Washington State Air Quality Designation Recommendation

2024 Annual Sulfur Dioxide National Ambient Air Quality Standard

Air Quality Program

Washington State Department of Ecology

Olympia, Washington

February 2026

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State of Washington

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Sulfur dioxide air pollution damage to a blackberry leaf, NC, 1990. Photo by: Robert L. Anderson, USDA Forest Service, Bugwood.org[1]

Related Information

- Publication 24-02-023: Redesignation to Attainment and 1st 10-year Maintenance Plan for the Intalco-Ferndale Sulfur Dioxide Nonattainment Area[2]
- Publication 17-02-007: Area Designation Recommendation and Response to Comments: One-Hour 2010 Sulfur Dioxide National Ambient Air Quality Standard[3]

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[1] https://www.forestryimages.org/browse/image/3036094
[2] https://apps.ecology.wa.gov/publications/SummaryPages/2402023.html
[3] https://apps.ecology.wa.gov/publications/SummaryPages/1702007.html
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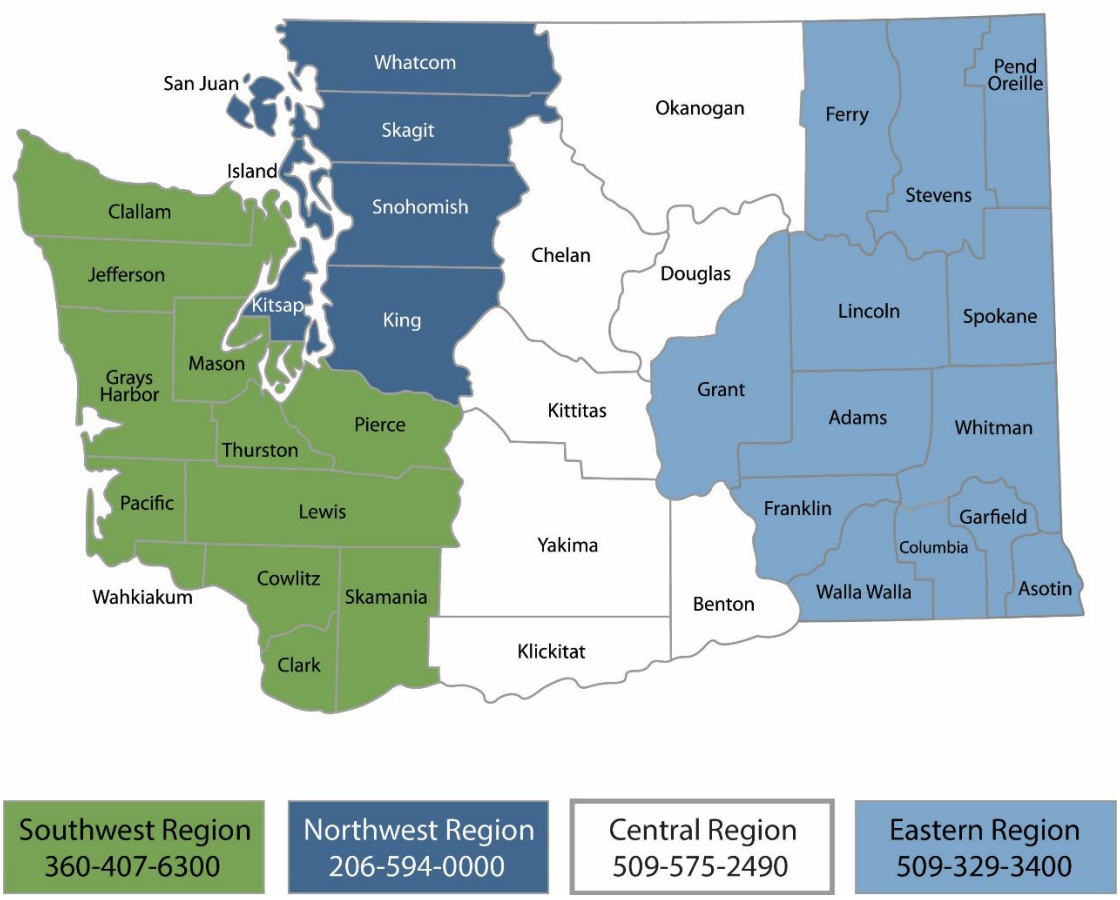
Department of Ecology's Regional Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

Washington Clean Air Agencies

Map of Areas Served by Local Clean Air Agencies[5]

Washington Clean Air Agencies

Benton Clean Air Agency
(*Benton County*)
526 South Steptoe Street
Kennewick, WA 99336
509-783-1304
www.bentoncleanair.org

Northwest Clean Air Agency
(*Island, San Juan, Skagit, Whatcom Counties*)
1600 South Second Street
Mount Vernon, WA 98273
360-428-1617
www.nwcleanairwa.gov

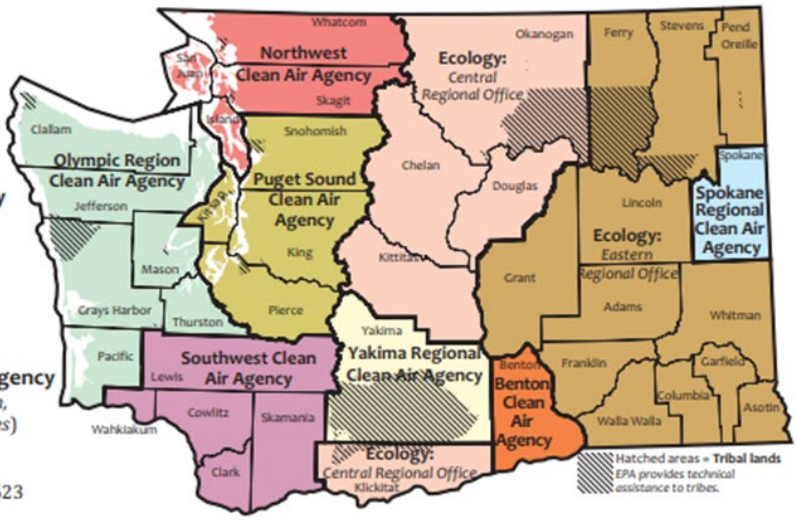
Olympic Region Clean Air Agency
(*Clallam, Grays Harbor, Jefferson, Mason, Pacific, Thurston Counties*)
2940 Limited Lane NW
Olympia, WA 98502
360-539-7610 or 1-800-422-5623
www.orcaa.org

Puget Sound Clean Air Agency
(*King, Kitsap, Pierce, Snohomish Counties*)
1904 Third Avenue, Suite 105
Seattle, WA 98101
206-343-8800 or 1-800-552-3565
www.pscleanair.gov

Southwest Clean Air Agency
(*Clark, Cowlitz, Lewis, Skamania, Wahkiakum Counties*)
5101 NE 82nd Avenue, Suite 102
Vancouver, WA 98662
360-574-3058 or 1-800-633-0709
www.swcleanair.gov

Spokane Regional Clean Air Agency
(*Spokane County*)
1610 South Technology Blvd., Suite 101
Spokane, WA 99224
509-477-4727
www.spokanecleanair.org

Yakima Regional Clean Air Agency
(*Yakima County*)
186 Iron Horse Court, Suite 101
Yakima, WA 98901
509-834-2050
www.yakimacleanair.org



Ecology Central Regional Office
(*Chelan, Douglas, Kittitas, Klickitat, Okanogan Counties*)
1250 West Alder Street
Union Gap, WA 98903-0009
509-575-2490

Ecology Eastern Regional Office
(*Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman Counties*)
4601 North Monroe Street
Spokane, WA 99205-1295
509-329-3400

Ecology Northwest Regional Office
15700 Dayton Avenue North
Shoreline, WA 98133
206-594-0000

Ecology Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775
360-407-6300

Ecology Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600
360-407-6800
www.ecology.wa.gov/airquality

Ecology Industrial Section
(*pulp and paper mills, metal smelters*)
P.O. Box 47600
Olympia, WA 98504-7600
360-407-6900

EPA Region 10
(*tribal lands*)
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3188
206-553-1200 or 1-800-424-4372
www.epa.gov/r10-tribal

To request ADA accommodation, call 360-407-6831 (voice), 711 (relay service), or 1-877-833-6341 (TTY).

DEPARTMENT OF ECOLOGY
State of Washington

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[5] Download printable map and contact list at:
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Olympia, WA

March 2026

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Abbreviations and Acronyms

CASTNET	Clean Air Status and Trends Network
CFR	Code of Federal Regulations
DV	design value
Ecology	Washington State Department of Ecology
EI	emissions inventory
EPA	U.S. Environmental Protection Agency
FR	Federal Register
IMPROVE	Interagency Monitoring of Protected Visual Environments
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NADP/NTN	National Atmospheric Deposition Program's National Trends Network
NEI	National Emissions Inventory
(NH4)2SO4	ammonium sulfate, a particulate species
ppb	parts per billion
QA/QC	quality assurance / quality control
RCW	Revised Code of Washington
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_3	sulfur trioxide
SOx	sulfur oxides
ton	In the U.S., a ton is referred to a "short ton", which is equal to 2,000 pounds, instead of the metric ton which is equal to 1,000 kilograms or 2,204.62 pounds.
WAC	Washington Administrative Code

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Executive Summary

The Washington Department of Ecology has evaluated ambient air quality monitoring data, statewide emissions inventories, and air quality trends for sulfur dioxide (SO_2), a criteria air pollutant. Our analysis shows that Washington meets the 2024 annual secondary National Ambient Air Quality Standard for SO_2 in all areas with active monitoring. In areas without ambient air monitoring, available information suggests the standard is also being met. Therefore, Ecology recommends that the U.S. Environmental Protection Agency (EPA) designate all areas in Washington State as "attainment/unclassifiable" for the 2024 annual SO_2 standard.

EPA established the new annual SO_2 standard to protect ecosystems and public welfare. SO_2 pollution can directly harm vegetation and wildlife and indirectly impact ecosystems through atmospheric deposition, causing acidification and nutrient enrichment. Acidified soils and waters cannot support healthy fish, animals, or plant life—resources essential to Washington's food systems, cultural heritage, economy, and environment. Ensuring attainment of the new standard supports our commitment to protect Washington's ecosystems, agriculture, fisheries, and industries.

During the 2022–2024 evaluation period, SO_2 levels recorded at Washington's five ambient air quality monitoring sites – as well as at three sites near Washington's borders with Idaho, Oregon, and British Columbia, Canada – were significantly lower than the standard's level. The calculated three-year annual average SO_2 concentration at each U.S. site was below one part-per-billion (ppb), and all values rounded down to zero. In comparison, the new annual standard is violated when the three-year average is above 10 ppb.

Three of Washington's monitoring sites are located near major SO_2 emission sources; the fourth one represents background air quality in a rural area, and the fifth is situated in a densely populated urban area with some industrial activity. The nearest Idaho site is regional-scale; the Oregon site is urban-scale; and the British Columbia site sits next to one of the largest SO_2 sources in the region. The consistently low concentrations, recorded even near major sources, suggest that unmonitored areas, often with fewer and smaller SO_2 sources, meet the standard.

This "attainment/unclassifiable" designation recommendation affirms that current air quality regulations, permitting programs, and monitoring efforts are effective at managing SO_2 emissions. Ecology does not propose any changes to state SO_2 emission controls in this action.

Ecology held a public comment period from January 12 to February 12, 2026. Nobody requested a hearing. We received one comment in support of strong SO_2 assessment and controls. We did not change the proposed recommendation as the result of the comment period.

This recommendation is submitted to EPA by Ecology Director Casey Sixkiller, acting as the Governor's designee. It reflects the official position of the State of Washington. It does not apply to Tribal lands or territories, which are evaluated and designated separately by EPA. EPA will notify the Governor and the state of its intended designation at least six months prior to finalizing its decision and will also conduct its own public review and comment process.

Introduction

Overview

Sulfur oxides (SOx) are gases composed of sulfur and oxygen; the most prevalent and environmentally significant are sulfur dioxide (SO_2) and sulfur trioxide (SO_3). SOx are common outdoor air pollutants. The Clean Air Act identifies sulfur oxides – measured by SO_2 as the indicator – as a criteria pollutant and requires the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS). EPA uses ambient SO_2 measurements to represent the broader sulfur oxides family.

Large quantities of SO_2 are generated when sulfur containing fuels (especially coal and high sulfur oils) are burned in power plants, industrial boilers, and some commercial heating systems. Industrial processes, particularly nonferrous metal smelting of sulfide ores and petroleum refining, are also important sources.

On road diesel vehicles, locomotives, off road equipment, and marine vessels were once significant SO_2 sources; over the past decade, adoption of ultra-low sulfur diesel and gasoline and stringent marine fuel sulfur limits has driven emissions down substantially. Fireworks and other pyrotechnics contain sulfur and can generate SO_2. Similarly, high acceleration engine activities at closed course venues may emit SO_2 in proportion to a fuel's sulfur content. These contributions are episodic and highly localized compared with ongoing emissions from major point sources.

Among natural sources, wildfire smoke typically contains relatively modest SO_2 compared with other pollutants because forest biomass has lower sulfur content than sulfur rich fossil fuels. Volcanic and geothermal activity can release substantial SO_2 episodically and unpredictably. The U.S. Geological Survey (USGS) monitors SO_2 emitted by active volcanoes; changes in emission rates can signal shifts in activity and support preparedness and response.

At current ambient levels in the United States, acute, direct adverse effects from SOx are infrequent. More commonly, SOx affect people and ecosystems indirectly by forming secondary pollutants and contributing to sulfur deposition. According to EPA, at current levels, SOx contribute to total sulfur deposition which, in turn, "cause alteration of the biogeochemistry and the physiology of organisms from multiple taxonomic groups (e.g., diatoms, lichens, herbaceous plants and trees), resulting in declines in biodiversity in terrestrial, freshwater, wetland, and estuarine ecosystems in the U.S." SO_2 can also corrode human made structures and equipment and impair visibility. The Clean Air Act authorizes EPA to protect public welfare from such adverse effects, including – among others – impacts on soils, water, wildlife, vegetation, visibility, weather, and climate, as well as damage to property, transportation hazards, economic impacts, and effects on personal comfort and well-being.

To protect the country's environmental, economic, and cultural resources from the ongoing *indirect* effects of SO_2 air pollution, in December 2024, EPA revised the secondary (welfare based) SO_2 NAAQS by strengthening it from 0.5 parts per million (ppm) – equal to 500 parts per billion (ppb) – as a 3-hour average, not to be exceeded more than once in a year, to an annual standard with a level of 10 ppb, averaged over three years. The final rule was published in the

Federal Register on December 27, 2024, and became effective 30 days after publication. The primary 1-hour SO_2 standard remains 75 ppb (established in 2010 and retained in 2019) to protect public health.

The states must evaluate air quality data and recommend to EPA how each area meets the new standard. Area designations are a regulatory tool for managing air pollution from controllable activities. EPA designates areas based on the most recent three full calendar years of certified air quality data from the existing monitoring network.[6]

EPA may exclude air quality data influenced by unusual, natural, or culturally significant events (e.g., wildfires, volcanic activity, fireworks) when making area designations. While we evaluate and characterize such events to identify public health risks[7], by excluding them from the designation process we avoid imposing planning requirements for violations caused by uncontrollable or culturally significant events.

Each area can be designated as:

- Attainment (meeting the NAAQS)
- Nonattainment (not meeting the NAAQS)
- Unclassifiable (not enough information to determine)

EPA assigns a combined attainment/unclassifiable designation to areas where a portion attains the NAAQS based on complete and quality-controlled and assured monitoring data, but there is not sufficient data available to verify compliance comprehensively across every part of the area. This situation can arise due to several factors:

- **Limited monitoring sites**: Washington has an established monitoring network that exceeds EPA's minimum monitoring requirements. EPA's minimum monitoring requirements for SO_2 are based on the Population-Weighted Emissions Index (PWEI), which factors both the population of an area and its emissions. In Washington, the Seattle-Tacoma-Bellevue Metropolitan Statistical Area[8] (MSA) has a high enough PWEI to require SO_2 monitoring. For the Portland-Vancouver-Hillsboro, OR-WA MSA, the minimum monitoring requirement is met by the Portland-SE Lafayette Street monitor located in Oregon. These two MSAs cover just above 10% of the 71,300 square miles of Washington state. It is not feasible – either logistically or financially – to install an unlimited number of monitoring stations across every airshed in the state. Even if we could install unlimited monitoring sites, many areas are likely to show concentrations close to zero, offering limited value for identifying SO_2 "hot spots."

[6] See *Ambient Air SO_2 Monitoring Network Review and Background* (Watkins et al., 2024) at: https://www.epa.gov/system/files/documents/2024-04/so2-network-review-and-background_jan2024.pdf

[7] During natural events, the public should consult public health agencies for steps to reduce exposure.

[8] https://censusreporter.org/profiles/31000US42660-seattle-tacoma-bellevue-wa-metro-area/

- **Absence of significant emission sources**: In regions without substantial emission sources, ambient concentrations are expected to be near background levels and monitoring is generally not informative or required.
- **Default attainment**: The areas with substantial emission sources and robust monitoring data generally report strong attainment of the NAAQS, allowing for confidence in extrapolating these findings to other areas with often much lower SO_2 emissions.
- **Assumed attainment**: In the absence of concrete evidence indicating nonattainment, it is assumed that the area meets the NAAQS by default. The attainment/unclassifiable designation ensures the area is treated as compliant until data potentially indicating otherwise becomes available.

EPA will consider the state's recommendations before designating each area.

Washington State Area Designation Recommendation

This report presents the technical data supporting Washington State's recommendation to designate all areas of the state as "attainment" (meeting the standard) and "unclassifiable" (insufficient information) for the 2024 annual secondary (welfare-based) NAAQS for SO_2.

Ecology has conducted a comprehensive assessment of three years of SO_2 monitoring data, the latest statewide emissions inventories, and long-term air quality trends. We have also reviewed published literature and the Environmental Information Database to identify if any areas in Washington might be affected by atmospheric deposition of SO_2. Our findings are as follows:

- At five monitoring sites, the three-year average annual SO_2 concentrations in ambient air are significantly below the newly established standard, with design values[9] at all monitors rounding to zero. The standard is violated if design values are over 10 parts of SO_2 per billion parts of air.
- EPA's monitoring data assessment shows that Washington's neighboring states, Idaho and Oregon, also have design values for SO_2 well below the 10-ppb standard, eliminating concerns over interstate transport of air pollutants in quantities that might cause or contribute to nonattainment in Washington. The highest values recorded near the border at the monitoring site in British Columbia, Canada, are also showing levels at approximately half the standard.
- The updated emission inventories highlight a marked reduction in SO_2 emissions. These reductions are attributed to the closure of several facilities, robust permitting programs, improved design technologies, and a widespread switch to low-sulfur fuels**.**
- We did not find published environmental assessments indicating any areas in Washington are experiencing acidification events or other environmental degradations

[9] A design value is a statistic that describes the air quality status of a given location relative to the level of the National Ambient Air Quality Standards (NAAQS). See: https://www.epa.gov/air-trends/air-quality-design-values.

that could be associated with current levels of SO_2 in the atmosphere or atmospheric deposition of sulfur compounds.

- We found no other evidence that any part of the state might be in nonattainment or at risk of nonattainment.

As a result, Ecology recommends designating the entire state of Washington as "attainment/unclassifiable" for the 2024 secondary annual SO_2 NAAQS.

Public Consultation

Ecology held the public comment period and provided an opportunity to request a hearing from January 12 to February 12, 2026. We welcomed public review and accepted comments and feedback on the information in this report and the conclusions reached. We solicited written and oral comments on the proposal via Ecology's website, as well as through email lists and selected digital or printed news media. EPA holds a separate public comment period on their decision on how to designate the area. EPA also coordinates the designation actions that might affect tribal lands.

EPA outlined the schedule and process for initially designating areas in the memorandum "Area Designations for the 2024 Revised Secondary Annual Sulfur Dioxide National Ambient Air Quality Standard" signed by the EPA Director Peter Tsirigotis on January 25, 2025.[10] EPA is expected to finalize the designation process in December 2026. Table 1 lists significant milestones.

Table 1. Area designations timeline for the 2024 secondary annual SO_2 NAAQS.

Milestone	Date
EPA promulgated the 2024 secondary annual SO_2 NAAQS	December 11, 2024
States and Tribes submit designation recommendations	By December 11, 2025
EPA notifies states and Tribes about intended designations (120-day letters)	August 11, 2026
EPA holds a 30-day public comment period	~September 2026
States and Tribes submit any additional information	October 2026
EPA issues final designations	By December 11, 2026

The Washington Administrative Code, specifically WAC 173-400-171(12) quoted below for reference, requires Ecology to hold public review and a public hearing for all air quality area designation recommendations in Washington state. The federal requirement for the states asks, at a minimum, to involve the public if a potential nonattainment area is identified. Ecology's rule allows for consistent processes for all Ecology's actions implementing the NAAQS,

[10] Available at: https://www.epa.gov/system/files/documents/2025-07/2024-revised-secondary-so2-designations-memo-1-16b-24.pdf

and allows the public to review data supporting attainment, nonattainment, and unclassifiable area designations.

> **WAC 173-400-171(12) Special requirements for ecology only actions**.
>
> (a) This subsection applies to ecology only actions including:
>
> > (i) A Washington state recommendation to EPA for the designation of an area as attainment, nonattainment or unclassifiable after EPA promulgation of a new or revised ambient air quality standard or for the redesignation of an unclassifiable or attainment area to nonattainment;
> >
> > (ii) A Washington state submittal of a SIP revision to EPA for approval including plans for attainment and maintenance of ambient air quality standards, plans for visibility protection, requests for revision to the boundaries of attainment and maintenance areas, requests for redesignation of Class I, II, or III areas under WAC 173-400-118, and rules to strengthen the SIP.
>
> (b) Ecology must provide a public hearing or an opportunity for requesting a public hearing on an ecology only action. The notice providing the opportunity for a public hearing must specify the manner and date by which a person may request the public hearing and either provide the date, time and place of the proposed hearing or specify that ecology will publish a notice specifying the date, time and place of the hearing at least 30 days prior to the hearing. When ecology provides the opportunity for requesting a public hearing, the hearing must be held if requested by any person. Ecology may cancel the hearing if no request is received.
>
> (c) The public notice for ecology only actions must comply with the requirements of 40 C.F.R. 51.102 (in effect on the date in WAC 173-400-025).

Document Organization

Following the Introduction, the analytical chapters establish the technical basis for the recommended area designation.

Chapters

Sulfur dioxide ambient air quality monitoring

This chapter introduces the NAAQS "design value" metric used to determine attainment and describes Washington's SO_2 monitoring network. It then evaluates Washington's certified SO_2 monitoring data and considers relevant data from nearby areas in Oregon, Idaho, and British Columbia, Canada.

Sulfur dioxide emission inventories

In the subsequent chapter, we review sources of SO_2 pollution within Washington and analyze data from the three-year Washington State Comprehensive Emissions Inventory, the Annual Point Source Inventories, and the five-year Puget Sound Maritime Air Emissions Inventory. We also review annual emissions from a small number of large SO_2 sources in Oregon, Idaho, and British Columbia that are near the Washington state line or the international border.

National and state SO_2 levels, atmospheric deposition, and visibility trends

We conclude the technical analysis with a chapter summarizing trends in state and national ambient concentrations, wet and dry deposition, and visibility. These trends demonstrate an overall decline in sulfur compounds in the environment **–** including in remote areas where direct ambient SO_2 monitoring is not feasible **–** further supporting the recommendation of an attainment/unclassifiable designation for all areas, with and without ambient monitoring sites.

Discussion and conclusion

The final chapter synthesizes findings from ambient monitoring data, emissions inventories, and long-term trend analyses to present an integrated picture of sulfur oxides in Washington. It explains how these multiple lines of evidence converge, while also acknowledging limitations inherent in current methods—such as spatial and temporal coverage, instrument detection limits, and representativeness of monitoring locations. The chapter reiterates the study's principal conclusions and reinforces Washington's recommendation for an attainment/unclassifiable designation under the Clean Air Act. It concludes with a clear description of next steps, including actions for implementation, planned coordination with local clean air agencies and federal partners, and priorities for future data collection and methodological improvements.

Appendices

Appendix A provides foundational context on sulfur oxides air pollutant. It summarizes the national and Washington ambient air quality standards, traces the history of SO_2 air quality designations in Washington, and offers an overview of atmospheric chemistry and transformations relevant to SO_2. The appendix also describes direct and indirect environmental and welfare impacts of sulfur oxides and their compounds, using examples from Washington's experience to illustrate how these effects manifest in practice.

Appendix B presents the U.S. Environmental Protection Agency's correspondence approving changes to Washington's ambient air quality monitoring network, providing the administrative record that supports the monitoring framework changes.

Appendix C compiles the public outreach notices issued for this action, the comments received during the public review period, and Ecology's responses to those comments. It also includes a copy of the signed correspondence letter to EPA.

Sulfur Dioxide Ambient Air Quality Monitoring

Washington SO_2 Ambient Air Monitoring Sites

As of December 31, 2024, five ambient SO_2 monitors operated as part of the Washington Ambient Air Monitoring Network using Federal Equivalent Method monitors to measure hourly SO_2 concentrations in the ambient air. These monitors are in Clallam, King, Skagit, and Whatcom counties and serve urban and regional areas. Two SO_2 monitors in Whatcom County are within proximity; at the published map scale their symbols overlap and display as a single dot. Ecology is using the 2022-2024 data collected from these five monitors as the basis for the designation assessment.

