

# Mattawa Community 2025 Environmental Justice Report



## Publication Information

This report is available on the Department of Ecology's website at <https://apps.ecology.wa.gov/publications/summarypages/2502037.html>

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## Executive Summary

The Mattawa Community Report provides community information, demographic data, greenhouse gas emissions data, and information about criteria air pollutant levels (CAPs) and their health impacts. This document provides information about air quality and health impacts to those who live, work, and play in the Mattawa community.

For more information about the background and methodology of this document, please visit *2025 Environmental Justice Report: Overburdened Communities Highly Impacted by Air Pollution* (2025 EJ Report).



## Community Overview

The Mattawa community was identified as overburdened and highly impacted by air pollution because it met the statewide screening criteria based on the EJScreen demographic index<sup>1</sup> and experiences elevated levels of short-term exposure to fine particulate matter (PM<sub>2.5</sub>).

Community identification is described in more detail in the [Overburdened Communities Highly Impacted by Air Pollution StoryMap](#).

**Land Area:** 10 sq. mi

**Population:** 5,412

**County:** Grant

**Municipal Government:** Mattawa City Council

**Ecology Region:** Eastern

**Local Clean Air Authority:** ECY Eastern Region Office

**Local Health Jurisdiction:** Grant County Health District

**Primary languages spoken:** English, Spanish

**Primary pollutant of concern:** Short-term PM<sub>2.5</sub>



## Geographic characteristics

Mattawa is a small city on the southern end of Grant County by the Columbia River. The city has a population of about 3,890 residents. Located alongside State Route 243 approximately 15 miles south of Interstate 90, the city is surrounded by orchards, vineyards, and agricultural land. There are hills to the north, south and east, which can trap air pollution within the local community.

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<sup>1</sup> EJScreen demographic index <https://www.epa.gov/ejscreen>

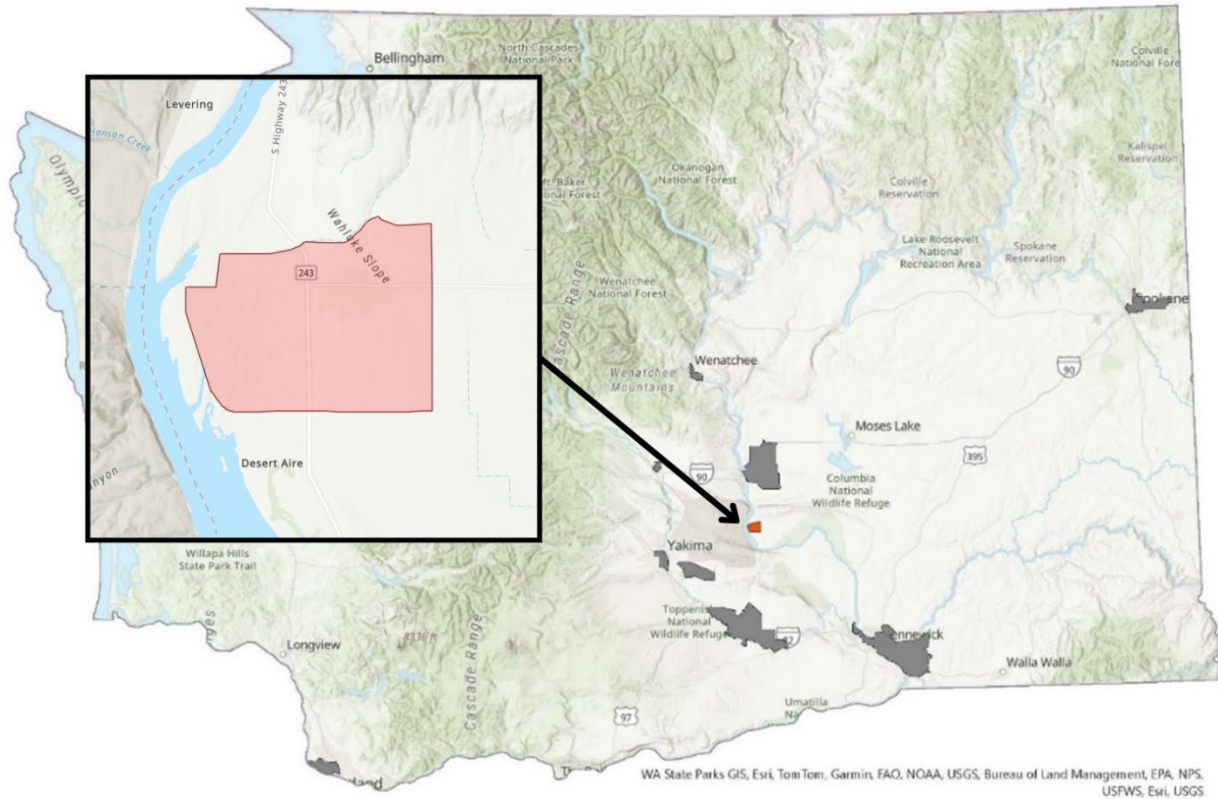


Figure 1. Map of the 16 overburdened communities highly impacted by air pollution (gray) in Washington state, with Mattawa (red) highlighted.

## Socioeconomic characteristics

Mattawa is a rural farming community and is predominantly Hispanic and Spanish-speaking. Nearly 6 in 10 workers are employed in agriculture, fishing, or forestry occupations. In more than 9 out of 10 households in Mattawa, a non-English language is spoken at home.<sup>2,3</sup> One-third of residents are children. During harvest seasons, Highway 243 has high truck traffic carrying goods towards I-90 and the Tri-Cities and often becomes congested.

The community has high rates of asthma and limited access to health care, which may make residents more sensitive to the health impacts of air pollution.<sup>4</sup> Two-fifths of residents are uninsured, more than six times the statewide average, and Mattawa has the highest share of

<sup>2</sup> American Community Survey Data <https://www.census.gov/programs-surveys/acs/data.html>

<sup>3</sup> WA Office of Financial Management, Estimates of April 1 population by age, sex, race and Hispanic origin <https://ofm.wa.gov/data-research/population-demographics/forecasts-projections/age-sex-race-and-hispanic-origin/information/>

<sup>4</sup> U.S. Centers for Disease Control and Prevention, PLACES Data Portal <https://www.cdc.gov/places/tools/data-portal.html>

population below the federal poverty line out of the 16 designated communities. It has several sensitive receptor locations including schools, childcare facilities, and healthcare clinics.

