



## Air

### Status of Ground-Level Ozone in B.C. (2021-2023 & 2022-2024)

British Columbia has a network of air monitoring stations that measure ground-level ozone and other air contaminants. This indicator reports on the concentration of ground-level ozone from two reporting periods, 2021-2023 and 2022-2024. The data are reported as a metric based on three consecutive years of data. These metrics are compared against the [Canadian Ambient Air Quality Standards](#) to determine achievement and to define colour-based management levels. CAAQS were established by the [Canadian Council of Ministers of the Environment](#) in 2012 as a key element of the Air Quality Management System that collaboratively and comprehensively manages air quality in Canada.

- **Ground-level ozone is a type of air contaminant.** While ozone high up in the Earth's atmosphere occurs naturally and helps protect us from the sun's ultraviolet rays, ozone at ground level is a harmful pollutant. It forms when pollution from vehicles, industry, and other sources reacts in sunlight.
- **Ground-level ozone can be harmful to humans.** Exposure to ground-level ozone (hereafter ozone) can reduce lung function and cause inflammation of airways, which can increase respiratory symptoms and aggravate asthma<sup>1</sup>. These effects are linked to more emergency room visits, hospitalizations, and absenteeism, and higher health care costs<sup>2</sup>.
- **2021-2023: ozone levels met the Canadian Ambient Air Quality Standard at 44 of the 46 B.C. ozone monitoring stations.** Ozone levels from the 46 stations ranged from 37 to 63 parts per billion (ppb). Ozone levels were  $\leq 50$  ppb at 25 reporting stations (54%). Two stations reported ozone levels  $>62$  ppb.
- **2022-2024: ozone levels met the Canadian Ambient Air Quality Standard at 46 of the 46 B.C. ozone monitoring stations.** Ozone levels (see box below) from the 46 stations ranged from 38 to 62 parts per billion (ppb). Ozone levels were  $\leq 50$  ppb at 25 reporting stations (54%). There were no stations reporting ozone levels  $>62$  ppb.
- **Ozone levels met the Canadian Ambient Air Quality Standard in five of B.C.'s seven air zones for 2021-2023 reporting period and in six air zones for 2022-2024.** The ozone level for an air zone is the highest ozone level reported from monitoring stations within the air zone. Currently, there are no [air monitoring stations](#) in the Northwest Air Zone.
- **Ozone levels are used to set management levels for each air zone.** Four management levels (green, yellow, orange, and red) are each associated with a suite of actions that become more rigorous as ozone levels approach the Canadian Ambient Air Quality Standard.

#### Ground-Level Ozone: Canadian Ambient Air Quality Standard

Ozone levels are calculated using a statistical form called the 8-hour metric.

The Canadian Ambient Air Quality Standard value for ozone applied in the 2021-2023 and 2022-2024 reporting periods is **62 parts per billion (ppb)**.

The ozone standard is achieved when ozone metrics are  $\leq 62$  ppb. The next reporting period (2023-2025) will apply the more stringent 2025 CAAQS for ground-level ozone of 60 ppb.

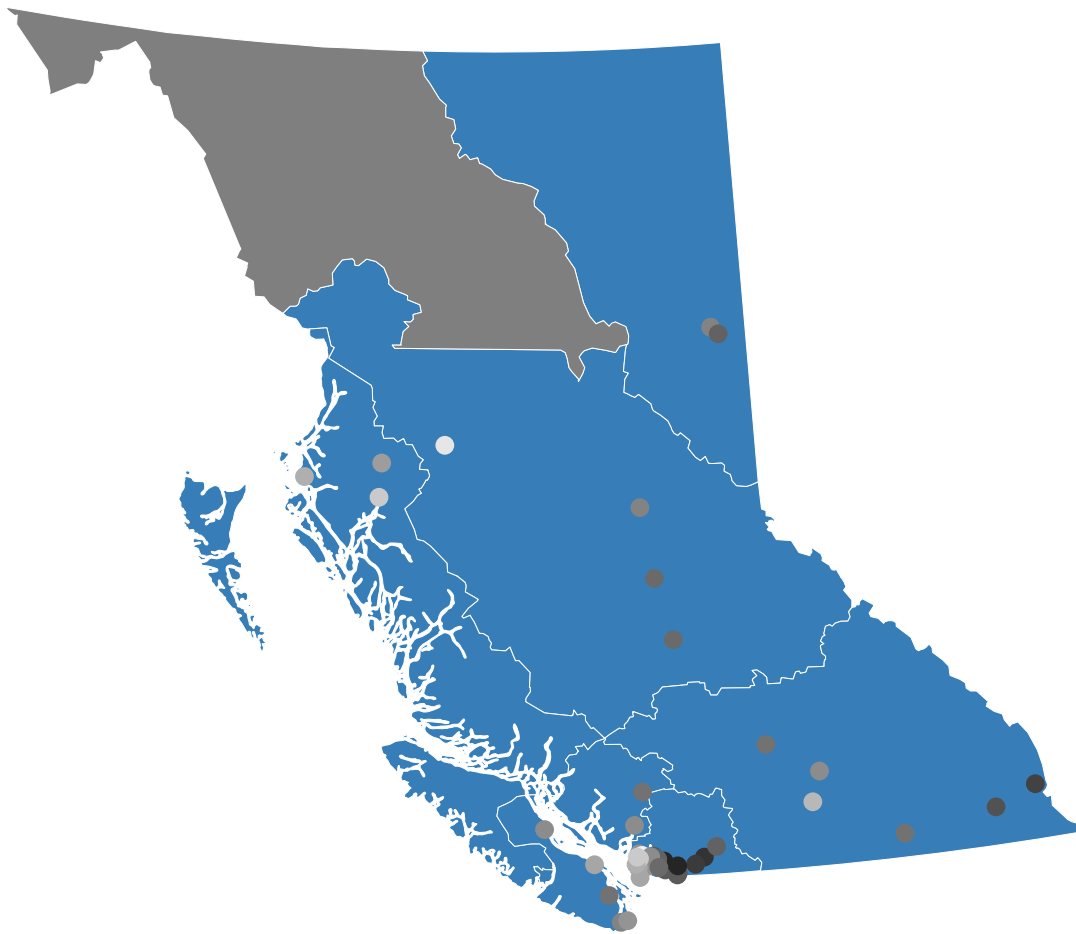


**What is an Air Zone?**

British Columbia is divided up into seven air zones, which are areas that typically exhibit similar air quality characteristics, issues, and trends.

The map and chart below summarise Canadian Ambient Air Quality Standard achievement status for ozone in B.C. air zones, as well as ozone levels at individual monitoring stations. Summaries are given for each monitoring station where sufficient data were available for the 2022-2024 and 2021-2023 reporting periods.

**Status of Ground-Level Ozone Levels in B.C. Air Zones (2022-2024)**



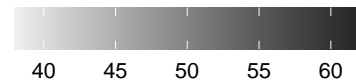
**Airzones:**

Ozone Air Quality Standard

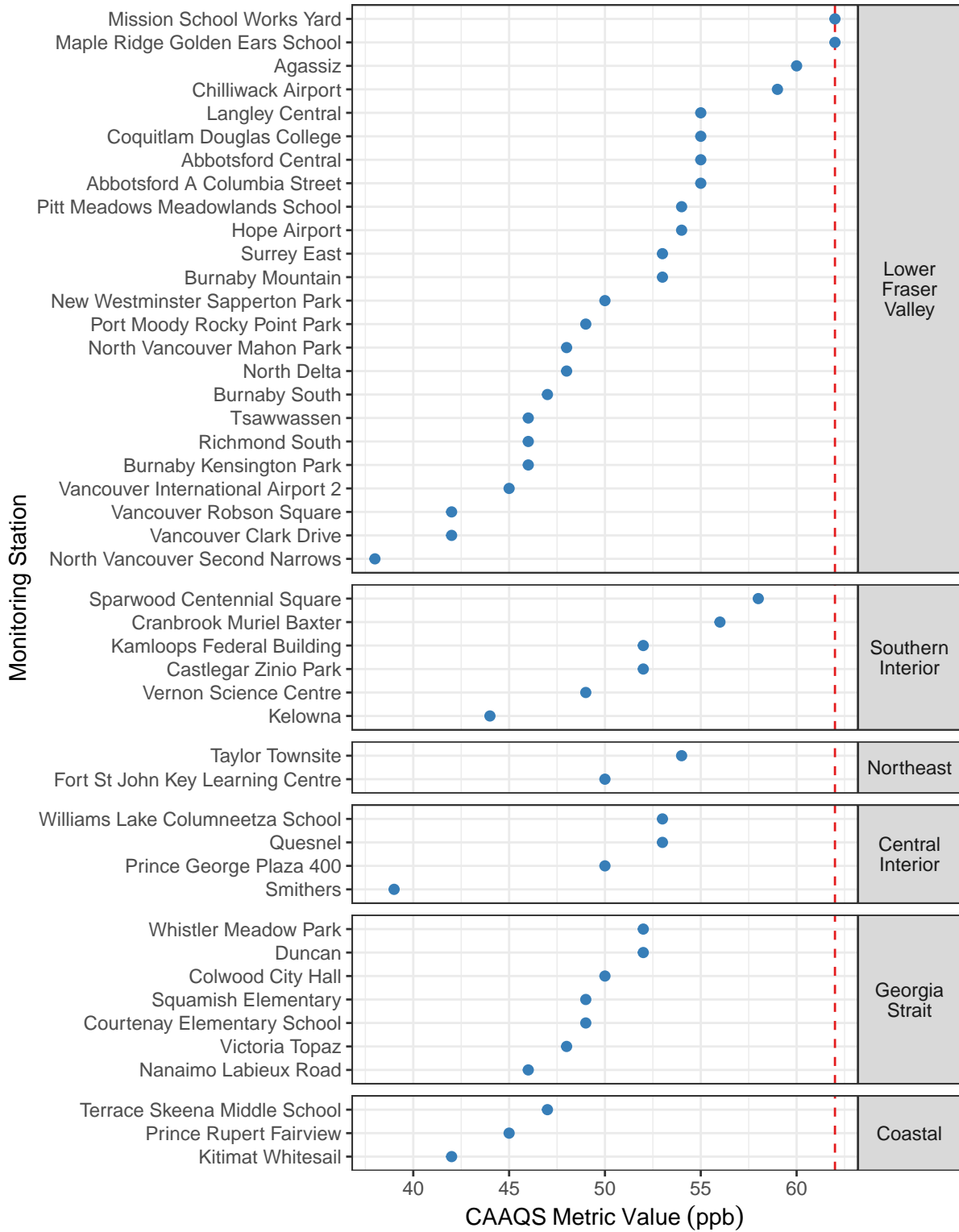


**Monitoring Stations:**

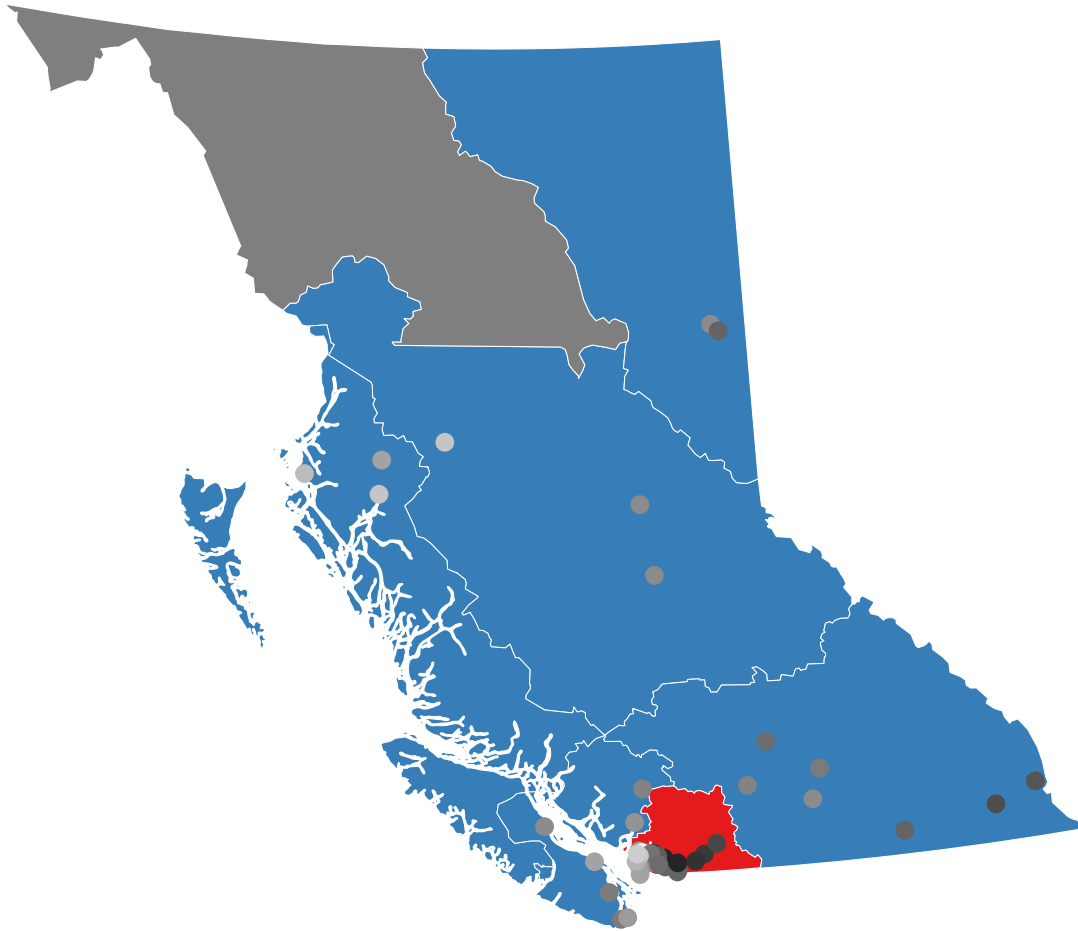
Ozone (ppb)



