

2024

# AIR QUALITY SUMMARY



# Air Quality and Weather in 2024

The Metro Vancouver Regional District has regulated and managed air pollutants in the region for over 50 years. This authority was delegated to Metro Vancouver under the BC *Environmental Management Act*.

Metro Vancouver’s air quality is good most of the time, and despite population growth and urbanization, air quality has improved over the past decades. This demonstrates the effectiveness of local policies and programs that reduce air pollutants. However, a changing climate can threaten these improvements, as seen by the increasing frequency and intensity of wildfires and smoke impacts. It is essential that Metro Vancouver’s air quality programs continue to respond to new challenges.

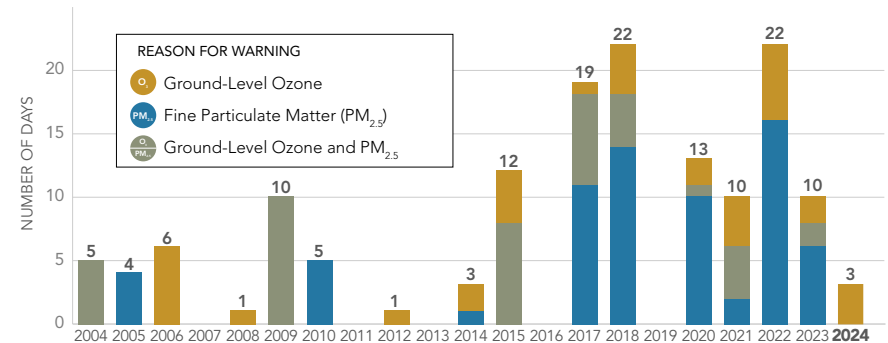
Metro Vancouver’s air quality monitoring network measures air pollutants from Horseshoe Bay to Hope. This annual summary provides an overview of the data measured by the network. The summary compares the measurements to Metro Vancouver’s ambient air quality objectives — which are health-based benchmarks for acceptable air quality. It also highlights notable air quality events in 2024, along with trends observed over the past 10 years.

## Air Quality Warnings

Metro Vancouver issues air quality warnings (previously called “air quality advisories”) when air quality is poor or expected to become poor. There are many air pollutants that harm health, and those that are the most likely to cause a regional air quality warning are:

- **Ground-level ozone (smog)**, which forms when air pollutants from various sources, like vehicles and industrial activities, react with each other on hot, sunny days.
- **Fine particulate matter**, which are small particles in the air that may impact health. Sources include wildfire smoke, residential wood smoke, vehicle exhaust, industrial processes, and chemical reactions.

AIR QUALITY WARNINGS 2004 – 2024 (NUMBER OF DAYS)