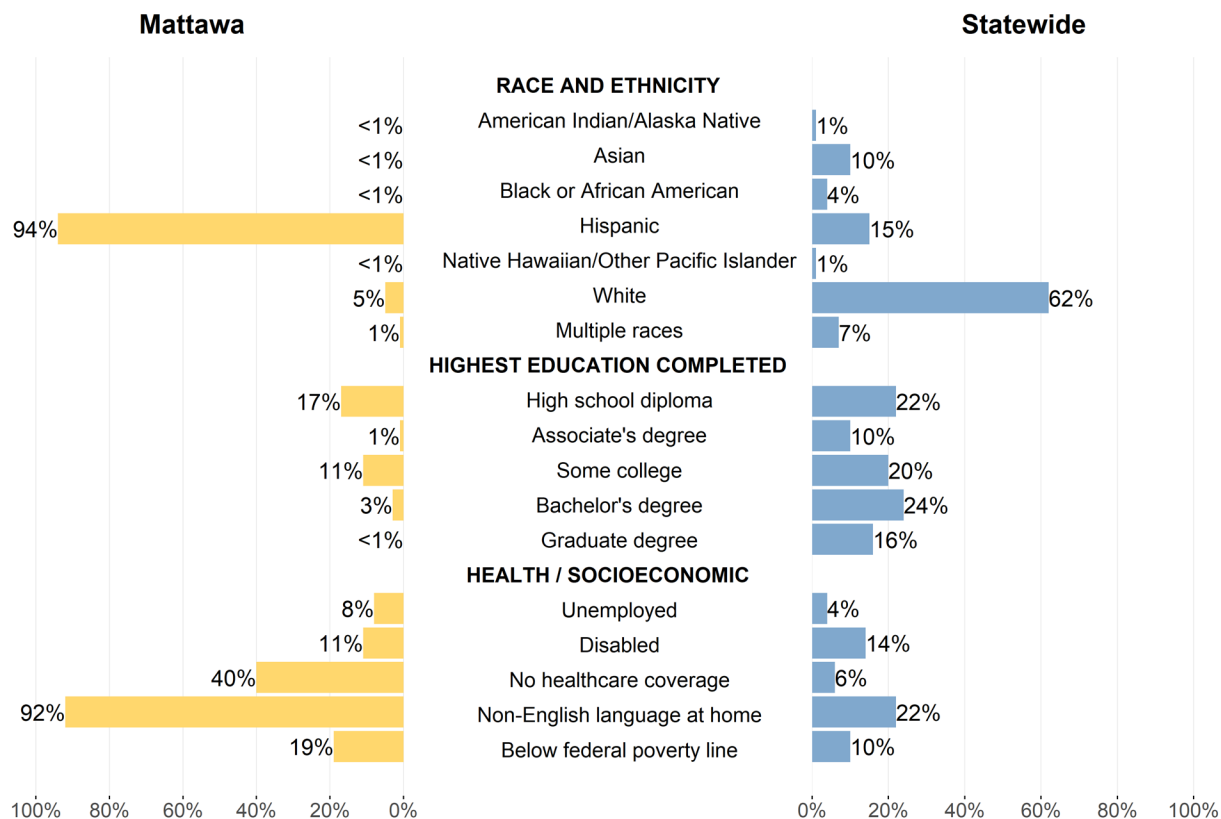


Figure 2. Sociodemographic characteristics of the Mattawa community compared to statewide percentages, based on Washington State's 2024 estimated population of 8,035,700.<sup>5</sup>

## Health characteristics

According to 2022 CDC health survey data,<sup>6</sup> Mattawa has elevated prevalences of chronic health conditions among individuals aged 18 years and older relative to the statewide population, including asthma (13.0% vs. 11.4%), cardiovascular disease (6.0% vs. 5.7%), COPD (6.5% vs. 5.7%), diabetes (14.5% vs. 9.6%), and stroke (3.7% vs. 3.1%). These prevalences are not necessarily attributable to air pollution. Community and statewide prevalences that have overlapping 95% confidence intervals, as shown in Figure 3, might not be statistically significant.

<sup>5</sup> WA Office of Financial Management, Nov 2024 Data Tables, Population by age and sex [https://ofm.wa.gov/wp-content/uploads/sites/default/files/public/dataresearch/pop/stfc/stfc\\_2024.xlsx](https://ofm.wa.gov/wp-content/uploads/sites/default/files/public/dataresearch/pop/stfc/stfc_2024.xlsx)

<sup>6</sup> U.S. Centers for Disease Control and Prevention, PLACES Data Portal <https://www.cdc.gov/places/tools/data-portal.html>

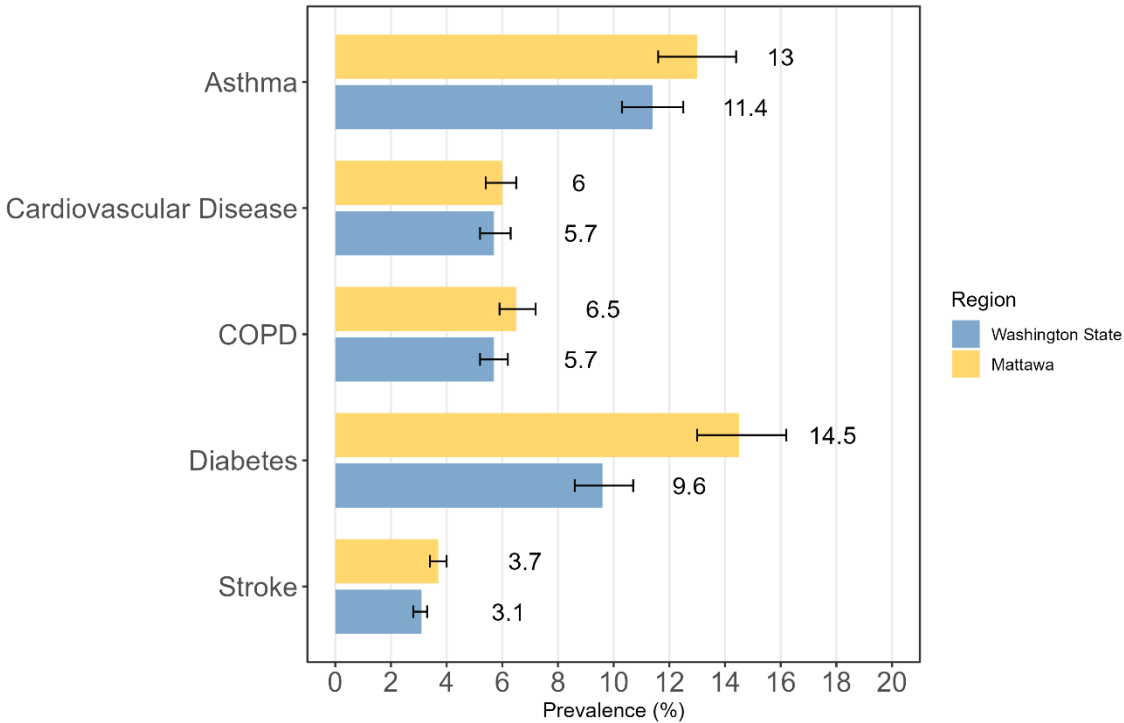




Figure 3. Prevalence of chronic health conditions among people ages 18 years and older in Mattawa census tracts compared with Washington State.

Data come from CDC PLACES, 2024 release, which uses 2022 survey data.<sup>6</sup> Yellow and blue bars indicate the estimated prevalence of each condition. Black lines indicate the 95% confidence interval.

## Air Monitoring

In January 2023, Ecology’s Eastern Regional Office (ERO) installed a PM<sub>2.5</sub> sensor (SensWA) in the Mattawa community using Climate Commitment Act (CCA) funding. The low-cost, high accuracy sensor continuously monitors PM<sub>2.5</sub> concentrations at the Mattawa-Wahluke High School site. No other criteria air pollutants are currently monitored in this community.



-  Air monitoring sites - Included in analysis
-  Mattawa community boundary

0 0.5 1 Miles

Figure 4. Map of Mattawa air monitoring sites.

Table 1. Mattawa criteria air pollutant monitors.

Monitoring Site	Type	Site Owner	Pollutants Monitored
Mattawa-Wahluke High School	SensWA <sup>1</sup>	Ecology-ERO	PM <sub>2.5</sub>

<sup>1</sup> Installed as part of Climate Commitment Act implementation

## Criteria Air Pollution

This report summarizes criteria air pollution (CAPs) concentrations in the Mattawa community from 2023 and 2024. CAPs concentrations for PM<sub>2.5</sub> are calculated using data from the Washington Ambient Air Monitoring Network and reported according to the Environmental

Protection Agency’s (EPA) methodology. More information can be found in the background and methods sections of the 2025 EJ Report.

In addition to analyzing monitored criteria air pollution concentrations, we calculated the number of days per year residents of the Mattawa community experienced unhealthy air quality, according to EPA’s Air Quality Index (AQI). The AQI is a six-category color-coded scale used to communicate daily air quality levels to the public. Days when an AQI above 100 are considered “unhealthy for sensitive groups” or worse.