Ozone Metrics for Air Monitoring Stations within B.C. Air Zones (2022-2024)



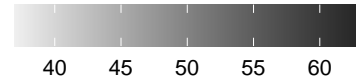
Status of Ground-Level Ozone Levels in B.C. Air Zones (2021-2023)



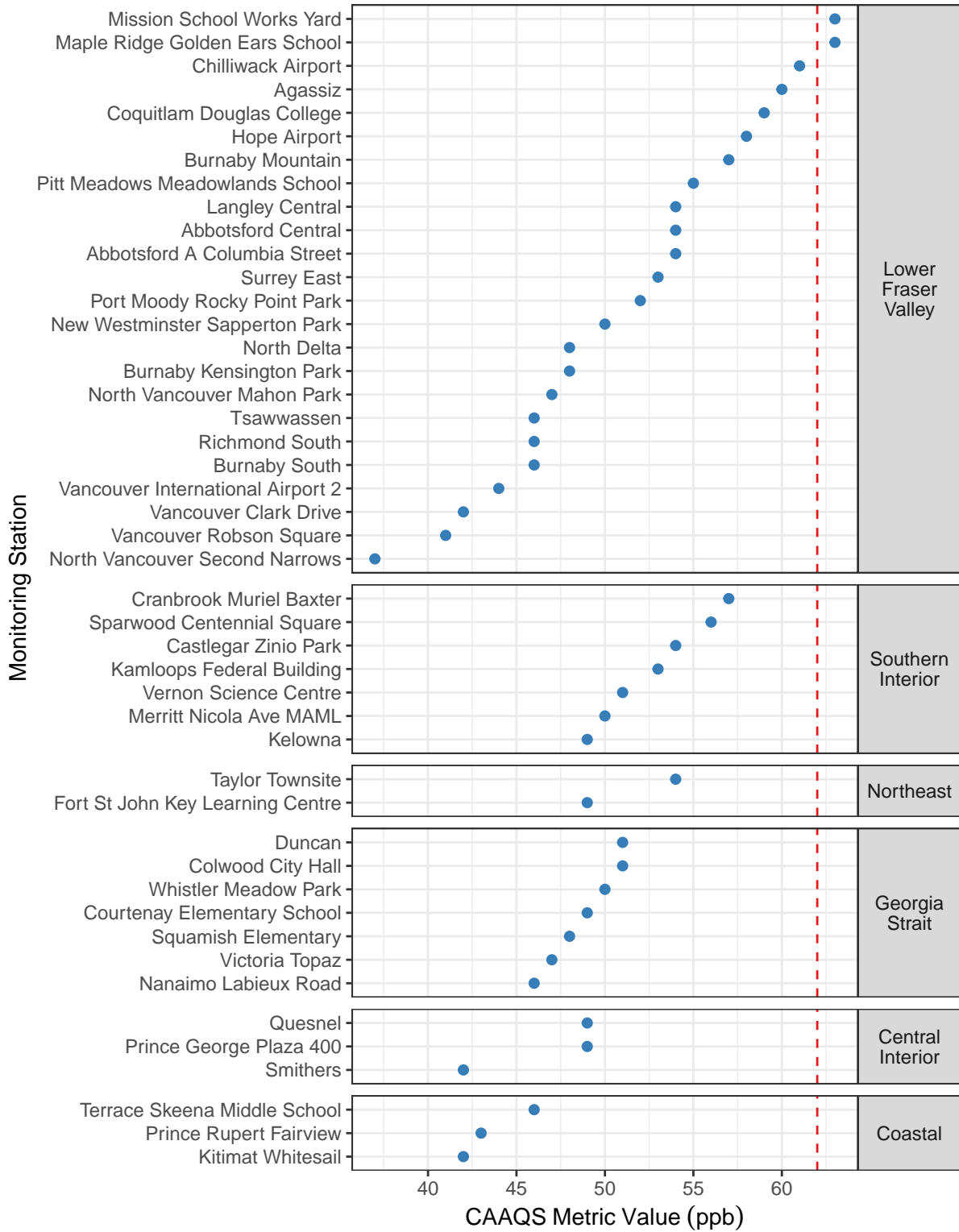
**Airzones:**  
Ozone Air Quality Standard

Insufficient Data
  Achieved
  Not Achieved
  NA

**Monitoring Stations:**  
Ozone (ppb)



## Ozone Metrics for Air Monitoring Stations within B.C. Air Zones (2021-2023)



## More about the Canadian Ambient Air Quality Standard for Ozone:

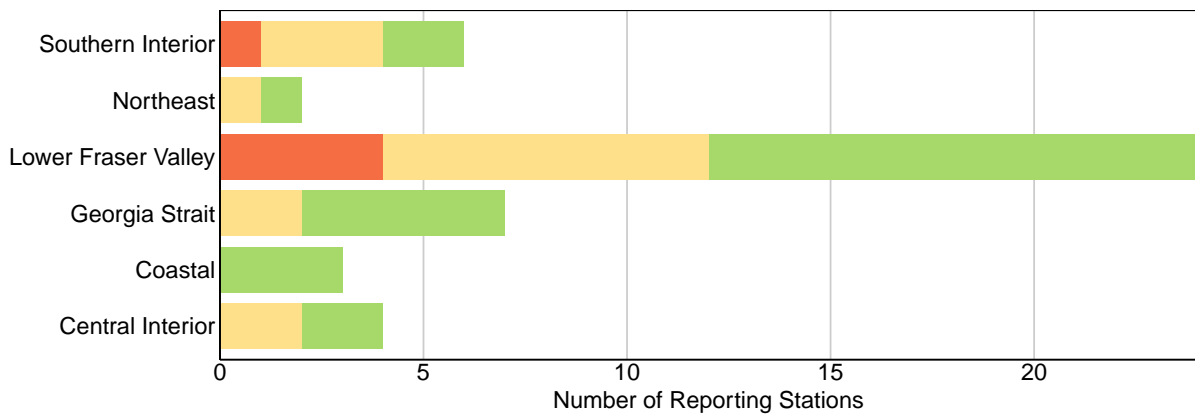
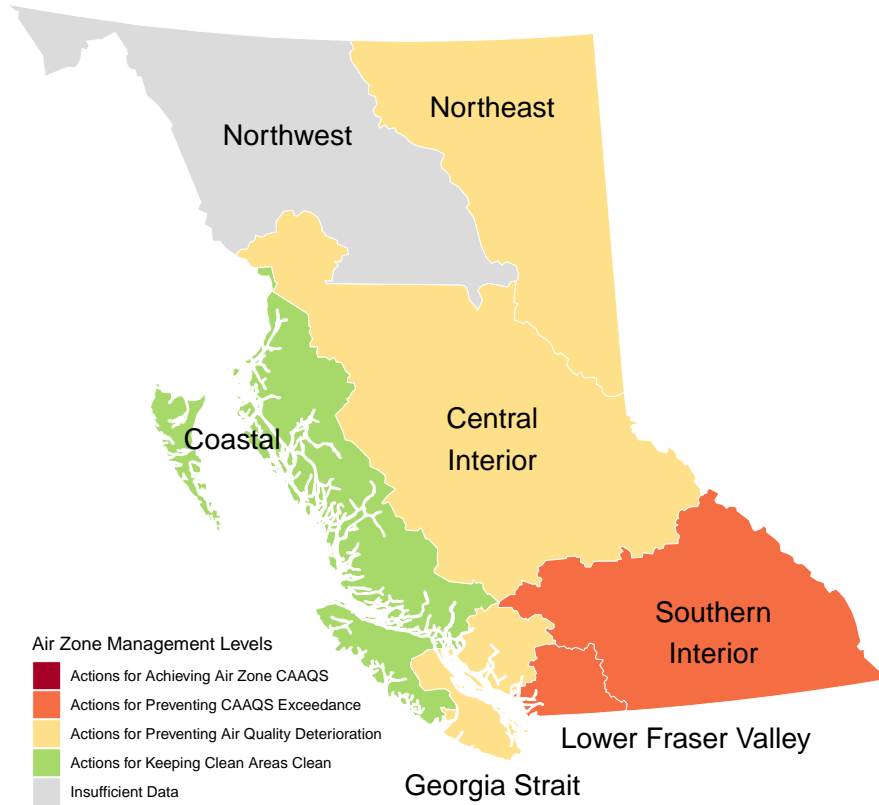
- The statistical form of the Canadian Ambient Air Quality Standard ozone metric is the 3-year average of the annual 4th-highest daily maximum 8-hour rolling average concentration.
- The ozone metric for an air zone is the highest ozone metric reported from monitoring stations within the air zone.
- Criteria for data completeness and sufficiency of the ozone metric are described in the [Guidance Document on Achievement Determination: Canadian Ambient Air Quality Standards for Ozone \(2021\)](#).
- Air quality monitoring stations with at least two years of valid data from 2022-2024 and 2021-2023 reporting periods were included in this indicator. Visit [Current Air Quality Data](#) for a complete list of currently active air quality monitoring stations across B.C.

## Canada-wide Air Quality Management System

The Air Quality Management System is Canada's approach for protecting air quality. Under the Air Quality Management System, provinces and territories monitor, report and manage local air quality within air zones, with the goal of continuously improving air quality and keeping pollutants below the Canadian Ambient Air Quality Standards.

- There are seven air zones in British Columbia: Coastal, Georgia Strait, Lower Fraser Valley, Southern Interior, Central Interior, Northeast and Northwest.
- The Air Zone Management Framework defines management levels based on the highest ozone level reported from monitoring stations within the air zone. The four management levels are (1) green (actions for keeping clean areas clean); (2) yellow (actions for preventing air quality deterioration); (3) orange (actions for preventing Canadian Ambient Air Quality Standard exceedance); and (4) red (actions for achieving air zone Canadian Ambient Air Quality Standard). Actions for each management level are detailed in the [Guidance Document on Air Zone Management \(2019\) \(PDF\)](#). Air zone management levels are preferentially based on stations with 3 complete years of data.
- The Coastal and Central Interior air zones were assigned to a green management level. The Southern Interior, Georgia Strait, and Northeast air zones were assigned to a yellow management level, and the Lower Fraser Valley was assigned to an orange management level. Currently, there are no [air monitoring stations](#) in the Northwest air zone.