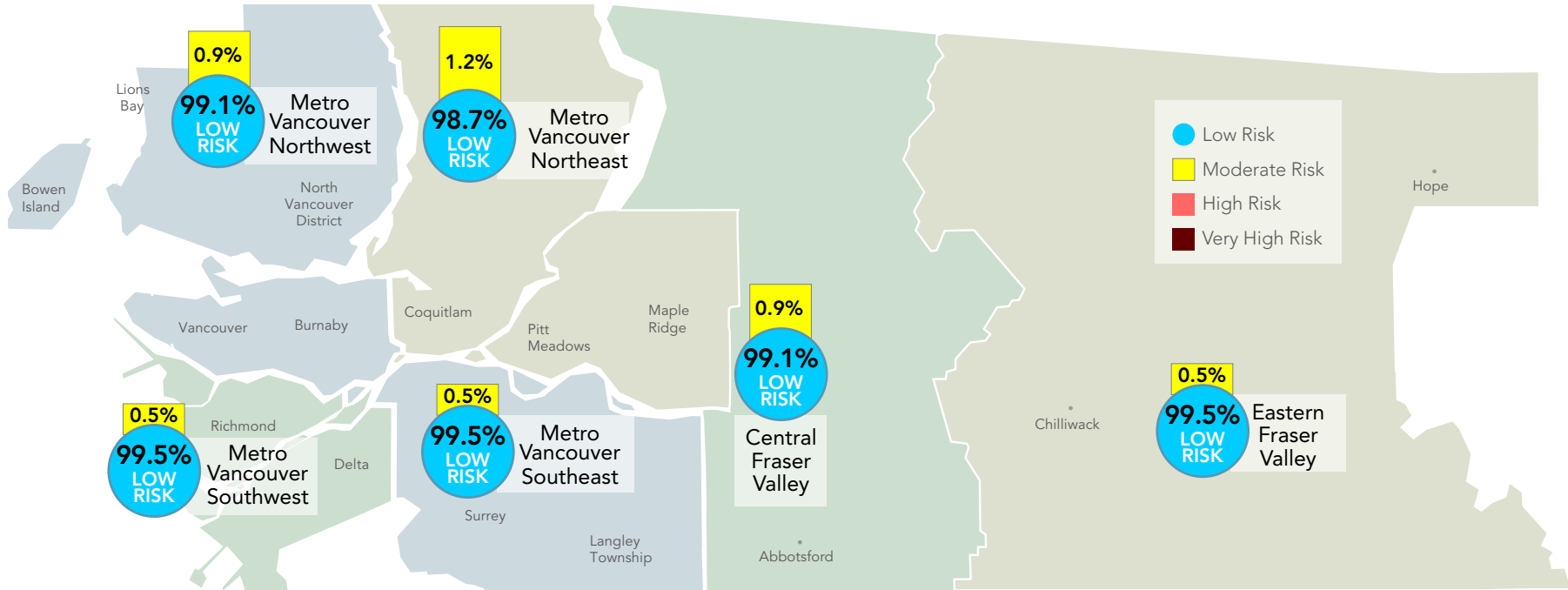


## Air Quality Warnings and Weather in 2024

In 2024, Metro Vancouver issued one air quality warning in early July for ground-level ozone (smog). The warning was in effect for three days for eastern parts of Metro Vancouver and the Fraser Valley, and was caused by local emissions and hot and sunny weather. July was the sixth-warmest July on record for Vancouver and Abbotsford since records began in 1896 and 1944, respectively.

(Continued on page 6)

**AIR QUALITY HEALTH INDEX: PER CENT OF ANNUAL HOURS  
BY HEALTH RISK CATEGORY IN 2024**



Percentages may not total 100% due to rounding. Risk categories with fewer than five hours are not shown.

**AIR QUALITY HEALTH INDEX**

The Air Quality Health Index (AQHI) is a Canadian health index designed to help people understand how air quality can affect their health and how they can protect themselves when air quality is poor. It uses a scale of 1 (low health risk) to 10+ (very high health risk) to indicate potential health risk and is updated every hour. The figure above shows the percentage of hours in each health risk category in 2024.

## Air Quality Warnings and Weather in 2024 *(Continued from page 3)*

Metro Vancouver issued two air quality bulletins in 2024. Air quality bulletins notify residents of short-term and localized air quality issues that are not widespread enough to trigger an air quality warning. In January, Metro Vancouver issued an air quality bulletin after an incident occurred at the Parkland Refinery in Burnaby and a strong chemical odour was reported in some parts of the region. In late June, Metro Vancouver issued an air quality bulletin for thick smoke from a train trestle fire over the Fraser River between Richmond and Vancouver.

According to the [BC Wildfire Service](#), 1.08 million hectares of land in BC were burned by wildfires in 2024. This was much less than the area burned in BC in 2023 (over 2.84 million hectares) — BC's most destructive wildfire season in recorded history — but still above the 10-year average. Most of the areas burned in 2024 were in northeastern BC, where drought conditions have persisted for several years.