In 2023, the Mattawa community experienced an average of four days with unhealthy air quality (Figure 5), primarily due to wildfire.

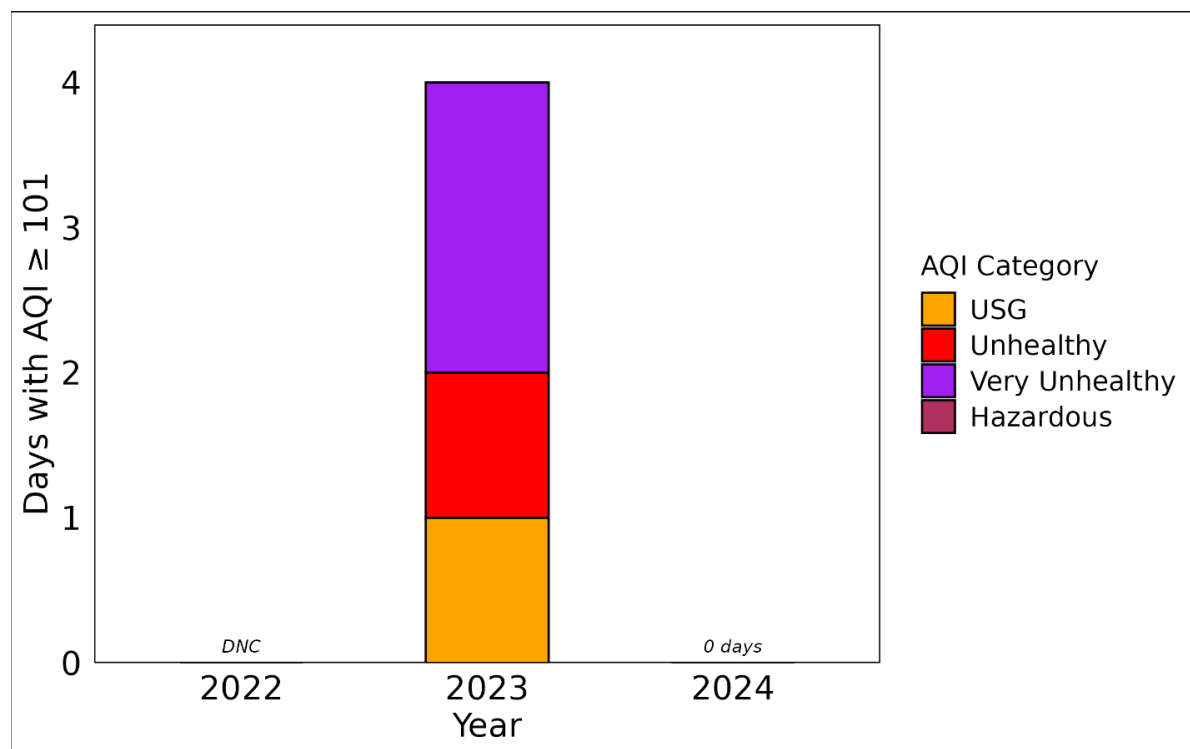


Figure 5. Number of days 2022-2024 with unhealthy air quality. Includes days impacted by wildfire smoke. DNC = Data Not Collected.

Table 2 includes 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) summary statistics. PM<sub>2.5</sub> concentrations are measured over 24-hour periods in micrograms per cubic meter (µg/m<sup>3</sup>). The EPA establishes national ambient air quality standards (NAAQS), which define the maximum allowable levels (thresholds) for each criteria pollutant. The NAAQS threshold for 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) is 35 µg/m<sup>3</sup>. The design value for 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) is a statistic that describes the

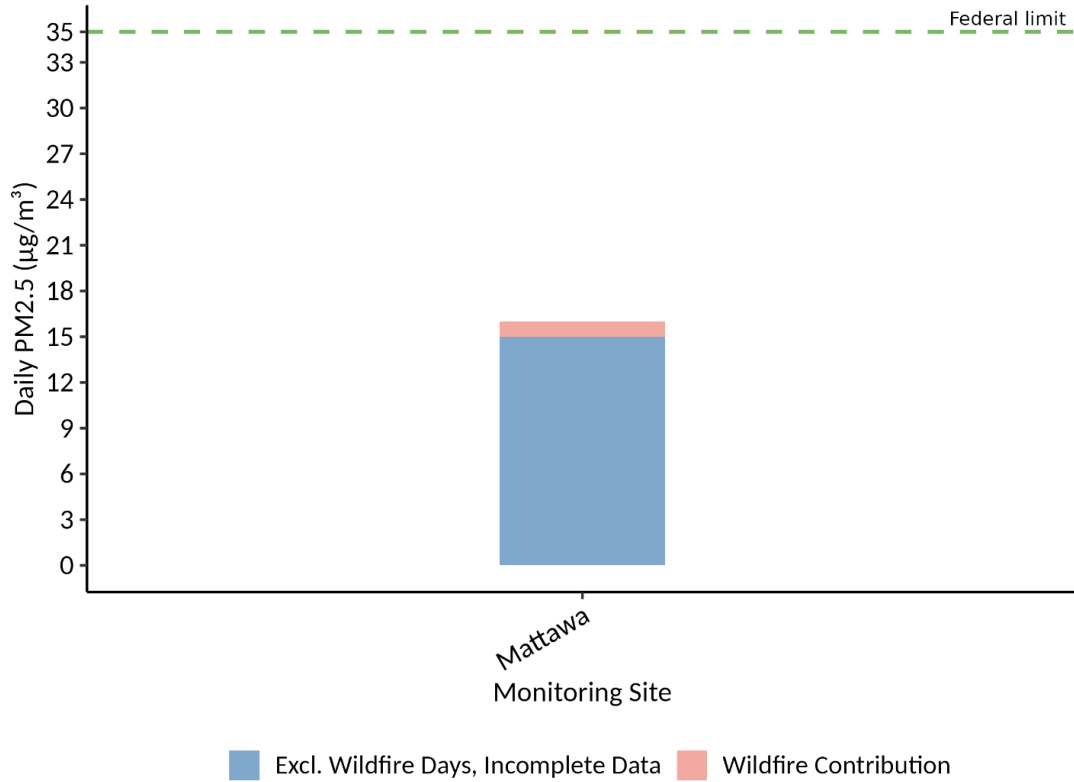
air quality of a location relative to the NAAQS over a three-year period and is used to describe short-term fine particulate exposure.

In 2023 and 2024, 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) concentrations at the Mattawa-Wahluke High School monitoring site ranged from 13.8 to 18.3 µg/m<sup>3</sup>. The 24-hour PM<sub>2.5</sub> concentrations remained below the NAAQS threshold. Values shown in brackets in Table 2 exclude wildfire-impacted days on which the 24-hour average PM<sub>2.5</sub> concentrations exceeded 35.4 µg/m<sup>3</sup>.

*Table 2. 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) summary statistics, 2023-2024. Units are in µg/m<sup>3</sup>. Brackets [ ] exclude wildfire days when 24-hour average PM<sub>2.5</sub> concentration exceeded 35.4 µg/m<sup>3</sup>. 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) NAAQS is 35 µg/m<sup>3</sup>.*

Monitoring Site	2022 24-hour 98 <sup>th</sup> Percentile	2023 24-hour 98 <sup>th</sup> Percentile	2024 24-hour 98 <sup>th</sup> Percentile	2024 Design Value
Mattawa-Wahluke High School	DNC	18.3 [15.9]	13.8 [13.8]	*

DNC = data not collected, NAAQS = national ambient air quality standards, PM = particulate matter, µg/m<sup>3</sup> = micrograms per cubic meter, \* = incomplete data for 3-year design value.