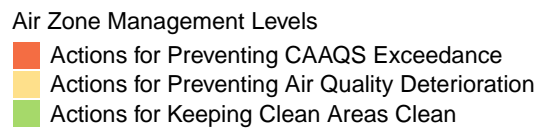
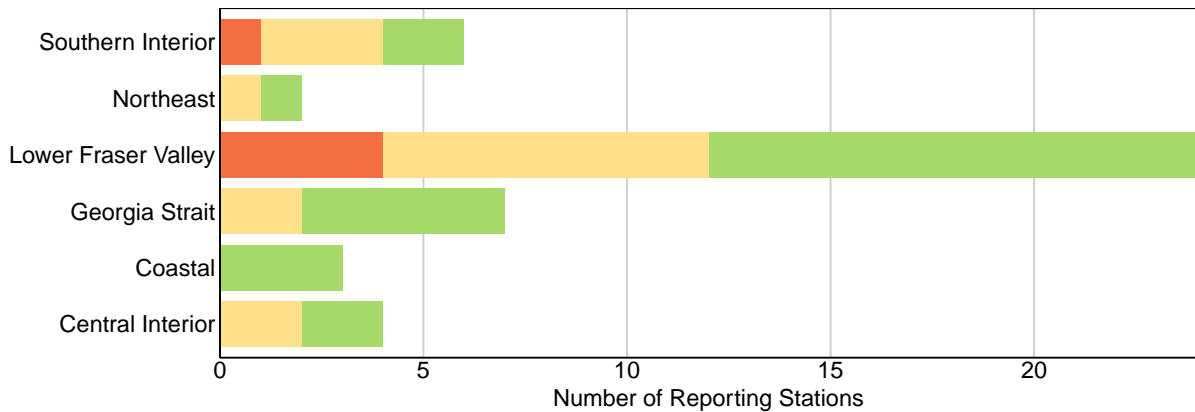
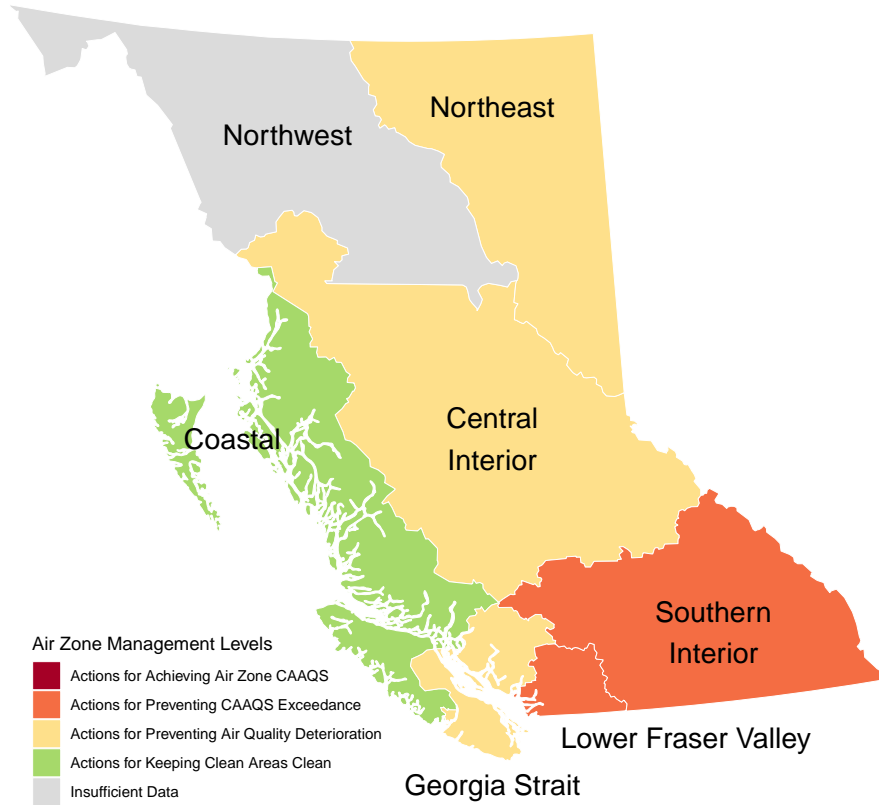
Management Levels for Ground-Level Ozone in B.C. Air Zones (2022-2024)



**Air Zone Management Levels**

- Actions for Preventing CAAQS Exceedance
- Actions for Preventing Air Quality Deterioration
- Actions for Keeping Clean Areas Clean

Management Levels for Ground-Level Ozone in B.C. Air Zones (2021-2023)



## More about the Air Quality Management System management levels:

- There can be cases when an air zone does not achieve a given Canadian Ambient Air Quality Standard because of sources over which jurisdictions have little or no control, such as those related to transboundary flows and exceptional events, like forest fires.
- Prior to determining management levels, jurisdictions have the option of adjusting their air zone metric values to remove such external influences. These arrangements aim to ensure that jurisdictions are responsible for managing only the emissions sources they can control.
- Wildfire influences were determined for 13 monitoring sites in B.C. on a total of 6 days for both 2021-2023 and 2022-2024 reporting periods. The daily concentrations for these days were removed from the calculations of management levels, but this resulted in no changes in management levels for ground-level ozone.

## Methods

The methods used to develop this indicator—including procedures, data requirements, and calculation of the Canadian Ambient Air Quality Standard ozone metric—are detailed in the [Guidance Document on Achievement Determination: Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone \(2012\)](#) published by the [Canadian Council of Ministers of the Environment](#).

**R package and code:** We have developed an R package to facilitate the calculation of air quality metrics according to the [Canadian Ambient Air Quality Standards](#). Download the 'rcaaq' package from [GitHub](#). The source code for repeating the analysis presented on this page is also available on [GitHub](#).

## References and Other Useful Links

- [Access B.C.'s real-time data on air pollutants and find locations of all provincial air monitoring stations in B.C.](#)
- [BC Lung Association's BC State of the Air Reports](#)
- [Canadian Ambient Air Quality Standards](#)
- [Canadian Council of Ministers of the Environment](#)
- [Canadian Environmental Sustainability Indicators: Air Indicators](#)
- [Guidance Document on Achievement Determination: Canadian Ambient Air Quality Standards for Ozone \(2021\)](#)
- [Guidance Document on Air Zone Management](#)
- [Learn more about the implementation of the Air Quality Management System in British Columbia](#)
- Read individual [Air Zone reports](#) on the achievement of the Canadian Ambient Air Quality Standards in B.C.
- [United States Environmental Protection Agency. February 2013. Integrated Science Assessment of Ozone and Related Photochemical Oxidants \(600/R-10/076F\)](#)
- Willey, J., N. Gilbert, and N. Lyrette. 2004. Human health effects of ozone: Update in support of the Canada-wide standards for particulate matter and ozone. Revised version. Working paper prepared for Canadian Council of Ministers of the Environment. Health Canada. Ottawa, Ontario: Health Canada

## Data

\*By accessing these datasets, you agree to the licence associated with each file, as indicated in parentheses below.



- [Indicator Summary Data: BC Ground-Level Ozone Canadian Ambient Air Quality Standards 2022-2024](#) (Licence: [Open Government Licence - British Columbia](#))
- [B.C. Ground-level Ozone Hourly Data & Air Monitoring Station Locations](#) (Licence: [Open Government Licence - British Columbia](#))
- [B.C. Air Zones](#) (Licence: [Open Government Licence - British Columbia](#))

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Email correspondence to: [envreportbc@gov.bc.ca](mailto:envreportbc@gov.bc.ca)

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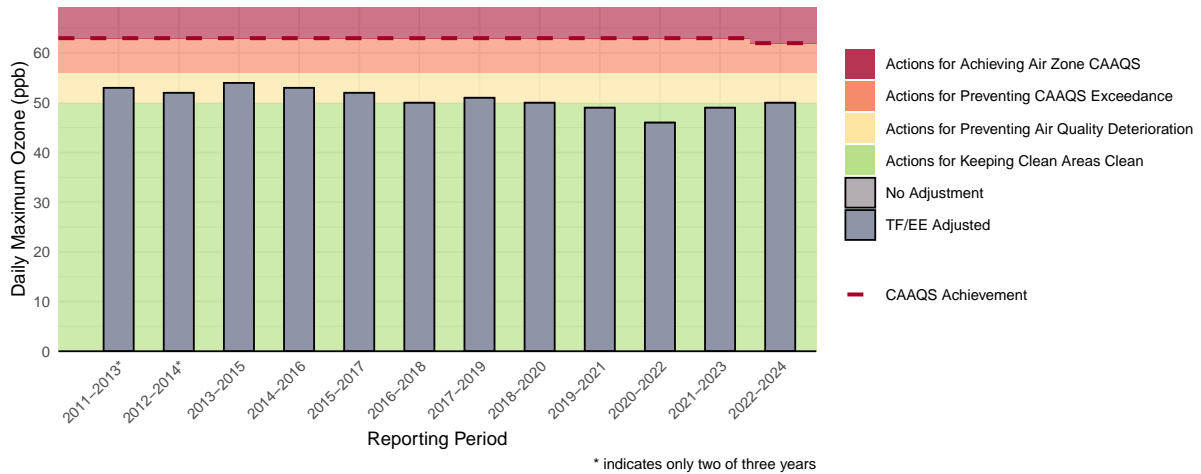
## Appendix: Detailed Ground-Level Ozone Canadian Ambient Air Quality Standard Results for Monitoring Stations within Air Zones in B.C. (2022-2024)

**Air Zone:** Central Interior

**Monitoring Station:** Prince George Plaza 400

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 50 ppb (3 year average)

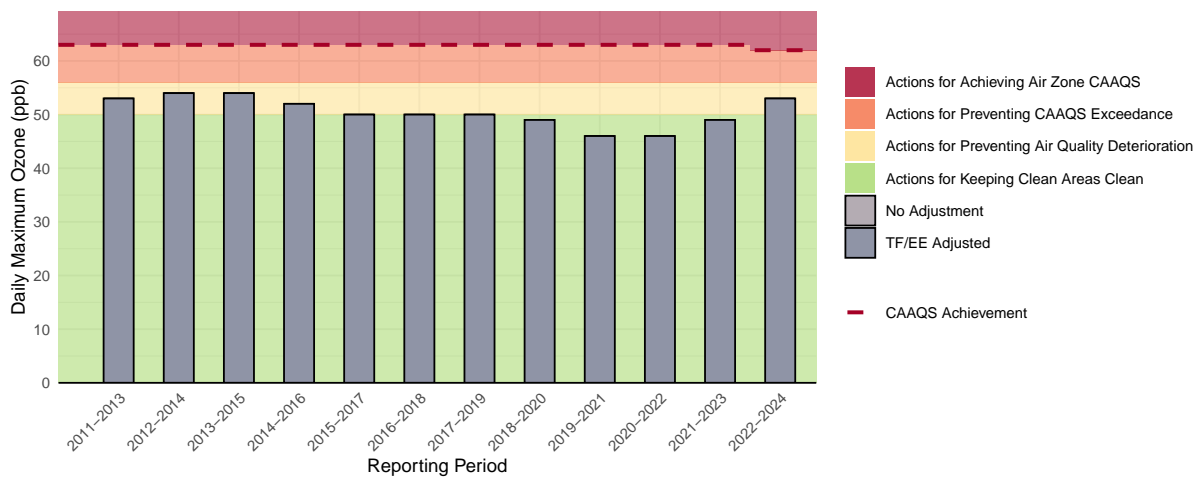


**Air Zone:** Central Interior

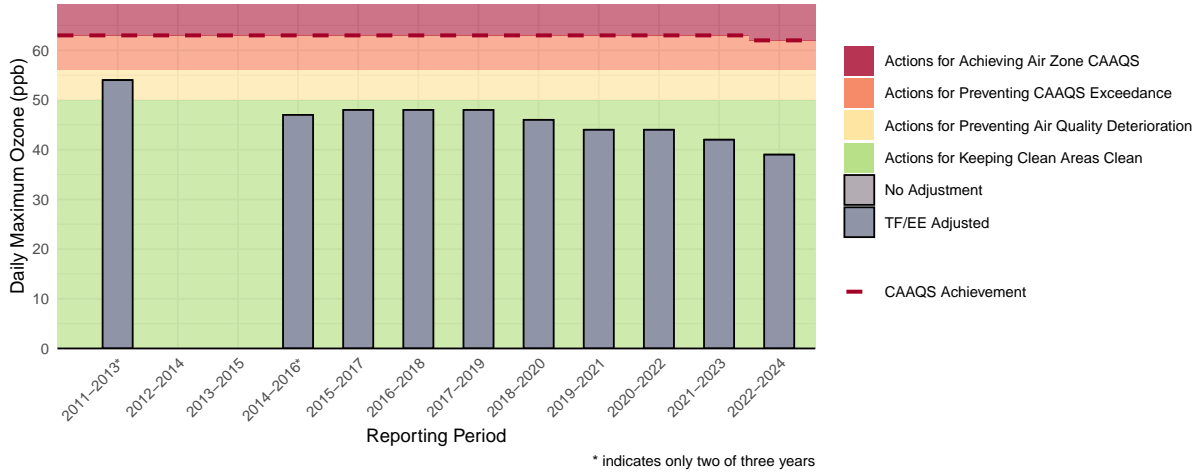
**Monitoring Station:** Quesnel

**Ozone Air Quality Standard:** Achieved

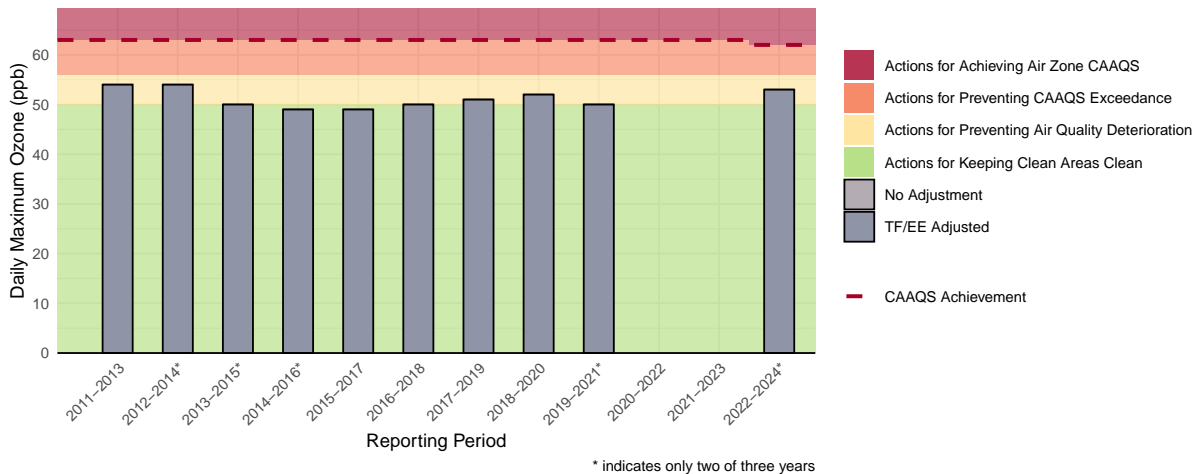
**Ozone Metric:** 53 ppb (3 year average)