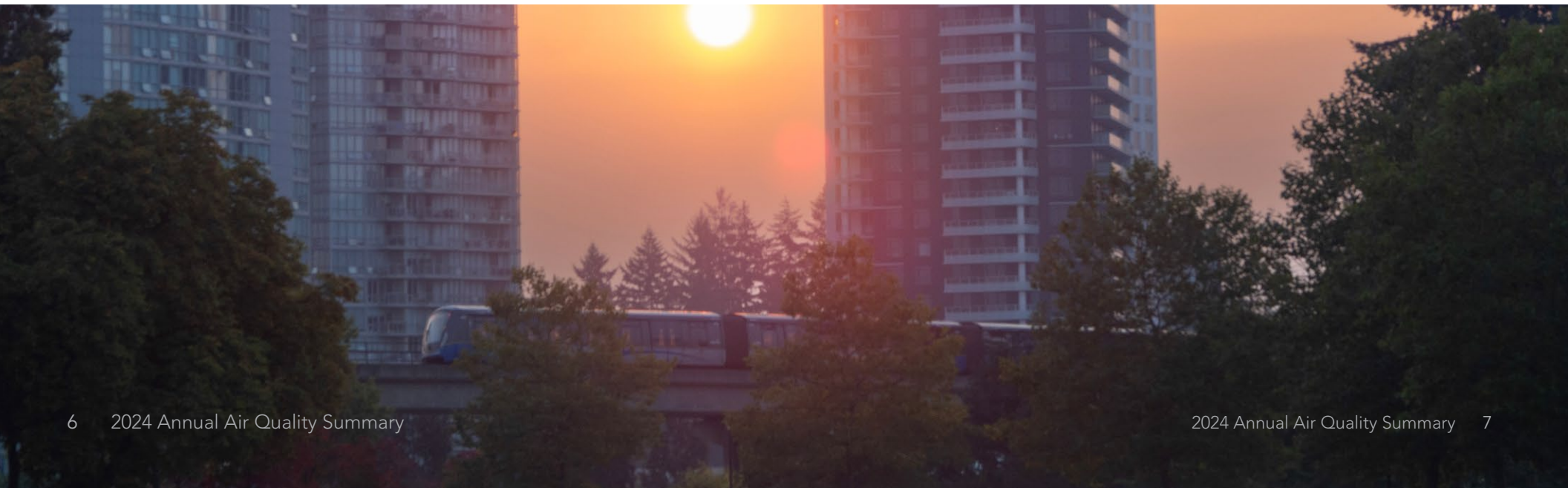
In 2024, the number of wildfires and hectares burned in the Coastal Fire Centre, which includes the Metro Vancouver region, as well as the Sunshine Coast, Vancouver Island, and other areas along the southern coast of BC, were well below the 10-year average for the Coastal Fire Centre. The BC Wildfire Service attributes this to a wet spring and summer, a low number of lightning strikes, and the public's safe use of open fire.

October 2024 was Vancouver's sixth-wettest October on record, and a major atmospheric river led to flooding in parts of Metro Vancouver. The rest of the year had normal amounts of precipitation. December was the fifth-warmest December on record for Vancouver and Abbotsford, with no significant snowfall.

## Climate Change Impacts

The average global temperature in 2024 was the warmest on record, beating 2023 for the top spot. With a changing climate, the Metro Vancouver region can expect warmer, drier summers, and longer periods of drought. These changes can increase how often wildfires and smoke impacts occur and how long they last. Heat waves are also predicted to become more intense and prolonged, leading to increased ground-level ozone formation in the region. Furthermore, air pollutants in wildfire smoke can accelerate chemical reactions that form ozone.

In response to these changes, Metro Vancouver is reviewing the Regional Ground-Level Ozone Strategy to examine trends such as more extreme temperatures and new sources of emissions, including wildfires. The review will also explore ways to mitigate the health impacts of ground-level ozone.