**Figure 6. 24-hour PM<sub>2.5</sub> (98<sup>th</sup> percentile) summary statistics, 2023-2024.** Annual summary statistics calculated with and without days elevated from wildfire smoke. Light blue bars include data from 2023 and 2024. Dashed line is the federal limit (NAAQS) for 24-hr PM<sub>2.5</sub>.

Table 3 includes annual mean PM<sub>2.5</sub> concentrations from 2023 to 2024. The annual PM<sub>2.5</sub> design value is a three-year average of annual mean concentrations used to describe long-term exposure; however, we did not have three-years of data available. We provided annual mean PM<sub>2.5</sub> concentrations from the Mattawa-Wahluke High School monitoring site, which remained below the NAAQS threshold of 9.0 µg/m<sup>3</sup>. Future reports will include more annual PM<sub>2.5</sub> data as additional years of monitoring data become available.

*Table 3. Annual mean PM<sub>2.5</sub> concentrations, 2023-2024. Units are in µg/m<sup>3</sup>. Brackets [ ] exclude wildfire days when the average PM<sub>2.5</sub> concentration exceeded 15.0 µg/m<sup>3</sup>. Annual PM<sub>2.5</sub> NAAQS is 9.0 µg/m<sup>3</sup>.*

Monitoring Site	2022	2023	2024	2024 Design Value
Mattawa-Wahluké High School	DNC	6.21 [4.63]	3.42 [3.34]	*

DNC = data not collected, NAAQS = national ambient air quality standards, PM = particulate matter, µg/m<sup>3</sup> = micrograms per cubic meter, \* = incomplete data for 3-year design value.

## Health Impacts of Criteria Air Pollution

We estimated the number and rate of deaths and morbidities associated with PM<sub>2.5</sub> and ozone concentrations by age range and using health effect estimates from peer-reviewed studies (Appendix B, Table 2 in the 2025 EJ Report). All estimates are rounded to the nearest whole number. We present ranges of deaths or morbidities where multiple studies assessed that health outcome.

### PM<sub>2.5</sub>

We estimated <1 death by any cause (11 deaths per 100,000 population, Table B1) related to yearly PM<sub>2.5</sub> exposure. Among older adults, which is a smaller portion of the population, we estimated <1 total death (46 deaths per 100,000 population) each year associated with annual PM<sub>2.5</sub> exposure (Table B2).

Among different racial and ethnic groups (Figure 7), we estimated <1 PM<sub>2.5</sub>-related death by any cause per year among all people (<1 death among 18–84-year-olds). However, when accounting for the ages of people in each racial and ethnic group<sup>7</sup>, the annual age-adjusted mortality rate was highest among Hispanic people (41 deaths per 100,000 population) and non-Hispanic people of two and more races (17 deaths per 100,000 population).

<sup>7</sup> Age-adjusted mortality rates represent the mortality rate if the age distribution in that race category matched the age distribution of the total Washington State population. This allows for better comparability given that different race groups can have different age distributions and the risk of death is higher in older age groups. We see higher age-adjusted rates for race categories other than the non-Hispanic White group given that these groups are generally younger in overburdened communities compared to the statewide age distribution; when we standardize these groups to the state age distribution (which has a higher proportion of older people) the estimated mortality rates are higher. More information about our age-adjustment methods can be found in the 2025 EJ Report.

Figure 7 is based on the study by Pope et al. (2019),<sup>8</sup> where AIAN refers to American Indian and Alaska Native; NH to non-Hispanic; and NHOPI to Native Hawaiian and Other Pacific Islander. The bars indicate the 95% confidence interval (CI) for each rate.

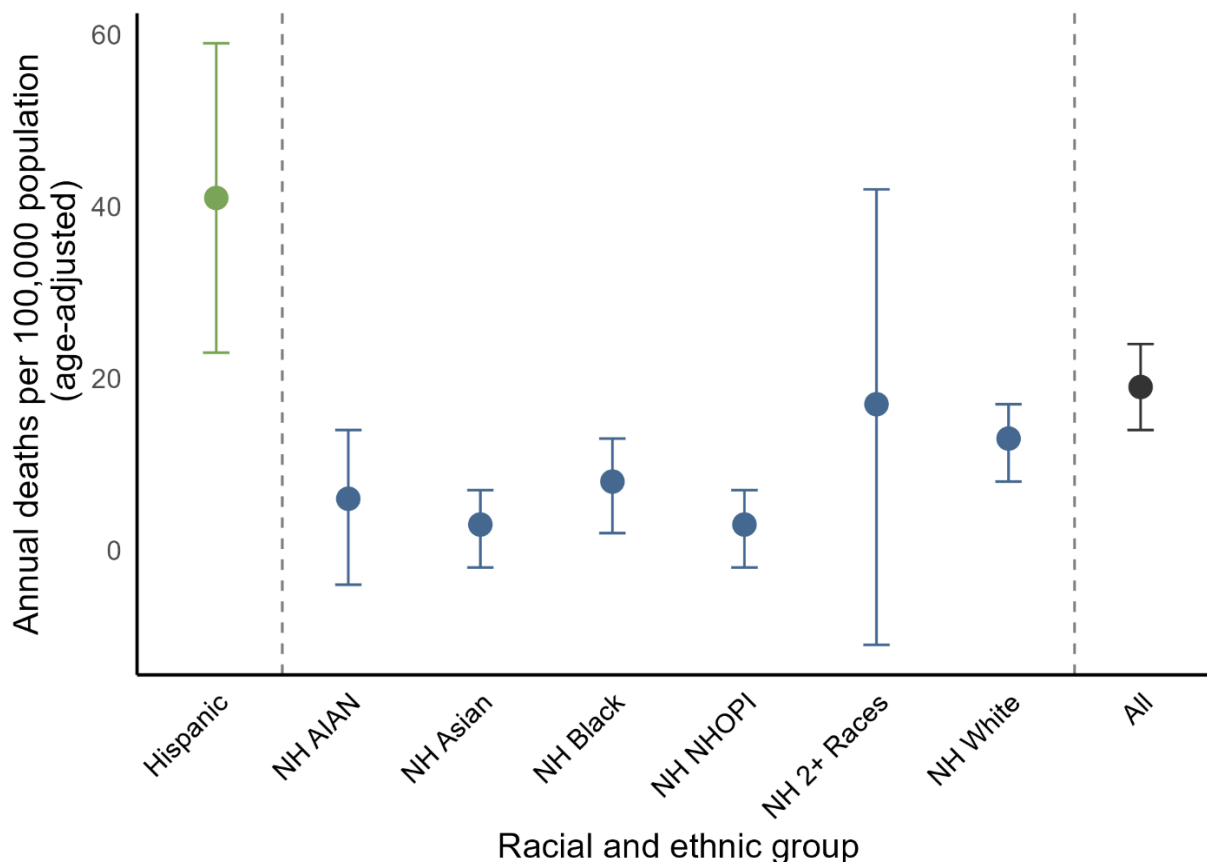


Figure 7. Age-adjusted annual death rates by any cause associated with annual PM<sub>2.5</sub> exposure among ages 18-84 by racial and ethnic group in Mattawa.

When assessing specific causes of death related to annual PM<sub>2.5</sub> concentrations (Table B3), we estimated <1 death due to cardiovascular disease (1 death per 100,000 population), <1 death due to ischemic heart disease (3 to 5 deaths per 100,000 population), and <1 death per year due to lung cancer (<1 death per 100,000 population) among adults.

Regarding non-fatal health outcomes (Table B3), we estimated that <1 hospital admission (3 visits per 100,000 population) for acute non-fatal myocardial infarction was associated with

<sup>8</sup> Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. *Environmental Health Perspectives*, 127(7), 77007.

yearly PM<sub>2.5</sub> concentrations among adults. Additionally, <1 lung cancer diagnosis per year was associated with annual PM<sub>2.5</sub> exposure among all people (<1 diagnosis per 100,000 population).