**Air Zone:** Central Interior  
**Monitoring Station:** Smithers  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 39 ppb (3 year average)



**Air Zone:** Central Interior  
**Monitoring Station:** Williams Lake Columneetza School  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 53 ppb (2 year average)

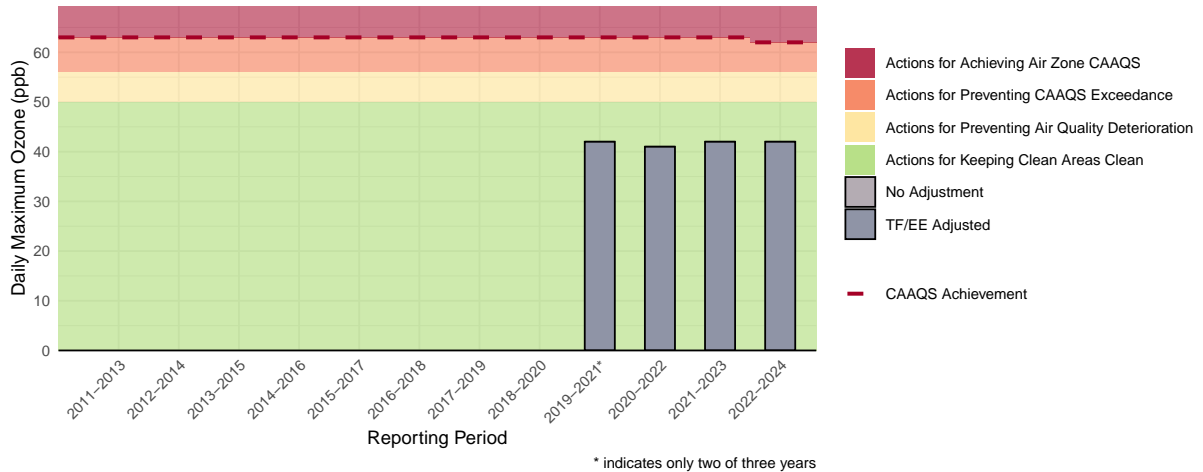


**Air Zone:** Coastal

**Monitoring Station:** Kitimat Whitesail

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 42 ppb (3 year average)

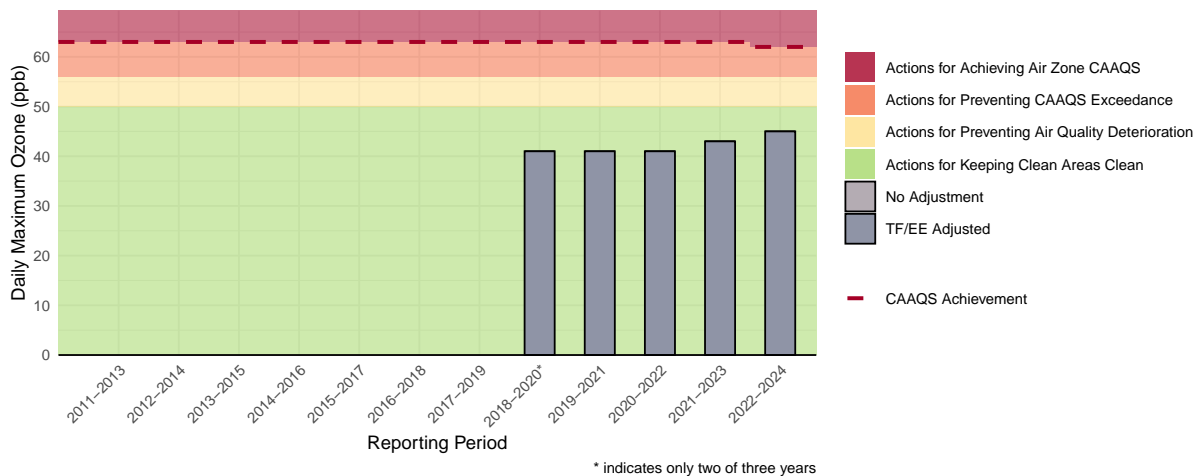


**Air Zone:** Coastal

**Monitoring Station:** Prince Rupert Fairview

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 45 ppb (3 year average)

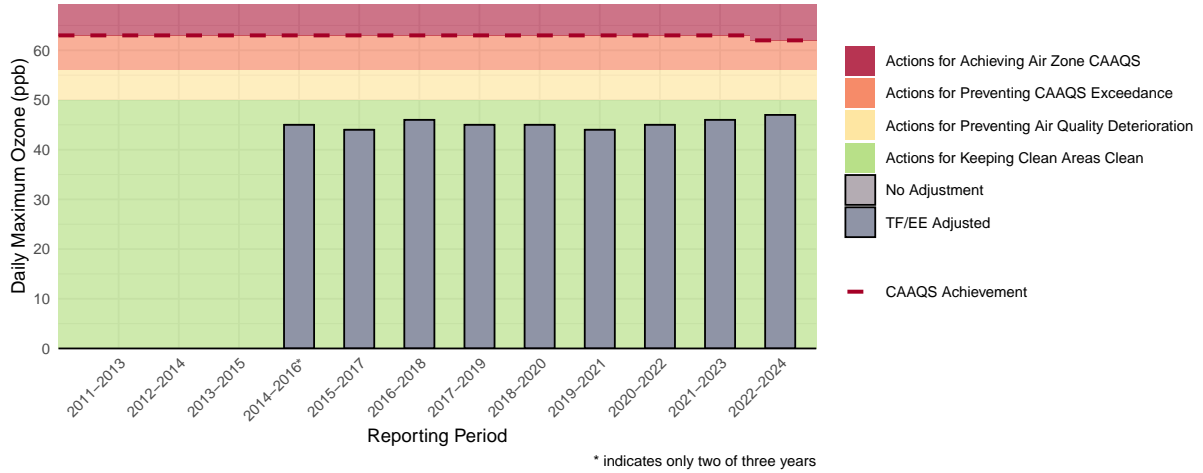


**Air Zone:** Coastal

**Monitoring Station:** Terrace Skeena Middle School

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 47 ppb (3 year average)

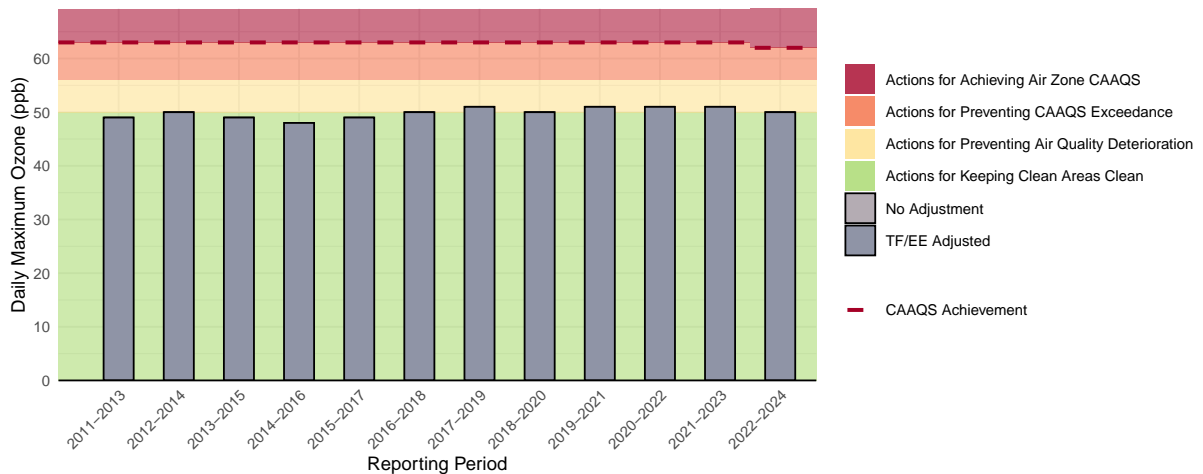


**Air Zone:** Georgia Strait

**Monitoring Station:** Colwood City Hall

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 50 ppb (3 year average)

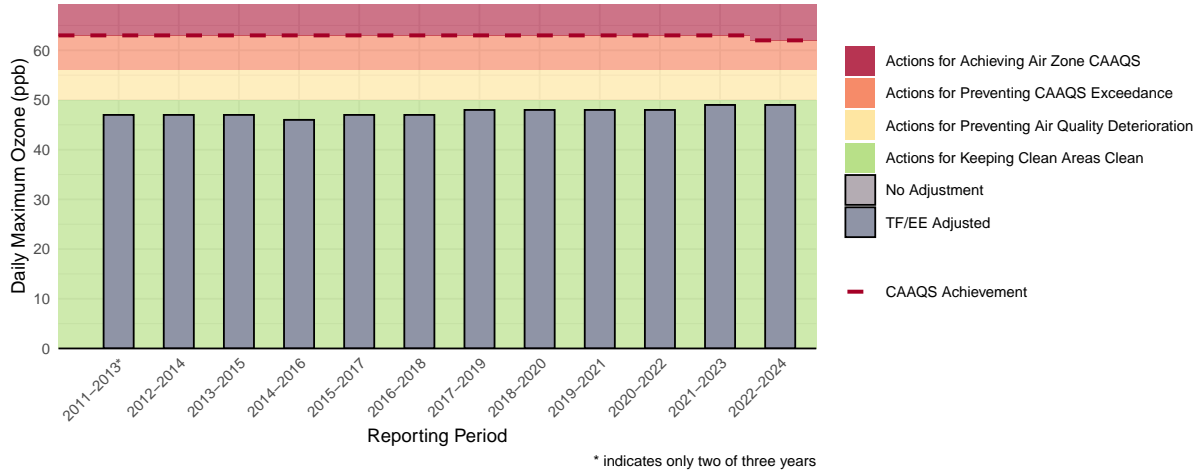


**Air Zone:** Georgia Strait

**Monitoring Station:** Courtenay Elementary School

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 49 ppb (3 year average)

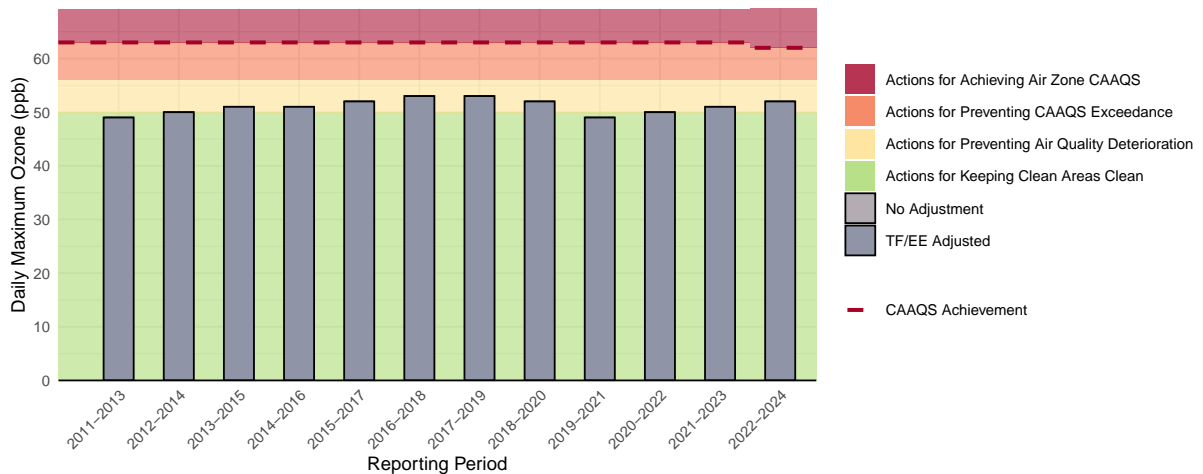


**Air Zone:** Georgia Strait

**Monitoring Station:** Duncan

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 52 ppb (3 year average)