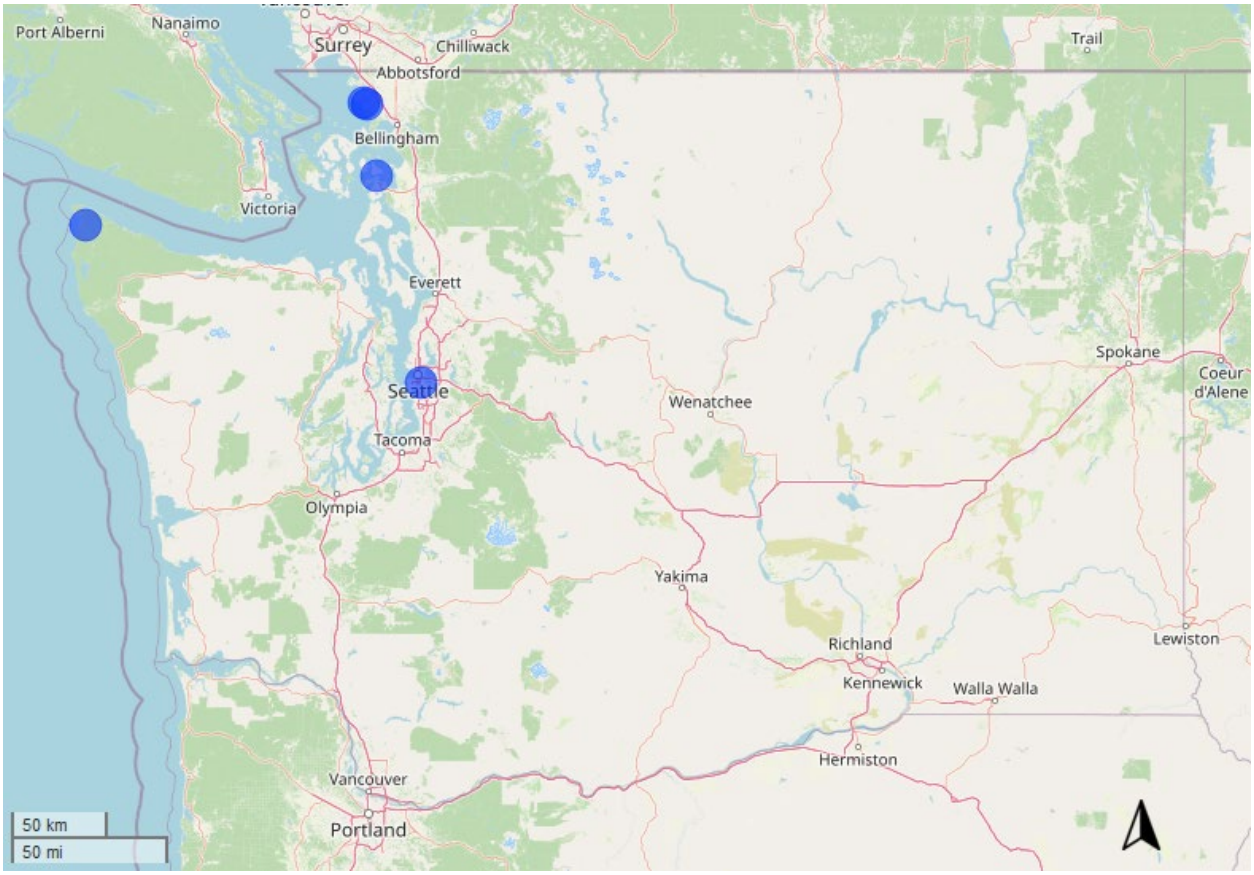

Figure 1. Map of SO_2 monitoring sites in Washington as of December 31, 2024.

There are other SO_2 monitoring programs that focus on specific industrial sources and their emissions. However, these source-oriented monitors are not located in areas considered "ambient air." Ambient air is defined as "that portion of the atmosphere, external to buildings, to which the general public has access" (40 C.F.R. Part 50.1).

Because non-ambient monitors do not represent public exposure, their data cannot be used to determine compliance with the NAAQS. Instead, attainment assessments must rely on ambient air monitors that reflect the air quality experienced by the general population.

Each monitor is assigned a specific spatial scale, which represents the size of the area characterized by the monitoring site.[11] The spatial scales of the SO_2 monitors in the Washington Network, as of December 31, 2024, range from the microscale to the regional scale. These spatial scales are defined as:

- Microscale: 0 to 100 meters (up to ~328 feet)
- Middle scale: 100 to 500 meters (~328 to 1,640 feet)
- Neighborhood scale: 500 meters to 4 kilometers (~0.3 to 2.5 miles)
- Urban scale: 4 to 50 kilometers (~2.5 to 31 miles)
- Regional scale: 50 to 1,000 kilometers (~31 to 621 miles)

Each monitor may have one or more monitoring objectives, which define the purpose of the data being collected. The six main objective categories are:

- General background: Measure overall background concentrations of SO_2.
- Highest concentration: Capture the maximum expected SO_2 levels within the network area.
- Source-oriented: Assess the impact of specific sources or source categories on local air quality.
- Population exposure: Monitor typical concentrations in densely populated areas.
- Regional transport: Evaluate the movement of pollutants across regions and support secondary standards.
- Welfare-related impacts: Assess effects on visibility, vegetation, and other welfare-based concerns.

The table below summarizes the spatial scale and monitoring objectives of Washington's ambient SO_2 monitors as of December 31, 2024.

Table 2. Washington SO_2 monitoring sites: spatial scale and objectives.

County	AQS Site ID	Spatial Scale	Monitor Objective(s)
Clallam	530090013	Regional (up to 621 mi)	General background
King	530330080	Urban (up to 31 mi)	General exposure
Skagit	530570011	Neighborhood (up to 2.5 mi)	Population exposure
Whatcom	530730013	Microscale (up to 328 ft)	Source oriented
Whatcom	530730017	Microscale (up to 328 ft)	Source oriented

[11] The spatial scales and objectives are defined in 40 CFR Part 58, Appendix D, Section 1 "Monitoring Objectives and Spatial Scales."

Monitors operating at the microscale, middle scale, and neighborhood scale are designed to measure air quality over relatively small areas. This is consistent with the nature of direct SO_2 emissions and plumes, which tend to dissipate or react with other chemicals—forming different sulfur compounds—within one to two miles of the source. According to the EPA's January 2024 memorandum, *Ambient SO_2 Monitoring Network Review and Background*, the background monitor in Clallam County likely reflects conditions across large, unmonitored areas with few or no significant SO_2 emission sources in the vicinity of the monitoring site. In contrast, the smaller-scale monitors in Whatcom, and Skagit Counties are focused on areas with higher SO_2 emissions and are intended to represent exposure over limited geographic areas. The urban-scale monitor in King County is sited to represent the Seattle-Tacoma-Bellevue, WA metropolitan area as required by the Population-Weighted Emissions Index of that MSA.

Design Value Metric

To assess how each area attains a new or revised NAAQS, each state must collect air quality monitoring data in accordance with Appendix T to Title 40 Part 50 of the Code of Federal Regulations (CFR). The appendix specifies the protocol for collecting and analyzing air quality data, and ensuring that monitoring methodologies are consistent and scientifically robust. Additionally, it defines methods for measuring SO_2 (Specific Federal Reference Methods (FRM) and Federal Equivalent Methods (FEM)) to ensure uniformity and comparability across different monitoring locations nationally.

The monitoring data must then be analyzed and computed at each monitoring site. There are specific computation rules for averaging the daily SO_2 concentrations and their translations into annual averages over a three-year period. These computations result in the metric called a "design value." This metric is then compared against the level of the standard during the area designation process.

The emphasis on the three years of quality-controlled and quality-assured monitoring data mitigates the effects of meteorological variability and episodic emissions that may otherwise skew data assessments. This period ensures that a design value reflects stable trends rather than anomalies, providing a robust long-term assessment of air quality and justifying regulatory actions should persistent, repeatable violations be documented.

EPA calculates and publishes the official design values for all monitoring sites and all criteria pollutants at: https://www.epa.gov/air-trends/air-quality-design-values. The states use the official design values, in conjunction with the emissions data, meteorology, and other data in the designation process specific to each NAAQS.

2022 – 2024 Annual SO_2 Design Values

All five monitors recorded annual average SO_2 concentrations of 0 ppb, calculated using the calculation procedures and data handling conventions described in 40 C.F.R. Part 50, Appendix T. The monitor in Skagit County (530570011) did not meet the minimum data completeness

requirements for calculation of a valid design value.[12] These data were retrieved from EPA's Air Quality System (AQS) on May 6, 2025. Table 3 below summarizes the design value data.

Table 3. Washington SO_2 monitoring sites: CBSA and 2022 – 2024 design values.

County	AQS Site ID	CBSA	2022-2024 Design Value (ppb)
Clallam	530090013	Port Angeles, WA	0
King	530330080	Seattle-Tacoma-Bellevue, WA	0
Skagit	530570011	Mount Vernon-Anacortes, WA	0 (Incomplete)
Whatcom	530730013	Bellingham, WA	0
Whatcom	530730017	Bellingham, WA	0

EPA has stated that the national SO_2 network is adequate for implementation of the 2024 standard. Ecology concurs that the current monitoring sites are representative of statewide conditions and to assess compliance.

Changes to the Washington SO_2 Monitoring Network in 2025

Following the closure of the Intalco aluminum smelter in Whatcom County in 2022, Ecology proposed – and EPA approved – the discontinuation of two out of the five ambient SO_2 monitoring sites in Washington. These two sites were originally established in 2017 to meet the requirements of the EPA's 2015 Data Requirements Rule (DRR), which mandated monitoring near sources emitting over 2,000 tons of SO_2 per year to assess attainment of the 2010 1-hour primary SO_2 NAAQS.

With the closure of the facility, the area was re-designated from nonattainment to attainment in 2024. As a result, the two microscale monitoring sites in Whatcom County were discontinued in January 2025. The discontinuation request can be reviewed in the *2024 Ambient Air Monitoring Plan,*[13] available on Ecology's website. A copy of the EPA approval letter is included in **Appendix B. EPA Approval to Discontinue SO_2 monitoring sites.** Ecology updates this plan annually by July 1.

To verify ongoing attainment of the 2010 1-hour SO_2 standard, the Northwest Clean Air Agency (NWCAA) developed an "alternative-to-monitoring" approach. Under this approach, the NWCAA annually reviews changes in SO_2 emissions in the area. If any changes are deemed significant, the agency will conduct additional screening and air quality modeling. Should the modeling indicate that a new SO_2 source may significantly elevate pollutant levels, a new

[12] The monitor had to be relocated to a new property across the road from the existing site making it temporary nonoperational.
[13] See "2024 Ambient Air Monitoring Network Plan" at: https://apps.ecology.wa.gov/publications/SummaryPages/2402017.html

monitoring site will be established. The NWCAA's 2025 verification process is documented in the report titled *Verification of Ongoing Attainment in Select Maintenance Areas*.[14]

Looking ahead to the EPA's initial designations for the secondary SO_2 NAAQS (due by December 2026), it is likely that data from the remaining three monitoring sites — located in Clallam, King, and Skagit Counties — will be used to inform those decisions.

SO_2 Ambient Monitoring Near Washington's Stateline

Monitoring sites in neighboring states Idaho and Oregon, and in British Columbia, Canada, particularly those sited near the interstate and international boundary, can also be helpful in air quality assessments. In Oregon, the closest monitor to Washington's boundary is an urban monitoring site in Multnomah County. It is also the only SO_2 ambient monitoring site in Oregon, and it represents multiple counties including Clark County, WA, within the Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area.[15]

There are three SO_2 ambient air monitoring sites in Idaho.[16] The closest site to Washington's border is in Boise, Ada County, and is just over 200 miles south-southeast from Asotin County, situated in the far southeastern corner of Washington State. The other two sites, sited to monitor maximum concentrations from nearby large industrial SO_2 sources, are located in Bannock and Caribou in southeastern Idaho, over 400 miles away from Washington.

According to EPA, these four SO_2 monitoring sites also have 2022 – 2024 design values well within the standard. See Table 4 below for a summary of the location and design values data.

Table 4. Idaho and Oregon SO_2 monitoring sites and 2022 – 2024 Design Values.

State	County - CBSA	AQS Site ID	2022-2024[17] Annual DV (ppb)
Idaho	Ada – Boise City, ID	160010010	0
Idaho	Bannock – Pocatello, ID	160050004	3
Idaho	Caribou	160290031	2
Oregon	Multnomah – Portland-Vancouver-Hillsboro, OR-WA	410510080	0

The British Columbia Ministry of Environment under the Government of Canada maintains an extensive SO_2 monitoring site network. The SO_2 data along with Canada's other local and regional environmental indicators can be viewed on an interactive map[18] online at the

[14] See "2025 Verification of Ongoing Attainment in Select Maintenance Areas" at: https://apps.ecology.wa.gov/publications/SummaryPages/2502018.html
[15] See "Oregon 2025 Annual Ambient Monitoring Network plan" at: https://www.oregon.gov/deq/aq/Documents/aqmAnAmbCritPollAMNP.pdf
[16] See "Idaho Monitoring Network Plan" at: https://www.deq.idaho.gov/air-quality/monitoring-network/
[17] AQS Data Retrieval: 5/6/2025.
[18] https://indicators-map.canada.ca/App/CESI_ICDE

Canadian Environmental Sustainability Indicators - Canada.ca website[19] and Environment and Climate Change Canada Data Catalogue[20]. The data is reported as annual average annual value and as "peak concentrations." While not exactly the same, the Canadian calculation methods are comparable to the calculation methods for the U.S. NAAQS and, thus, can be informative in our designation evaluation.

Figure 3 shows the SO_2 monitoring sites located in British Columbia, near Washington's northern Stateline and international border. The figure shows the sites clustered around the areas with more SO_2 emission sources. The monitoring sites on the map are color-coded depending on their annual average hourly levels of SO_2, reported in parts per billion. There are five color codes representing the following measurements:

- Dark red/maroon: > 5 ppb
- Yellow: between 1 - <2 ppb
- Green: 0.5 - <1 ppb
- Dark blue: 0 - <0.5 ppb
- Grey: no recordings

The monitoring site Butler Park-Trail (NAPS ID: 102201) is located in Trail, about 13 miles north of Northport in Stevens County (address: 1875 Columbia Ave., Trail, British Columbia, Canada). It is located near a large emitter of SO_2 emissions (Teck Trail Operations). Due to the transboundary movement of emissions downwind into Stevens County in Washington, this monitoring site is of interest to Washington state's air quality assessment. This site is the only site along the border labeled in the red-maroon color indicating that annual hourly average ambient concentrations are over 5 parts per billion.

The SO_2 monitoring data gathered in 2010-2023 at this monitoring site is presented in Table 5. The annual and peak concentrations of SO_2 at the Trail monitoring site show a steady decline in recent years, reaching the lowest level recorded, 3.7 ppb annual average, in 2023. While it is not a 3-year average design value metric, we recognize that the three years of available data all show values significantly below the annual 10 ppb level of the 2024 secondary NAAQS. Furthermore, this decline is consistent with the newly implemented control strategies that we will discuss more closely in the next chapter on Emissions Inventories. Thus, at this time we did not identify evidence prompting any additional evaluations.

[19] https://indicators-map.canada.ca/App/Detail?id=02102201&GoCTemplateCulture=en-CA
[20] https://data-donnees.az.ec.gc.ca/data/air/monitor/national-air-pollution-surveillance-naps-program/Data-Donnees?lang=en

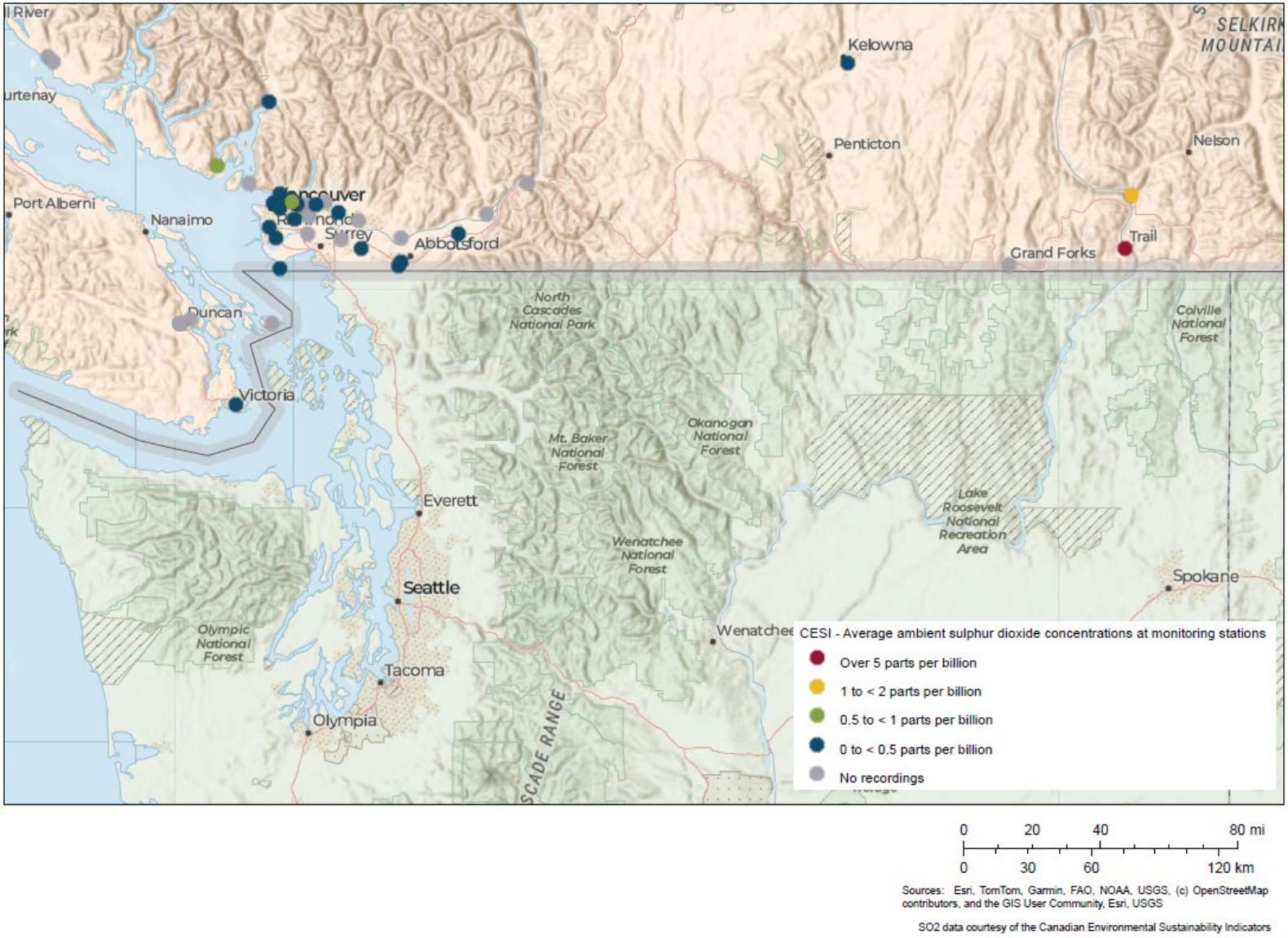

Figure 2. SO_2 monitoring sites in British Columbia, along the international border[21]

[21] Map citation: https://maps-cartes.ec.gc.ca/arcgis/rest/services/CESI/MapServer/28

Table 5. Annual average and peak SO_2 levels in Trail, British Columbia, and Canadian national averages 2010-2023.

Year	SO_2 annual average (ppb)	Peak SO_2 (ppb)	SO_2 national annual average	Peak SO_2 - national average
2010	10.1	256.9	1.2	41.7
2011	8.7	225.4	1.2	28.2
2012	8.9	240	1.2	30.6
2013	11.2	276.1	1.1	30
2014	8.8	164.8	1	25.8
2015	10.2		0.9	23.6
2016	11.7	245.3	0.8	24.4
2017	11.4	303.2	0.8	24
2018	6.2	181.7	0.7	22.2
2019	7.5	147	0.7	20.1
2020	5.9	206.8	0.7	21.1
2021	5.4	170.1	N/A	N/A
2022	4.5	124.8	N/A	N/A
2023	3.7	99.1	N/A	N/A

Sulfur Dioxide Emission Inventories

The majority of anthropogenic sulfur dioxide (SO_2) emissions in Washington come from industrial and mobile sources. Significant point sources include pulp and paper mills, refineries, industrial boilers, and combustion engines. Significant mobile sources include aircraft, commercial marine vessels, and on-road vehicles. Natural sources that generate occasional SO_2 emissions include wildfires, volcanic eruptions, and geothermal activity.

Industrial facilities with an Air Operating Permit (point sources) must report their emissions to their respective permitting authority, which is then submitted to EPA as required in the Air Emissions Reporting Requirements (AERR) rule. Ecology's Air Quality Program (AQP) compiles the statewide point source emissions annually for review. The AQP also reviews other sources of SO_2 emissions that are estimated in the EPA's National Emissions Inventory (NEI).

The NEI is a comprehensive county-specific report of criteria air pollutant emissions from most anthropogenic sources and some natural sources. The NEI categorizes sources as point sources (e.g., large industrial facilities, power plants, etc.), nonpoint sources (e.g., residences, businesses, and institutions), fire (e.g. wildfire, silvicultural burning, crop residue burning, outdoor residential burning), and mobile sources (e.g., aircraft, cars, trucks, ships, locomotives, agricultural equipment). The NEI is updated every three years using data from federal, state, local, and Tribal agencies. At the time of writing this report, the 2023 NEI is in progress and will not be published until May of 2026.

Ecology's AQP publishes a Comprehensive Emissions Inventory that is nearly identical to the EPA's NEI but includes additional corrections and more specific information. The data from the most recent inventories – 2020 Comprehensive, 2023 Point Source, and 2021 Puget Sound Maritime – are summarized below for the purposes of this designation recommendation evaluation.

Washington's Comprehensive Emissions Inventory

The "2020 Washington Comprehensive Emissions Inventory Technical Support Document"[22] is the most recent Comprehensive Emissions Inventory available. It is posted on Ecology's website. Anthropogenic sources of SO_2 are the most relevant to ambient air quality and the implementation of the 2024 secondary annual SO_2 NAAQS.

The 2020 Comprehensive Emissions Inventory estimated a statewide total from anthropogenic sources of 9,212 tons of SO_2 emissions, of which 7,482 tons (81%) were from point sources. In 2023, point source emissions totaled 3,817 tons, nearly a 50% reduction since 2020 due to the closure of the Intalco Alcoa facility and significant reductions at TransAlta Centralia Generation and the Packaging Corporation of America. This update will be reflected in the next NEI and

[22] https://apps.ecology.wa.gov/publications/summarypages/2002012.html

Comprehensive update (~May 2026). We overview the 2023 Point Source Emissions Inventory in more detail in the next section.

Among natural sources, SO_2 from wildfires has recently become an area of increasing research and emissions quantification. Although wildfires can affect large areas and produce substantial smoke, the sulfur content of most vegetative fuels is low and SO_2 emissions are typically small relative to particulate matter and carbon monoxide. Large wildfire plumes are often lofted high into the atmosphere, limiting surface-level impacts. Wildfire SO_2 emission estimates carry high uncertainty due to variability in fuel types, combustion conditions, and plume-rise behavior, and are likely to be refined as methods improve. We will continue to track emerging science, refine wildfire emission estimates, and reassess should monitoring or modeling indicate a meaningful contribution warranting additional analysis.

Point Sources Emissions Inventory

We collect data about SO_2 emissions generated by permitted point sources in Washington. The latest data available is from 2023. There were 110 major permitted sources operating in Washington in 2023, with 99% of their SO_2 emissions originating from 52 sources. Their cumulative SO_2 emissions amounted to just under 4,000 tons statewide, marking the lowest amount of SO_2 emissions in a year on record since the collection of emissions inventory data began.

Significant reductions of SO_2 occurred due to curtailments at the Packaging Corporation of America's recycling paper mill in Wallula (Walla Walla County), the closures of the Intalco Aluminum Smelter in Ferndale (Whatcom County) and COSMO Pulp and Paper (Grays Harbor County), and the decommissioning of a coal-fired boiler at the TransAlta Power Plant in Centralia (Lewis County). Additional reductions were observed at other industrial sites due to upgraded controls, improved operating procedures, and the use of low-sulfur fuel. Table 6 shows the annual emissions from major point sources, 2016 – 2023, and statewide total SO_2 emissions from major point sources. This downward trend aligns with national trends as well.[23]

The locations of these point sources are depicted on the map in Figure 4. Each source is indicated by a yellow-orange circle, with three different sizes representing varying emission levels. We used the 2023 data for the sources in Washington. The smallest circle represents sources that emitted between 100 and 500 tons of SO_2 in 2023; followed by sources that emitted between 501 and 1000 tons. The largest circle denotes sources emitting above 1,000 tons of SO_2 in 2023. The sources are concentrated in the western part of the state. Many sources are located near shipping ports and waterways, and some urban areas, with the largest emissions found in Lewis, Whatcom, and Clark Counties.

[23] To review and download national emissions trends data, visit the EPA website at: https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data.

Table 6. Major point sources SO_2 emissions, 2016 - 2023, in tons, sorted from largest to lowest in 2023.