Daily PM<sub>2.5</sub> exposure (Table B4) was associated with <1 death by any cause (<1 per 100,000 population) among all people and <1 (4 per 100,000 population) death by any cause among older adults ages 65 to 99. For non-fatal conditions, daily PM<sub>2.5</sub> was associated with <1 acute non-fatal myocardial infarction admission (0 to 1 per 100,000 population) among all adults, <1 respiratory admission (35 per 100,000 population) among older adults ages 65 to 99, <1 asthma hospital admission (1 per 100,000 population) among people ages 0 to 64. Additionally, 0 to 1 asthma-related emergency department (ED) visit (6 to 11 per 100,000 population) among all people and 1 asthma-related ED visit (30 per 100,000 population) among youths ages 0 to 17 years were associated with daily PM<sub>2.5</sub> exposure.

## Ozone

We estimated that O<sub>3</sub> exposure during the warm season (Table B5) was associated with <1 seasonal all-cause death among older adults ages 65 to 99 (17 deaths per 100,000 population). Daily O<sub>3</sub> exposure was associated with <1 death by any cause (1 per 100,000 population), 1 asthma-related ED visit (25 per 100,000 population) among all people and <1 respiratory hospital admission (89 per 100,000 population) among older adults ages 65–99.

## Greenhouse Gas Emissions

Greenhouse gas results for the Mattawa overburdened community highly impacted by air pollution include: 1) Emissions from greenhouse gas reporting entities per RCW 70A.65<sup>9</sup> and WAC 173-441,<sup>10</sup> -446;<sup>11</sup> and 2) Mobile source emissions.<sup>12</sup>

We did not collect information or model greenhouse gas emissions from other sources at this time. The greenhouse gas information provided in this report aligns with the Climate Commitment Act's (CCA) requirements. For further information on methods and statewide results, refer to the 2025 EJ Report.

## Facilities

Washington State requires certain businesses that emit more than 10,000 metric tons of carbon dioxide equivalents (MT CO<sub>2e</sub>) to report to the Washington Greenhouse Gas Reporting

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<sup>9</sup> Greenhouse Gas Emissions – Cap-and-Invest Program <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65>

<sup>10</sup> Reporting of Emissions of Greenhouse Gases <https://app.leg.wa.gov/WAC/default.aspx?cite=173-441>

<sup>11</sup> Climate Commitment Act – Program Rule <https://app.leg.wa.gov/WAC/default.aspx?cite=173-446>

<sup>12</sup> Environmental Justice Review <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65.020>

Program.<sup>13</sup> Businesses that emit over 25,000 MT CO<sub>2</sub>e are also subject to the Cap-and-Invest Program (covered sources). Each reporting facility is required to follow a compliance plan.

There are no major stationary sources of greenhouse gas emissions in or nearby<sup>14</sup> the Mattawa community. There were no facilities reported in the 2023 report<sup>15</sup> or in 2022 and 2023, resulting in no change from year-to-year. The absence of reporting facilities does not mean that industrial sectors do not exist.

There are some facilities in other communities that report biogenic carbon (biogenic CO<sub>2</sub>)<sup>16</sup> emissions, which are expected to be partially recaptured as part of the natural carbon cycle. For reporting purposes, biogenic CO<sub>2</sub> is subtracted from total metric tons of CO<sub>2</sub>e, even though it has the same atmospheric warming effect as non-biogenic CO<sub>2</sub>. There were no facilities that reported biogenic CO<sub>2</sub> in Mattawa. Since 2020, total reported greenhouse gas emissions from facilities within and near all OBCs have decreased by 20.3%, and by 6.3% after subtracting biogenic CO<sub>2</sub> emissions. Some year-to-year fluctuations in emissions from individual facilities are expected.

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<sup>13</sup> Mandatory greenhouse gas reports <https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/mandatory-greenhouse-gas-reports>

<sup>14</sup> “Nearby” refers to facilities within a three-mile radius of the community boundary that were included in this analysis.

<sup>15</sup> Improving Air Quality in Overburdened Communities Highly Impacted by Air Pollution: 2023 Report <https://apps.ecology.wa.gov/publications/SummaryPages/2302115.html>

<sup>16</sup> Biogenic carbon refers to greenhouse gases released from the combustion, decomposition, or processing of materials derived from biological sources – such as wood, paper, biomass fuels, agriculture residues, food waste, or biogas. Under the Washington Greenhouse Gas Reporting Program, these emissions are reported separately from fossil-derived emissions because they result from carbon that circulates within the short-term natural carbon cycle rather than long-term carbon stores. Biogenic CO<sub>2</sub> acts the same way in the atmosphere as non-biogenic CO<sub>2</sub>. Anthropogenic processes that include these emissions reduce a facility’s environmental impact.

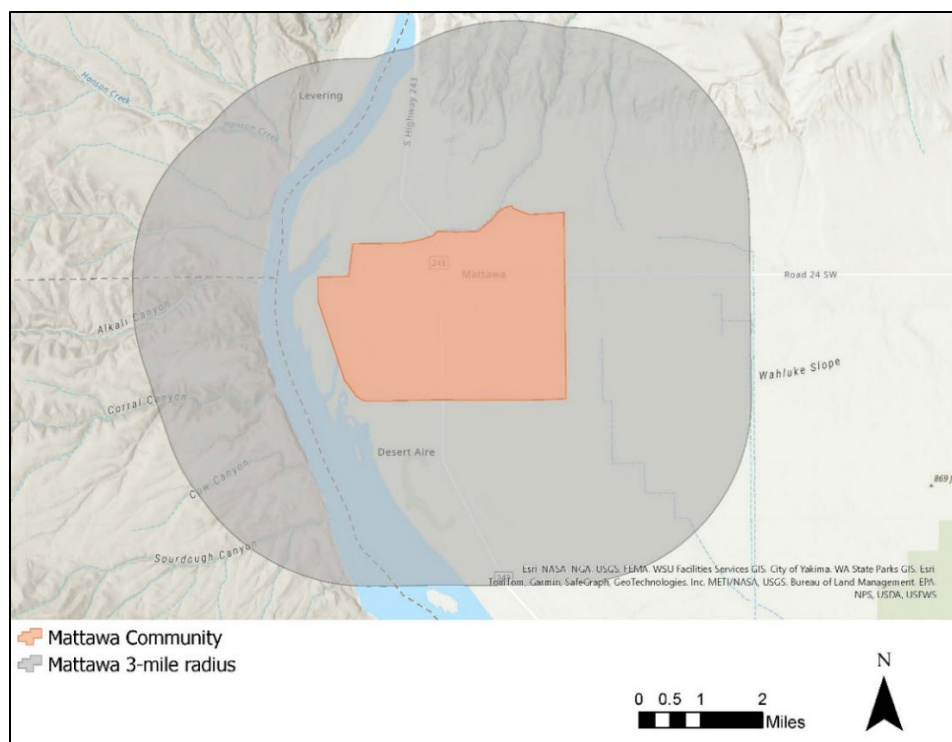


Figure 8. Mattawa community boundary and 3-mile radius include no greenhouse gas reporting facilities.

