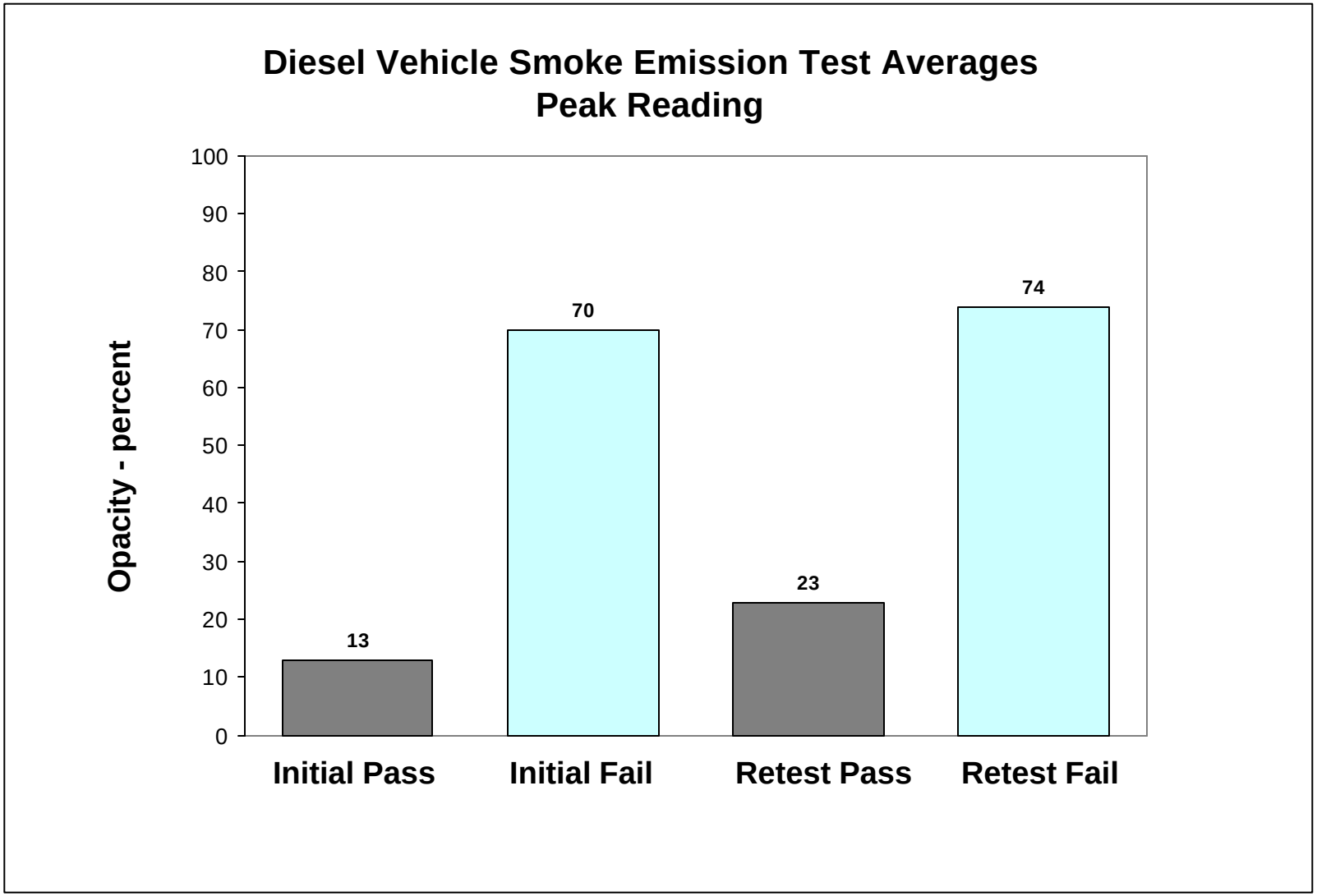
Toxic air pollutants: Compounds which may cause cancer and/or other health problems at very low concentrations.

Appendices


All Vehicle Types - Failure Rate by Model Year
1999 Test Year
Initial Failure Rate
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Vehicle Model Year


Gasoline Vehicle Emission Test Averages
Carbon Monoxide at Cruise
Of all the gasoline powered vehicles statewide that failed their initial testing during 1999, 19 percent were waived from having to pass the emission check after appropriate repairs. The waiver rate for diesel vehicles was 6 percent.
CO Percent
9
8
7
6
5
4
3
2
1
0
0.21
2.33
0.63
2.68
Initial Pass
Initial Fail
Retest Pass
Retest Fail


Gasoline Vehicle Emission Test Averages
Hyrdocarbons at Cruise
HC - ppm
1000
750
500
250
0
32
234
63
244
Initial Pass
Initial Fail
Retest Pass
Retest Fail


Diesel Vehicle Smoke Emission Test Averages
Peak Reading
Opacity - percent
100
90
80
70
60
50
40
30
20
10
0
13
70
23
74
Initial Pass
Initial Fail
Retest Pass
Retest Fail