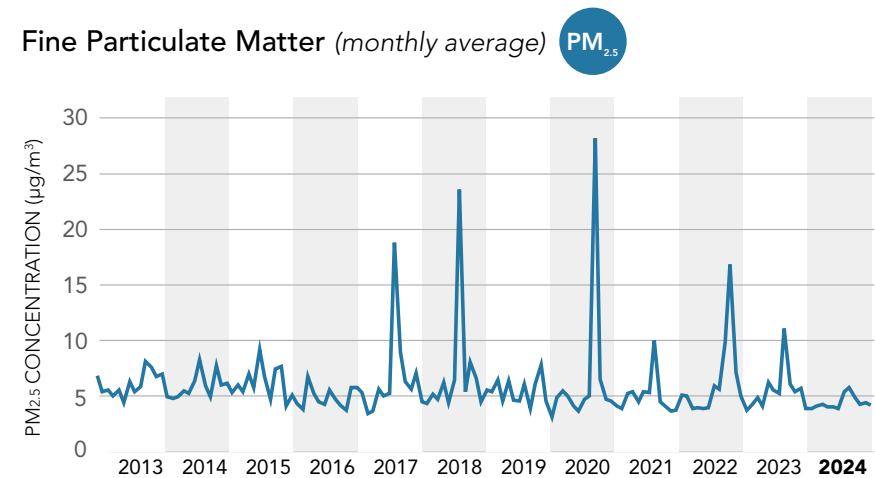


# Air Quality Trends

Trend charts illustrate changes in average air quality across the region over time. Measurements from monitoring stations, spanning from Horseshoe Bay to Hope, are averaged to represent the typical outdoor air quality in the region. Trends show that most air pollutant levels have been decreasing over the last decade, even as the region's population has grown.

## Fine Particulate Matter

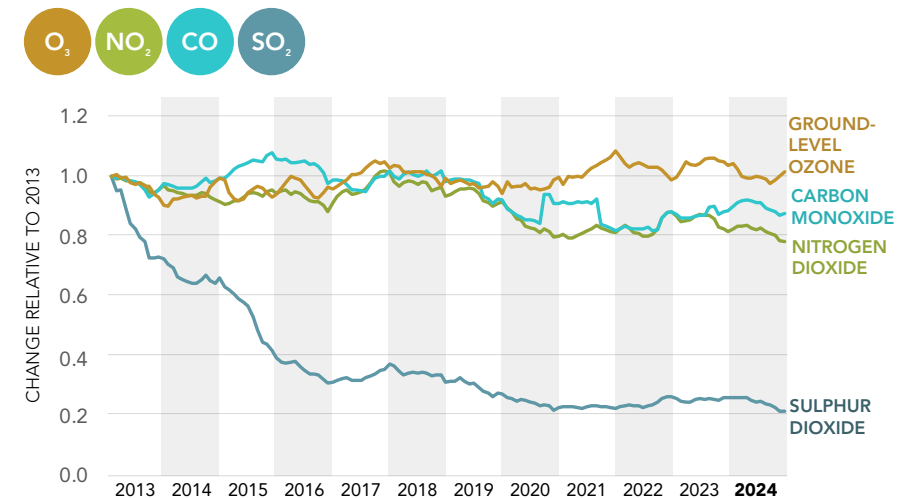
Wildfire smoke has impacted Metro Vancouver's air quality in seven of the last 10 years. As seen in the graph, the highest monthly average concentrations were measured in 2017, 2018, 2020, and 2022.



## Other Pollutants

Sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and carbon monoxide (CO) have generally continued to decrease, even as the region's population grows. These reductions are largely due to improvements in engine and fuel standards for vehicles, marine vessels, and non-road equipment — such as construction and agricultural machinery — as well as decreased emissions from industrial facilities. In more recent years, the shift from gasoline and diesel vehicles to electric vehicles also reduced emissions. Average levels of ground-level ozone (O<sub>3</sub>) have increased slightly despite reductions in some pollutants that create it, possibly due in part to more prolonged heat events and rising background O<sub>3</sub> concentrations.