## Mobile sources

In the Mattawa community, greenhouse gas emissions from mobile sources increased by 21% from 2020 to 2021 (Table 4), but have decreased by 5.4% between 2019 to 2021.<sup>17</sup> Mobile sources consist of on-road and non-road emissions. The drop in emissions in 2020 was largely due to a decrease in vehicle traffic that was attributed to the COVID-19 pandemic.<sup>18,19</sup>

The results in Table 4 are in units of MT CO<sub>2</sub>e. Each greenhouse gas uses a conversion factor known as its Global Warming Potential (GWP), in this case AR5 GWP<sup>20</sup>, to convert emissions into CO<sub>2</sub>e. A GWP describes how much heat a greenhouse gas traps in the atmosphere relative to carbon dioxide over a specific time horizon (20, 100, or 500 years). In 2013-2014, the

<sup>17</sup> Improving Air Quality in Overburdened Communities Highly Impacted by Air Pollution 2023 Report <https://apps.ecology.wa.gov/publications/SummaryPages/2302115.html>

<sup>18</sup> Washington State Greenhouse Gas Emissions Inventory: 1990-2021, Jan 2025 <https://apps.ecology.wa.gov/publications/SummaryPages/2414077.html>

<sup>19</sup> Reducing Greenhouse Gas Emissions from the Transportation Sector through Climate Planning, Dec 2024 <https://www.epa.gov/system/files/documents/2024-12/420f24042.pdf>

<sup>20</sup> Reporting of Emissions of Greenhouse Gases <https://app.leg.wa.gov/WAC/default.aspx?cite=173-441>

Intergovernmental Panel on Climate Change (IPCC)<sup>21</sup> published AR5 GWPs and AR6 GWPs in 2021-2022. The Washington Greenhouse Gas Emissions Inventory uses AR5 GWPs in mobile source emission estimates, as the inventory models for greenhouse gas accounting are revised as science improves.

Table 4. Greenhouse gas emissions from mobile sources per capita from 2020-2021.

Population	2020 Emissions (MT CO <sub>2</sub> e)	2020 Per Capita MT CO <sub>2</sub> e	2021 Emissions (MT CO <sub>2</sub> e)	2021 Per Capita MT CO <sub>2</sub> e
4,398	30,389	6.9	36,762	8.4

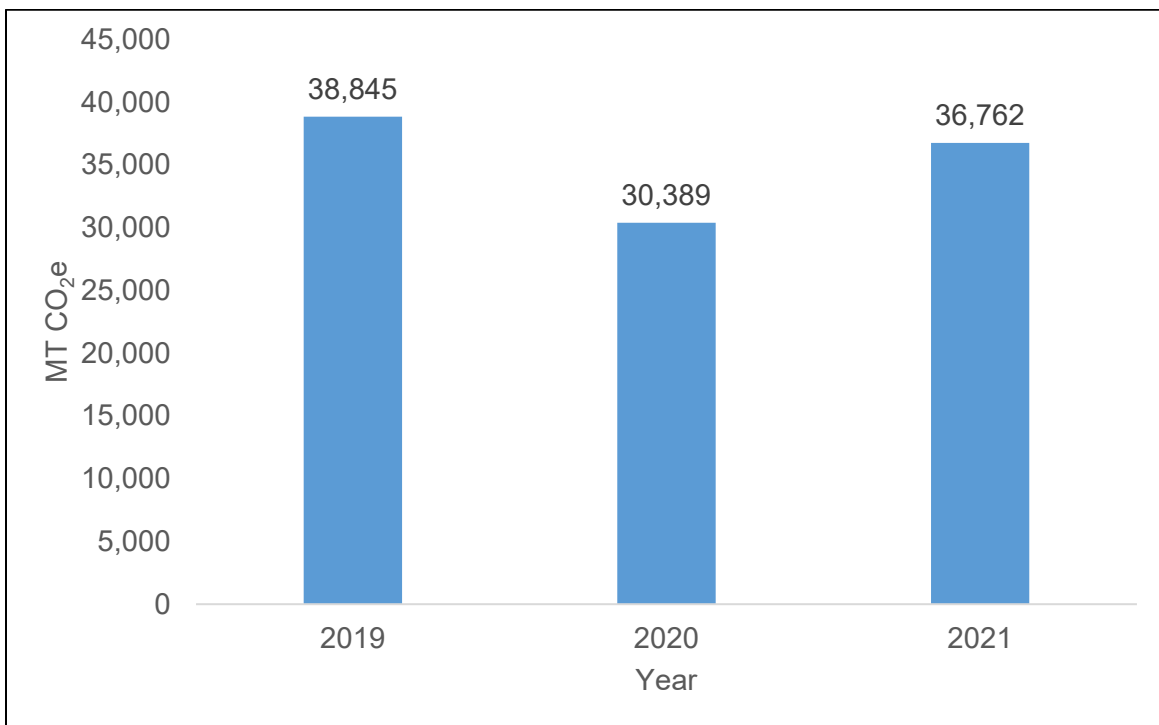


Figure 9. Annual greenhouse gas emissions from mobile sources in the Mattawa community, 2019-2021.

<sup>21</sup> Intergovernmental Panel on Climate Change <https://www.ipcc.ch/>

## Community Resources

These resources provide more information about air quality and health in the Mattawa community:

- [Grant County Health District Data and Assessment page](#)<sup>22</sup>
- [Grant County 2023-2024 Community Health Assessment](#)<sup>23</sup>
- [Grant County Trends - Health indicators](#)<sup>24</sup>
- [Zero-emission and electric vehicles mapping tool | WSDOT](#)<sup>25</sup>
- [Home | Washington Climate Action](#)<sup>26</sup>

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<sup>22</sup> <https://granthealth.org/249/Health-Data-and-Assessment>

<sup>23</sup> <https://granthealth.org/DocumentCenter/View/241/Community-Health-Assessment-2023-to-2024-PDF?bidId=>

<sup>24</sup> <https://grantcountytrends.org/category.cfm?id=5>

<sup>25</sup> <https://wsdot.wa.gov/business-wsdot/grants/zero-emission-vehicle-grants/zero-emission-and-electric-vehicles-mapping-tool>