County (Permitting Agency)	Site Name	2016	2017	2018	2019	2020	2021	2022	2023
Lewis (SWCAA)	TransAlta Centralia Generation, LLC	1,438	1,707	1,502	2,276	1,609	788	1,254	1,147
Whatcom (NWCAA)	BP Cherry Point Refinery	781	828	726	608	646	698	848	665
Cowlitz (ECY - Industrial)	Nippon Dynawave Packaging Co.	376	390	328	392	456	482	433	342
Skagit (NWCAA)	HF SINCLAIR Puget Sound Refinery	246	225	228	215	224	230	213	232
Skagit (NWCAA)	CHEMTRADE	174	203	152	153	91	144	168	186
Cowlitz (ECY - Industrial)	WestRock Longview, LLC	126	198	258	180	250	259	201	183
Walla Walla (ECY - Industrial)	Packaging Corporation of America	692	885	393	363	1,094	1,279	628	138
Pierce (ECY - Industrial)	WestRock Tacoma Mill	190	190	224	223	208	190	171	134
Jefferson (ECY - Industrial)	Pt Townsend Paper	44	46	68	76	81	78	83	114
Whatcom (ECY Industrial)	Alcoa Primary Metals Intalco Works	4,374	3,987	4,103	3,546	1,613			
Grays Harbor (ECY - Industrial)	COSMO Specialty Fibers, Inc.	369	242	255	189	63		269	
	All Other Title V Air Operating Permit (AOP) Sources	734	647	685	611	521	668	884	678
	TOTAL	**9,543**	**9,549**	**8,923**	**8,831**	**6,855**	**4,815**	**5,152**	**3,817**

Figure 3. Major point sources of SO_2 in Washington and adjacent areas; annual emissions (tons).

2021 Puget Sound Maritime Emissions Inventory

In the western part of the state, especially around the Puget Sound area, sulfur oxides from ships and marine vessels have historically been a significant source of SO_2. To understand the maritime and port related emissions, the Puget Sound Maritime Air Forum prepares the Puget Sound Emissions Inventory (PSEI) report.[24] It captures maritime-related air emissions and involves collaboration between seven ports, six government agencies, and three industrial partners. The report is prepared every five years, and the most recent inventory was released in 2021.

As shown in Table 7 below, there has been a 97% decline in SO_2 emissions between 2005 and 2021. The Puget Sound Maritime Air Forum explains that "the decline in emissions is attributed to strategic investments in electrification, cleaner engine technologies, operational efficiencies, and the implementation of the North American Emissions Control Area regulation, which requires vessels to burn lower sulfur fuels while within 200 miles of shore."[25]

[24] Data from Puget Sound Marine Air Forum. 2024. The 2021 Puget Sound Emissions Inventory (PSEI) report Results Summary: https://pugetsoundmaritimeairforum.org/wp-content/uploads/2024/06/revised_onesheet_pugetsoundregional_05.09_final_press.pdf

[25] Visit: https://www.nwseaportalliance.com/newsroom/new-report-shows-maritime-related-air-emissions-continue-decrease-puget-sound-region

Table 7. Puget Sound maritime SO_2 emissions (tons), in 2005, 2016, and 2021[26].

Source category	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	DPM	BC	CO_2e
Ocean-going vessels	10,465	316	891	364	151	139	125	40	609,081
Harbor vessels	6,784	377	1,887	45	43	42	37	12	476,977
Recreational vessels	910	1,277	10,237	1	29	27	6	7	132,379
Locomotives	860	49	180	1	25	23	25	18	67,642
Cargo-handling equipment	261	20	104	0	16	16	16	12	60,408
Heavy-duty vehicles	767	17	390	2	7	7	7	6	238,471
Fleet vehicles	3	1	17	0	0	0	0	0	1,719
2021 Total	**20,050**	**2,057**	**13,707**	**372**	**380**	**358**	**326**	**157**	**1,586,676**
2016 Total	**23,477**	**3,081**	**17,372**	**369**	**525**	**495**	**464**	**238**	**1,651,612**
2005 Total	**29,846**	**3,793**	**21,346**	**13,521**	**2,220**	**1,847**	**1,802**	**367**	**1,755,023**
2021 vs 2016 =increase =decrease	-15%	-33%	-21%	1%	-28%	-28%	-30%	-34%	-4%
2021 vs 2005 =increase =decrease	-33%	-46%	-36%	-97%	-83%	-81%	-82%	-57%	-10%

NO_x (nitrogen oxide), VOC (volatile organic compounds), CO (carbon monoxide), SO_2 (sulfur dioxide), PM_{10} (particulate matter <10 microns), $PM_{2.5}$ (particulate matter <2.5 microns), DPM (diesel particulate matter), BC (black carbon), CO2e (carbon dioxide equivalent)

[26] See footnote 24 above.

SO_2 Emission Sources Near Washington's Stateline, in Idaho, Oregon, and British Columbia

We used the EPA Emissions Modeling Platform and Canada's National Pollutant Release Inventory Dashboard (NPRI)[27] to identify sources over 100 tons of SO_2 situated near Washington State, in Canada, Idaho, and Oregon based on 2022 data. The sources are depicted in Figure 4 with the size of the yellow-orange circles labeling facilities that emit between 100-500 tons, 501-1,000 tons, and 1,000+ tons of SO_2.

Wauna Mill, OR is the largest of the closest sources to Washington within the U.S. There are five facilities in British Columbia, Canada that are located near the border with Washington State. Of them, the Tech Trail Operations metallurgical smelter in Trail, BC is by far the largest and closest of the sources.

Annual 2022 emissions from Oregon and Idaho sources that emitted 100 tons or more of SO_2 are summarized in Table 8 below.

Table 8. SO_2 sources over 100 tons in Idaho and Oregon.

000000 State-County	2022 SO2 (tons)	2026 SO2 (tons)	Facility Name	Facility Type	NAICS Description	Lat	Lon
ID-Power	725	717	J R SIMPLOT COMPANY-DON SIDING POCATELLO	Fertilizer Plant	Phosphatic Fertilizer Manufacturing	42.9084	-112.526734
OR-Clatsop	532	524	Wauna Mill	Pulp and Paper Plant	Paper Mills	46.1558	-123.4058
ID-Caribou	434	429	ITAFOS CONDA LLC	Fertilizer Plant	Phosphatic Fertilizer Manufacturing	42.7381	-111.54009
ID-Caribou	401	387	P4 PRODUCTION LLC (TV FACILITY)	Chemical Plant	Other Basic Inorganic Chemical Manufacturing	42.6879	-111.58822
OR-Malheur	179	193	EP Minerals, LLC	Unspecified	Other Crushed and Broken Stone Mining and Quarrying	43.9497	-117.3719
ID-Twin Falls	161	159	AMALGAMATED SUGAR COMPANY - TWIN FALLS	Sugar Mill	Beet Sugar Manufacturing	42.5318	-114.4319

In Trail, British Columbia, Canada, less than 10 miles from Washington's northern boundary and Stevens County, is one of the world's largest fully integrated zinc and lead smelting and refining complexes - Teck's Trail Operations[28]. The metallurgical operations produce refined zinc and lead, a variety of precious and specialty metals, chemicals and fertilizer products. NPRI recorded the following total SO_2 emissions generated at Teck Metals Ltd. - Trail Operations

[27] https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/tools-resources-data/all-year-dashboard.html

[28] https://www.teck.com/operations/canada/operations/trail-operations/

(NPRI ID 3802; Address: 25 Aldridge Avenue, Trail, BC, V1R 4L8; NAICS 331410 - Smelting and Refining). Tech Trail Operations is by far the largest source of SO_2 emissions within or near the Washington state borders.

Table 9. Teck Trail Operations annual SO_2 emissions 2015 – 2024.

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
Tons	4,486	5,161	5,307	3,966	4,201	4,171	3,393	2,647	2,112	1,806

*2024 data is incomplete as of the time of writing this report.

Over the past decade, the Trail Smelter has invested in modernizing the facility and installing more effective controls. On its website, the following efforts to reduce and control SO_2 emissions are listed (as retrieved on October 9, 2025):

> Sulphur Dioxide (SO_2) Reduction Program:
>
> Teck Trail Operations currently captures more than 99% of the sulfur contained in feed and meets the highest standard for sulfur capture for base metal smelters across Canada, which is equal to levels of capture achieved in new facilities.
>
> Teck Trail Operations operates under permits established by the BC Ministry of Environment and Climate Change (ENV). With the recent addition of SO_2 to the Canadian Ambient Air Quality Standards, permitted levels have dropped. In response, Trail Operations is driving improvements to lower SO_2 emissions through several completed and ongoing initiatives, including:
>
> - two new state-of-the-art Acid Plants, which were installed in 2014 and 2018
> - upgrades to the SO_2 scrubbing systems, which were completed in 2020
> - an upgrade to the KIVCET feed drying process, expected to be completed in 2023
> - additional improvements to operational controls through sophisticated weather modelling and data analysis to support air quality predictions and inform short-term production adjustments

National and State Trends: SO_2 Levels, Atmospheric Deposition, and Visibility

When examining national and state trends of ambient SO_2 concentration, sulfate deposition, and light extinction (a measure of visibility), a clear downward trajectory is evident. We present below select data summaries from these environmental monitoring networks. This further demonstrates the overall reduction of SO_2 pollution and attainment of the NAAQS; and supports Washington's recommendation of attainment of the new secondary annual SO_2 NAAQS in all of Washington.

Ambient Levels of SO_2 Trends

EPA's air trends data show that between 1980 and 2022, the national average ambient concentration of SO_2 declined by about 94%. The national average annual mean SO_2 concentration decreased from 12.1 ppb to 0.7 ppb over this period (Figure 5). The graph also includes two additional trend lines: 90% of sites have concentrations below the upper line, and 10% of sites have concentrations below the lower line. Since 1980, the 90th-percentile line has trended downward, showing a decrease of more than 20 ppb.

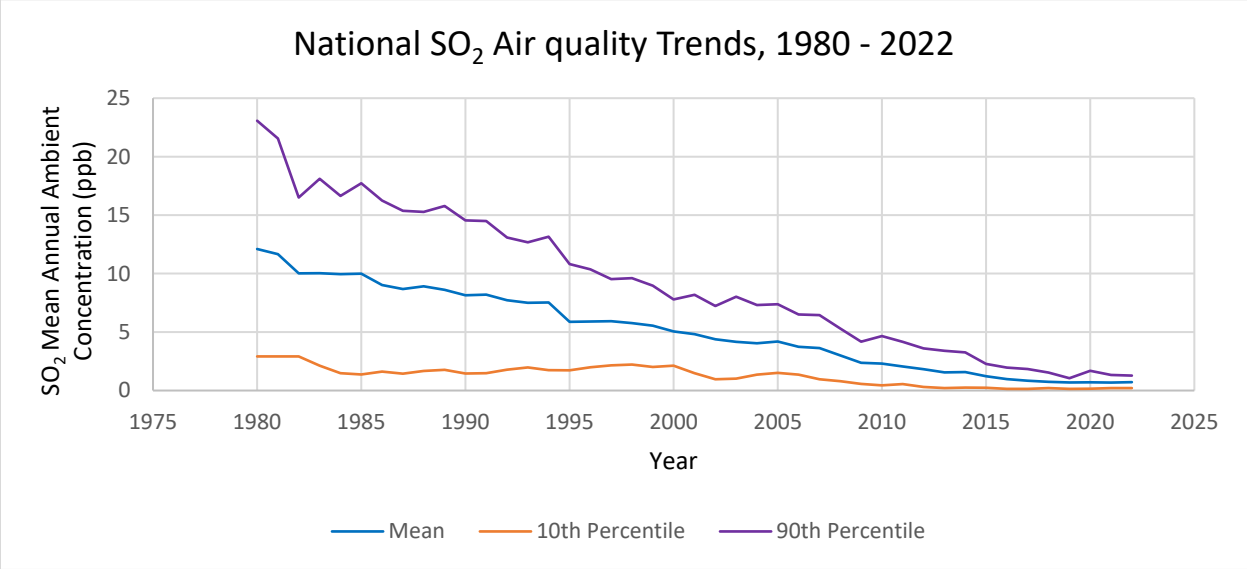

Figure 4. National SO_2 air pollution trends, 1980 – 2022 (EPA).

Statewide monitoring trends show similar reductions. Annual mean SO_2 concentrations recorded at six monitoring sites in Washington are plotted in **Figure 5** below. The two National Core network sites operated continuously since their respective installations: Seattle-Beacon Hill since 2000 and Cheeka Peak from 2008 until 2025, when it was relocated to nearby Bahokas Peak. Other sites have been deployed for shorter time periods to assess localized conditions.

The locations plotted are:

- 530070012 – Malaga/Alcoa Wenatchee (Chelan County)

•530090013 – Cheeka Peak (Clallam County) – relocated to nearby Bahokas Peak (530090019) in 2025

•530330080 – Seattle Beacon Hill (King County)

•530570011 – Anacortes (Skagit County)

•530730013 – Ferndale / Intalco (Whatcom County)

•530730017 – Ferndale / Intalco (Whatcom County)

Hollow triangles on the plot indicate years that do not meet completeness criteria, while filled circles represent valid annual means. A dashed 10 ppb reference line lies above all data points; recent annual means are roughly an order of magnitude lower.

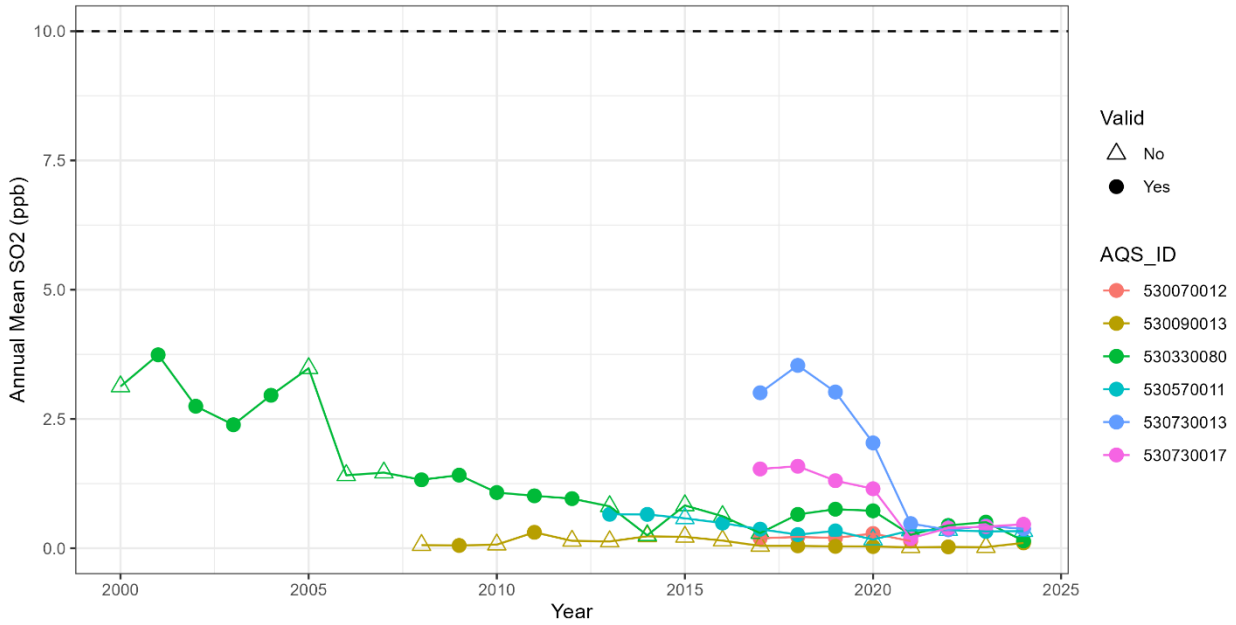

Figure 5. Annual mean SO_2 concentration trends at monitoring sites in Washington.

Site highlights:

- Cheeka Peak (530090013) remains among the lowest (≤0.5 ppb) across its record.
- The Malaga/Alcoa Wenatchee area site (530070012) has a shorter record (2017–2021) with similarly low values (≤0.5 ppb).
- Beacon Hill (530330080) declines from a peak of 4 ppb (2000–2002) to ≤1 ppb in recent years.
- Anacortes (530570011) operated since 2013, with annual means from 0.5-1 ppb trending downward to ≤0.5 ppb by 2022–2024.
- Whatcom/Intalco (530730013) is elevated in 2017–2020 (2-4 ppb) before dropping to ≤0.5 ppb by 2021; the companion Whatcom site (530730017) recorded annual means of 1-2 ppb in 2017–2019, declining to ≤0.5 ppb by 2022–2024.

Atmospheric Sulfur Deposition Trends

Corresponding with the reductions in ambient SO_2 concentrations, a comprehensive study conducted from 2002 to 2017 revealed decreasing trends in both wet and dry sulfur deposition across the continental U.S.[29] A separate study of high-elevation national parks in the western U.S. (1985-1999) found declines in lake and precipitation levels of SO_4, a related Sulfur compound, indicating a response to reduced SO_4 deposition.[30] Deposition reduction rates vary regionally, with the eastern U.S. generally showing higher deposition and larger absolute declines, while the western U.S. exhibits notable decreases, particularly near sources or downwind of emissions.

Ecosystems (especially lakes) show decreasing SO_4 concentrations in water over time consistent with reduced deposition. This suggests partial recovery from acidification in some western areas.[31] However, recovery is not always uniform: some watersheds may retain stored sulfate; soils may still be leaching sulfur or have changes that persist even after emissions drop. Some western lakes that are vulnerable (low buffering) might still be at risk of episodic acidification during heavy storms or dry spells.

To monitor atmospheric deposition and its effects on agricultural crops, forests, rangelands, surface waters, and other natural and cultural resources, the National Atmospheric Deposition Program[32] (NADP) was established in 1977 under the State Agricultural Experiment Station with support from the U.S. Department of Agriculture. The NADP program is hosted at the University of Wisconsin-Madison/Wisconsin State Laboratory of Hygiene.

Furthermore, to enhance understanding of acidic precipitation's causes and effects, the National Acid Precipitation Assessment Program (NAPAP) was instituted in 1981. This program initiated the National Trends Network (NTN), a long-term precipitation chemistry network comprising sites located far from point sources.

To unify efforts, NADP and NTN later merged under the designation NADP/NTN, benefiting from consistent siting criteria, operational procedures, and a shared analytical laboratory. Many NADP/NTN sites are supported by the U.S. Geological Survey (USGS) – NAPAP's lead agency for deposition monitoring. The NADP collects data on chemistry in precipitation along with air concentrations of ammonia and other toxics (e.g., mercury). These sites measure free acidity (H^+ as pH), conductance, and various ions such as calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^+), potassium (K^+), sulfate (SO_4^{2-}), nitrate (NO_3^-), chloride (Cl^-), and ammonium (NH_4^+).

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[29] https://acp.copernicus.org/articles/22/12749/2022 "Long-term regional trends of nitrogen and sulfur deposition in the United States from 2002 to 2017"

[30] https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2002WR001533 "Changes in the chemistry of lakes and precipitation in high-elevation national parks in the western United States, 1985–1999" (AGU)

[31] AGU Publications

[32] https://nadp.slh.wisc.edu/

The Cooperative Institute for Research in the Atmosphere[33] (CIRA), a research organization affiliated with Colorado State University, collaborates with the National Oceanic and Atmospheric Administration (NOAA) and conducts research focused on atmospheric science and weather-related phenomena. CIRA uses NADP/NTN and inputs for data analysis that helps state and federal agencies and scientists track changes in atmospheric deposition and visibility impairment over time. CIRA developed the graphs in Figure 6, Figure 7, and Figure 8 below. They show wet deposition data, in kilograms per hectare, collected at three NADP/NTN sites in Washington's Mount Rainier, North Cascades, and Olympic National Parks.

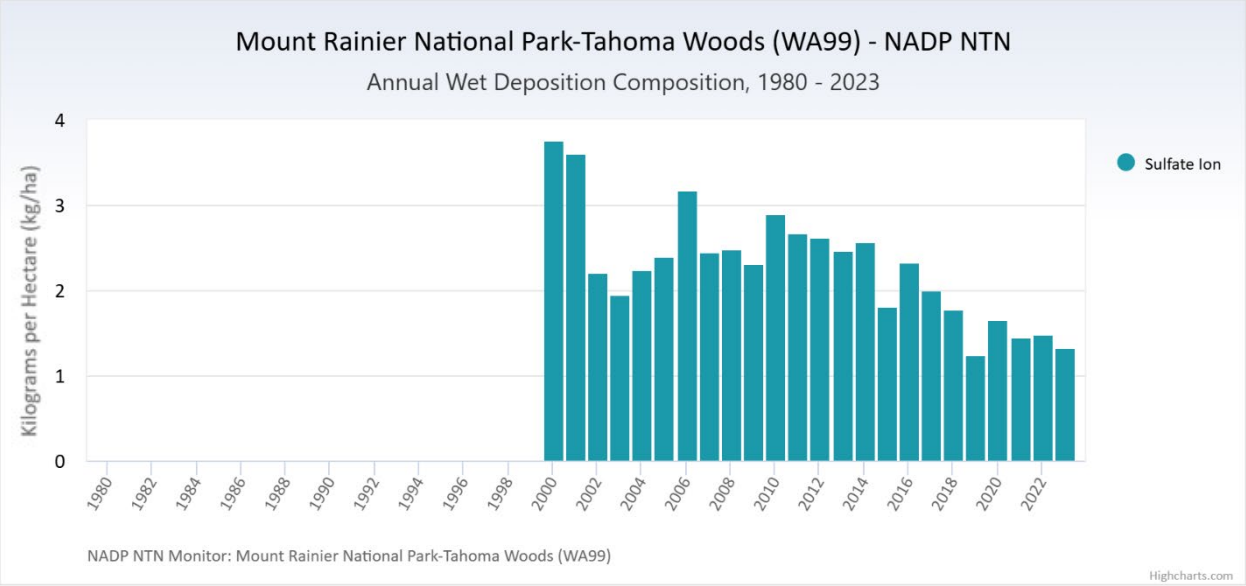

Figure 6. Annual wet deposition of sulfate ions, Mount Rainier National Park, 1980 – 2023.

[33] Regional Haze Technical Support System (RTSS) (TSSv3); CSU and the Cooperative Institute for Research in the Atmosphere (CIRA), 03 Oct 2025, https://views.cira.colostate.edu/tssv3

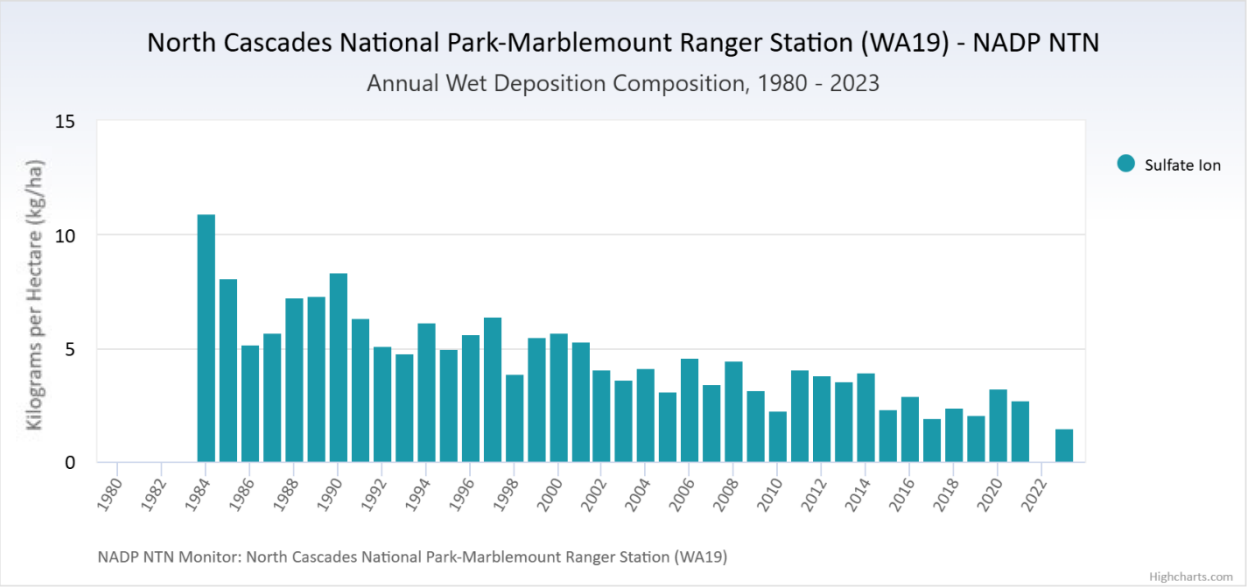

Figure 7. Annual wet deposition of sulfate ion, North Cascades National Park, 1980 - 2023.