## Other Pollutants (average level compared to 2013)



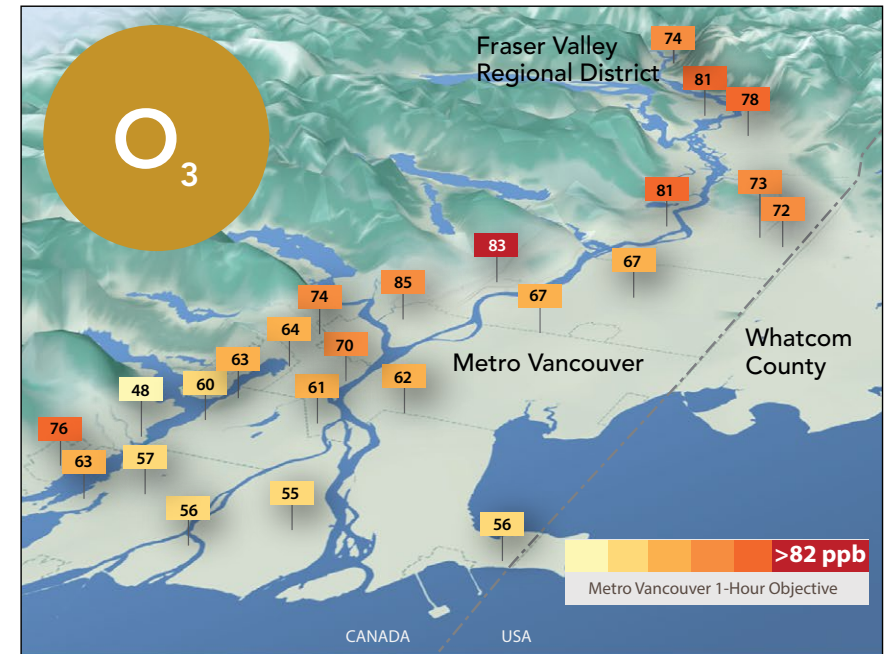
## AIR QUALITY OBJECTIVES AND STANDARDS

Air quality objectives and standards are health-based metrics that are used to assess air quality and guide air quality management. They include [Metro Vancouver ambient air quality objectives](#) and [Canadian Ambient Air Quality Standards \(CAAQS\)](#).

In November 2024, Metro Vancouver updated its ambient air quality objectives to align with the national Canadian Ambient Air Quality Standards for ground-level ozone (one-hour average), nitrogen dioxide (one-hour and annual average), and sulphur dioxide (annual average). Metro Vancouver's 24-hour objective for  $PM_{2.5}$  ( $25 \mu\text{g}/\text{m}^3$ ) is more stringent than the 24-hour CAAQS ( $27 \mu\text{g}/\text{m}^3$ ).

Metro Vancouver seeks to continually improve air quality, and to ensure that regional air quality meets or is better than these objectives. Metro Vancouver's [Clean Air Plan](#) describes actions to reduce air pollutants and greenhouse gas emissions in the region.