<sup>26</sup> <https://climate.wa.gov/>

## Appendix A. Criteria Air Pollution

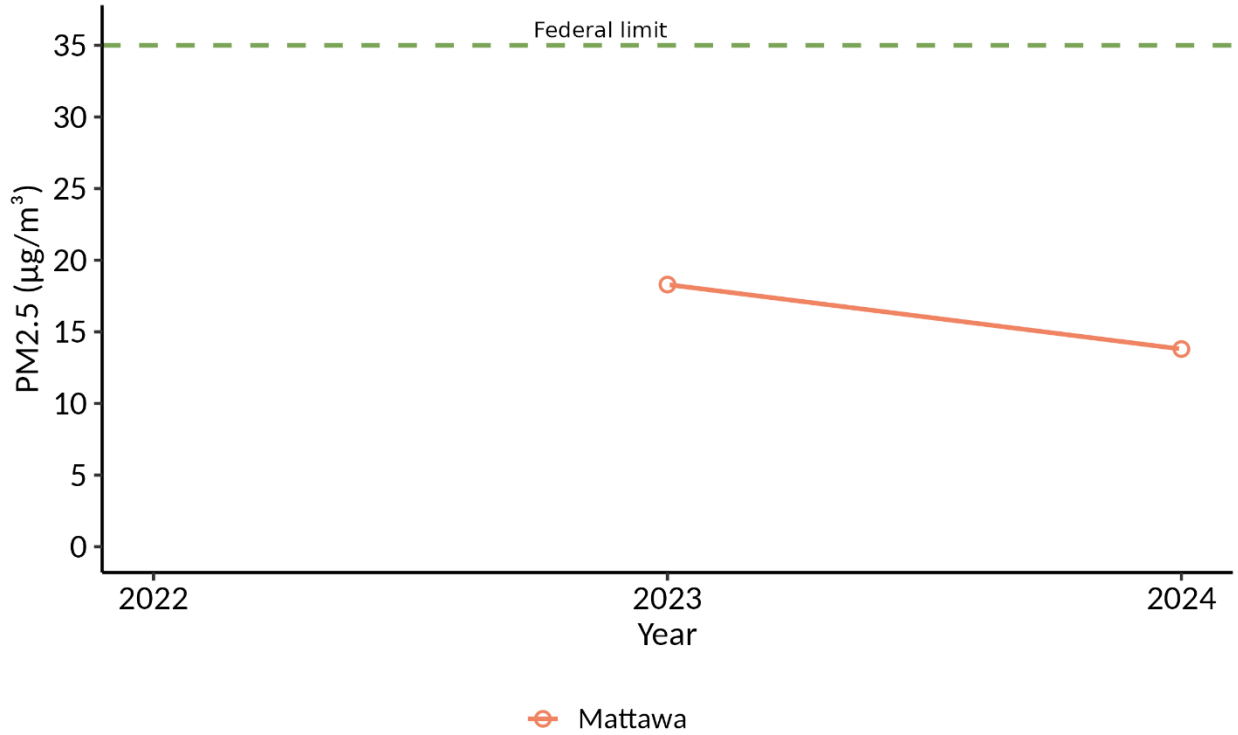


Figure A1. 24-hour  $PM_{2.5}$  (98th percentile) concentrations at the Mattawa monitoring site, 2023-2024. Days impacted by wildfire smoke are included. Dashed line is the 24-hr  $PM_{2.5}$  NAAQS (35  $\mu\text{g}/\text{m}^3$ ).

## Appendix B. Supplemental Health Impacts Tables

*Table B1. Estimated annual deaths by any cause related to yearly PM<sub>2.5</sub> exposure among 18–84-year-olds in Mattawa by racial and ethnic group, 2022–2023 (based on effect estimates in study by Pope, et al., 2019<sup>8</sup>).*

Racial and Ethnic Group	Population (18-84-year-olds)	Estimated Annual Deaths [95% CI]	Estimated annual deaths per 100,000 population [95% CI]	Estimated age-adjusted annual deaths per 100,000 population [95% CI]
All	3,077	<1 [range <1]	11 [8 to 13]	19 [14 to 24]
Hispanic	2,830	<1 [0 to 1]	16 [9 to 23]	41 [23 to 59]
Non-Hispanic AIAN	21	<1 [range <1]	3 [-2 to 7]	6 [-4 to 14]
Non-Hispanic Asian	8	<1 [range <1]	3 [-2 to 8]	3 [-2 to 7]
Non-Hispanic Black	7	<1 [range <1]	10 [3 to 16]	8 [2 to 13]
Non-Hispanic NHOPI	2	<1 [range <1]	2 [-1 to 5]	3 [-2 to 7]
Non-Hispanic 2+ races	15	<1 [range <1]	20 [-13 to 50]	17 [-11 to 42]
Non-Hispanic White	194	<1 [range <1]	19 [12 to 25]	13 [8 to 17]

AIAN: American Indian and Alaska Native; CI: confidence interval; NHOPI: Native Hawaiian and Other Pacific Islander.

Race categories only include people who identify as non-Hispanic to reflect the race categories used in the study by Pope, et al.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

*Table B2. Estimated annual deaths by any cause related to yearly PM<sub>2.5</sub> exposure among 65–99-year-olds in Mattawa by racial and ethnic group, 2022–2023 (based on effect estimates in study by Di, et al., 2017<sup>27</sup>).*

<sup>27</sup> Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.

Racial and Ethnic Group	Population (65-99-year-olds)	Estimated Annual Deaths [95% CI]	Estimated annual deaths per 100,000 population [95% CI]	Estimated age-adjusted annual deaths per 100,000 population [95% CI]
All	262	<1 [range <1]	43 [42 to 44]	46 [45 to 47]
Hispanic	197	<1 [range <1]	91 [78 to 103]	107 [93 to 121]
AIAN	16	<1 [range <1]	17 [10 to 23]	41 [25 to 57]
Asian	6	<1 [range <1]	69 [54 to 83]	40 [32 to 48]
Black	19	<1 [range <1]	40 [38 to 42]	55 [52 to 57]
NHOPI	1	<1 [range <1]	29 [18 to 40]	24 [15 to 33]
2+ races	60	<1 [range <1]	17 [11 to 24]	22 [13 to 30]
White	161	<1 [range <1]	20 [19 to 21]	20 [19 to 21]

AIAN: American Indian and Alaska Native; CI: confidence interval; NHOPI: Native Hawaiian and Other Pacific Islander.

Race categories include people who identify as Hispanic and non-Hispanic to reflect the race categories used in the study by Di, et al.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

*Table B3. Annual mortality and morbidity associated with yearly PM<sub>2.5</sub> exposure (yearly 24-hour average concentrations) in Mattawa, 2022-2023. Brackets [ ] include 95% confidence interval.*

Health Outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
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Deaths – Any cause	65 to 99	Di et al., 2017 <sup>28</sup>	262	<1 [range <1]	43 [42 to 44]
Deaths – Any cause	18 to 84	Pope et al., 2019 <sup>29</sup>	3,077	<1 [range <1]	11 [8 to 13]
Deaths – Cardiovascular disease	18 to 99	Alexeeff et al., 2023 <sup>30</sup>	3,096	<1 [range <1]	1 [0 to 2]
Deaths – Ischemic heart disease	30 to 99	Jerrett et al., 2017 <sup>31</sup>	2,258	<1 [range <1]	3 [2 to 4]
Deaths – Ischemic heart disease	30 to 99	Krewski et al., 2009 <sup>32</sup>	2,258	<1 [range <1]	5 [4 to 6]
Deaths – Ischemic heart disease	30 to 99	Pope et al., 2019 <sup>33</sup>	2,258	<1 [range <1]	3 [2 to 4]
Deaths – Lung Cancer	30 to 99	Krewski, et al., 2009 <sup>34</sup>	2,258	<1 [range <1]	<1 [range <1]
Deaths – Lung Cancer	30 to 99	Turner et al., 2016 <sup>35</sup>	2,258	<1 [range <1]	<1 [range <1]

<sup>28</sup> Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.

<sup>29</sup> Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. *Environmental Health Perspectives*, 127(7), 77007.

<sup>30</sup> Alexeeff SED, K.Van Den Eeden, S.Schwartz, J.Liao, N. S.Sidney, S. Association of Long-term Exposure to Particulate Air Pollution with Cardiovascular Events in California. *JAMA Network Open*. 2023;6(2):e230561.

<sup>31</sup> Jerrett, 2017. Comparing the Health Effects of Ambient Particulate Matter Estimated Using Ground-Based Versus Remote Sensing Exposure Estimates. *Environmental Health Perspectives*. 2017 Apr;125(4):552-559. doi: 10.1289/EHP575. Epub 2016 Sep 9.

<sup>32</sup> Krewski D, Jerrett M, Burnett R, et al. 2009. Extended Follow-Up and Spatial analysis of the American Cancer Society Linking Particulate Air Pollution and Mortality. Health Effects Institute, Cambridge MA

<sup>33</sup> Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. *Environmental Health Perspectives*, 127(7), 77007.

<sup>34</sup> Krewski D, Jerrett M, Burnett R, et al. 2009. Extended Follow-Up and Spatial analysis of the American Cancer Society Linking Particulate Air Pollution and Mortality. Health Effects Institute, Cambridge MA

<sup>35</sup> Turner, M.C., Jerrett, M., Pope, C.A., III, Krewski, D., Gapstur, S.M., Diver, W.R., Beckerman, B.S., Marshall, J.D., Su, J., Crouse, D.L., & Burnett, R.T. (2016). Long-term ozone exposure and mortality in a large prospective study. *American Journal of Respiratory Critical Care Medicine* 193(10): 1134-1142.

Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Alexeeff, et al., 2023 <sup>36</sup>	3,096	<1 [range <1]	3 [2 to 4]
Lung Cancer Diagnoses	30 to 99	Gharibvand et al., 2016 <sup>37</sup>	2,258	<1 [range <1]	<1 [range <1]

CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people. CIs that include 0 indicate that it is plausible that no deaths are associated with PM<sub>2.5</sub> in this group in this community.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 EJ Report for more information.