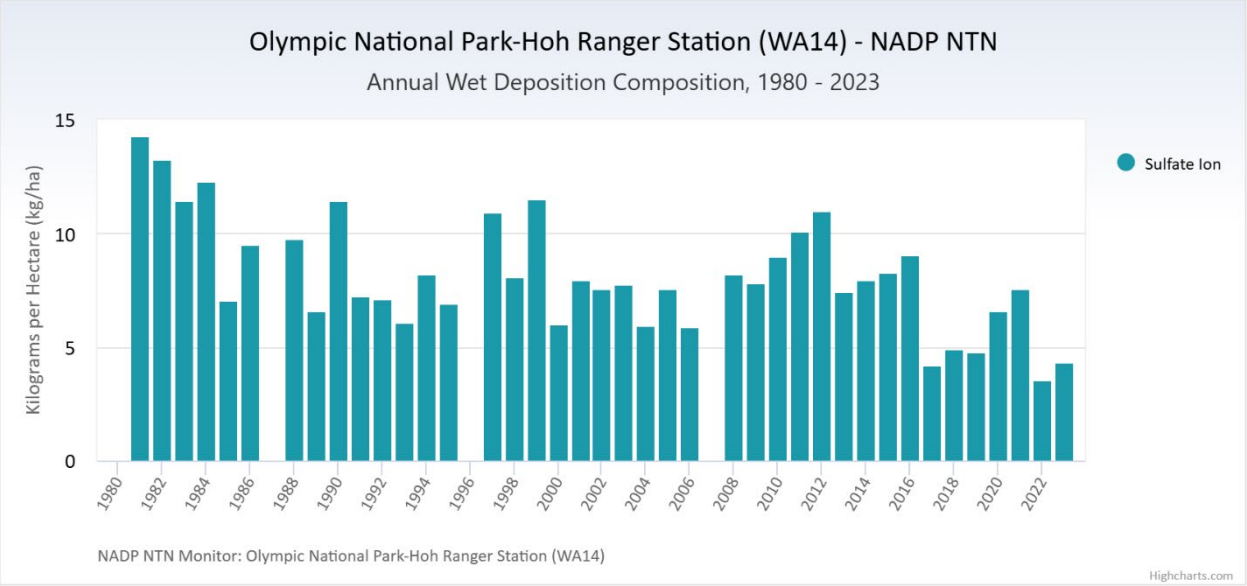

Figure 8. Annual wet deposition of sulfate ion, Olympic National Park, 1980 – 2023.

The Clean Air Status and Trends Network (CASTNET) estimate dry deposition using measured atmospheric concentrations with modeled deposition velocities (i.e., the rate at which the gases and particles are deposited to the surface).

The CASTNET federal sponsors (EPA, National Park Service, and Bureau of Land Management) provide site infrastructure and equipment, training, quality assurance activities, and data analysis to reduce the burden on network partners that operate the sites. CASTNET data are used to:

- Assess regional and international pollutant transport
- Validate and evaluate chemical transport models (e.g., EPA's Community Multiscale Air Quality (CMAQ) model)
- Inform NAAQS reviews that consider human health and environmental impacts due to air pollution

Most CASTNET sites are co-located with NADP monitoring locations. Air quality observations from CASTNET are combined with NADP's precipitation chemistry measurements ("wet deposition") and modeled values from EPA's CMAQ model to estimate total (wet + dry) atmospheric deposition and report on trends. This technique is referred to as measurement model fusion. CASTNET is the only network in the U.S. reporting dry and total deposition[34]. Figure 9 and Figure 10 below show how much dry and total deposition decreased across the country.

There is one active CASTNET site in Washington collecting site-specific sulfur deposition monitoring data. The site is located in the southeast corner of the state, on the Confederated Tribes of the Umatilla Indian Reservation (AQS Site ID 530139991; CASTNET Site ID UMA009.) We included a deposition trend (2000 – 2023) from this site in Figure 11.

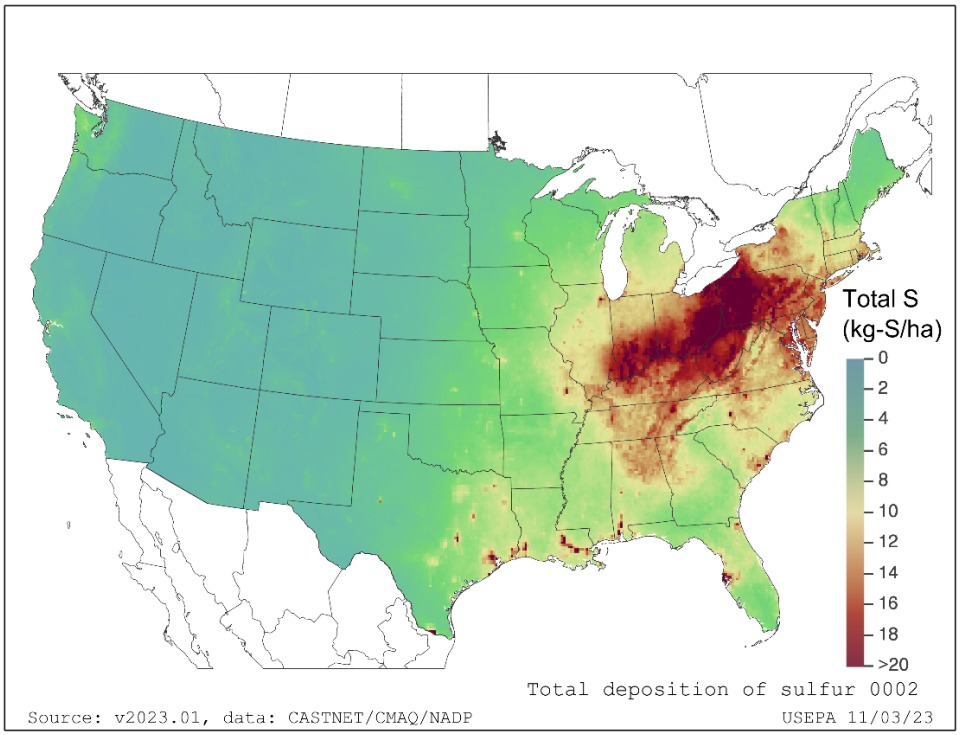

Figure 9. CASTNET total sulfur (dry + wet) deposition, in kg / square hectare, 2000 – 2002.

[34] "Measurement Model Fusion Method for Estimating Total Deposition (TDEP MMF): Method and TDEP data products" at: https://nadp.slh.wisc.edu/committees/tdep/

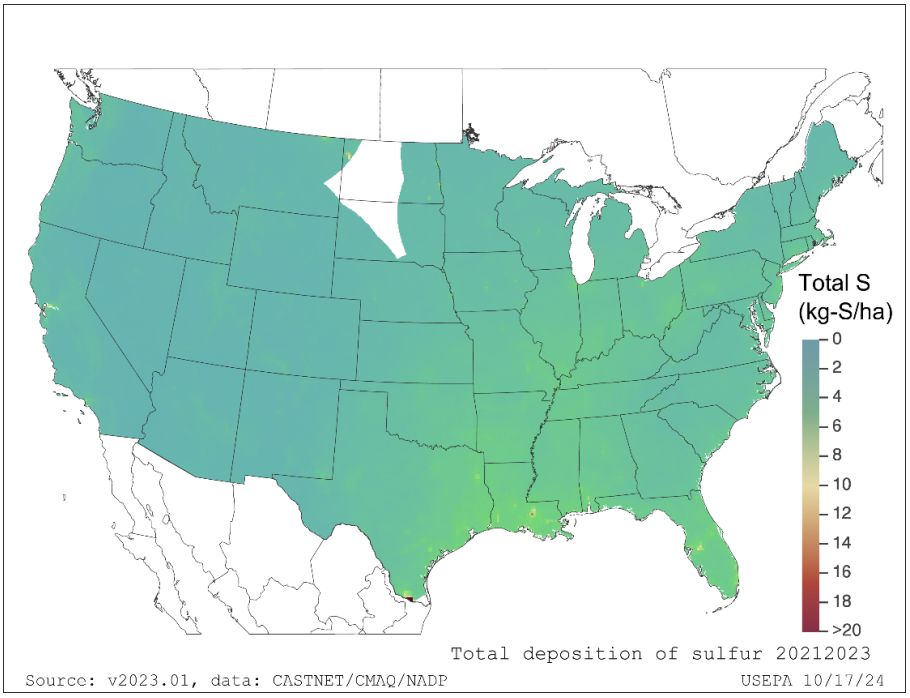

Figure 10. CASTNET total sulfur (dry + wet) deposition, in kg / square hectare, 2021-2023.

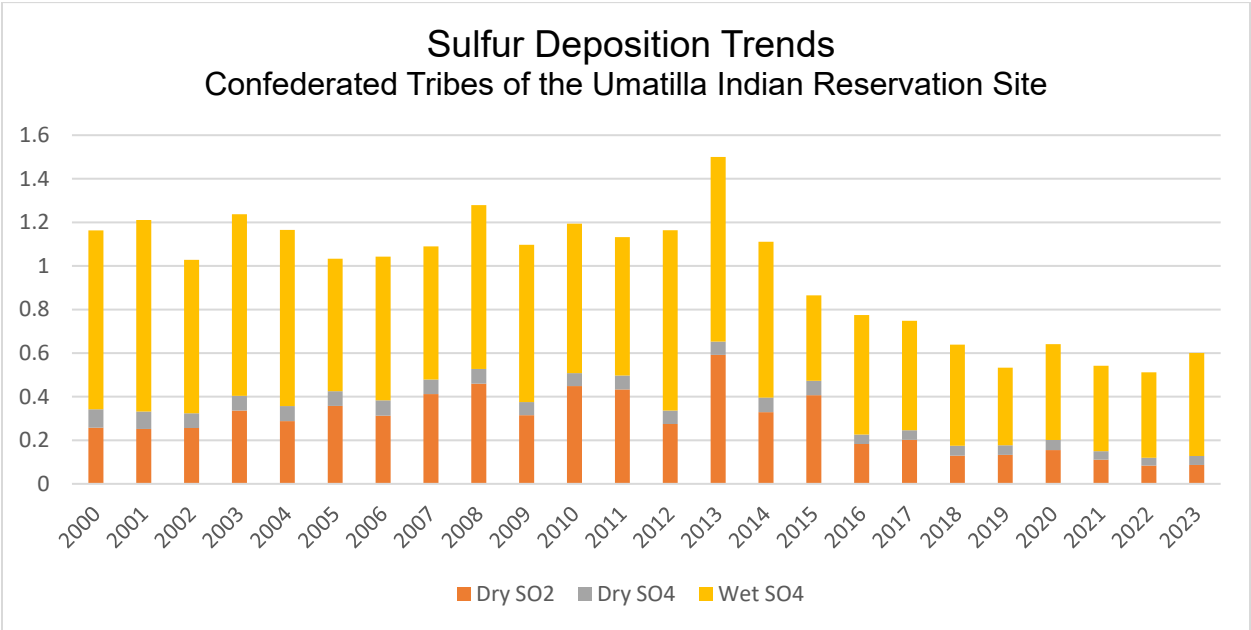

Figure 11. CASNET trends, Confederated Tribes of the Umatilla Indian Reservation, 2000 – 2023. [35]

Ammonium Sulfate Visibility Impact Trends

[35] Data source: https://www.epa.gov/castnet/uma009

In addition to the above monitoring programs, the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, a multiagency cooperative effort to protect visibility and reduce regional haze in national parks and wilderness areas, obtains a complete signature of the composition of the airborne particles affecting visibility, including sulfate ions presence.

Each IMPROVE monitor collects a 24-hour sample of these particles onto a set of filters every three days to determine the standard chemical components causing visibility impairment at that site. Some of the particles that compose aerosols absorb light, while others reflect or scatter light. Both absorption and scattering of light result in light extinction. Light extinction is the technical term for visibility impairment between the viewer and the light source.

The Western Regional Air Partnership (WRAP) and CIRA analyze and compile the IMPROVE monitoring data for consistency in regional haze planning among Western states. They use IMPROVE monitoring data to evaluate annual trends for each aerosol species contributing to visibility impairment and regional haze. Ammonium sulfate $(NH_4)_2SO_4$ is a particle that contains sulfur compounds and is one of the particles that is evaluated at the IMPROVE sites.

The charts in **Figure 12** – **Figure 17** illustrate the ammonium sulphate aerosol contributions to light extinction on all days (clearest and haziest) at IMPROVE sites in Washington.

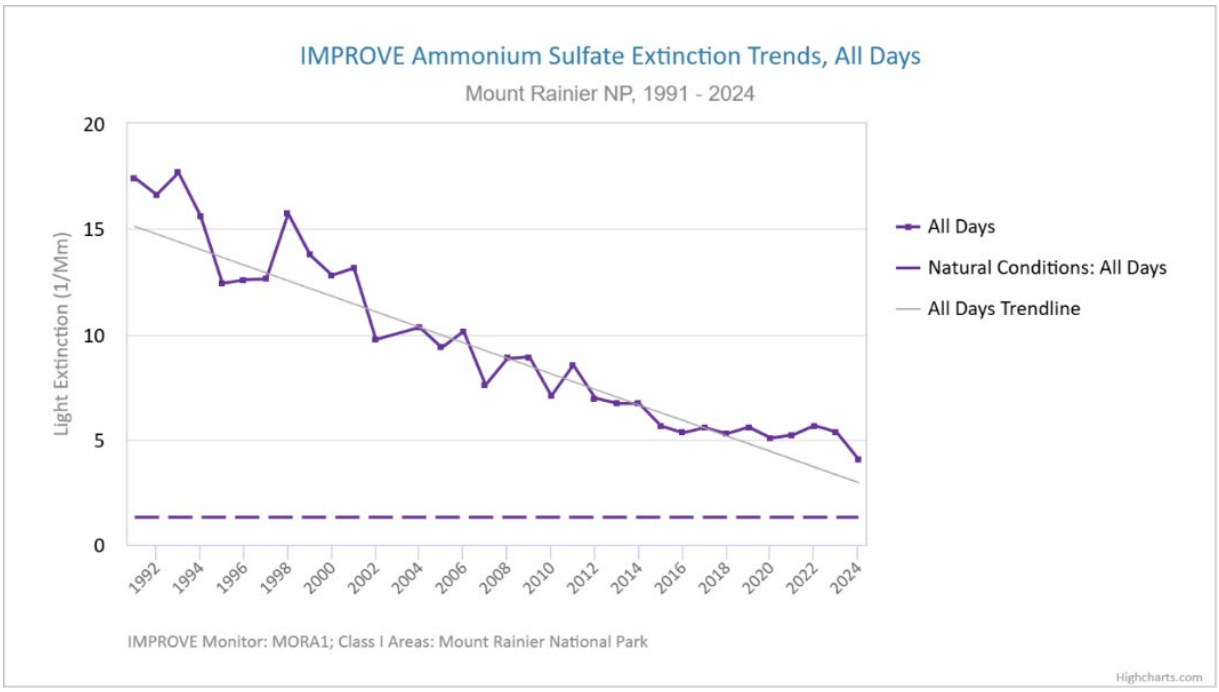

Figure 12. Ammonium sulfate light extinction, Mount Rainier National Park, 1991 – 2024.

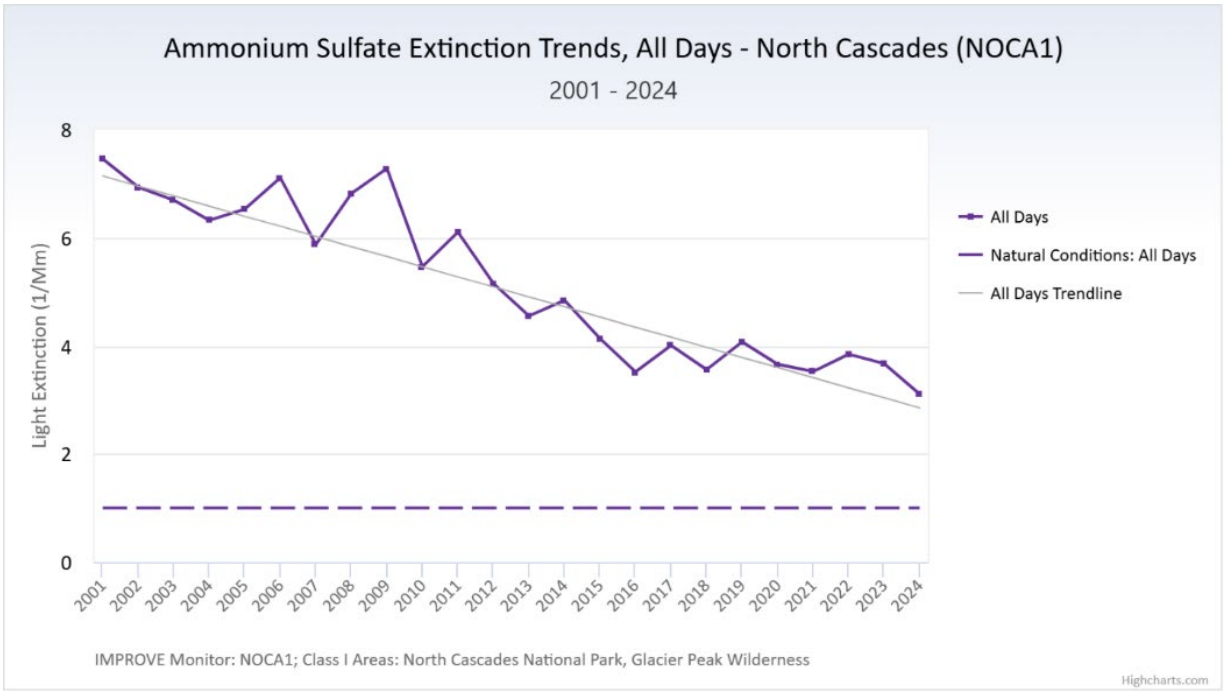

Figure 13. Ammonium sulfate light extinction, North Cascades National Park, 2001 – 2024.

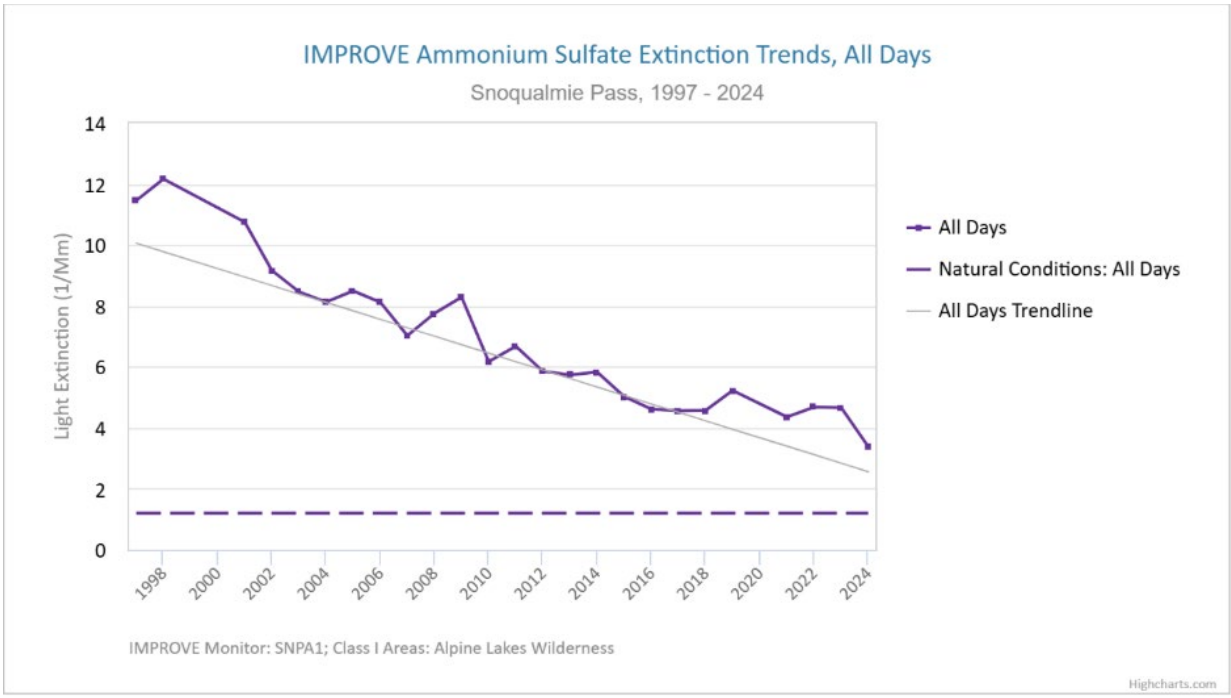

Figure 14. Ammonium sulfate light extinction, Alpine Lakes Wilderness, 1997 – 2024.

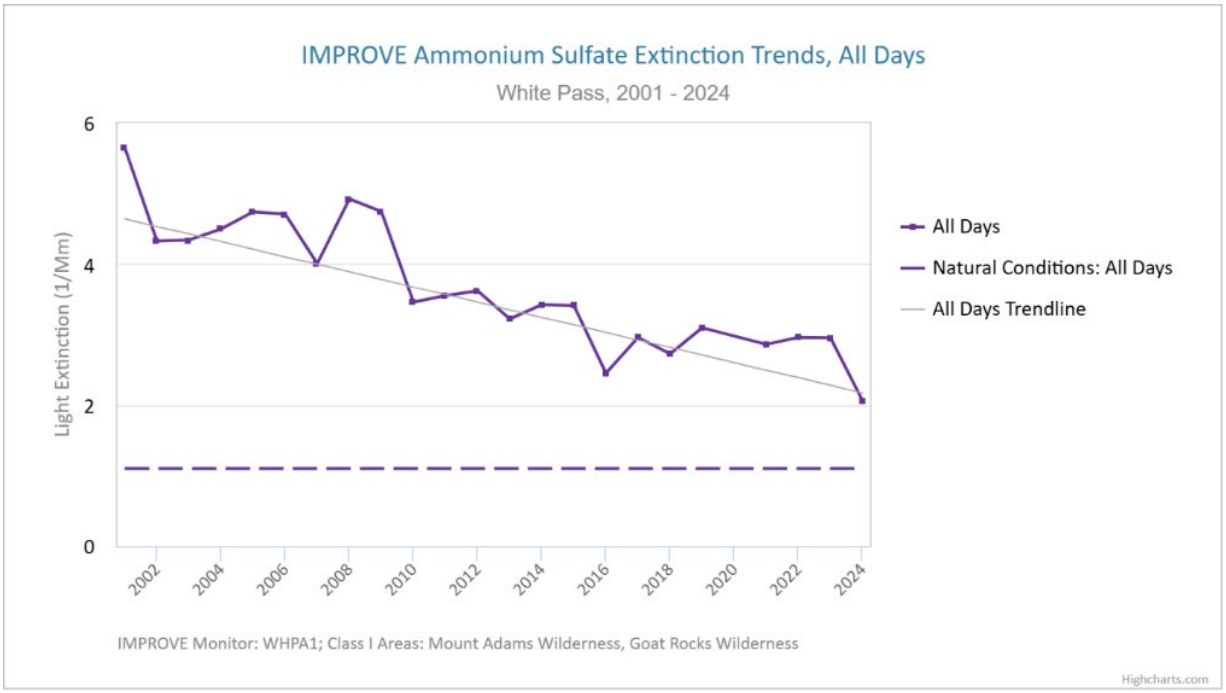

Figure 15. Ammonium sulfate light extinction, Mount Adams and Goat Rocks Wilderness, 2001 - 2024.

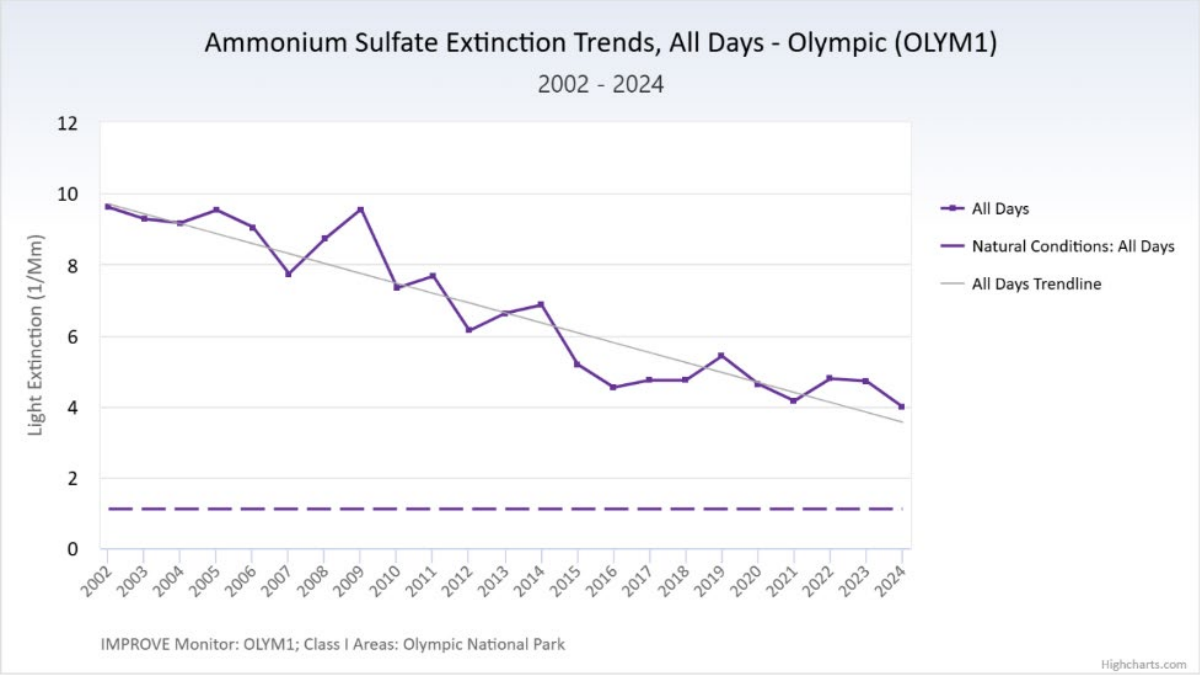

Figure 16. Ammonium sulfate light extinction, Olympic National Park, 2002 – 2024.

