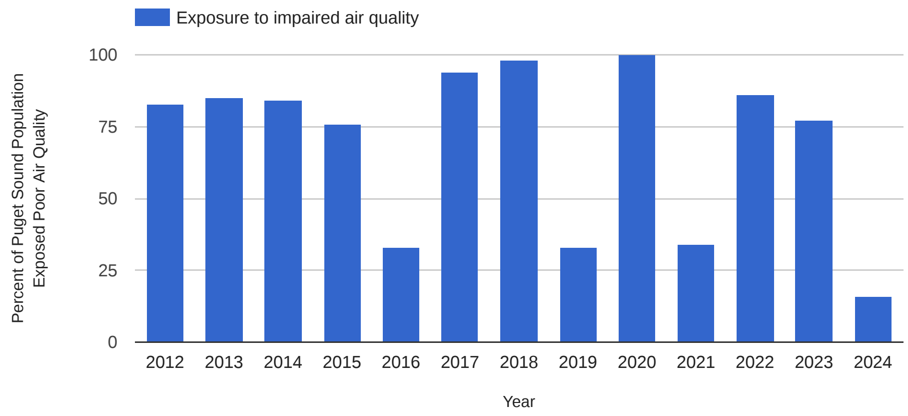
PUGET SOUND
VITAL SIGNS

INDICATOR
EXPOSURE TO IMPAIRED AIR QUALITY

Particle pollution, also called particulate matter (PM), is a mixture of tiny solids or liquid droplets that includes smoke, soot, dirt, and dust floating in the air. $PM_{2.5}$ (particles less than 2.5 micrometers) is identified as a pollution problem in many Washington communities and is associated with a number of adverse health impacts. This indicator tracks the percent of the Puget Sound population exposed to air quality that does not meet the state healthy air goal for $PM_{2.5}$ (20 µg/m^3).

Exposure to impaired air quality



Percentage of the Puget Sound population exposed to air quality that does not meet Ecology's healthy air goal for fine particulate matter ($PM_{2.5}$) of 20 µg/m^3.

Indicator Progress

MIXED RESULTS

Target Status

NO TARGET

Target

No targets are currently set for this indicator.

Data Source

Washington State Department of Ecology Ambient Air Monitoring Network

Washington Office of Financial Management April 1 Population Estimates

Indicator Lead

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Key Vital Sign Indicator Results

- 2024 was a relatively mild year for both wintertime $PM_{2.5}$ impacts and wildfire smoke. Exceedances of Washington's healthy air goal of 20 $\mu g/m^3$ were limited to a relatively small number of stagnant winter days with accumulated smoke from residential wood combustion, and to fireworks-related pollution on July 4th and 5th. There were no exceedances of Washington's healthy air goal due to wildfire smoke at any Puget Sound-area monitoring sites in 2024. The Marysville monitoring site in Snohomish County was the only site whose 98th percentile $PM_{2.5}$ concentration exceeded the healthy air goal.

- In summer 2023, western Washington experienced brief and moderate periods of wildfire smoke. Wildfire smoke conditions were not severe enough to cause the year's 98th percentile $PM_{2.5}$ concentrations in any county to exceed Washington's healthy air goal of 20 $\mu g/m^3$ based on summer concentrations alone. Three counties exceeded the healthy air goal in 2023: King, Pierce, and Snohomish. In all three counties, elevated concentrations were driven by a combination of moderate wildfire smoke impacts in summer and smoke from residential wood combustion during wintertime stagnation events. As King County comprises approximately 43% of the total population of the Puget Sound counties, the indicator results in 2023 are primarily driven by the inclusion of King County as an impacted county. However, only three of King County's nine monitoring sites exceeded the healthy air goal.

- In 2022, smoke from several fires in Washington’s Cascade Range caused intermittent periods of impaired air quality across the state, with an unusually late and severe smoke episode in western Washington in October. $PM_{2.5}$ monitors in Clallam, King, Mason, Pierce, Skagit, Snohomish, and Whatcom counties recorded 98th percentile concentrations above the Washington healthy air goal of 20 $\mu g/m^3$. All monitors representing Island, Jefferson, Kitsap, San Juan, and Thurston counties met the healthy air goal.

- In 2021, western Washington experienced a relatively mild wildfire smoke season with only a few summer days with smoke impacts at most monitoring sites. Only three Puget Sound communities recorded a 98th percentile $PM_{2.5}$ concentration over Washington's healthy air goal of 20 $\mu g/m^3$: Darrington, Marysville, and South Tacoma. Exceedances of Washington's health air goal were primarily observed during brief episodes of cold and stagnant weather in the winter months. During such conditions, residential wood combustion is a leading source of $PM_{2.5}$ in these communities.

- In 2020, greater than 99% of the Puget Sound population was exposed to impaired air quality. An extensive and severe wildfire smoke episode in late summer caused unhealthy air quality across the state, with many areas reaching the very unhealthy and hazardous ranges of $PM_{2.5}$ for several days. All but one monitoring site in the Puget Sound watershed (Neah Bay) recorded 98th percentile $PM_{2.5}$ concentrations above Washington's healthy air goal of 20 $\mu g/m^3$. During this smoke event, many monitoring sites set records for their highest concentrations ever recorded. Outside of the wildfire season, $PM_{2.5}$ concentrations were relatively low.

- After two consecutive years of prolonged wildfire smoke impacts in 2017 and 2018, calendar year 2019 was marked by a mild wildfire season with very few smoke-impacted days. The exceedances of Washington's healthy air goal of 20 $\mu g/m^3$ were primarily observed during brief episodes of cold and stagnant weather in the winter months. These episodes occurred with moderate frequency relative to other years. Residential wood combustion is a dominant source of $PM_{2.5}$ during cold, stagnant weather.

- In 2017 and 2018, smoke from local and regional wildland fires caused impaired air quality across western Washington for several weeks. The wildfire smoke incidents were so extensive and prolonged that they caused $PM_{2.5}$ concentrations to rise above Washington's healthy air goal of 20 $\mu g/m^3$ for an extended period at most monitoring sites in the Puget Sound region. Consequently, the majority of Puget Sound residents were exposed to air quality that did not meet the state's healthy air goal for $PM_{2.5}$ in both years.

CONTRIBUTING PARTNERS

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