*Table B4. Annual mortality and morbidity associated with daily PM<sub>2.5</sub> exposure (daily 24-hour average concentrations) in Mattawa, 2022-2023. Brackets [ ] include 95% confidence interval.*

Health outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
Deaths – Any cause	0 to 99	Ito et al., 2013 <sup>38</sup>	5,082	<1 [range <1]	<1 [range <1]

<sup>36</sup> Alexeeff SED, K. Van Den Eeden, S. Schwartz, J. Liao, N. S. Sidney, S. Association of Long-term Exposure to Particulate Air Pollution with Cardiovascular Events in California. *JAMA Network Open*. 2023;6(2):e230561.

<sup>37</sup> Gharibvand, L., Shavlik, D., Ghamsary, M., Beeson, W.L., Soret, S., Knutsen, R., & Knutsen, S.F. (2016). The association between ambient fine particulate air pollution and lung cancer incidence: results from the AHSMOG-2 study. *Environmental Health Perspectives* 125 (3): 378?384

<sup>38</sup> Ito, K., Ross, Z., Zhou, J., Nádas, A., Lippmann, M. and Thurston, G.D., 2013. NPACT Study 3. Time-series analysis of mortality, hospitalizations, and ambient PM<sub>2.5</sub> and its components. National Particle Component Toxicity (NPACT) Initiative. <https://www.healtheffects.org/publication/national-particle-component-toxicity-npact-initiative-integrated-epidemiologic-and>

Deaths – Any cause	65 to 99	Zanobetti et al., 2014 <sup>39</sup>	262	<1 [range <1]	4 [3 to 5]
Deaths – Cardiovascular disease	0 to 99	Liu et al., 2022 <sup>40</sup>	5,082	<1 [range <1]	<1 [range <1]
Deaths – Respiratory	0 to 99	Liu et al., 2022 <sup>41</sup>	5,082	<1 [range <1]	<1 [range <1]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Sullivan et al., 2005 <sup>42</sup>	3,096	<1 [range <1]	<1 [-1 to 1]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Zanobetti et al., 2009 <sup>43</sup>	3,096	<1 [range <1]	1 [0 to 1]
Hospital Admissions – All Respiratory	65 to 99	Zanobetti et al., 2009 <sup>44</sup>	262	<1 [range <1]	25 [14 to 35]
Hospital Admissions – Asthma	0 to 64	Sheppard et al., 2003 <sup>45</sup>	4,820	<1 [range <1]	1 [0 to 1]

<sup>39</sup> Zanobetti, A., Dominici, F., Wang, Y. and Schwartz, J.D., 2014. A national case-crossover analysis of the short-term effect of PM<sub>2.5</sub> on hospitalizations and mortality in subjects with diabetes and neurological disorders. *Environmental Health*, 13(1), p.38.

<sup>40</sup> Liu, R.A., Wei, Y., Qiu, X., Kosheleva, A. and Schwartz, J.D., 2022. Short term exposure to air pollution and mortality in the US: a double negative control analysis. *Environmental Health*, 21(1), p.81.

<sup>41</sup> Liu, R.A., Wei, Y., Qiu, X., Kosheleva, A. and Schwartz, J.D., 2022. Short term exposure to air pollution and mortality in the US: a double negative control analysis. *Environmental Health*, 21(1), p.81.

<sup>42</sup> Sullivan, J., L. Sheppard, A. Schreuder, N. Ishikawa, D. Siscovick and J. Kaufman. 2005. Relation between short-term fine-particulate matter exposure and onset of myocardial infarction. *Epidemiology*. Vol. 16 (1): 41-8.

<sup>43</sup> Zanobetti, A., Franklin, M., Koutrakis, P. and Schwartz, J., 2009. Fine particulate air pollution and its components in association with cause-specific emergency admissions. *Environmental Health*, 8(1), p.58.

<sup>44</sup> Zanobetti, A., Franklin, M., Koutrakis, P. and Schwartz, J., 2009. Fine particulate air pollution and its components in association with cause-specific emergency admissions. *Environmental Health*, 8(1), p.58.

<sup>45</sup> Sheppard, L. Ambient Air Pollution and Nonelderly Asthma Hospital Admissions in Seattle, Washington, 1987-1994. In: Revised Analyses of Time-Series Studies of Air Pollution and Health. 2003, Health Effects Institute: Boston, MA. p. 227-230.

ED Visits – Asthma	0 to 99	Mar et al., 2010 <sup>46</sup>	5,082	1 [0 to 1]	11 [3 to 18]
ED Visits – Asthma	0 to 99	Slaughter, J. C., et al., 2005 <sup>47</sup>	5,082	<1 [0 to 1]	6 [-5 to 16]
ED Visits – Asthma	0 to 17	Norris, G., et al., 1999 <sup>48</sup>	1,987	1 [0 to 1]	30 [15 to 44]

ED: emergency department; CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people. CIs that include 0 indicate that it is plausible that no deaths are associated with PM<sub>2.5</sub> in this group in this community.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 EJ Report for more information.

*Table B5. Annual mortality and morbidity associated with seasonal and daily O<sub>3</sub> exposure (seasonal and daily 8-hour maximum concentrations) in Mattawa, 2022-2023. Brackets [ ] include 95% confidence interval.*

Health Outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
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<sup>46</sup> Mar, T. F., J. Q. Koenig and J. Primomo. 2010. Associations between asthma emergency visits and particulate matter sources, including diesel emissions from stationary generators in Tacoma, Washington. *Inhalation Toxicology*. Vol. 22 (6): 445-8.

<sup>47</sup> Slaughter, J. C., E. Kim, L. Sheppard, J. H. Sullivan, T. V. Larson and C. Claiborn. 2005. Association between particulate matter and emergency room visits, hospital admissions and mortality in Spokane, Washington. *Journal of Exposure Analysis and Environmental Epidemiology*. Vol. 15

<sup>48</sup> Norris, G., et al. An association between fine particles and asthma emergency department visits for children in Seattle. *Environmental Health Perspectives*, 1999. 107(6): p. 489-93.

Deaths – Any cause (Seasonal)	65 to 99	Di, et al. 2017 <sup>49</sup>	262	<1 [range <1]	17 [9 to 25]
Deaths – Any cause (Daily)	0 to 99	Zanobetti and Schwartz, 2008 <sup>50</sup>	5,082	<1 [range <1]	1 [0 to 1]
ED Visits – Asthma (Daily)	0 to 99	Mar and Koenig, 2009 <sup>51</sup>	5,082	1 [0 to 2]	25 [6 to 41]
Hospital Admissions – All Respiratory (Daily)	65 to 99	Schwartz, 1995 <sup>52</sup>	262	<1 [range <1]	89 [26 to 146]

ED: emergency department; CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people. CIs that include 0 indicate that it is plausible that no deaths are associated with O<sub>3</sub> in this group in this community.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

Age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 EJ Report for more information.

<sup>49</sup> Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.

<sup>50</sup> Zanobetti, A. and Schwartz, J., 2008. Mortality displacement in the association of ozone with mortality: an analysis of 48 cities in the United States. *American Journal of Respiratory and Critical Care Medicine*, 177(2), pp.184-189.

<sup>51</sup> Mar, T.F. and Koenig, J.Q. (2009). Relationship between visits to emergency departments for asthma and ozone exposure in greater Seattle, Washington. *Annals of Allergy, Asthma & Immunology*, 103, 474-479.

<sup>52</sup> Schwartz, J., 1995. Short term fluctuations in air pollution and hospital admissions of the elderly for respiratory disease. *Thorax*, 50(5), pp.531-538.