## GROUND-LEVEL OZONE IN 2024

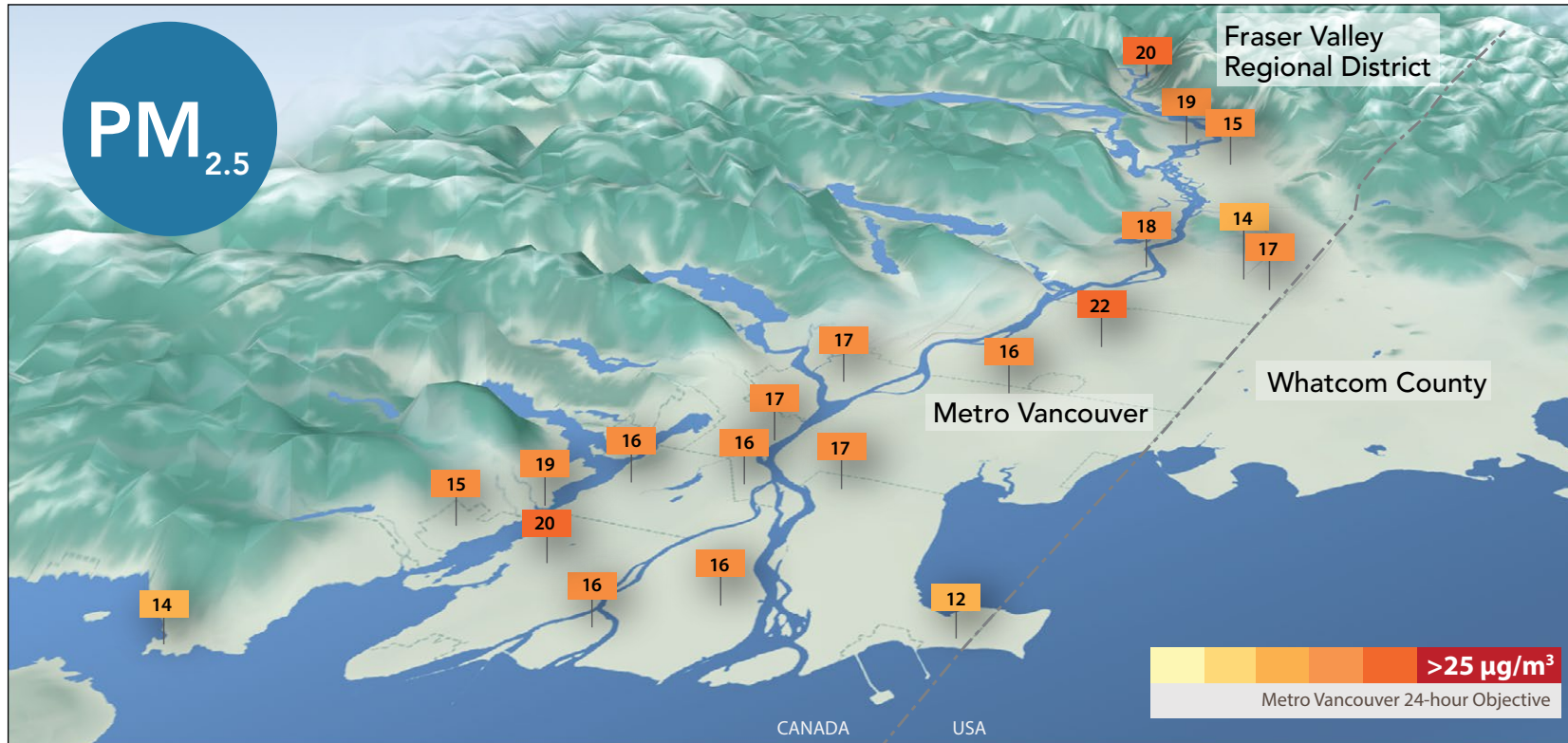


Ground-level ozone (smog) forms when nitrogen oxides and volatile organic compounds react in the air during hot, sunny weather.

The highest ozone concentrations are typically in eastern parts of Metro Vancouver and the Fraser Valley.

The map shows ground-level ozone measurements averaged over one-hour periods. In Pitt Meadows and Maple Ridge, ozone concentrations exceeded Metro Vancouver's one-hour objective (82 ppb) in July 2024. In that same month, ozone concentrations in Maple Ridge and Mission were higher than Metro Vancouver's eight-hour objective and Canadian Ambient Air Quality Standard (both 60 ppb).