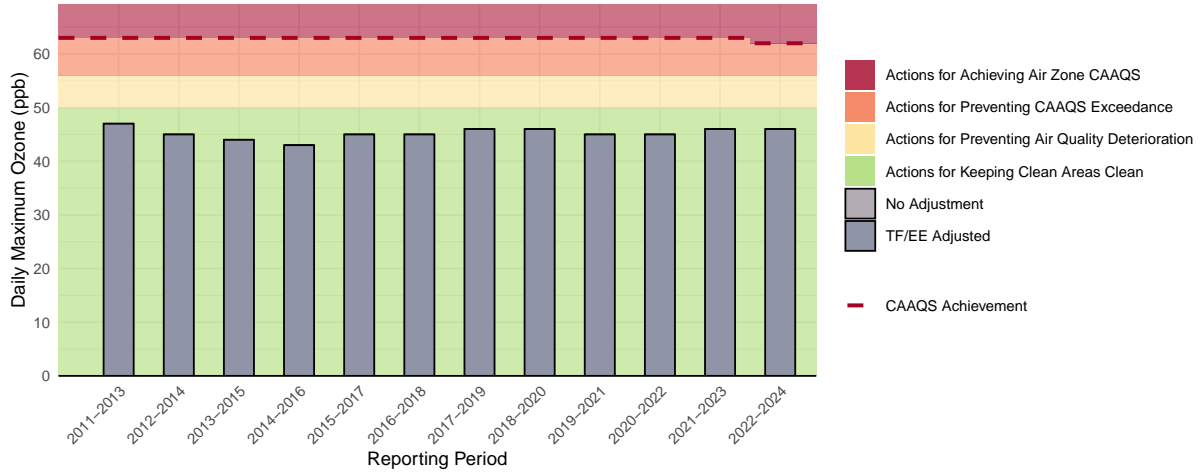


**Air Zone:** Georgia Strait

**Monitoring Station:** Nanaimo Labieux Road

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 46 ppb (3 year average)

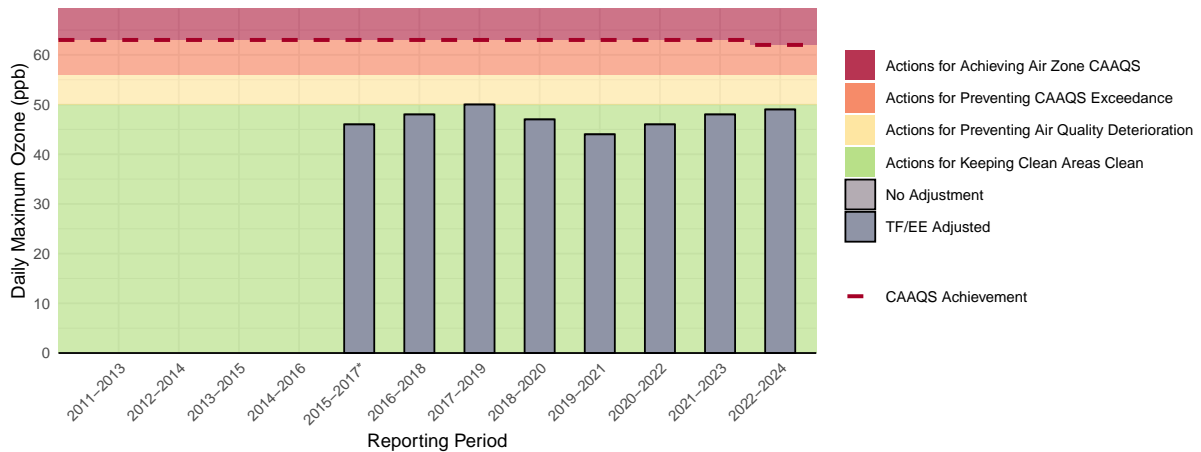


**Air Zone:** Georgia Strait

**Monitoring Station:** Squamish Elementary

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 49 ppb (3 year average)



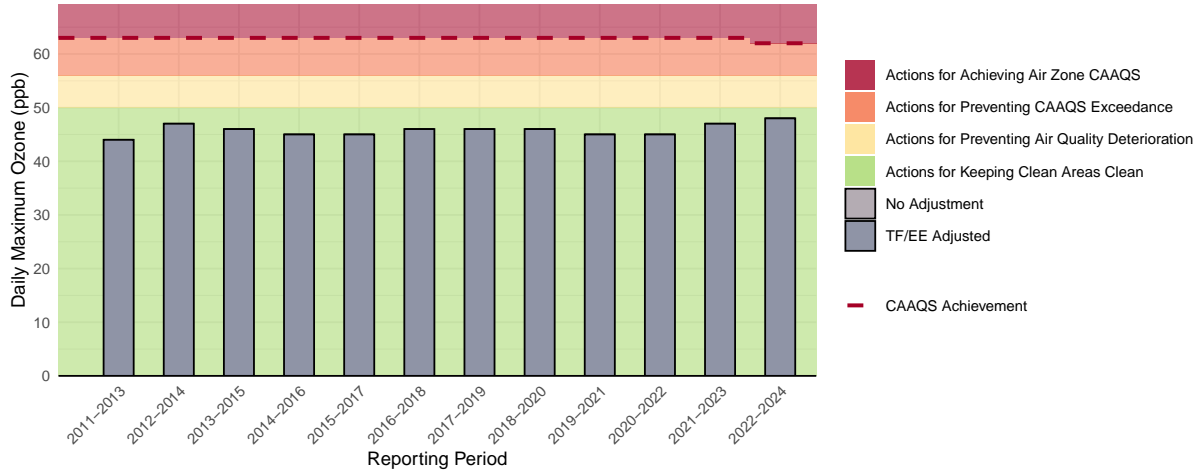
\* indicates only two of three years

**Air Zone:** Georgia Strait

**Monitoring Station:** Victoria Topaz

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 48 ppb (3 year average)

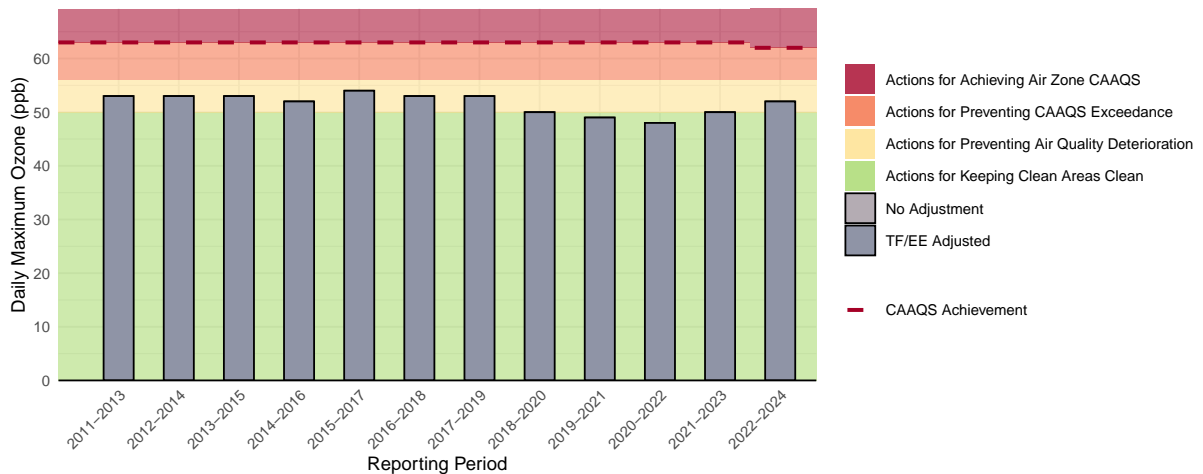


**Air Zone:** Georgia Strait

**Monitoring Station:** Whistler Meadow Park

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 52 ppb (3 year average)

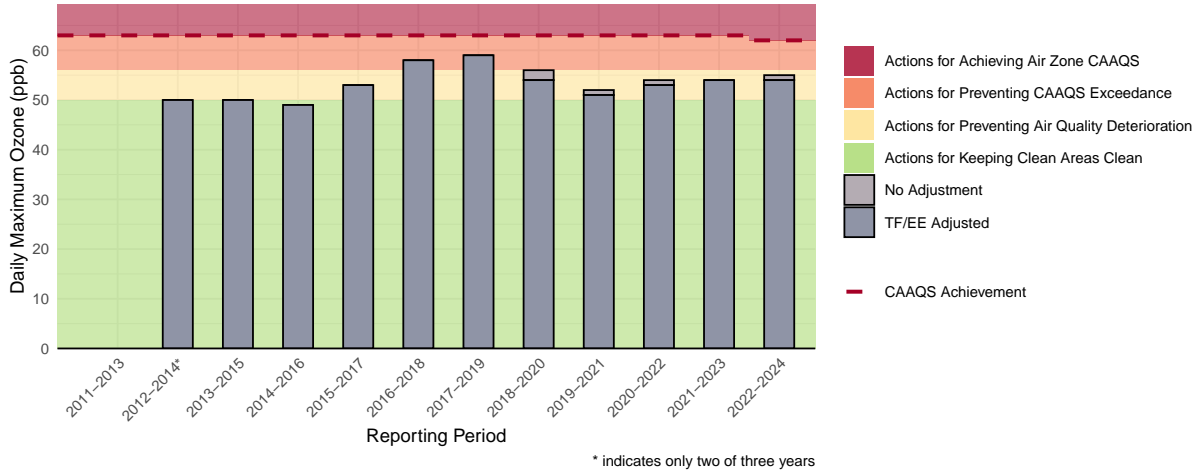


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Abbotsford A Columbia Street

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 55 ppb (3 year average)

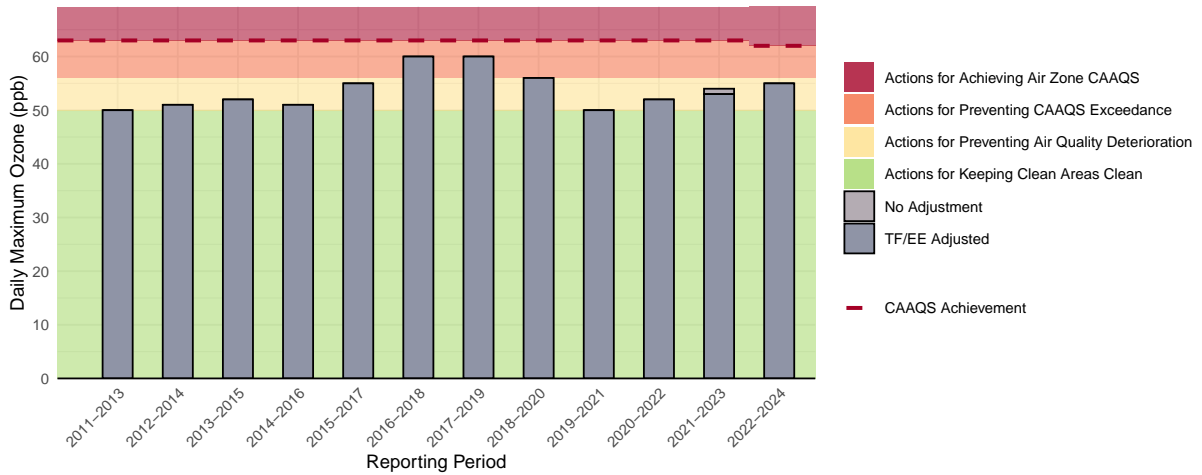


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Abbotsford Central

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 55 ppb (3 year average)

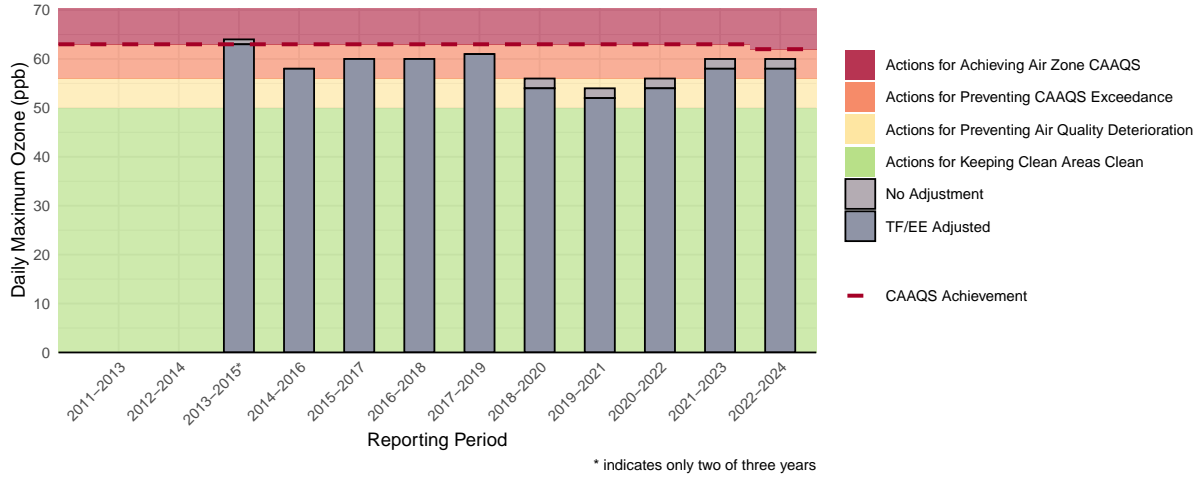


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Agassiz

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 60 ppb (3 year average)