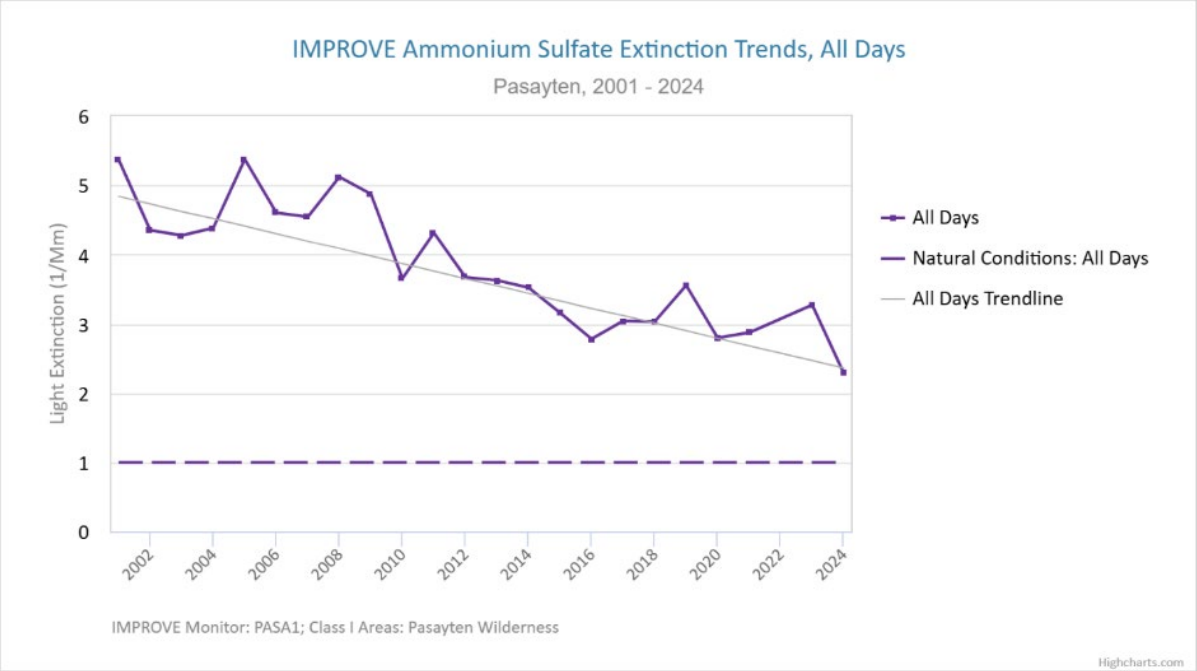

Figure 17. Ammonium sulfate light extinction, Pasayten Wilderness, 2001 - 2024.

Discussion and Conclusion

Findings

In this document, we evaluated sulfur oxides in Washington's ambient air to determine whether all areas were meeting the 2024 annual secondary NAAQS for SO_2 (10 ppb). We comprehensively reviewed SO_2 monitoring data, emissions inventories, and air quality trends Based on available data and accepted evaluation methods, Ecology has robustly demonstrated that all areas in Washington are meeting the standard (attainment) or qualify for an unclassifiable designation.

Key findings:

- **Air quality monitoring indicates attainment:**
    - Washington operates five SO_2 monitoring sites; all report levels well below the 10-ppb annual standard.
    - Additional monitoring data from adjacent states and Canada also report low values.
    - Ecology concurs with EPA that data from the monitoring sites not significantly affected by nearby sources can be indicative of broader areas where emissions are modest and no monitors are sited.
- **Emissions inventories:**
    - Anthropogenic SO_2 emissions in Washington are dominated by major point sources, which account for more than 80% of statewide SO_2; the statewide total is below 10,000 tons per year.
    - Major sources include power plants and industrial sites. Emissions have declined due to technological upgrades, regulatory measures, and widespread fuel switching to low sulfur options in industry and transportation.
    - In 2023, 24 of Washington's 39 counties had at least one permitted SO_2 point source. Of these 24 counties, only eight had combined point source SO_2 emissions above 100 tons per year; seven of the eight emitted up to 800 tons per year.
    - As of 2023, Lewis County had the highest SO_2 emissions (1,232 tons), of which 1,147 tons were from the TransAlta Power Plant.
- **Dispersion and Prevention of Significant Deterioration permit modeling findings:**
    - Although no ambient SO_2 monitors were located near the TransAlta Power Plant, Washington's largest SO_2 emitter during the evaluation period, we find:
        - TransAlta is the only regionally influential SO_2 source within several counties. Other nearby sources collectively emit well below levels that would materially affect ambient design values.

        - When the facility emitted more than 2,000 tons per year of SO_2, EPA, Ecology, and the Southwest Clean Air Agency (SWCAA) required refined dispersion modeling. The modeling did not identify any short term "hot spots" violating the health based 2010 1-hour SO_2 NAAQS. Additionally, TransAlta's PSD permits included a demonstration of compliance with the 2010 1-hour SO_2 NAAQS. While the 2010 1-hour and 2024 annual SO_2 standards use different metrics, EPA has issued memorandum[36] allowing a Prevention of Significant Deterioration (PSD) demonstration for the primary 1-hour SO_2 NAAQS to also satisfy the demonstration requirement for the secondary annual SO_2 NAAQS.
        - Ambient monitors located near comparable large industrial SO_2 sources in Oregon, Idaho, and Canada report concentrations well within the 2024 annual SO_2 standard.
    - While this recommendation is based on the 2022-2024 evaluation period, it is notable that on December 9, 2025, the owners announced plans to convert one boiler to a natural gas fueled generation system, with a long-term power sales agreement to Puget Sound Energy (PSE) through December 2044. Natural gas combustion produces negligible SO_2 emissions.
- **Indirect findings:**
    - Continued emission reductions from power plants and industry are contributing to measurable improvements in ecosystem indicators (e.g., lakes and soils deposition) and public welfare (e.g., visibility and recreation).
    - We did not identify environmental assessment reports indicating significant degradations attributable to current SO_2 levels or to atmospheric deposition of sulfur compounds.
    - We found no evidence that any part of the state is in nonattainment or at risk of nonattainment.

Our technical support documentation meets or exceeds Clean Air Act and EPA requirements for initial area designations. We also note current scientific and methodological limitations that may be addressed in the future as science and technology improve:

- **Hyper-local impacts**: Hyper-local conditions, influenced by fine-scale geography and meteorology, and intense but episodic rises in emissions (e.g. fireworks) cannot be exhaustively individually evaluated with current monitoring, emission inventory, and air quality modeling resources and methods.
- **Population-centric monitoring siting**: The ambient air quality monitoring network is primarily sited for the health-based (primary) NAAQS (e.g., using the

[36] https://www.epa.gov/system/files/documents/2024-12/secondary-so2-naaqs-psd-memo-12-10-24.pdf

Population-Weighted Emissions Index, PWEI). There is no parallel siting index centered on ecosystems, bioregions, or biological sensitivity to SO_2 air pollution.

- **Changes in emissions over time**: Designations reflect the most recent data and assume existing regulations will sustain attainment. Changes in emissions, emerging new sources or technologies, atmospheric chemistry, or meteorology could alter air quality after designations are finalized.
- **Standards reconsideration**: Future research may indicate that ecological critical loads are exceeded in sensitive ecosystems, warranting lower standards or revised methods/implementation.

These limitations do not diminish the substantial progress achieved to date or the strength of our recommendation to designate all areas in Washington as attainment/unclassifiable for the 2024 annual secondary SO_2 NAAQS. Rather, they clarify the scope of the designation process and identify areas where further research or alternative evaluation approaches may be warranted.

Next Steps

Following the public review process, Ecology will respond to comments, and the Director will decide whether to submit Washington's recommendations to EPA. The EPA Administrator will consider state recommendations before proposing the designation for public comments. EPA is expected to notify the states of any intended modifications by August 10, 2026, and finalize the designations by December 10, 2026.

Once initial designations are finalized, areas designated as attainment or unclassifiable will continue routine monitoring and implementation of existing permitting and compliance programs. If an area is designated nonattainment, the state must plan to return the area to attainment; this may include additional monitoring and permitting requirements.

In parallel with the designation process, states must review their regulatory infrastructure—rules, permitting, compliance, and enforcement programs—to ensure the structure provides for implementation of the new standard. The state must submit an Infrastructure State Implementation Plan revision, attesting to the existing or updated regulatory framework, by December 10, 2027.

Under the federal Clean Air Act, EPA reviews the adequacy of the NAAQS considering the latest science on a five-year cycle. The Administrator may revise an existing standard or establish a new one when warranted by scientific evidence. Areas are not re-designated for the same standard unless they are found to be in nonattainment or if sufficient evidence supports a state or public petition for reevaluation based on changed emissions or newly identified impacts.

Washington and its partners will continue routine monitoring and permitting to protect public health, visibility, and ecosystems so residents can enjoy the state's natural resources for generations to come. We thank the public, Tribal governments, local clean air, state, and federal agencies, and industry partners for upholding the values protected by the federal and

state Clean Air Acts and helping advance Ecology's Air Quality 2030 vision of "Clean air for a healthy and vibrant Washington."

Appendix A. Background

National and State SO_2 Ambient Air Quality Standards

EPA establishes the National Ambient Air Quality Standards (NAAQS) for common "criteria" air pollutants. The "criteria pollutants" include sulfur oxides (SO_x) as well as fine and coarse particles ($PM_{2.5}$ and PM_{10}), ozone (O_3), nitrogen oxides (NO_x), carbon monoxide (CO), and lead (Pb). There could be more than one standard for each of the criteria pollutants. Primary standards are set at levels protective of human health, whereas secondary standards aim to protect public welfare from adverse effects of the criteria pollutants and their compounds.

Sulfur Oxides Criteria Pollutant

Upon release, SO_x gases can remain in the atmosphere for several days, while undergoing a series of complex transformations in the form of oxidation. These reactions depend on the meteorology (temperature, pressure, moisture, mixing wind speeds) and the availability of oxidants, like ozone, and the speed of the reactions can be influenced by catalysts, like iron metal ions.

In the presence of sunlight, drier air, and oxidants such as ozone (O_3) or hydroxyl radicals (•OH), SO_2 is oxidized to sulfur trioxide (SO_3). This is known as gas phase transformation (gas-to-gas):

$$SO_2 + \bullet OH \rightarrow HOSO_2\bullet$$

$$HOSO_2\bullet + O_2 \rightarrow HO_2\bullet + SO_3$$

SO_3 gas is highly reactive and, thus, very transient. Upon contact with atmospheric moisture, it will instantaneously form sulfuric acid (H_2SO_4):

$$SO_3 + H_2O \rightarrow H_2SO_4$$

The formation of sulfuric acid marks a key stage in the acidification cycle and formation of acid rain. The widespread environmental impacts from acid rainfall range from acidification of soils and water bodies to accelerating the deterioration of built structures.

In more moist air, in the cloud and fog droplets, instead of the gaseous reactions described above, SO_2 dissolves and forms sulfites (SO_3^{2-}) and sulfates (SO_4^{2-}). This transformation is called aqueous-phase oxidation. The droplets can then form secondary aerosols. Ammonium sulfate ($(NH_4)_2SO_4$) and sulfuric acid aerosols are the most common secondary inorganic aerosols. Some of them can add up to a significant fraction of fine particulate matter ($PM_{2.5}$). Sulfate aerosols can worsen the haze and visibility.

In some cases, natural processes will be sufficient to recycle and neutralize the negative effects of atmospheric deposition of pollution, and, in others, the ecosystems and built structures may not have sufficient buffering or neutralizing capacity to process all deposited sulfur-compounds leading to imbalances and damages. EPA has comprehensively evaluated the SO_2 atmospheric chemistry and evidence for negative impacts on ecosystems and welfare during a multi-year scientific review. It resulted in an encyclopedic-level synthesis of the policy-relevant science in "The Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur, and

Particulate Matter—Ecological Criteria."[37] The graphic in **Figure 18** is a copy of a graphic in Figure IS-2 on page 10 of the ISA publication. It summarizes atmospheric chemistry, deposition, and ecological effects of SO_2 emissions and lists ISA chapters that discuss deposition processes and their ecological effects for those who desire further information.

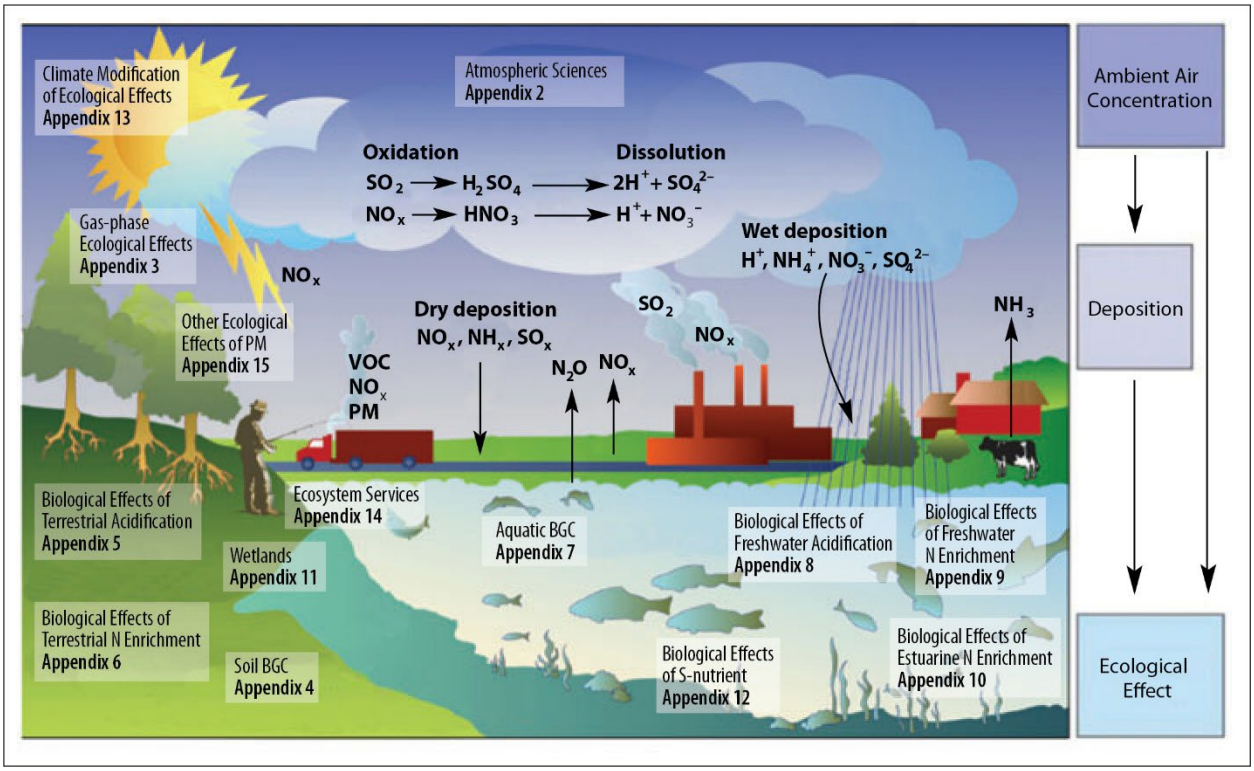

Figure 18. Atmospheric chemistry, deposition, and ecological effects of emissions of SOx.

Table notes: Ca^{2+} = calcium ion; GHG = greenhouse gas; H^+ = hydrogen ion; H_2SO_4 = sulfuric acid; HNO_3 = nitric acid; Mg^{2+} = magnesium ion; N_2O = nitrous oxide; N = nitrogen; NH_3 = ammonia; NH_4^+ = ammonium; NH_X = NH_3 + NH_4^+ + reduced organic nitrogen compounds; NO = nitric oxide; NO_2 = nitrogen dioxide; NO_3^- = nitrate; NO_X = NO + NO_2; PAN = peroxyacetyl nitrate; PM = particulate matter; SO_2 = sulfur dioxide; SO_4^{2-} = sulfate; SO_X = SO_2 + SO_4^{2-}; VOC = volatile organic compounds. The sum of reactive oxidized nitrogen species is referred to as NO_Y (NO_Y = NO + NO_2 + HNO_3 + $2N_2O_5$ + HONO + NO_3^- + N_2O PAN + other organic nitrates).

Although not explicitly indicated, wet and dry deposition of PM components (e.g., metals, minerals, and secondary organic aerosols) also occur and contribute to ecological effects.

Source: Modified from U.S. EPA (2008a[1]).

[37] U.S. EPA. Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter Ecological Criteria (Final Report, 2020). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/278, 2020. Accessed at: https://www.epa.gov/isa/integrated-science-assessment-isa-ecological-criteria-assessment-oxides-nitrogen-oxides-sulfur

SO_2 NAAQS overview

On April 28, 1971, EPA established primary and secondary annual SO_2 standards for the first time (36 FR 8186). The primary SO_2 standards were set as an annual average of 0.03 parts per million (ppm) and 24-hour level of 0.14 ppm, not to be exceeded more than once per year. The secondary SO_2 standards were set as an annual average of 0.02 ppm and a 3-hour average of 0.5 ppm, not to be exceeded more than once per year.

In 1973, after reviewing available science, EPA revoked the annual secondary SO_2 standard of 0.02 ppm due to a lack of evidence of adverse effects on public welfare at ambient concentrations (38 FR 25678). In 1993 and 1996, EPA concluded that the existing primary and secondary SO_2 standards continued to provide the requisite level of public health protection and, therefore, did not change them.

In 2010, after a multi-year science review and consultation process, EPA established a new primary 1-hour SO_2 standard (75 FR 35520). This change was necessary due to increasing evidence showing that short-term impacts to certain high levels of SO_2 can cause symptoms and health impairments. Despite the new and more stringent short-term standard, the 1971 annual and 24-hour primary SO_2 standards remained in effect in some specified areas.

The 2010 1-hour primary standard was further reviewed and retained in 2019, with no changes. In 2012, the three-hour secondary SO_2 standard was retained, without revision.

In December 2024, due to the mounting evidence of welfare-related, secondary impacts at the lower SO_2 levels, EPA made the decision to revise the 3-hour standard and added a new annual secondary standard (89 FR 105692). The new standard is set at the level of 10 ppb, in the form of an annual average that is further averaged over three years. EPA did not revoke the 3-hour standard at the same time, in effect leaving both the 3-hour and annual standards in effect.

Table 10 contains information from the "History of SO_2 NAAQS" table that was published at the EPA's website as of July 31, 2025. We reformatted it for accessibility.

Table 10. Primary SO_2 NAAQS historic timeline

Averaging Time	Level in ppm or ppb & Form of the Standard	Apr 30, 1971 36 FR 8186	May 22, 1996 61 FR 25566	Jun 22, 2010 75 FR 35520	March 18, 2019 84 FR 9866
24-Hour	0.14 ppm Not to be exceeded more than once per year	Established	Retained	Revoked	
Annual	0.03 ppm Annual arithmetic average	Established	Retained	Revoked	
1-Hour	70 ppb Annual 99th percentile, averaged over 3 years			Established	Retained

Table 11. Secondary SO_2 NAAQS historic timeline

Averaging Time	Level in ppm or ppb & Form of the Standard	Apr 30, 1971 36 FR 8186	Sept 14, 1973 38 FR 25678	April 21, 1993 58 FR 21351	Jun 22, 2010 75 FR 35520	Dec 27, 2024 89 FR 105692
3-Hour	0.5 ppm Not to be exceeded more than once per year	Established	Retained	Retained	Retained	Revised, but not revoked*
Annual	0.02 ppm Annual arithmetic average	Established	Revoked			
Annual	10 ppb Averaged over 3 years					Established

*In the final action, EPA did not specify it was revoking the 3-hour standard upon revision. Pending any additional clarification from EPA, at this time we are not aware of any additional requirements in implementing the 3-hour SO_2 NAAQS.

Washington state SO_2 ambient air quality standards

States are required to develop rules, permits, and plans to attain the NAAQS. They can also adopt their own ambient air quality standards that are at least as stringent as the federal standards. Washington State adopts the NAAQS and state specific adaptations of the standards into the state rules through Chapter 173-476 of the Washington Administrative Code (WAC). We may implement additional rulemaking to address state-specific environmental concerns.

At the time of writing this report, the Department of Ecology has started a rulemaking to update the state SO_2 standards, including the adoption of the 2024 Secondary Annual SO_2 NAAQS in Chapter 173-476 WAC[38]. The results of the rule revision will be included in the subsequent submittal of the "Infrastructure" State Implementation Plan (SIP), which will account for the state's system of rules and permitting and enforcement programs in place to implement the revised federal SO_2 standard.

Irrespective of the status of the state standards, EPA must designate areas in the state for attainment of the federal standards.

Previous Area Designations for SO_2 NAAQS in Washington

EPA formalizes how each area in the country is designated for each standard in the Code of Federal Regulation, Title 40, Chapter 1, Part 81 – Designations of Areas for Air Quality Planning Purposes. Washington specific designations are under 40 CFR § 81.348 - Washington[39].

[38] https://ecology.wa.gov/regulations-permits/laws-rules-rulemaking/rulemaking/wac-173-476-400.
[39] https://www.law.cornell.edu/cfr/text/40/81.348

No areas in Washington were designated as nonattainment for the 1971 SO_2 NAAQS. The designation process for the 2010 1-hour SO2 standard took almost 10 years after the standard was established and was accomplished in four rounds. Each round evaluated specific areas as sufficient monitoring or modeling data became available. Washington areas were designated during the third and fourth rounds, in 2017 and 2020, respectively.

To collect data for the SO_2 designations, EPA required at least one monitoring site located in the area with the expected highest concentration and with large SO_2 sources or a cluster of sources emitting 2,000 tons or more of SO_2 a year. Alternatively, states could employ ambient air quality dispersion modeling instead of monitoring. In general, the SO_2 modeling of the emission sources has excellent correlation and agreement with monitored values. For the areas where the state chose to rely on modeling, a grid of receptors within several miles or more along the entire perimeter (fenceline) of the source was modeled.

During the 2nd Round of Designations, in December 2017, EPA designated:

- Most of Washington as attainment/unclassifiable based on available monitoring data and extensive emission inventory. Douglas, Chelan and Whatcom Counties were not designated during this round as they required more time for data collection.

- Lewis and Thurston Counties as unclassifiable based on the air quality modeling of emissions from the TransAlta coal-fired power plant located in Lewis County. EPA determined that attainment determination, as proposed by Ecology, could not be fully supported due to the limited meteorological dataset available for the area. There was no concern about the area violating the standard and there was already a plan in place for TransAlta to phase out coal – the source of SO_2 – by the end of 2025.

During the 4th Round of Designations, in December 2020, EPA designated:

- Douglas and Chelan Counties as being in attainment/unclassifiable based on the monitoring data from 2017-2019. The monitoring site was located next to the Alcoa Primary Metals Wenatchee Works. Due to the closure of the facility in 2016, and confirmed attainment, monitoring was discontinued in 2020.

  A small area in Whatcom County – the site of the now defunct Intalco aluminum smelter and the area around it – as not meeting the SO_2 standard. The levels of SO_2 have since decreased. Effective January 16, 2025, the area was redesignated to attainment. Ecology and the Northwest Clean Air Agency developed the *1st 10-year SO_2 Maintenance Plan*[40] for the area to ensure the levels of SO_2 do not violate the 1-hour SO_2 NAAQS in the future.

[40] https://apps.ecology.wa.gov/publications/SummaryPages/2402023.html

Appendix B. EPA Approval to Discontinue SO_2 Monitoring Sites

REGION 10
SEATTLE, WA 98101

February 12, 2025

Ms. Jill Schulte
Ambient Air Monitoring Coordinator
Department of Ecology
State of Washington
P.O. Box 47600
Olympia, Washington 98504-7600

Dear Ms. Schulte:

The U.S. Environmental Protection Agency (EPA), Region 10 (R10) evaluated the Washington Department of Ecology's 2024 Annual Monitoring Network Plan (ANP) received June 28, 2024. By this letter, R10 documents its findings from the review, provides suggestions for continued improvement, and approves the State of Washington's 2024 ANP.

We appreciate the detail with which Ecology has documented network modification and the work Ecology and Local Air Agency staff have put into maintaining and improving the monitoring network. Notable improvements include establishing a new $PM_{2.5}$ State and Local Air Monitoring Station (SLAMS) sites at SeaTac, a new $PM_{2.5}$ Tribal site in Wapato, as well as three new $PM_{2.5}$ Special Purpose Monitoring (SPM) sites. Additionally, we understand Ecology plans to further expand Washington's regulatory monitoring network in coming years: a new ozone monitoring site in the Kennewick-Richland metropolitan statistical area (MSA) and new $PM_{2.5}$ monitoring sites in Liberty Lake, Friday Harbor, and Oak Harbor. We also appreciate Ecology providing detailed and timely information to EPA regarding the operation and performance of the supplemental SensWA instruments.

Thank you for documenting monitoring waivers for carbon monoxide (CO), PM_{10}, PAMS solar and ultraviolet radiation, and ozone (O_3) in Appendix B. We remind Ecology that these waivers will need to be revisited every five years. Thank you for submitting a waiver renewal request for PM_{10} minimum monitoring requirements for the Kennewick-Richland core-based statistical area (CBSA) on April 11, 2024. R10 provides our formal response to that request in this letter.