## FINE PARTICULATE MATTER IN 2024

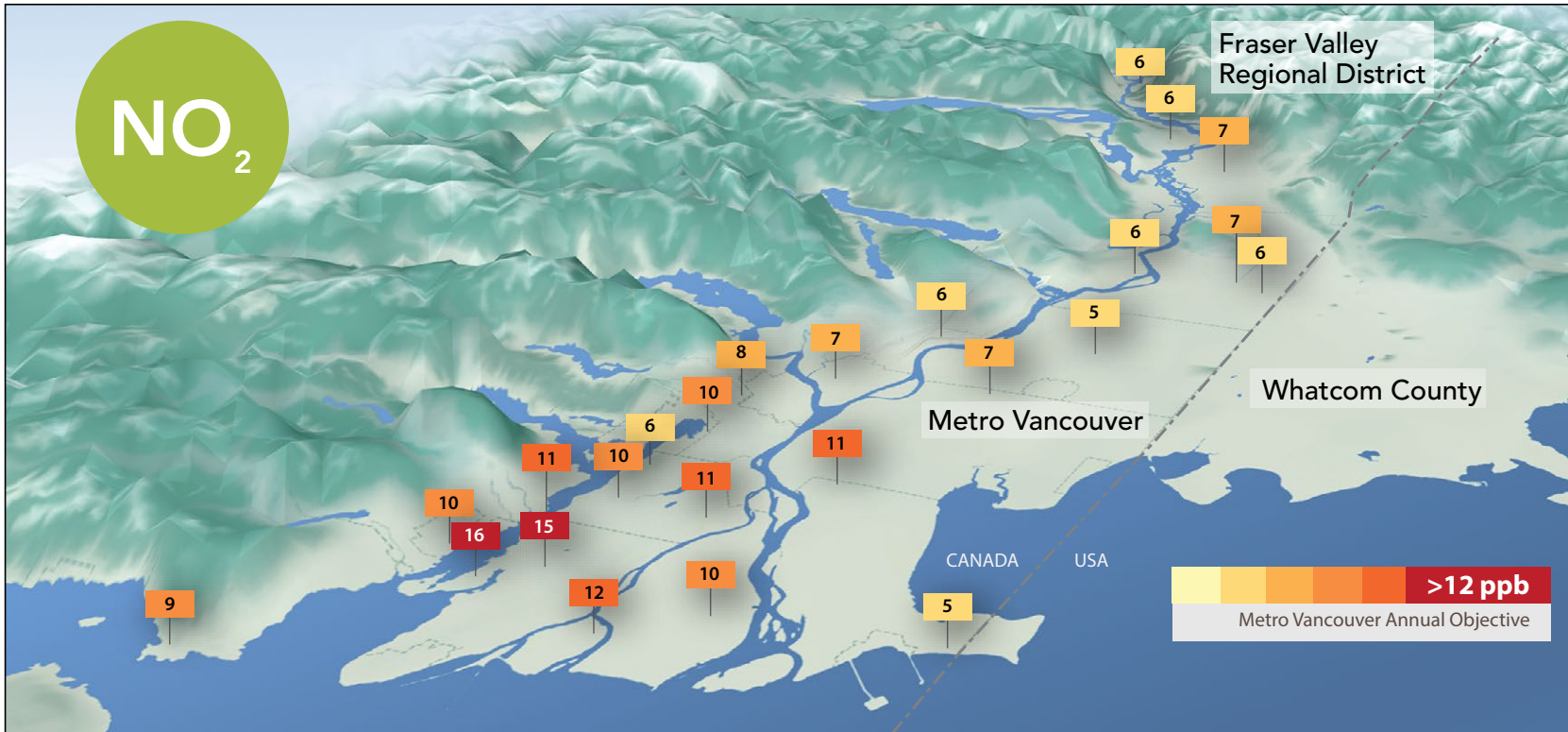


Fine particulate matter ( $\text{PM}_{2.5}$ ) measurements were below Metro Vancouver's 24-hour objective ( $25 \mu\text{g}/\text{m}^3$ ) at all monitoring stations in 2024, as illustrated in the map. Measurements averaged over the entire year were below Metro Vancouver's annual objective at all stations.

The Canadian Ambient Air Quality Standard\* is calculated using the most recent three years of data and was exceeded at Chilliwack and Hope. This was mainly due to wildfire smoke in the region in 2022 and 2023.

\*Calculated using data from 2022, 2023, and 2024 without removing exceptional events, such as wildfires.