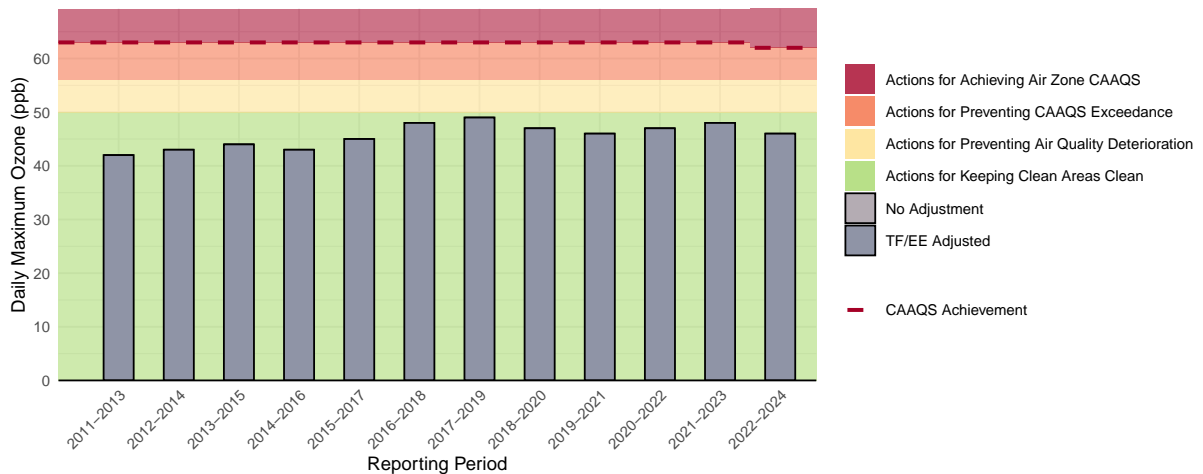


**Air Zone:** Lower Fraser Valley

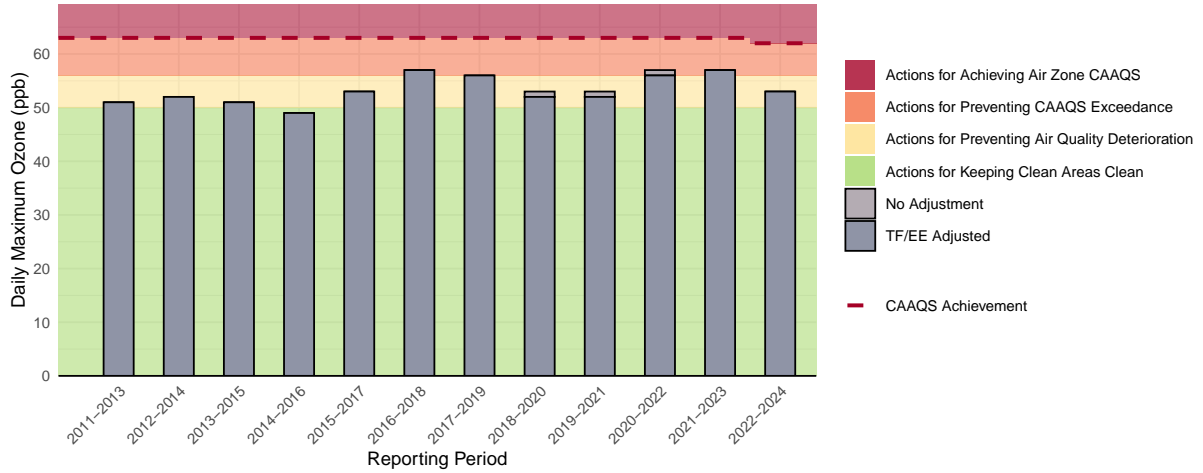
**Monitoring Station:** Burnaby Kensington Park

**Ozone Air Quality Standard:** Achieved

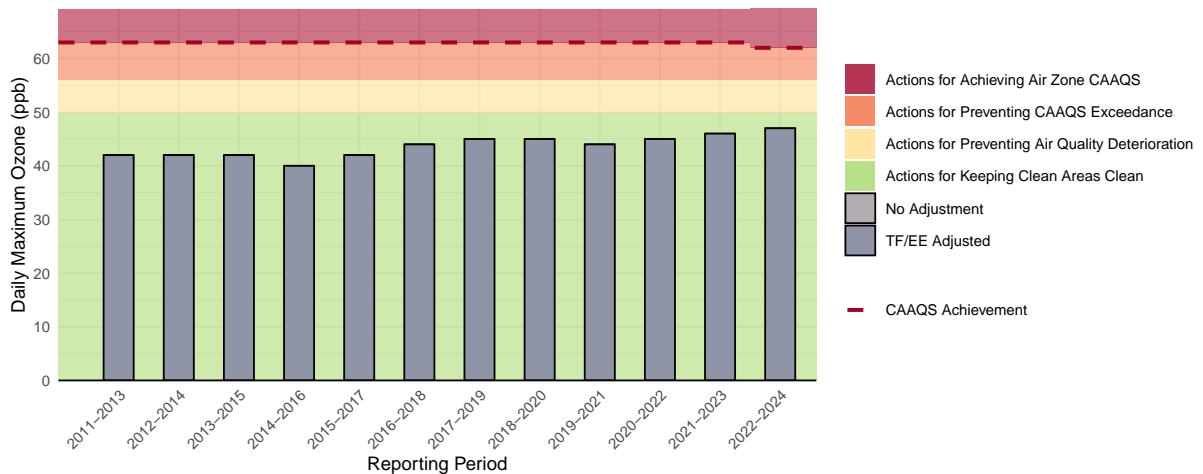
**Ozone Metric:** 46 ppb (3 year average)



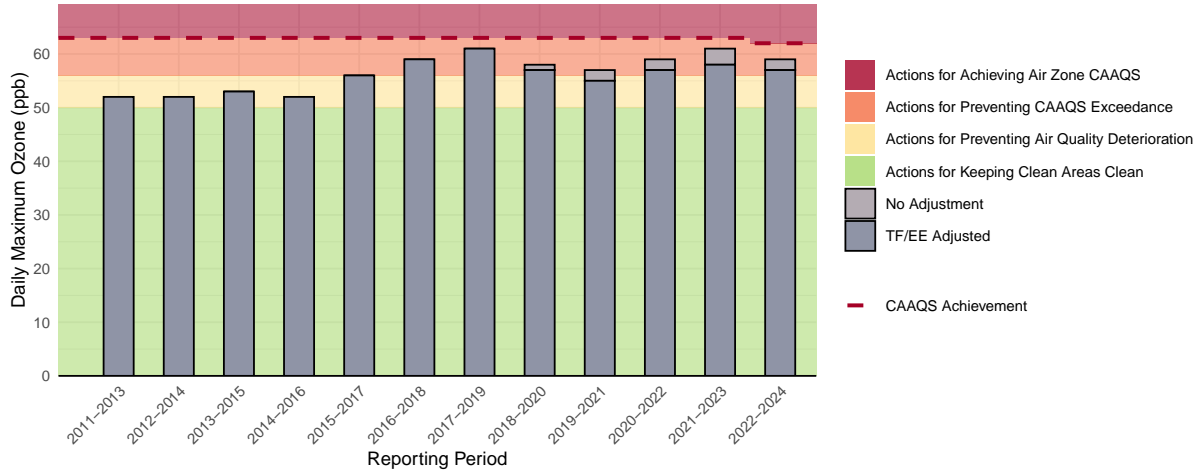
**Air Zone:** Lower Fraser Valley  
**Monitoring Station:** Burnaby Mountain  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 53 ppb (3 year average)



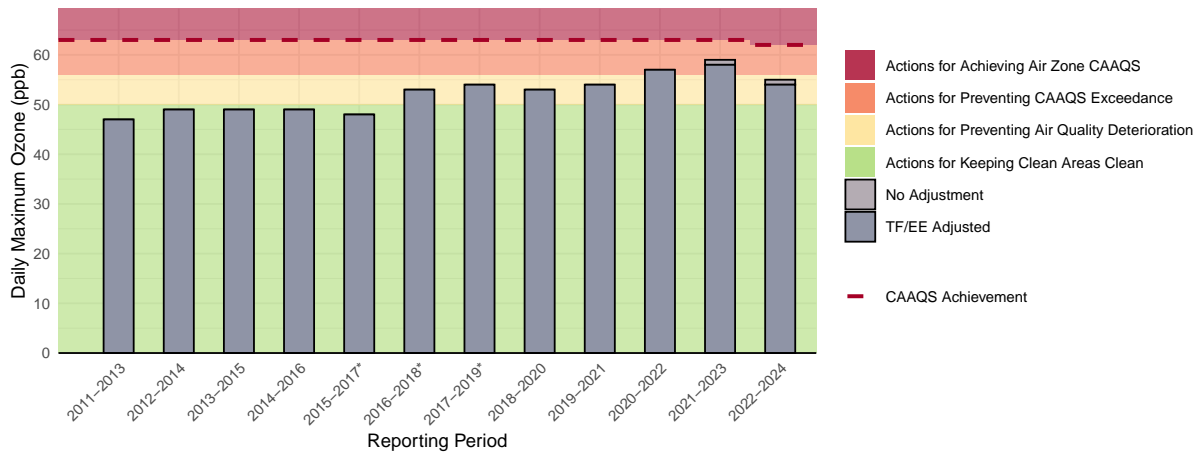
**Air Zone:** Lower Fraser Valley  
**Monitoring Station:** Burnaby South  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 47 ppb (3 year average)



**Air Zone:** Lower Fraser Valley  
**Monitoring Station:** Chilliwack Airport  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 59 ppb (3 year average)



**Air Zone:** Lower Fraser Valley  
**Monitoring Station:** Coquitlam Douglas College  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 55 ppb (3 year average)



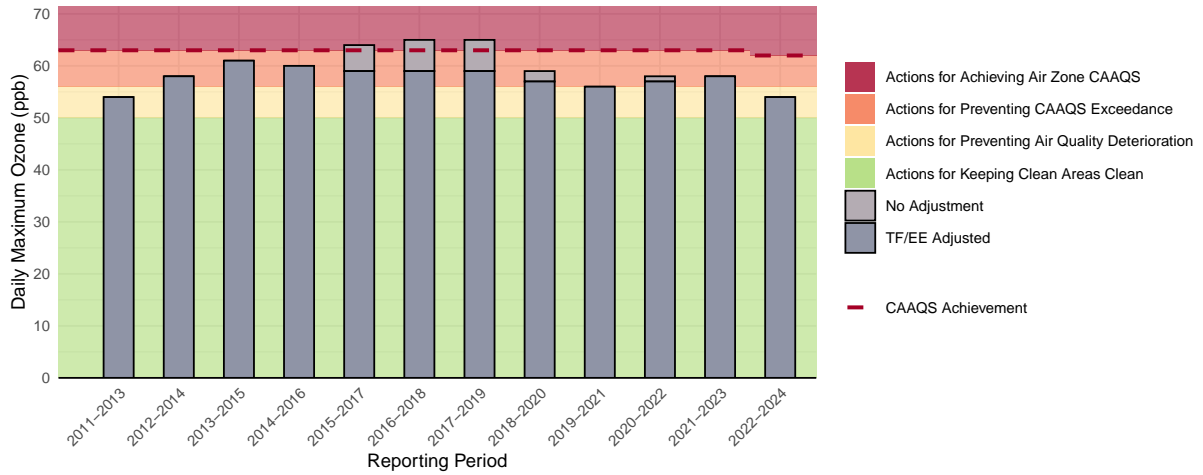
\* indicates only two of three years

**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Hope Airport

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 54 ppb (3 year average)