Thank you for submitting the Verification of Continued Attainment in Limited Maintenance Areas with the ANP. We also appreciate the inclusion of the Memorandum of Understanding (MOU) between Ecology and the Oregon Department of Environmental Quality (ODEQ) as Appendix E. This MOU formally establishes that the minimum monitoring requirements for the Portland-Vancouver-Hillsboro core-based statistical area (CBSA) are jointly met by the two agencies. This MOU was reaffirmed and resigned by Ecology and ODEQ in April 2024 and is valid through 2029.

We approve the following network modifications laid out in the ANP:

1. Establishing a new $PM_{2.5}$ SLAMS site at SeaTac Sunset Park (AQS-ID: 53-033-0040) by the end of 2024. Thank you for providing documentation on the site, including: a map and aerial image, photos facing the cardinal directions, and diagram of the site layout and nearby obstructions. The information you provided on the proposed site meets the requirements of 40 C.F.R. 58.10(a) and (b).

   While the addition of this site to the Seattle-Tacoma-Bellevue MSA is in excess of the minimum monitoring requirements for the MSA, the monitoring site will provide additional air quality information in an at-risk community close to a major airport. We appreciate that this addition aligns with the modified EPA air monitoring network design criteria set out in 40 C.F.R Part 58, Appendix D, § 4.7.1(b)(3).

2. Upgrading the Lacey-College St. $PM_{2.5}$ SLAMS (AQS-ID: 53-067-0013) from non-regulatory (88502 POC 8) to regulatory FEM (88101 POC 8) on January 1, 2025. Thank you for providing information on the proposed site per the requirements of 40 C.F.R. 58.10(a) and (b). While the addition of this site to the Olympia-Lacey-Tumwater MSA is in excess of the minimum monitoring requirements for the MSA, we agree it is valuable to have a regulatory $PM_{2.5}$ monitor in the Olympic Region Clean Air Agency's jurisdiction.

3. Establishing a PM_{10} SLAMS regulatory monitor at the Seattle-Duwamish site (AQS-ID: 53-033-0057). This addition is part of the expanded monitoring funded by Washington. The information you provided on the proposed monitor siting and reporting details meets the requirements of 40 C.F.R. 58.10(a) and (b). With the addition of this monitor, the Seattle-Tacoma-Bellevue CBSA now meets the minimum monitoring requirements for PM_{10}. Renewal of the PM_{10} monitoring waiver for this CBSA, which expires in 2025, is no longer necessary.

4. Discontinuation of the Cheney-Turnbull PM_{10} SLAMS monitor (AQS-ID: 53-063-0001). Ecology designated this PM_{10} monitor as a SLAMS site in 2021. R10 requested this change in the 2019 ANP response as part of the agreement on minimum monitoring requirements for the Spokane-Spokane Valley MSA. While the site was originally established for the purpose of providing regional background PM_{10} (per the 2019 waiver request), impacts from an adjacent unpaved road mitigate the usefulness of the monitoring data and violate the requirements of 40 C.F.R. Part 58, Appendix E, § 3(a).

   We approve the discontinuation per 40 C.F.R. 58.14(c)(2). Ecology provided data showing the Cheney-Turnbull PM_{10} monitor has consistently measured lower concentrations than the other PM_{10} monitors in the Spokane-Spokane Valley MSA during the previous five years. The monitor is not specifically required by an attainment or maintenance plan. The Spokane-Spokane Valley MSA meets minimum monitoring requirements for PM_{10} with the updated waiver approved below.

5. Updating the waiver for the PM_{10} minimum monitoring requirements in the Spokane-Spokane Valley CBSA from three required monitors to two. R10 waived the requirement for a fourth PM_{10} SLAMS site in this area in the 2019 ANP response letter. With the addition of the Cheney-Turnbull PM_{10} SLAMS site, the area had three SLAMS sites. In the 2024 ANP, Ecology provided information supporting the discontinuation of the Cheney-Turnbull site and evidence that two PM_{10} SLAMS sites in the MSA are sufficient to protect public health and to characterize regional PM_{10} air quality trends:
   a. The $PM_{2.5}$ and PM_{10} monitoring network is sufficient to protect public health without the Cheney-Turnbull site. The only days with high PM_{10} levels were due to region-wide wildfire smoke. During these events, the Air Quality Index (AQI) for $PM_{2.5}$ levels was higher than the AQI based on PM_{10}. Additional analysis showed that PM_{10} was highly correlated with $PM_{2.5}$ during these events, and that the 24-hour $PM_{2.5}$ NAAQS would be exceeded before PM_{10} levels approached their standard.

b. The Cheney-Turnbull monitor is not needed for verifying continued attainment in a maintenance area. The Spokane Valley – E Broadway Ave SLAMS site is the required monitor for demonstrating continued attainment of the PM_{10} standard for the Spokane County Maintenance Area; the other two monitors in the CBSA are outside of the Maintenance Area boundary.

40 C.F.R. Part 58, Subpart D, § 4.6(a) notes, "because sources of pollutants and local control efforts can vary from one part of the country to another[,] some flexibility is allowed in selecting the actual number of stations in any one locale." In addition, that section allows the Regional Administrator to approve modifications from the minimum monitoring requirements. For the reasons stated above and pursuant to 40 C.F.R. Part 58, Appendix D, § 4.6(a), EPA approves Ecology's request to update the waiver to only require two PM_{10} SLAMS sites for the Spokane-Spokane Valley CBSA. This PM_{10} network size waiver for reducing the monitoring requirements in the Spokane-Spokane Valley MSA to two stations is in effect for five years from the date of this correspondence. Additionally, changes to the air quality concentrations in the Spokane-Spokane Valley MSA may warrant modifying this waiver in the future.

6. Renewal of waiver for PM_{10} minimum monitoring requirements in the Kennewick-Richland MSA. R10 approved a waiver for the PM_{10} minimum monitoring requirements for this area on April 18, 2019, effective for five years. The waiver reduced the required number of PM_{10} monitors from 3-4 to one. Ecology submitted an updated waiver request on April 11, 2024 (see Enclosure 2). The waiver request documented that PM_{10} conditions in the MSA are similar to those documented in 2019: the only high PM_{10} levels observed by the monitor in the MSA are due to widespread windblown dust or wildfire smoke exceptional events that are captured by the current PM10 monitor in the MSA. By this letter, R10 approves the renewal of the waiver for PM_{10} minimum monitoring requirements for the Kennewick-Richland MSA for another five years.

7. Discontinuation of the Ferndale-Mountain View Rd (AQS-ID: 53-073-0017) and Ferndale Kickerville Rd (53-073-0013) SO_2 monitors after December 31, 2024. Thank you for providing background information on the establishment of these source-oriented monitoring sites, the area's designation as non-attainment, the curtailment of the facility, and the SO_2 levels measured at these sites before and after curtailment. We are also aware that the facility permanently shut down in 2023, and their Title V Air Operating Permit was terminated. The State Implementation Plan (SIP), entitled: "Redesignation to Attainment and 1st 10-year Maintenance Plan for the Intalco-Ferndale Sulfur Dioxide Nonattainment Area" (hereafter "SO_2 Maintenance Plan"), was submitted to EPA in the summer of 2024. The EPA's final approval of the SO_2 Redesignation and Maintenance Plan was signed by the R10 Deputy Regional Administrator on December 11, 2024 and published in the Federal Register on December 17, 2024[1]. EPA's action became effective on January 16, 2025.

   We agree that these monitors meet the requirements for discontinuation set out in 40 C.F.R. 58.14(c)(3). Both monitors are expected to have a record of five years without a violation of the NAAQS (2020-2024) upon certification of the 2024 data in early summer of 2025. The submitted SO_2 Maintenance Plan specifies using emissions inventories and modeling as the specific, reproducible approach to represent the air quality of the area.

Thank you for including details on the following network modifications completed in Washington in the period between ANP reports (July 2023 – July 2024) that do not require approval:

1. Establishing a supplemental chemical speciation network (CSN) station site at Toppenish-Ward Rd (AQS-ID: 53-077-0015) as of November 2, 2023. Ecology discontinued CSN sampling at the Seattle 10th &

[1] 89 FR 101896, https://www.govinfo.gov/content/pkg/FR-2024-12-17/pdf/2024-29575.pdf

Weller near-road site in 2022 and coordinated with EPA and the Yakama Nation to identify a suitable CSN site in the Lower Yakima Valley.

2. Discontinuation of the collocated $PM_{2.5}$ federal reference method (FRM) monitors at the Seattle-Duwamish SLAMS site (AQS-ID: 53-033-0057) and designation of the site's BAM 1020 federal equivalent method (FEM) as the primary monitor as of December 31, 2023. This modification was approved in the 2023 ANP response. Thank you for confirming this modification in the 2024 ANP.

3. Reduction of the sampling frequency of the collocated $PM_{2.5}$ FRM at the Yakima 4th Ave SLAMS site (AQS-ID: 53-077-0009) from 1-in-3 to 1-in-6 as of December 31, 2023. This modification was approved in the 2023 ANP response. Thank you for confirming this modification in the 2024 ANP.

4. Updating the method used to monitor PM_{10} at the Seattle-Beacon Hill SLAMS station (AQS-ID: 53-033-0080) from filter-based to a continuous BAM 1020 (81102 POC 5). This update means Ecology is no longer deficient in the PM_{10} collocation requirements of 40 C.F.R. Part 58 Appendix A, as noted in the 2023 ANP response. Thank you for documenting this update in the 2024 ANP.

5. Changes to Special Purpose Monitoring Sites (SPMs). Per the requirements of 40 C.F.R. 58.10(a)(1) and (2), details on SPMs must be included in the ANP.
   a. Establishing new FEM $PM_{2.5}$ and PM_{10} monitors at Everett-Beverly Park Road (AQS-ID: 53-061-0022) on June 17, 2024. Ecology established this site as part of the expansion of monitoring funded by Washington.
   b. Establishing a new non-regulatory $PM_{2.5}$ monitor at Spokane-E Sprague Ave (AQS-ID: 53-063-0054) on January 24, 2024. This site is also part of the expansion of monitoring funded by Washington.
   c. Establishing a new non-regulatory $PM_{2.5}$ monitor at the Raymond 4th St monitoring site (AQS-ID: 53-049-0003) on October 1, 2023.
   d. Discontinuation the non-regulatory $PM_{2.5}$ SPM at Winthrop-Chewuch Rd (AQS-ID: 53-047-0010) on April 30, 2024. Discontinuing SPM sites does not require prior approval from EPA per 40 C.F.R 58.20(f).
   e. Relocation of the non-regulatory $PM_{2.5}$ SPM in Twisp due to construction from Ewell St (AQS-ID: 53-047-0016) to S Lincoln St (AQS-ID: 53-047-0009) on June 3, 2024.
   f. Establishing a new FEM nitrogen dioxide (NO_2) monitor at the Seattle-Duwamish site (AQS-ID: 53-033-0057). This addition was planned to occur on October 1, 2024. This site is also part of the expansion of monitoring funded by Washington.

   We remind Ecology that any SPM data collected by FEMs must be submitted to the Air Quality System (AQS) database per 40 C.F.R. 58.20(b). Additionally, all data from an SPM using an FRM or FEM which has operated for more than 24 months are eligible for comparison to the relevant NAAQS, per 40 C.F.R. 58.20(c). If Ecology wishes to redesignate any of these SPM sites as SLAMS, a formal request with the information required in 40 C.F.R. 58.10(b) must be provided in a future ANP.

Thank you for including details on the following network modifications planned for the next 18 months which may require approval in a future ANP:

1. Relocation of the Kent $PM_{2.5}$ SLAMS site (AQS-ID: 53-033-2004). The lease for this site was discontinued in July 2023. While Ecology and the operating agency, Puget Sound Clean Air Agency (PSCAA) planned to propose a replacement site in the 2024 ANP, installation is delayed until 2025.

2. Establishing a new Tribal regulatory $PM_{2.5}$ and meteorological monitoring site in Wapato. The Yakama Nation is the lead on establishing this site, which was funded via an ARP direct award. The 2024 ANP stated that the installation of the site was expected to be completed in 2024, but we understand it has

been delayed and is now expected to be established in 2025. As Tribal monitoring sites are their own designation (not designated SLAMS), R10 will work directly with the Tribe on confirming and documenting that it meets all the requirements of a regulatory monitoring site.

3. Temporary discontinuation of Yelm-Northern Pacific (AQS-ID: 53-067-0005) O_3 SLAMS site and relocation of O_3 as an SPM to Lacey-College St (AQS-ID: 53-067-0013). Ecology suspended O_3 monitoring at this site due to a construction project that was planned to be completed by the 2022 O_3 season, but delays have extended the timeline through 2025 as of the publication of the 2024 ANP. The Olympic Regional Clean Air Agency (ORCAA) has been operating a temporary O_3 SPM at the nearby Lacey site and will continue to do so until the Yelm site is re-established. Thank you for including details in this year's ANP on the updated plan to resume O_3 monitoring at the Yelm site in summer 2025. Ecology requested a waiver for this temporary suspension and relocation of O_3 monitoring, which was approved by R10 on May 5, 2022 and provided in the 2023 ANP as an appendix.

4. Addition of a second near-road site in the Portland-Vancouver-Hillsboro OR-WA MSA. Population in this MSA has increased to over 2.5 million people per the 2020 census results, triggering the requirement for a second site. We appreciate Ecology working with ODEQ on selecting an appropriate site. We understand that ODEQ is prioritizing the establishment of their PAMS site, and work on this near-road site will ramp up after the 2024 PAMS season. R10 will work closely with ODEQ and Ecology in selecting and establishing a site, which will need to be evaluated in a future ANP.

We did not identify any part of Washington's ambient air monitoring network that does not meet the minimum monitoring requirements set out in 40 C.F.R. Part 58. The enclosed Annual Monitoring Network Plan Checklist is the checklist EPA used to review your plan for overall items that are required to be included in the ANP along with our assessment of whether the plan submitted by your agency addresses those requirements. All comments conveyed via this letter and the enclosed checklist should be addressed in next year's annual monitoring network plan via corrections or addition of information to the plan. Please note that we cannot approve portions of the annual network plan for which the information in the plan is insufficient to judge whether the requirement has been met, or for which the information, as described, does not meet the requirements as specified in 40 C.F.R. 58.10 and the associated appendices. EPA Region 10 also cannot approve portions of the plan for which the EPA Administrator has not delegated approval authority to the regional offices.

Region 10 approves the State of Washington's 2024 ANP. Region 10 appreciates the timeliness and detail provided in the ANP. If you have any questions about our approval of the ANP, please contact me at (206) 553-0985 or Sarah Waldo at (206) 553-1504.

Sincerely,

Debra Suzuki, Manager
Air Planning and State/Tribal Coordination Branch

ENCLOSURES:

1. Region 10 Annual Air Monitoring Network Plan Checklist
2. Kennewick-Richland PM_{10} Waiver Renewal Request

Enclosure 1: Region 10 ANNUAL AIR MONITORING NETWORK PLAN CHECKLIST

Year: 2024
Agency: Washington State Department of Ecology

40 CFR § 58.10(a)(1) requires that each Annual Network Plan (ANP) include information regarding the following types of monitors: SLAMS monitoring stations including FRM and FEM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations.

40 CFR § 58.10(a)(1) further directs that, "The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable." On this basis, review of the ANPs is based on the requirements listed in 58.10 along with those in Appendices A, C, D, and E.

EPA Region 10 will not take action to approve or disapprove any item for which Part 58 grants approval authority to the Administrator rather than the Regional Administrators, but we will do a check to see if the required information is included and correct. The items requiring approval by the Administrator are: PAMS, NCore, and Speciation (STN/CSN).

Please note that this checklist summarizes many of the requirements of 40 CFR Part 58, but does not substitute for those requirements, nor do its contents provide a binding determination of compliance with those requirements. The checklist is subject to revision in the future and we welcome comments on its contents and structure.

Key:

Highlight Color:	**Meaning:**
White/no highlight	meets the requirement
Yellow	requirement is not met, or information is insufficient to make a determination. Action requested in next year's plan or outside the ANP process.
Turquoise	Incorrectly reported, or item requires attention to improve next year's plan

	ANP requirement	Citation within 40 CFR 58[1]	Was the information submitted?[2] If yes, section or page #s.	Does the info provided[3] meet the requirement?[4]	Notes
	GENERAL PLAN REQUIREMENTS				
1.	Submit plan by July 1st	58.10 (a)(1)	Y	Y	Submitted via email to the RA on 6/28/2024
2.	30-day public comment / inspection period	58.10 (a)(1); 58.10 (c)	Y; ANP App F	Y	Posted for comment May 20 - June 20, 2024. Screenshot in App F. No comments received.
3.	Statement of whether the operation of each monitor meets the requirements of appendices A, B, C, D, and E, where applicable	58.10 (a)(1)	Y; pg 6	Y	
4.	Modifications to SLAMS network – case when we are not approving system modifications	58.10 (a)(2); 58.10 (b)(5); 58.10 (e); 58.14	Y, pages 1-4	Y	**Recent network modifications completed in Washington in the period between ANP reports (July 2023 – July 2024) that do not require approval:** **1.**Discontinuation of the collocated $PM_{2.5}$ FRM monitors at the Seattle-Duwamish SLAMS site and designation of the FEM as the primary monitor. 2.Reduction of the sampling frequency of the collocated $PM_{2.5}$ FRM at the Yakima 4th Ave SLAMS site from 1-in-3 to 1-in-6. 3.Establishing a supplemental chemical speciation network (CSN) station site at Toppenish-Ward Rd 4.Changes to Special Purpose Monitoring Sites (SPMs): establishing FEM $PM_{2.5}$ and PM_{10} at Everett-Beverly Park Rd, non-regulatory $PM_{2.5}$ at Spokane - E Sprague Ave, and at Raymond 4th St; discontinuing non-regulatory $PM_{2.5}$ at Winthrop; relocating non-regulatory $PM_{2.5}$ in Twisp. 5. Updating the PM_{10} monitoring method at Beacon Hill from FRM to BAM1020.

					Planned modifications that don't require approval at this time: **1.** Moving O_3 back to Yelm from Lacey in Summer 2025 2. New $PM_{2.5}$ Tribal site in Wapato 3. Relocation of Kent $PM_{2.5}$ site 4. Near-road site in Portland-Vancouver
5.	Modifications to SLAMS network – case when we are approving system modifications per 58.14	58.10 (a)(2); 58.10 (b)(5); 58.10 (e); 58.14	Y; pages 1-4	Y	We approve all the following planned network modifications laid out in the ANP: 1. Establishing a new $PM_{2.5}$ SLAMS site at SeaTac Sunset Park 2. Upgrading the Lacey-College St. $PM_{2.5}$ SLAMS from non-regulatory to regulatory FEM (88101) 3. Establishing a PM_{10} SLAMS regulatory monitor at the Seattle-Duwamish 4. Discontinuation of the Ferndale-Mountain View Rd and Ferndale Kickerville SO_2 monitors on December 31, 2024, or upon approval of the SO_2 Maintenance Plan. 5. Discontinuation of the Cheney-Turnbull PM_{10} SLAMS 6. Updating the waiver for the PM_{10} minimum monitoring requirements in the Spokane-Spokane Valley CBSA from three required monitors to two. 7. Renewal of waiver for PM_{10} minimum monitoring requirements in the Kennewick-Richland MSA
6.	Does plan include documentation (e.g., attached approval letter) for system modifications that have been approved since last ANP approval?	N/A	N/A		

7.	Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal	58.10 (b)(5)	Y; pg 3	Y	Relocate Kent $PM_{2.5}$ SLAMS. Discontinue Cheney-Turnbull PM_{10}. Discontinue Ferndale Mountain View Rd and Ferndale Kickerville Rd SO_2 monitors.
8.	Statement that SPMs operating an FRM/FEM that meet Appendix E also meet either Appendix A or an approved alternative. Documentation for any Appendix A approved alternative should be included.[5]	58.11 (a)(2)	Y; p. 29; Table 12	Y	
9.	SPMs operating FRM/FEM monitors for over 24 months are listed as comparable to the NAAQS or the agency provided documentation that requirements from Appendices A, C, or E were not met.[6]	58.20 (c)	Y; p. 29	Y	
10.	For agencies that share monitoring responsibilities in an MSA/CSA: this agency meets full monitoring requirements or an agreement between the affected agencies and the EPA Regional Administrator is in place	App D 2(e)	Y; ANP p. 12, 23, 32	Y	WA ECY has an MOU with ODEQ for the Portland-Vancouver-Hillsboro MSA that was renewed on April 5, 2024.
	GENERAL PARTICULATE MONITORING REQUIREMENTS (PM_{10}, $PM_{2.5}$, Pb-TSP, Pb-PM_{10})				
11.	Designation of a primary monitor if there is more than one monitor for a pollutant at a site.	App. A 3.2.3	Y; Table 12 (p. 22-23); App D tables	Y	
12.	Distance between QA collocated monitors. For low volume PM instruments (flow rate < 200 liters/minute) > 1 m. For high volume PM instruments (flow rate > 200 liters/minute) > 2m.	App. A 3.2.3.4 (c) and 3.3.4.2 (c)	Y, Table 14	Y	
	$PM_{2.5}$ –SPECIFIC MONITORING REQUIREMENTS				
13.	Document how states and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact	58.10 (c)	N/A	N/A	No changes to $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor

	the location of a violating $PM_{2.5}$ monitor.				
14.	Identification of any $PM_{2.5}$ FEMs not eligible to be compared to the NAAQS due to poor comparability to FRM(s) [Note 1: must include required data assessment.] [Note 2: Required SLAMS must monitor $PM_{2.5}$ with NAAQS-comparable monitor at the required sample frequency.]	58.10 (b)(13) 58.11 (e)	Y; App C Table 30	Y	
15.	Minimum # of monitoring **sites** for $PM_{2.5}$ [Note 1: should be supported by MSA ID, MSA population, DV, # monitoring sites, and # required monitoring sites] [Note 2: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App. D 4.7.1(a) and Table D-5	Y; Table 30	Y	Thank you for providing both the highest 24-hour and annual DVs this year.
16.	Requirements for continuous $PM_{2.5}$ monitoring (number of monitors and collocation)	App. D 4.7.2	Y; Tables 13, 14, 15	Y	
17.	FRM/FEM $PM_{2.5}$ QA collocation	App. A 3.2.3	Y; Table 14	Y	
18.	$PM_{2.5}$ Chemical Speciation requirements for official STN sites	App. D 4.7.4	Y; Table 20 and Figure 44	Y	WA has 1 STN at Beacon Hill; 3 Supplemental CSN at Tacoma-L St, Yakima 4th Ave S, and Toppenish Ward Rd (lower valley). The last was incorporated into the network 11/2023. Thank you for updating Table 20.
19.	Identification of sites suitable and sites not suitable for comparison to the annual $PM_{2.5}$ NAAQS as described in Part 58.30	58.10 (b)(7)	Y; paragraph on p. 29; Table 27 indicates DVs, pseudo DVs, and sites not meeting data completeness	Y	
20.	Required $PM_{2.5}$ sites represent area-wide air quality	App. D 4.7.1(b)	Y; Table 12	Y	

21.	For $PM_{2.5}$, within each MSA, at least one site at neighborhood or larger scale in an area of expected maximum concentration	App. D 4.7.1(b)(1)	Y; Table 12; Table 13; paragraph on FRM/FEM $PM_{2.5}$ (88101) on p. 32; At-risk community monitoring requirements section on p. 32-33	Y	
22.	If additional SLAMS $PM_{2.5}$ is required, identification of any site(s) in an at-risk community where there are anticipated effects from sources in the area.	App. D 4.7.1(b)(3)	Y; Table 12; At-risk community monitoring requirements section on p. 32-33	Y	
23.	States must have at least one $PM_{2.5}$ regional background and one $PM_{2.5}$ regional transport site.	App. D 4.7.3	Y; Table 12; Table 15; paragraphs on FRM/FEM $PM_{2.5}$ (88101) on p. 29 & non-regulatory $PM_{2.5}$ (88502) on p. 45; statement on p. 48	Y	
24.	Sampling schedule for $PM_{2.5}$ - applies to year-round and seasonal sampling schedules (note: date of waiver approval must be included if the sampling season deviates from requirement)	58.10 (b)(4); 58.12(d); App. D 4.7	Y; p 29	Y	
	PM_{10} –SPECIFIC MONITORING REQUIREMENTS				
25.	Minimum # of monitoring sites for PM_{10} [Note: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App. D, 4.6 (a) and Table D-4	Y; Tables 16 & 17, paragraph on p. 51; ANP App B (Waivers)	Y	Thank you for including your waiver request for the two required PM_{10} monitors in Spokane-Spokane Valley and for the unmet monitoring requirements for the Kennewick-Richland CBSA that Ecology has submitted a waiver renewal request for on April 11, 2024. Thank you for providing rationale for why Ecology will not be requesting a waiver renewal for PM_{10} monitoring in the Seattle-Tacoma-Belleve MSA due to the addition of a new PM_{10} monitor at the Seattle-Duwamish site.