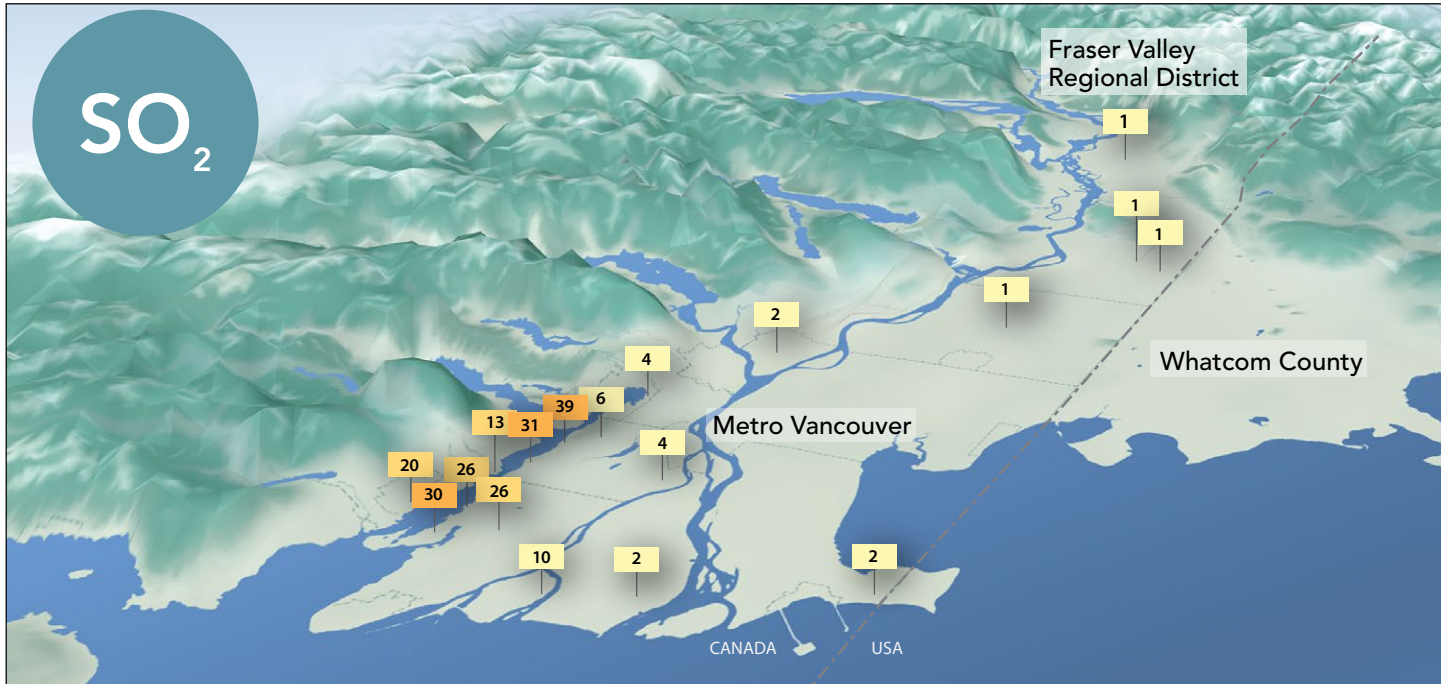
## NITROGEN DIOXIDE IN 2024



Nitrogen dioxide concentrations were below Metro Vancouver's annual objective (12 ppb) at all monitoring stations in 2024, except for Vancouver-Downtown and Vancouver-Clark Drive, as shown on the map. Most of the region's emissions of nitrogen oxides (which includes nitrogen dioxide) come from transportation sources, and the highest average nitrogen dioxide concentrations were measured near busy roads.

Nitrogen dioxide concentrations were also below Metro Vancouver's one-hour objective (42 ppb) at all monitoring stations except for Vancouver-Clark Drive, Horseshoe Bay, and North Vancouver-Second Narrows. Measurements at North Vancouver-Second Narrows were likely influenced by nearby construction activities.

## SULPHUR DIOXIDE IN 2024



Peak sulphur dioxide levels based on the highest one-hour average, as shown on the map, were below Metro Vancouver's one-hour objective (70 ppb) at all stations in 2024. Annual averages were below Metro Vancouver's annual objective and Canadian Ambient Air Quality Standard (both 5 ppb) in 2024.