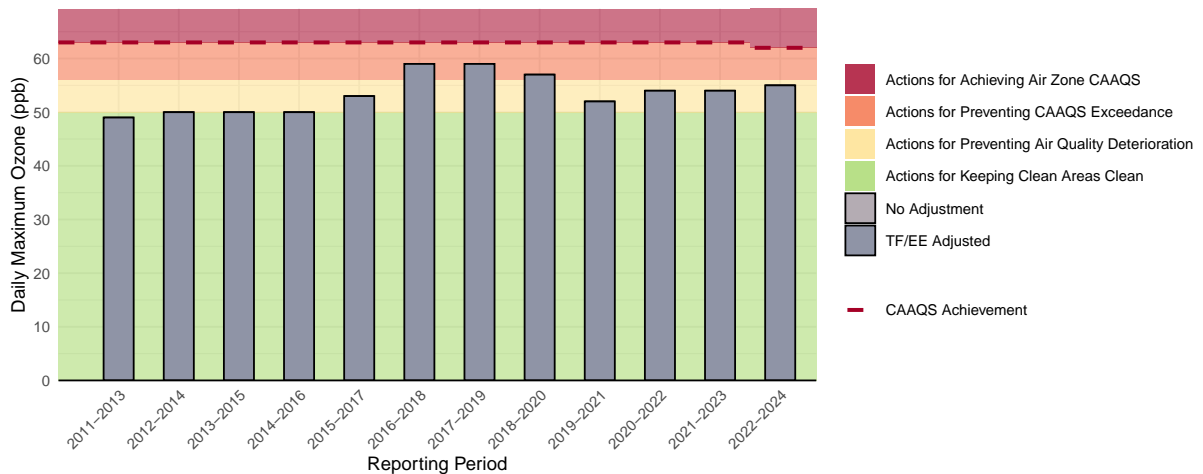


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Langley Central

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 55 ppb (3 year average)

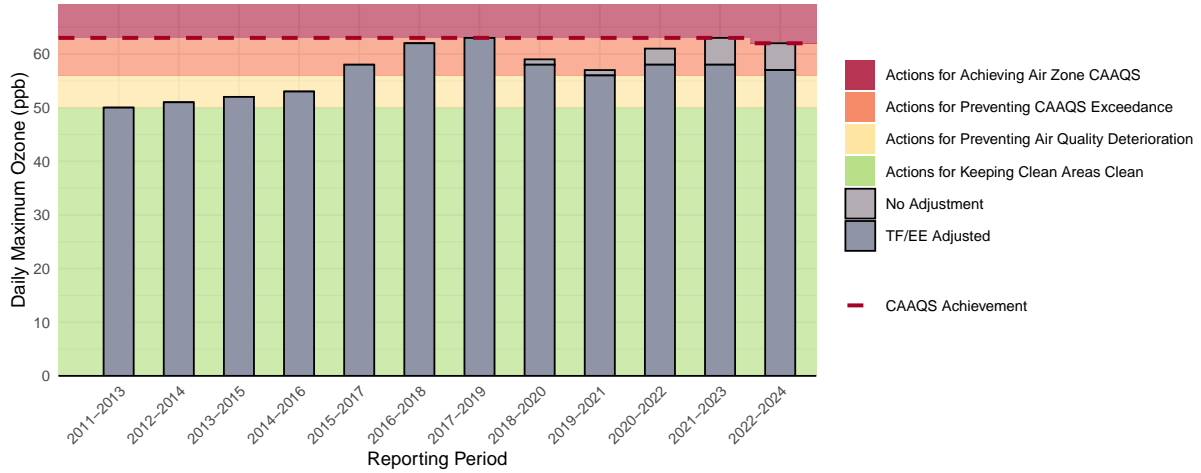


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Maple Ridge Golden Ears School

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 62 ppb (3 year average)

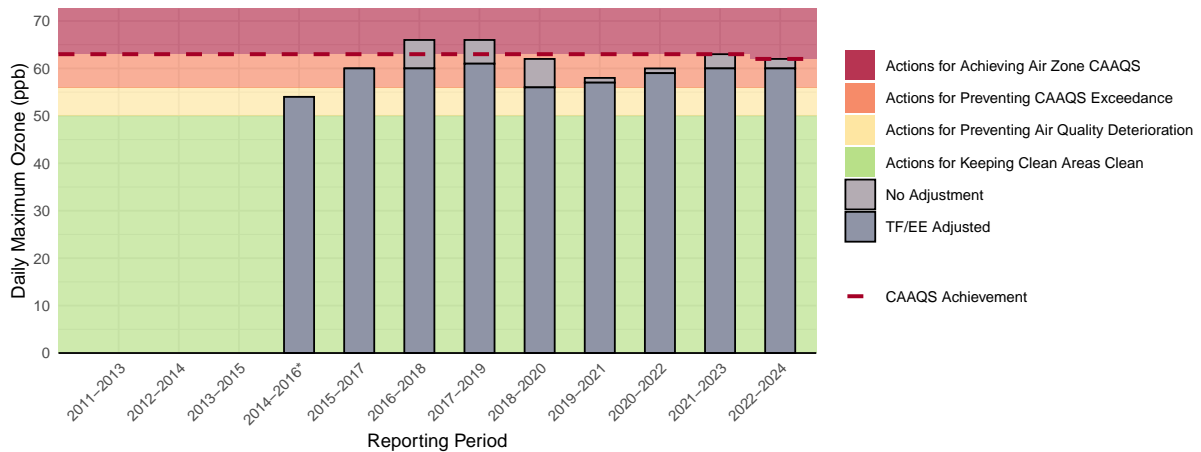


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Mission School Works Yard

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 62 ppb (3 year average)



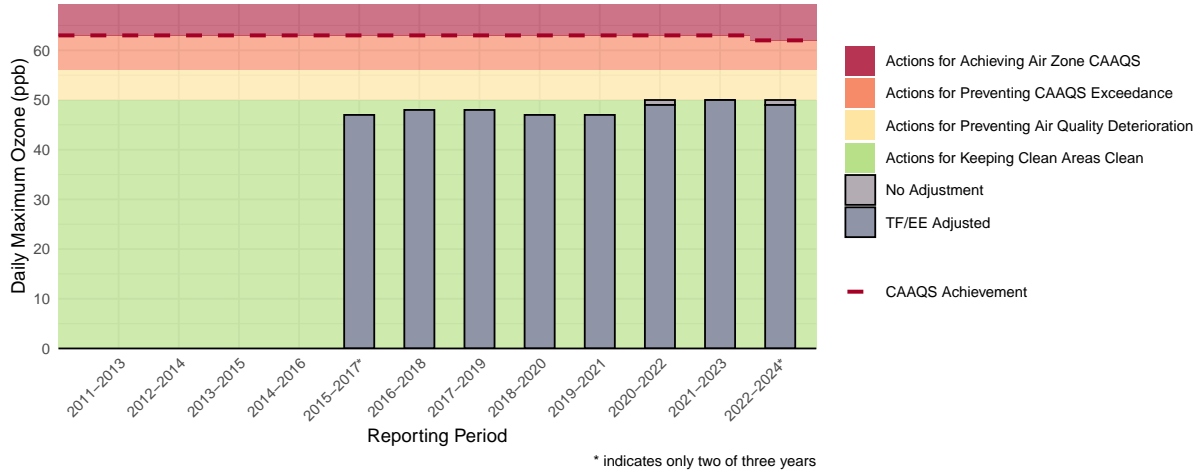
\* indicates only two of three years

**Air Zone:** Lower Fraser Valley

**Monitoring Station:** New Westminster Sapperton Park

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 50 ppb (2 year average)

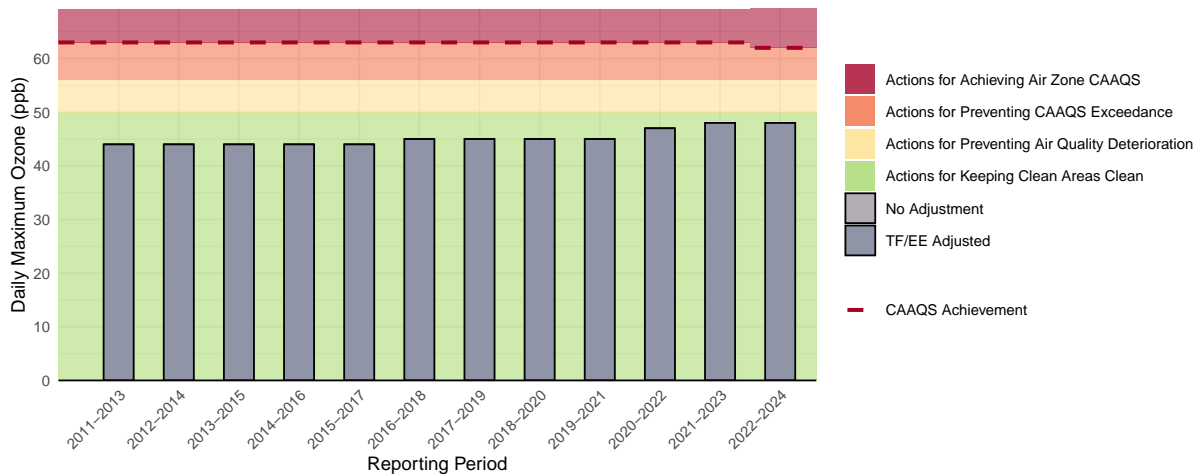


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** North Delta

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 48 ppb (3 year average)

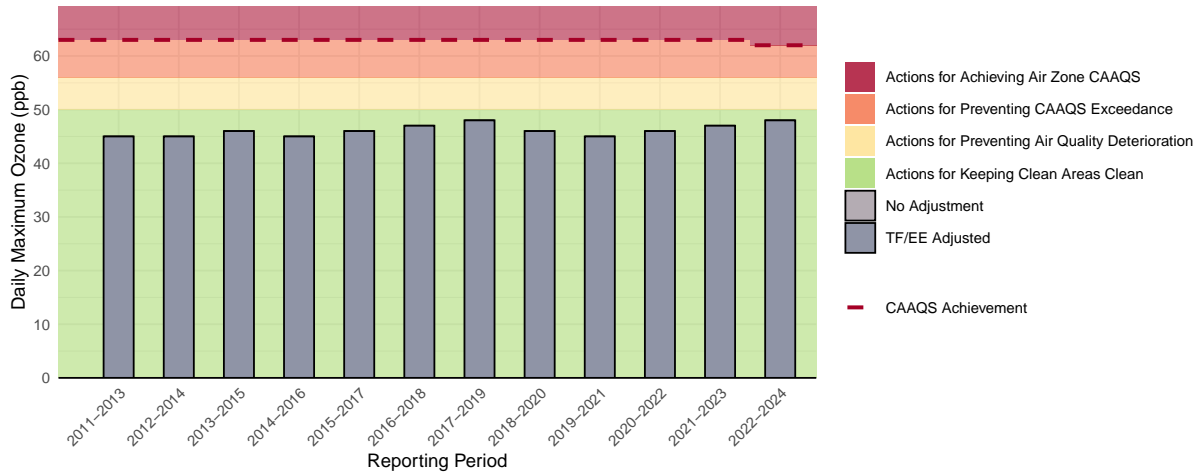


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** North Vancouver Mahon Park

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 48 ppb (3 year average)

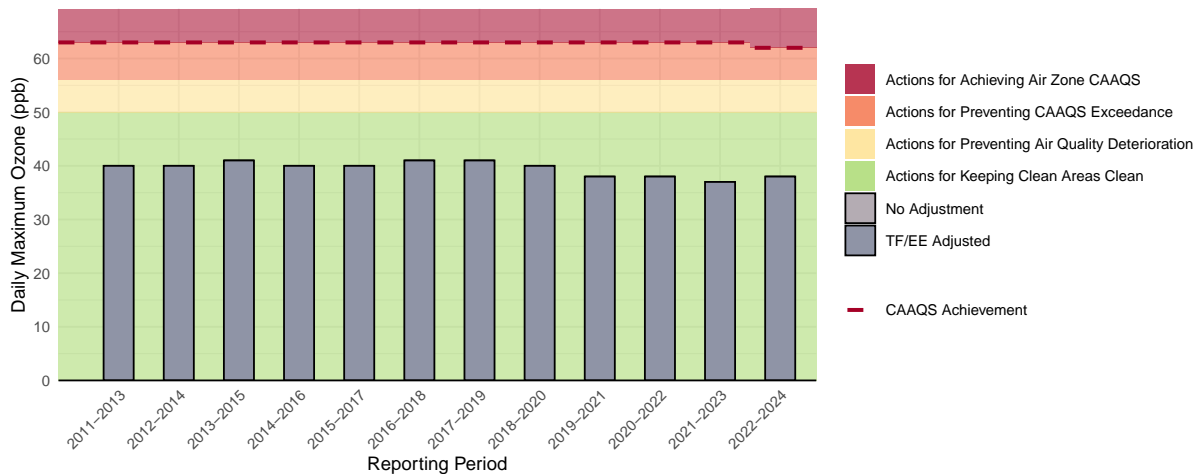


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** North Vancouver Second Narrows

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 38 ppb (3 year average)