26.	Manual PM_{10} method collocation (note: continuous PM_{10} does not have this requirement)	App. A 3.3.4	Y; p. 60	Y	Thank you for including the information about updating the PM_{10} monitoring method from a filter-based FRM to a continuous FEM at the Seattle-Beacon Hill SLAMS.
27.	Sampling schedule for PM_{10}	58.10 (b)(4); 58.12(e); App. D 4.6	Y; p. 60	Y	All WA PM_{10} samplers are continuous
	Pb –SPECIFIC MONITORING REQUIREMENTS				
28.	Minimum # of monitors for non-NCore Pb [Note: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App D 4.5	N/A	N/A	
29.	Pb collocation: for non-NCore sites	App A 3.4.4 and 3.4.5	N/A	N/A	
30.	Any source-oriented Pb site for which a waiver has been granted by EPA Regional Administrator	58.10 (b)(10)	N/A	N/A	
31.	Any Pb monitor for which a waiver has been requested or granted by EPA Regional Administrator for use of Pb-PM_{10} in lieu of Pb-TSP	58.10 (b)(11)	N/A		
32.	Designation of any Pb monitors as either source-oriented or non-source-oriented	58.10 (b)(9)	N/A		
33.	Sampling schedule for Pb	58.10 (b)(4); 58.12(b); App A 3.4.4.2 (c) and 3.4.5.3 (c)	N/A		
	O_3 –SPECIFIC MONITORING REQUIREMENTS				
34.	Minimum # of monitoring sites for O_3 [Note 1: should be supported by MSA ID, MSA population, DV, # monitoring sites, and # required monitoring sites] [Note 2: Only monitors considered to be required SLAMs are eligible to be	App D 4.1(a) and Table D-2	Y; Table 8	Y	Tri-Cities (pop. 314k) is approaching the population threshold that requires an additional monitor (350k).

	counted towards meeting minimum monitoring requirements.] [Note 3: monitors that do not meet traffic count/distance requirements to be neighborhood or urban scale (40 CFR Appendix E, Table E-1) cannot be counted towards meeting minimum monitoring requirements]				
35.	Identification of maximum concentration O_3 site(s)	App D 4.1 (b)	Y, Table 8	Y	
36.	Sampling season for O_3 (Note: Waivers must be renewed annually. EPA expects agencies to submit re-evaluations of the relevant data each year with the ANP. EPA will then respond as part of the ANP response.)	58.10 (b)(4); App D 4.1(i)	Y; Table 7 intro	Y	
37.	An Enhanced Monitoring Plan for O_3, if applicable, no later than October 1, 2019 or two years following the effective date of a designation to a classification of Moderate or above O_3 nonattainment, whichever is later.	58.10 (a)(11); App D 5 (h)	N/A	N/A	
	NO_2 –SPECIFIC MONITORING REQUIREMENTS				
38.	Minimum monitoring requirements for area-wide NO_2 monitor in location of expected highest NO_2 concentrations representing neighborhood or larger scale	App D 4.3.3	Y; Table 6; Minimum monitoring requirements section of p. 20	Y	ODEQ is working on identifying a suitable new near-road site in the Portland-Vancouver-Hillsboro, OR-WA MSA. WA ECY and PSCAA propose addition of SPM for NO2 to the Seattle-Duwamish site on October 1, 2024.
39.	Identification of required NO_2 monitors as either near-road, or area-wide	58.10 (b)(12)	Y; p. 20	Y	
	NEAR ROADWAY – SPECIFIC MONITORING REQUIREMENTS				
	In CBSAs ≥ 2.5 million, the following near-roadway minimum monitoring requirements apply:				

40.	Two NO_2 monitors	App. D 4.3.2(a); 58.13(c)(3) and (4)	Y; Table 6	Y	ODEQ is working on identifying a location for additional NO2 near-road site in Vancouver-Portland MSA.
41.	One CO monitor	App. D 4.2.1(a); 58.13(e)(2)	Y; Table 5	Y	
42.	One $PM_{2.5}$ monitor	App. D 4.7.1(b)(2); 58.13(f)(2)	Y; Table 13	Y	
	In CBSAs ≥ 1 million and AADT ≥ 250K, the following near-roadway minimum monitoring requirements apply:				
43.	Two NO_2 monitors	App. D 4.3.2(a); 58.13(c)(3) and (4)	N/A		
44.	One CO monitor	App. D 4.2.1(a); 58.13(e)(2)	N/A		
45.	One $PM_{2.5}$ monitor	App. D 4.7.1(b)(2); 58.13(f)(2)	N/A		
	*In CBSAs ≥ 1 million and ≤ 2.5 million **AND** AADT < 250K, the following near-roadway minimum monitoring requirements apply:*				
46.	One NO_2 monitor	App. D 4.3.2(a); 58.13(c)(3)	N/A		
47.	One CO monitor	App. D 4.2.1(a); 58.13(e)(2)	N/A		
48.	One $PM_{2.5}$ monitor	App. D 4.7.1(b)(2); 58.13(f)(2)	N/A		
	SO_2 –SPECIFIC MONITORING REQUIREMENTS				
49.	Minimum monitoring requirements for SO_2 based on PWEI and/or RA required monitors under Appendix D 4.4.3 [Note: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App D 4.4	Y; Table 9; text on pg. 35	Y	Proposal to discontinue SO_2 monitoring at Ferndale-Mountain View Rd and Ferndale-Kickerville Rd sites in Dec 2024 contingent on EPA approval of SO_2 Maintenance Plan
	NCORE –SPECIFIC MONITORING REQUIREMENTS				
50.	NCore site and all required parameters operational: year-round O_3, SO_2, CO,	App. D 3(b)	Y; Table 22, NCore section	Y	

	NO_y, NO, $PM_{2.5}$ mass, $PM_{2.5}$ continuous, $PM_{2.5}$ speciation, $PM_{10\text{-}2.5}$ mass, resultant wind speed at 10m, resultant wind direction at 10m, ambient temperature, relative humidity. NOy waiver, if applicable.				
51.	A plan for making Photochemical Assessment Monitoring Stations (PAMS) measurements, if applicable. The plan shall provide for the required PAMS measurements to begin by June 1, 2021.	58.10 (a)(10); 58.13 (h)	Y; pg 69-70	Y	
SITE OR MONITOR - SPECIFIC REQUIREMENTS (OFTEN INCLUDED IN DETAILED SITE INFORMATION TABLES)					
52.	AQS site identification number for each site	58.10 (b)(1)	Y; Table 31	Y	
53.	Location of each site: street address and geographic coordinates	58.10 (b)(2)	Y; Table 31	Y	
54.	MSA, CBSA, CSA or other area represented by the monitor	58.10 (b)(8)	Y; Table 4	Y	
55.	Parameter occurrence code (POC) for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Y, Tables 5 (CO), 6 (NO_2), p 22 (O_3), p23 (SO_2), Table 12 ($PM_{2.5}$ regulatory); p 45 ($PM_{2.5}$ non-regulatory); Table 16 (PM_{10}); App D tables	Y	
56.	Basic monitoring objective for each monitor	App D 1.1; 58.10 (b)(6)	Y, header information for each criteria pollutant, pages 17 - 49	Y	
57.	Site type (designation) for each monitor (e.g. SLAMS, SPM)	App D 1.1.1	Y, pollutant tables	Y	
58.	Monitor type for each monitor, and Network Affiliation(s) as appropriate	Needed to determine if other requirements (e.g., min # and	Y, pollutant tables	Y	

		collocation) are met			
59.	Scale of representativeness for each monitor as defined in Appendix D	58.10(b)(6); App D	Y, pollutant tables	Y	
60.	Parameter code for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Y, subsections of Monitoring Network Design are broken down by parameter code	Y	
61.	Method code and description (e.g., manufacturer & model) for each monitor	58.10 (b)(3); App C 2.4.1.2	Y, pollutant tables	Y	
62.	Sampling start date for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Y, pollutant tables	Y	
	SITE OR MONITOR - SPECIFIC REQUIREMENTS FOR NEW OR MODIFIED SITES (as of 2022)				
63.	Distance of monitor from nearest road	App E 6	Y; ANP App D tables	Y	
64.	Traffic count of nearest road	App E	Y; ANP App D tables	Y	
65.	Groundcover	App E 3(a)	Y; ANP App D tables	Y	
66.	Probe height	App E 2	Y; ANP App D tables	Y	
67.	Distance from supporting structure (vertical and horizontal, if applicable, should be provided)	App E 2	Y; ANP App D tables	Y	
68.	Distance from obstructions on roof (horizontal distance to the obstruction and vertical height of the obstruction above the probe should be provided)	App E 4(b)	Y; ANP App D tables	Y	
69.	Distance from obstructions not on roof (horizontal distance to the obstruction and vertical height of the obstruction above the probe should be provided)	App E 4(a)	Y; ANP App D tables	Y	

70.	Distance from the drip line of closest tree(s)	App E 5	Y; ANP App D tables	Y	
71.	Distance to furnace or incinerator flue	App E 3(b)	Y; ANP App D tables	Y	
72.	Unrestricted airflow (expressed as degrees around probe/inlet or percentage of monitoring path)	App E, 4(a) and 4(b)	Y; ANP App D tables	Y	
73.	Probe material ($NO/NO_2/NO_y$, SO_2, O_3; For PAMS: VOCs, Carbonyls)	App E 9	Y; ANP App D tables	Y	
74.	Residence time ($NO/NO_2/NO_y$, SO_2, O_3; For PAMS: VOCs, Carbonyls)	App E 9	Y; ANP App D tables	Y	

Request for PM_{10} Monitoring Waiver in Kennewick-Richland, WA

April 11, 2024

Washington's Kennewick-Richland Metropolitan Statistical Area (MSA) had a population of 314,253 as of July 1, 2023. The MSA is represented by a single PM_{10} monitoring site located at 5929 Metaline Ave in Kennewick (53-005-0002) operated by the Benton Clean Air Agency (BCAA). During high wind dust events and regional wildfire smoke episodes, the Kennewick-Metaline monitor has recorded 24-hour PM_{10} concentrations more than 20% above the PM_{10} standard. Five such events occurred in the 2021-2023 period. These exceedances placed Kennewick-Richland in the "High concentration" category according to Table D-4 of 40 C.F.R. Part 58 Appendix D. High concentration areas in this population range require 3-4 permanent PM_{10} monitoring sites.

Table 1. Exceedances of 120% of the PM_{10} NAAQS at Kennewick-Metaline in the 2021-2023 period

Date	24-hour PM_{10} concentration	Associated event
March 28, 2021	249.3 µg/m³	High-wind dust storm
May 27, 2021	205.0 µg/m³	High-wind dust storm
February 20, 2023	185.6 µg/m³	High-wind dust storm
August 20, 2023	185.8 µg/m³	Wildfire smoke event
August 21, 2023	209.5 µg/m³	Wildfire smoke event

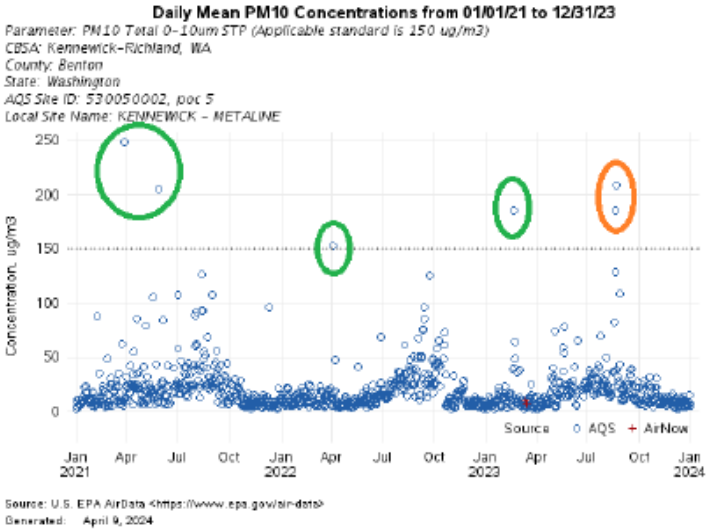

Figure 1. PM_{10} concentration plot, Kennewick, 2021-2023. High-wind dust events are circled in green and wildfire smoke events are circled in orange.

The Kennewick MSA is located downwind from an area of agricultural and undeveloped open space known as the Horse Heaven Hills (see Figure B2). During high wind events, dust entrained in the Horse Heave Hills can reach the greater Kennewick-Richland area and cause periodic exceedances of the PM_{10} standard at the Kennewick-Metaline monitor. In addition, the Kennewick-Metaline monitor recorded several exceedances of the PM_{10} standard during a regional wildfire smoke episode in September 2023. Outside of high wind events and wildfires, the Kennewick-Metaline monitor does not exceed the PM_{10} NAAQS.

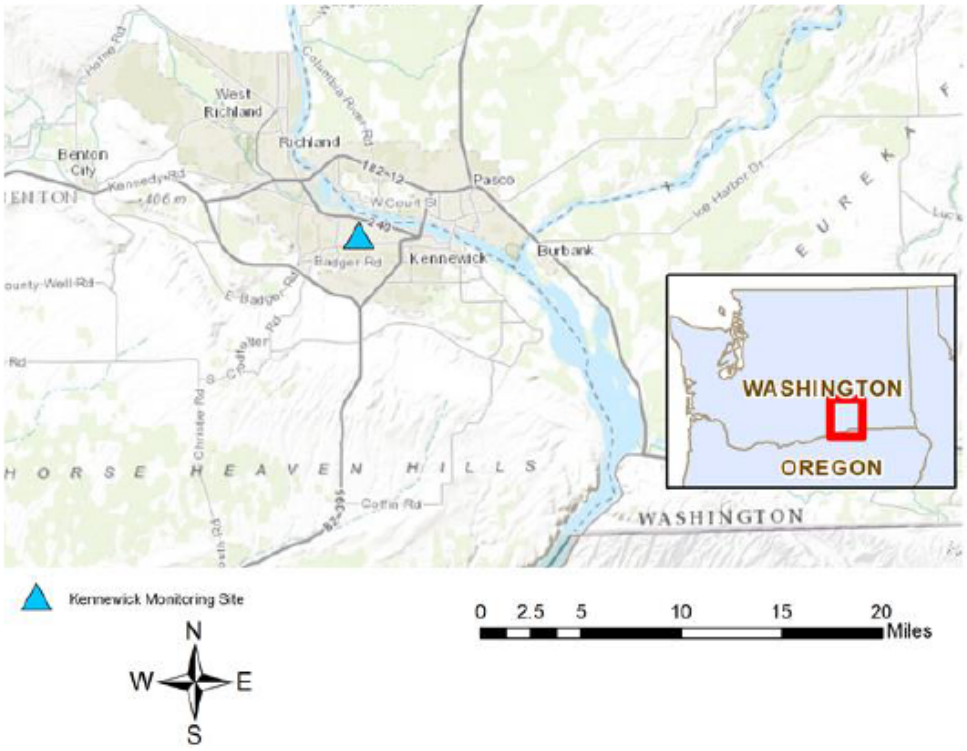

Figure B2. Map of Kennewick monitoring site

High-wind dust events

Three of these exceedances occurred during sustained high winds on March 28 and May 27, 2021, and on February 20, 2023. Hourly wind gusts in the region exceeded 50 mph on each of these days. All three events were regional wind storms that affected a large expanse of eastern Oregon and Washington, as shown in the following figures.

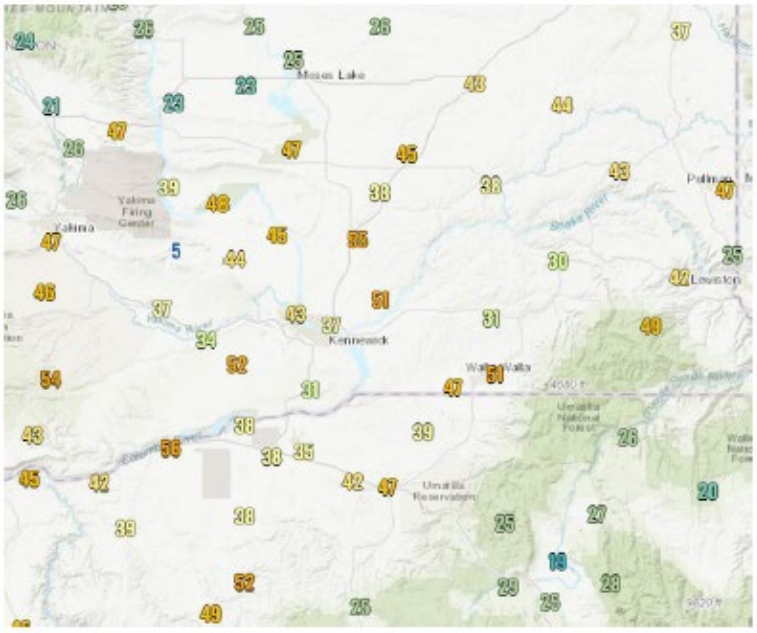

Figure 3. Regional wind gusts (mph), March 28, 2021 (source: National Weather Service Weather & Hazards Data Viewer)

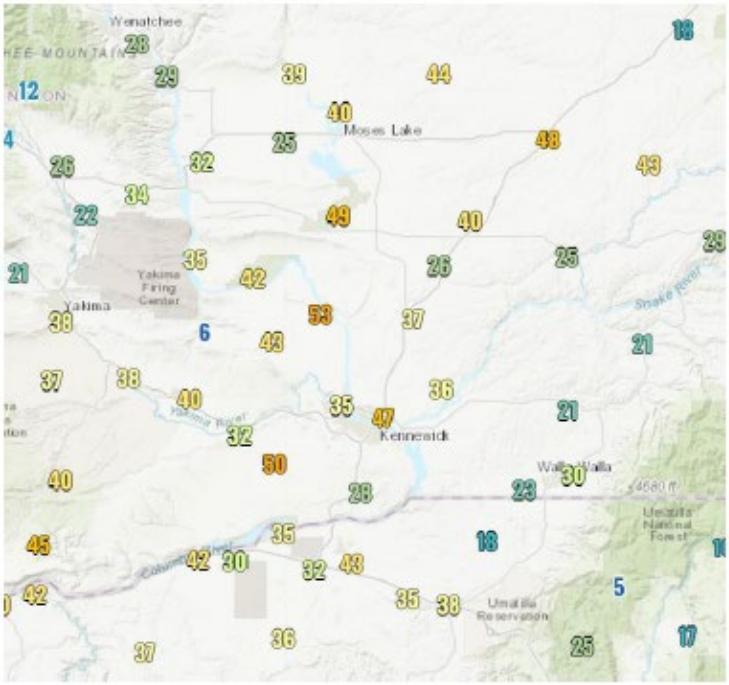

Figure 4. Regional wind gusts (mph), May 27, 2021 (source: National Weather Service Weather & Hazards Data Viewer)

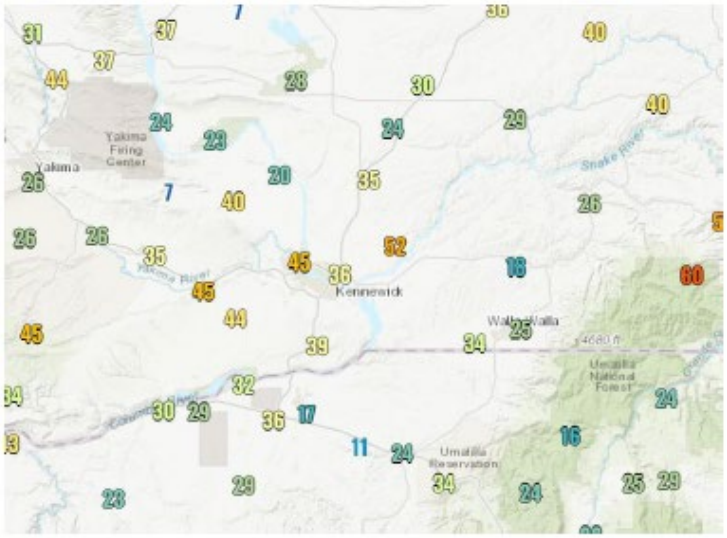

Figure 5. Regional wind gusts (mph), February 20, 2023 (source: National Weather Service Weather & Hazards Data Viewer)

The following local news stories and images provide documentation of the widespread and regional nature of these dust storms:

"60+ mph Tri-Cities winds cause 7-car chain-reaction crash, crumple trees and power lines." Tri-City Herald, March 29, 2021. https://www.tri-cityherald.com/news/weather-news/article250281685.html

Blowing dust contributed to a seven-car crash on I-182 in Richland on Sunday, March 28, 2021.

Figure 6. Image of windblown dust, March 28, 2021 (source: https://www.old.yaktrinews.com/wind-blowing-dust-40-mph-gusts-tuesday/)

"Blowing dust, crashes close highways around Tri-Cities WA." Tri-City Herald, May 28, 2021. https://www.tri-cityherald.com/news/weather-news/article251737118.html

Waves of windblown dust clog the air Thursday behind the Badger Canyon Apartment complex in Kennewick.
Tri-City Herald photo by BOB BRAWDY

Figure 7. Image of windblown dust in Kennewick, May 28, 2021 (source: Tri-City Herald)

"Wicked winds knock out power to thousands in Tri-Cities." The Key 98.3, February 21, 2023. https://keyw.com/high-winds-power-outage-tri-cities/

Figure 8. Image of vehicle off the roadway amidst blowing dust on Kennedy Rd west of Kennewick, February 20, 2023 (source: Benton County Sheriff)

Wildfire smoke exceedances

Two exceedances of 120% of the PM_{10} NAAQS occurred on August 20 and 21, 2023. During this time, heavy smoke blanketed most of Washington, causing widespread exceedances of both the $PM_{2.5}$ and PM_{10} standards across the state. The satellite image in Figure 9 show the broad extent of this regional smoke episode. Figure 10 and Figure 11 show the widespread extent of $PM_{2.5}$ concentrations in the Hazardous AQI range across eastern Washington on both days.

Figure 9. Satellite image of widespread wildfire smoke across Washington, August 20, 2023 (source: NOAA/NESDIS/STAR GOES-West)

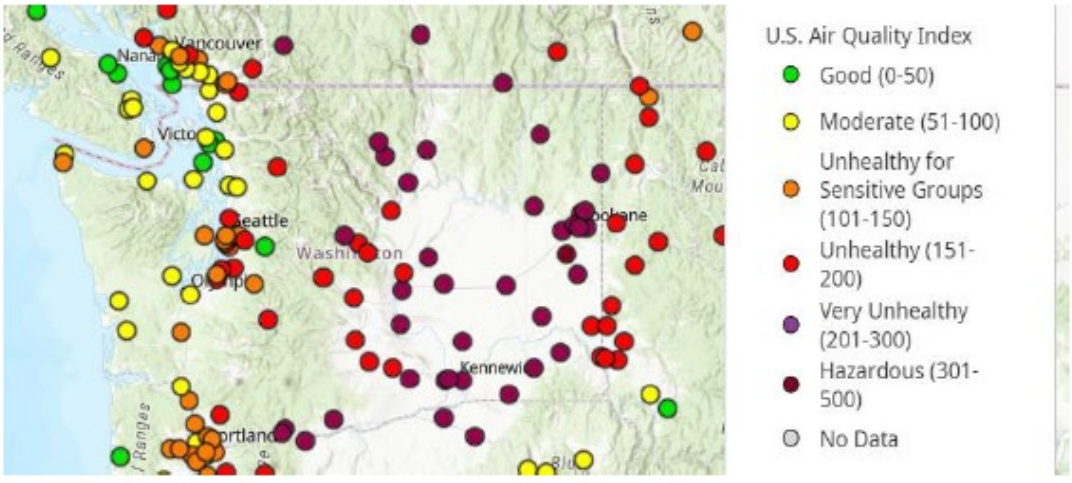

Figure 10. AirNow 24-hour $PM_{2.5}$ concentration map, August 20, 2023 (source: airnow.gov)

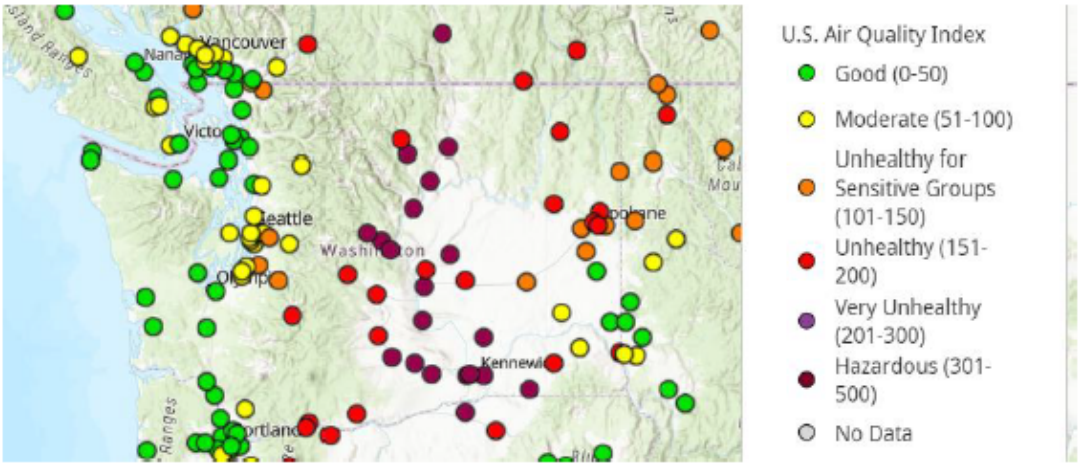

Figure 11. AirNow 24-hour $PM_{2.5}$ concentration map, August 21, 2023 (source: airnow.gov)

Given that the only exceedances of the PM_{10} NAAQS occur during regional extreme events, such as wildfires and dust storms, Ecology maintains that little value would be gained by expanding the PM_{10} monitoring network to 3-4 sites within the Kennewick MSA. During regional events, a high-density PM_{10} monitoring network within the MSA would likely show homogeneous conditions due to the broad scale of these events. In addition, the region surrounding Kennewick has an extensive network of $PM_{2.5}$ monitors that report the Air Quality Index, which is a more relevant and targeted source of public information during wildfire smoke conditions than a PM_{10} network would be.

In order to avoid duplicative PM_{10} monitoring within a relatively small MSA, and in order to direct monitoring resources toward higher-value efforts such as $PM_{2.5}$ monitoring, Ecology requests a waiver for the remainder of the required PM_{10} monitors in the Kennewick-Richland MSA.

Appendix C. Public Review and Response to Comments

Response to comments

Ecology held a public comment period on the proposed designation recommendation from January 12 through February 12, 2026. We did not receive requests for hearing. We received one written comment from a citizen. A copy of the comment, and Ecology's response are below:

Comment from Patricia Davis:

"Washington State needs STRONG Sulfur Dioxide assessment and containment Please ensure MAXIMUM protection of our ecosystems. Thank you for protecting our precious and delicate ecosystems."

Ecology's response:

Thank you for your review and comment. We appreciate your encouragement and support for strong oversight of sulfur dioxide emissions to protect our ecosystems in Washington. We believe the data in the report demonstrated Washington's strong attainment of the annual sulfur dioxide national ambient air quality standard. The air quality assessment process to designate areas is one way we evaluate the status of air quality and the effectiveness of the regulations and emission control programs for sulfur dioxide.

Changes to the document post-public comment period

We did not change our recommendation as a result of the input received during the comment period. We have made contextual, non-substantive, changes to the document to include updated information about the comment period results:

- Title and introductory pages: Updated formatting, links, and contact information.
- Acknowledgement: updated the list of contributors.
- Executive Summary: revised for grammar and style; last paragraph was revised to include the outcome of public review.
- Pages 13, 15: updated paragraphs to include the results of public review and updates to Appendix C.
- Pages 31, 32: added a clarifying note about the relocation of a long-term monitoring site.
- Appendix C: added copies of the public outreach and public comment materials, response to comment, and signed Director's correspondence letter to EPA.
- Updated publication dates and links through the document.

Public notice and outreach

We shared our public notice on January 12, 2026, at:

- Daily Journal of Commerce
- Ecology's Public Events Calendar Online
- Ecology's Areas Meeting and Not Meeting the Standards webpage
- Email to subscribers of the GovDelivery lists: "Air Quality Rulemaking and SIP Updates" and "SO_2 Attainment."

We offered the interested parties to submit comments:

- Online at SmartComment
- By mail
- Request a public hearing to testify

Copies of the above documents are included further in this Appendix.

Formal correspondence

A copy of the letter signed by the Director of Ecology and transmitted to EPA with the area designation recommendation is included at the end of this appendix.

DAILY JOURNAL OF COMMERCE
ADVERTISING PROOF

Date: 01/08/2026
Adnum: 445534
Custid: D714

Customer: DEPT. OF ECOLOGY-AIR QUALITY
Ad Title: Public Comment Period Notice
Lines: 73

State of Washington

PUBLIC COMMENT PERIOD

Area Designation Recommendation for the 2024 Sulfur Dioxide National Ambient Air Quality Standard

The Department of Ecology invites you to comment on the proposed recommendation to EPA to designate all areas in Washington as being in attainment / unclassifiable for the national air quality standard for sulfur dioxide. Set in 2024, the new annual standard protects natural and built welfare from adverse effect of sulfur dioxide air pollution. Washington is meeting (attaining) the standard in all areas with active monitoring. In areas without ambient air monitoring, available information suggests the standard is also being met (unclassifiable). We included a technical report in support of the recommendation. The comment period ends February 12, 2026. Deadline to request a hearing is February 12, 2026.

Read the proposed documents at online at https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards.

Submit written comments online at https://aq.ecology.commentinput.com/?id=9ENbg8x2pM or by mail to: Anya Caudill, Department of Ecology, Air Quality Program, P.O. Box 47600, Olympia, WA 98504-7600.

If you would like to testify, please **request a hearing by February 12, 2026.** If requested, we will hold an online public hearing on February 26, 2026, at 11 a.m. and will extend the comment period through February 27th. Find online hearing link at: https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards. If no hearing is requested, we will post a cancellation to that webpage, or you may call Anya Caudill at 360-791-5499 to inquire about the status of the hearing and public comment period.

To request printed copies, ADA accommodation, materials in a format for the visually impaired, or translation and language support, contact Anya Caudill at anya.caudill@ecy.wa.gov or 360-791-5499. Persons with impaired hearing may call Washington Relay Service at 711. Persons with a speech disability may call TTY at 877-833-6341.

Date of publication in the Seattle Daily Journal of Commerce, January 12, 2026.

1/12(445534)

COMMENT PERIOD

Air quality recommendation for sulfur dioxide designation

Determining if Washington's air meets national standards

Jan. 12, 2026, 12 a.m. - Feb. 12, 2026, 11:59 p.m. PT

We are recommending to EPA to designate all areas in Washington as "attainment/unclassifiable" for the 2024 national ambient air quality standard for sulfur dioxide (SO2).

Based on ambient air quality monitoring data, emissions inventories, and air quality trends:

> All areas with sulfur dioxide monitoring meet the standard (attainment). In unmonitored areas, available information shows the standard is also being met (unclassifiable).

Document for review

> Washington State Air Quality Designation Recommendation: 2024 Annual Sulfur Dioxide National Ambient Air Quality Standard report

Tentative public hearing

(if requested by **February 12, 2026, 11:59 p.m.**)
Thursday, February 26, 2026, 11 a.m. online

We will hold an online public hearing if we receive a written request. If we hold a public hearing, the public comment period will be extended through February 27, 2026, 11:59 p.m. If you request a public hearing, please tell us if you need interpretation in a language other than English.

If we do not receive a written request for a public hearing by **February 12, 2026**, then the public hearing will be cancelled. We will update this web page cancelling the public hearing or with a link to register for the public hearing.

After the public comment period, we will submit the report to EPA.

Background

Sulfur dioxide (SO_2) is a colorless gas with a strong smell. It gets into the air when fuel that contains sulfur is burned. Sulfur dioxide is a criteria air pollutant because of its health and environmental impacts.

Sulfur dioxide can make it harder to breathe by irritating the lungs and narrowing airways. High levels can damage trees and plants. It also helps form acid rain that harms sensitive ecosystems. In the air, it can create haze that reduces visibility.

Determining if areas meet national air quality standards is called "area designation." An area designation tells us if we need to adjust our rules or permits to meet the national air quality standard for sulfur dioxide. If an area is “attainment/unclassifiable,” it means our current, EPA-approved plan (the Washington State Implementation Plan, or SIP) is working. A State Implementation Plan (SIP) is a cleanup plan for air. It includes state and local rules, programs, and permits needed to meet, maintain, and enforce national air quality standards. The SIP explains how Washington will lower air pollution from sources like transportation, wood smoke, and industry. Sections of the plan are customized to meet regional air quality needs.

Comment online

Use our online comment form

Comment by mail

Anya Caudill
Washington Department of Ecology
Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

Questions

Anya Caudill
Environmental Planner
anya.caudill@ecy.wa.gov
360-791-5499

To request ADA accommodation, contact Ecology's ADA Coordinator by email at ecyadacoordinator@ecy.wa.gov, or call 360-407-6831, 711 (relay service), or 877-833-6341 (TTY). More about our accessibility services.

Determining if areas in Washington meet national air quality standards

Comment on our recommendation for sulfur dioxide designation

We are recommending to EPA to designate all areas in Washington as "attainment/unclassifiable" for the 2024 national ambient air quality standard for sulfur dioxide (SO_2).

Based on ambient air quality monitoring data, emissions inventories, and air quality trends:

> All areas with sulfur dioxide monitoring meet the standard (attainment).
> In unmonitored areas, available information shows the standard is also being met (unclassifiable).

Document for review

> Washington State Air Quality Designation Recommendation: 2024 Annual Sulfur Dioxide National Ambient Air Quality Standard report

Public comment period: January 12, 2026, 12 a.m. – February 12, 2026, 11:59 p.m.
Comment online.

Tentative public hearing
(if requested by **February 12, 2026, 11:59 p.m.**)
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After the public comment period, we will submit the report to EPA.

We must designate whether areas of Washington meet six national air quality standards for common air pollutants. An area can be classified in one of three ways.

I want to...

- Find out about national air quality standards
- Learn more about Washington's state implementation plan
- Sign up for email updates about current projects

We focus our work on six common air pollutants (called "criteria air pollutants") which EPA sets in National Ambient Air Quality Standards (NAAQS):

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particle pollution ($PM_{2.5}$ and PM_{10})
- Sulfur dioxide (SO_2)

Using air monitoring data, we must determine whether an area meets each air quality standard. This is called a designation. Then we recommend that designation to EPA.

Under the federal Clean Air Act, there are three ways to classify — or "designate" — an area's air quality:

- Attainment — meeting an air quality standard
- Nonattainment — not meeting an air quality standard
- Unclassifiable — not enough information to determine whether an area meets or doesn't meet an air quality standard

Each designation is made for a specific air quality standard. An area can be in attainment for one standard, and be in nonattainment or unclassifiable for another. If an area does not meet a standard, then we must follow a state implementation plan to bring that area back into attainment. When EPA sets or revises an air quality standard, we must determine if the state meets the new standard and if the designation has changed.

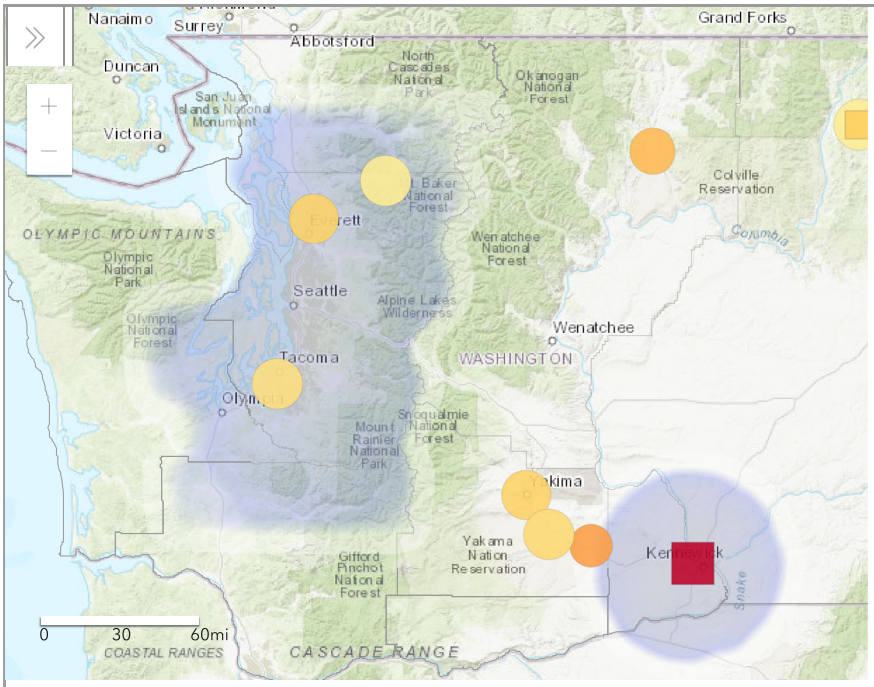
Read more about how we are working to prevent nonattainment.

Maintaining clean air

Most areas of Washington, except a small area in Whatcom County, currently meet air quality standards. Several areas are being watched closely. We and other clean air agencies monitor the air using Washington's air monitoring network at 55 locations.

- 22 are in urban areas (the Puget Sound region, the Tri-Cities, and Vancouver, Spokane and Yakima counties).
- 19 are in small communities outside of urban areas that have local sources of $PM_{2.5}$ pollution.
- 7 are in agricultural areas, to help us make decisions about agricultural burning.
- 7 are in tribal areas.
- 1 is in a natural rural location (Olympic Peninsula).

Areas of concern for criteria air pollutants



View the full map.

Related links

- Regional haze
- Washington's air quality implementation plan (aka state implementation plan)
- Plans for maintaining air quality
- Attainment State Implementation Plans
- Prevent nonattainment

Contact information

Kari Johnson
Prevent Nonattainment Coordinator
kari.johnson@ecy.wa.gov
509-481-1516

Caudill, Anya (ECY)

From: Washington Department of Ecology <waecy@public.govdelivery.com>
Sent: Monday, January 12, 2026 11:07 AM
To: Caudill, Anya (ECY)
Subject: Washington SIP Notice: Comment on sulfur dioxide air quality designation recommendation

Public comment period and public hearing (if requested)

Area Designation Recommendation

Ecology invites you to submit comments on our recommendation to EPA to designate all areas in Washington as "attainment/unclassifiable" for the 2024 national ambient air quality standard for sulfur dioxide (SO_2). Based on ambient air quality monitoring data, emissions inventories, and air quality trends:

- All areas with SO_2 monitoring are meeting the standard (attainment).
- In unmonitored areas, available information shows the standard is also being met (unclassifiable).

Recommendation

- **You may review the report and recommendation online:** SO2 Designation Recommendation Report
- **Printed copy available upon request**

Why is this important?

EPA established a new annual SO_2 standard in December 2024 to protect ecosystems and public welfare. SO_2 air pollution can directly harm vegetation and wildlife and indirectly impact ecosystems through wet and dry atmospheric deposition, causing acidification and corrosion. Acidified soils and waters cannot support healthy fish, animals, or plant life — resources essential to Washington's food systems, cultural heritage, economy, and environment. Compliance with the new standard supports our commitment to protect Washington's ecosystems, agriculture, fisheries, and industries.

Learn More

- National Ambient Air Quality Standards (EPA)

- The Designation Process (EPA)
- Sulfur dioxide air pollution in Washington State
- Washington's State Implementation Plan (SIP)

Send us your comments or request a public hearing by February 12, 2026

Please send us your written comments or requests for a public hearing by **February 12, 2026**. If requested, we will hold an online public hearing on **February 25, 2026, at 11 a.m.** and will extend the comment period through **February 27, 2026**. Find the webinar link at: https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards. If no hearing is requested, we will post a cancellation to that webpage, or you may call Anya Caudill at 360-791-5499 to inquire about the status of the hearing and public comment period.

Submit or view comments

Comment By Mail

Anya Caudill, Air Quality Program, P.O. Box 47600, Olympia, WA 98504-7600

Mailed comments must be postmarked by February 12, 2026.

ADA accessibility

To request an ADA accommodation, email anya.caudill@ecy.wa.gov, call (360)791-5499, or dial 711 to call through the Washington Telecommunications Relay for services like text telephone (TTY). Visit Ecology.wa.gov/ADA for more accessibility information

Language services

For assistance with translation or interpretation services to understand this report, please email Anya Caudill at anya.caudill@ecy.wa.gov or call 360-791-5499. When calling, please ask to be connected with an interpreter.

Anya Caudill
Air Quality Planner
anya.caudill@ecy.wa.gov
(360)791-5499

Subject:	Washington SIP Notice: Comment on sulfur dioxide air quality designation recommendation
Sent:	01/12/2026 11:06 AM PST
Sent By:	anya.caudill@ecy.wa.gov
Sent To:	Subscribers of ECY-AQ-RULE-AND-SIP-UPDATES or SO2-ATTAINMENT

1,562 Recipients

- ✓ Email
- ✗ SMS
- ✗ Facebook
- ✗ Twitter
- ✓ RSS

97% Delivered

0% Pending
3% Bounced
39% Open Rate
8% Click Rate

Email Delivery Stats

Minutes	Cumulative Attempted
3	95%
5	97%
10	99%
30	99%
60	99%
120	99%

Delivery Metrics - Details

1,562	Total Sent
1,515 (97%)	Delivered
0 (0%)	Pending
47 (3%)	Bounced
0 (0%)	Unsubscribed

Bulletin Analytics

950	Total Opens
590 (39%)	Unique Opens
119	Total Clicks
116 (8%)	Unique Clicks
20	# of Links

Delivery and performance

These figures represent all data since the bulletin was first sent to present time.

	Progress	% Delivered	Recipients	# Delivered	Opened Unique	Bounced/Failed	Unsubscribes
Email Bulletin	Delivered	96.5%	1,330	1,283	590 / 46.0%	47	0
Digest	n/a	n/a	232	232	0 / 0.0%	0	0
SMS Message	Delivered	0.0%	0	0	n/a	0	n/a

Link URL	Unique Clicks	Total Clicks
https://fortress.wa.gov/ecy/ezshare/AQ/PDFs/202512SO2DesignationRec.pdf?utm_medium=email&utm_source=govdelivery	2	2
https://www.epa.gov/criteria-air-pollutants/process-determine-whether-areas-meet-naaqs-designations-process?utm_medium=email&utm_source=govdelivery	0	0
https://ecology.wa.gov/air-climate/air-quality/air-quality-targets/air-quality-standards/sulfur-dioxide?utm_medium=email&utm_source=govdelivery	0	0
https://ecology.wa.gov/Regulations-Permits/Plans-policies/State-implementation-plans?utm_medium=email&utm_source=govdelivery	0	0
https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards?utm_medium=email&utm_source=govdelivery	0	0
https://aq.ecology.commentinput.com/?id=9ENbg8x2pM&utm_medium=email&utm_source=govdelivery	0	0
https://ecology.wa.gov/about-us/accessibility-equity/accessibility?utm_medium=email&utm_source=govdelivery	0	0
https://public.govdelivery.com/accounts/WAECY/subscriber/topics?qsp=ecology	0	0
https://ecology.wa.gov/?utm_medium=email&utm_source=govdelivery	0	0
https://ecology.wa.gov/About-us/Accessibility-equity/Accessibility-ADA?utm_medium=email&utm_source=govdelivery	0	0
https://www.facebook.com/EcologyWA/?utm_medium=email&utm_source=govdelivery	0	0
https://www.instagram.com/EcologyWA/?utm_medium=email&utm_source=govdelivery	0	0
https://www.threads.net/@ecologywa?utm_medium=email&utm_source=govdelivery	0	0

Link URL	Unique Clicks	Total Clicks
https://bsky.app/profile/ecology.wa.gov?utm_medium=email&utm_source=govdelivery	0	0
https://www.tiktok.com/@ecologywa?utm_medium=email&utm_source=govdelivery	0	0
https://www.youtube.com/EcologyWA?utm_medium=email&utm_source=govdelivery	0	0
https://www.linkedin.com/company/washingtonstatedepartmentofecology/?utm_medium=email&utm_source=govdelivery	0	0
https://content.govdelivery.com/accounts/WAECY/bulletins/3fd3fe7	0	0
https://subscriberhelp.granicus.com/?utm_medium=email&utm_source=govdelivery	0	0
https://www.epa.gov/criteria-air-pollutants/naaqs-table?utm_medium=email&utm_source=govdelivery	0	0

DEPARTMENT OF ECOLOGY State of Washington

Search Comment Items

Public Comment Form

Commenting open: **January 12, 2026 12:00AM PT** - **February 12, 2026 11:59PM PT**.

Air Quality Recommendation: Washington is meeting the 2024 Secondary Sulfur Dioxide Ambient Air Quality Standard

Ecology invites you to submit comments on our recommendation to EPA to designate all areas in Washington as "attainment/unclassifiable" for the 2024 national ambient air quality standard for sulfur dioxide (SO_2). Based on ambient air quality monitoring data, emissions inventories, and air quality trends:

- All areas with SO_2 monitoring are meeting the standard (attainment).
- In unmonitored areas, available information shows the standard is also being met (unclassifiable).

Recommendation

- You can review the document online or by clicking the button "Read SO_2 Report" at the bottom of this webpage.
- Printed copy available on request.

Public hearing on request

You may use the comment form, or email Anya Caudill, to request a public hearing. Requests must be received by **February 12, 2026.** If requested, we will automatically extend the comment period through **February 27, 2026** and hold an online public hearing on **February 25, 2026, at 6 p.m.** Find webinar link at: Areas meeting and not meeting air standards webpage.

If no hearing is requested, we will post a cancellation to that webpage, or you may call Anya Caudill at 360-791-5499 to inquire about the status of the public hearing and public comment period.

Next steps

After the public comment period, we will carefully consider and respond to comments. We will post updates and a Responsiveness Summary on Ecology's Areas meeting and not meeting air standards webpage and email updates to commenters who provided contact info.

The Director of Ecology, as the Governor's designee, will make the final decision on the recommendation. EPA will consider state's recommendations and notify the states before making their final decision about how to designate each area of the state. EPA will hold a public comment period before designating the areas.

More information

For more information about the sulfur dioxide national ambient air quality standard, please visit Ecology's Sulfur Dioxide Air Pollution webpage.

Contact Information

*Indicates Required Fields

Submitted By *

Individual

First Name

Enter First Name

Last Name

Enter Last Name

Address

Enter Address

City

Enter City or Town

State

Washington

ZIP

Enter ZIP

Email

Enter Email

☐ I Want To Be Added To The Project Mailing List

Your Comment

Comments are due by **Thursday, February 12, 2026, at 11:59 p.m.**

- **To submit your comment(s):** Type your comment(s) in the text box below.
- To include attachments, click “Upload a file.”
- Click “Continue” to review and submit your comments.

- **Before you submit:** Providing your name and contact info is optional.
- Any information you include may be publicly disclosed and posted online.
- You may view comments that others have already submitted by clicking on the blue "Read comments" button below.
- For tips on writing effective comments, visit Ecology’s comment guidance page.

Read comments | Read SO2 Report

Insert comments on Air Quality Recommendation: Washington is meeting the 2024 Secondary Sulfur Dioxide Ambient Air Quality Standard

Upload a File

Uploading a file is optional

You may attach up to five 20 MB files to accompany your submission. Allowed formats are pdf, jpg, jpeg, png, txt, gif, doc, docx, xlsx, xls. If you experience technical difficulties submitting your comment please contact the person listed at the bottom of this page.

DEPARTMENT OF ECOLOGY
State of Washington

Anya Caudill

360-791-5499

anya.caudill@ecy.wa.gov

https://ecology.wa.gov/ADA

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600, Olympia, WA 98504-7600 • 360-407-6000

April 28, 2026

Regional Administrator Emma Pokon
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

RE: Washington State Area Designation Recommendation for the 2024 Secondary Sulfur Dioxide National Ambient Air Quality Standard

Dear Regional Administrator Pokon:

Pursuant to Section 107(d) of the Clean Air Act, Washington State submits its area designation recommendation for the 2024 secondary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO_2). The Washington State Department of Ecology analyzed SO_2 monitoring data from 2022 through 2024, as well as the statewide SO_2 emissions inventory. Based on this analysis, Ecology recommends that the entire State of Washington be designated "attainment/unclassifiable."

On December 11, 2024, the U.S. Environmental Protection Agency revised the secondary SO_2 NAAQS to reflect the latest scientific understanding of SO_2's environmental and welfare impacts (89 FR 105692). The revised standard is an annual average concentration of 10 parts-per-billion (ppb). An area is in attainment when its design value – the three-year average of annual SO_2 concentrations, calculated from daily averages of hourly measurements collected at monitoring sites – is below 10 ppb. Areas without sufficient monitoring data to calculate a design value are designated as unclassifiable or attainment/unclassifiable if there are no significant SO_2 emission sources and no evidence suggesting nonattainment.

During the 2022–2024 evaluation period, SO_2 concentrations at each of Washington's five Federal Reference Method monitoring sites (located in Clallam, King, and Whatcom counties) resulted in design values of 0 ppb. Three monitoring sites characterize air quality near major SO_2 emission sources; a fourth represents background air quality in a rural area; and a fifth is in a densely populated urban area with some industrial activity. Available at the time of analysis and public review comment emissions inventory data included the 2020 Washington Statewide Comprehensive Emissions Inventory and the 2023 Washington Point Source Emission Inventory. The data show that most SO_2 emissions in Washington are generated by point sources. In 2023, cumulative SO_2 emissions from point sources totaled just under 4,000 tons statewide.

The consistently low SO_2 concentrations recorded at monitoring sites, including those near some of the state's largest sources, support the conclusion that unmonitored areas, which typically have fewer and smaller SO_2 sources, are meeting the NAAQS and should be treated as such unless future information indicates otherwise. This attainment/unclassifiable designation recommendation affirms that current air quality regulations, permitting programs, and monitoring efforts are effective at managing SO_2 emissions.

Ecology held a public comment period on this recommendation from January 12, 2026, through February 12, 2026. Ecology did not receive any requests to hold a public hearing. Ecology received one comment supporting strong controls and protection of Washington's ecosystems from SO_2 air pollution.

Technical support data and Ecology's response to the comment are included in the "Washington State Air Quality Designation Recommendation: 2024 Annual Sulfur Dioxide National Ambient Air Quality Standard" report (Publication #26-02-003). The report is enclosed here, and is available online at: https://apps.ecology.wa.gov/publications/summarypages/2602003.html.

Ecology looks forward to your response and to continued collaboration as EPA reviews and finalizes area designations by December 10, 2026. Ecology appreciates EPA Region 10's ongoing collaboration and technical guidance throughout the designation process.

If you have questions or need additional information to support EPA's final designation decision, please contact Anya Caudill at anya.caudill@ecy.wa.gov or 360-791-5499.

Sincerely,

(Signature not available on internet version)

Casey D. Sixkiller
Director

Enclosure