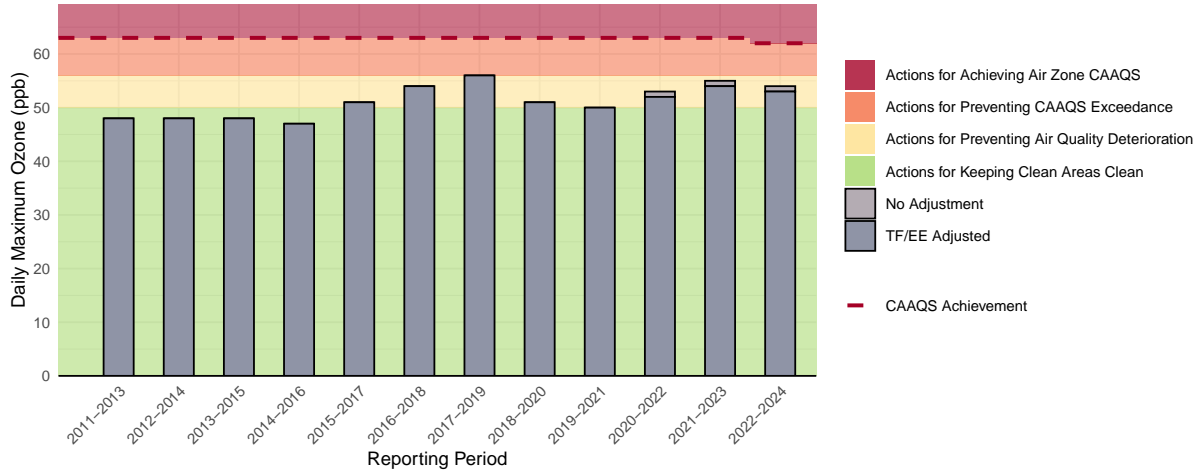


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Pitt Meadows Meadowlands School

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 54 ppb (3 year average)

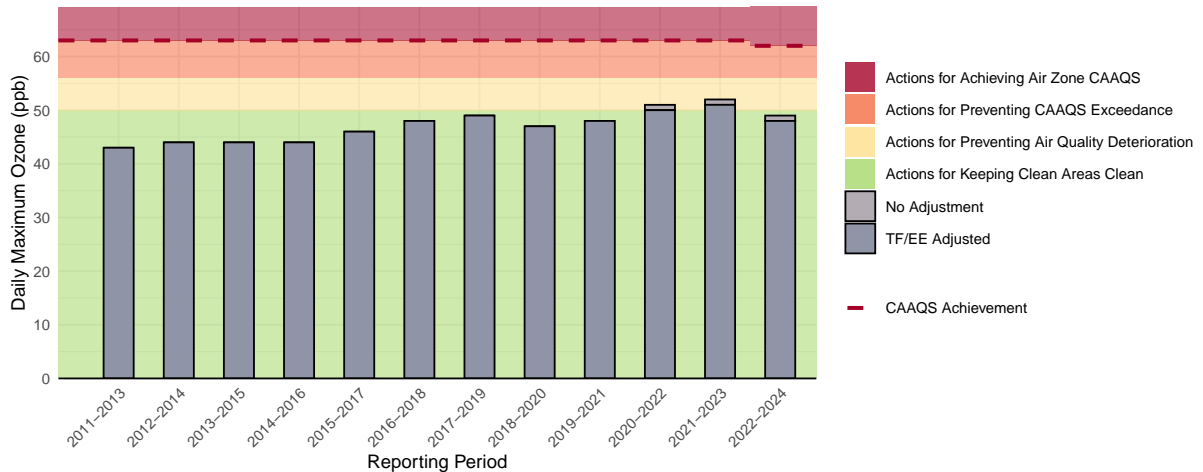


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Port Moody Rocky Point Park

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 49 ppb (3 year average)

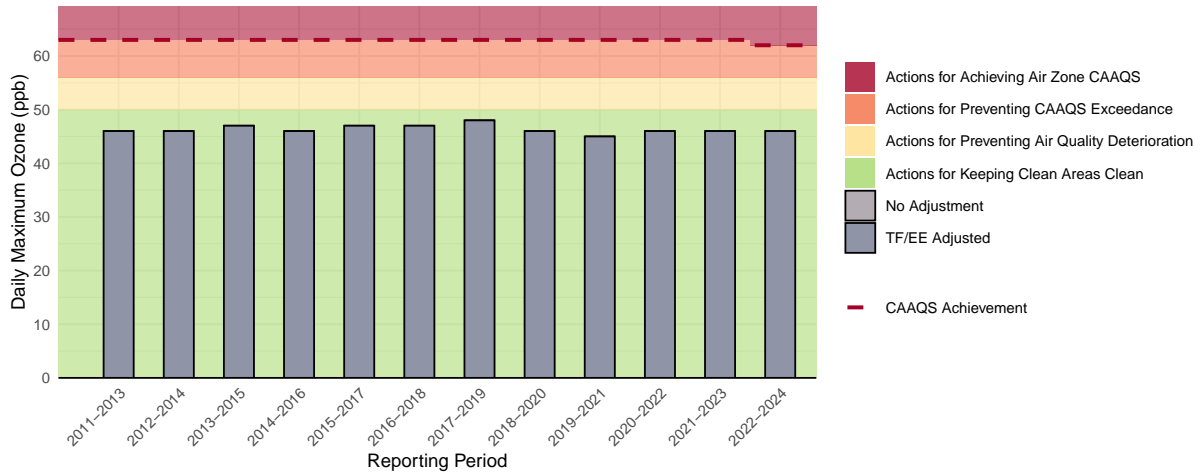


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Richmond South

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 46 ppb (3 year average)

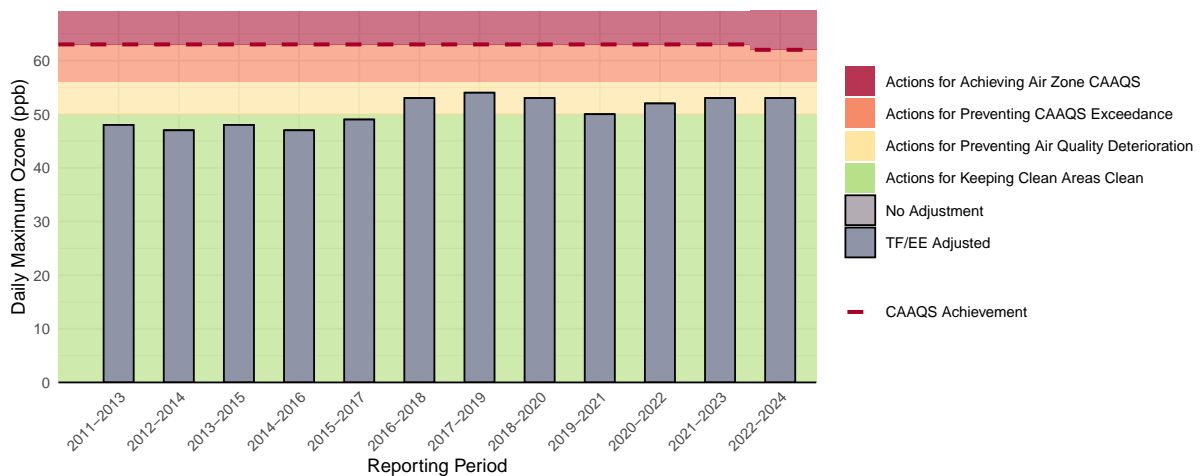


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Surrey East

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 53 ppb (3 year average)

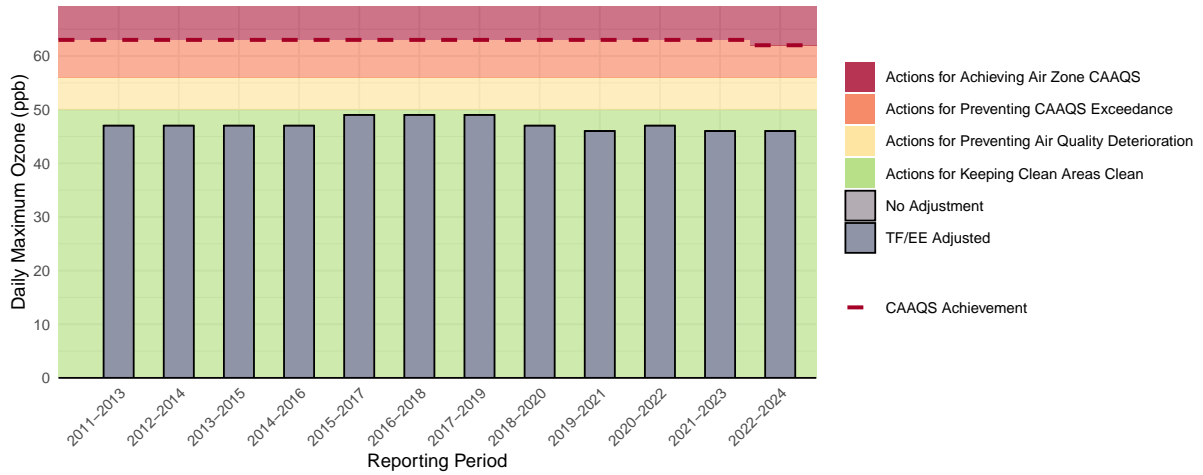


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Tsawwassen

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 46 ppb (3 year average)

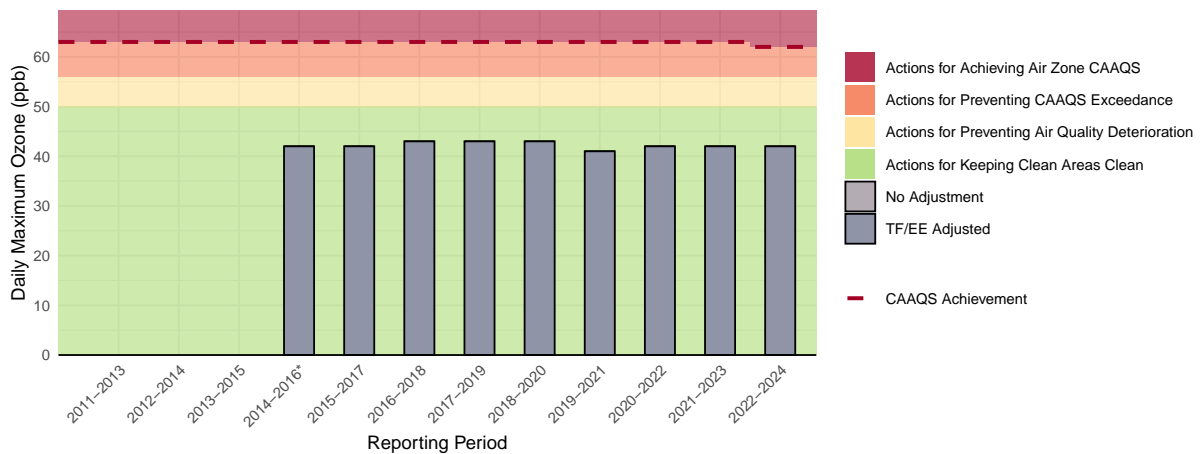


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Vancouver Clark Drive

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 42 ppb (3 year average)



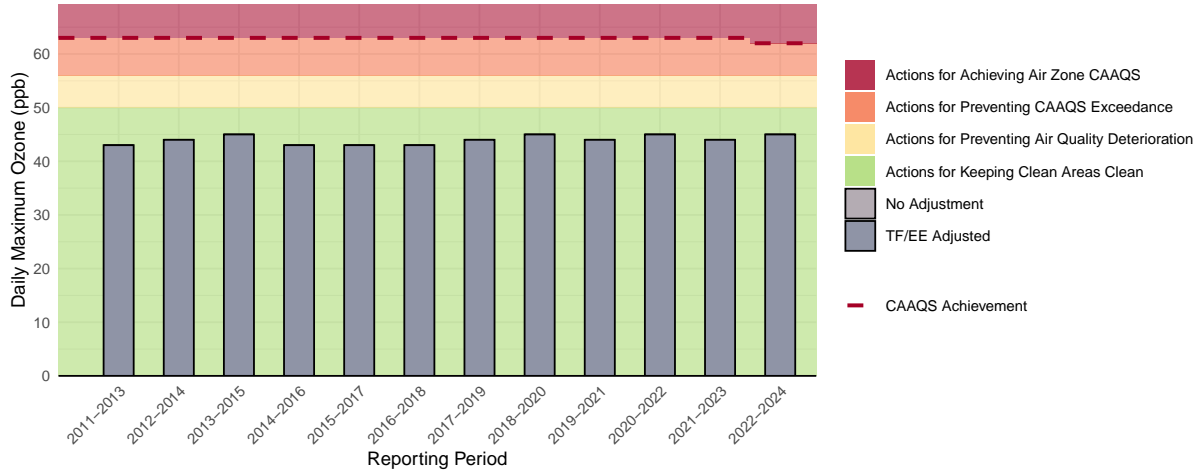
\* indicates only two of three years

**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Vancouver International Airport 2

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 45 ppb (3 year average)

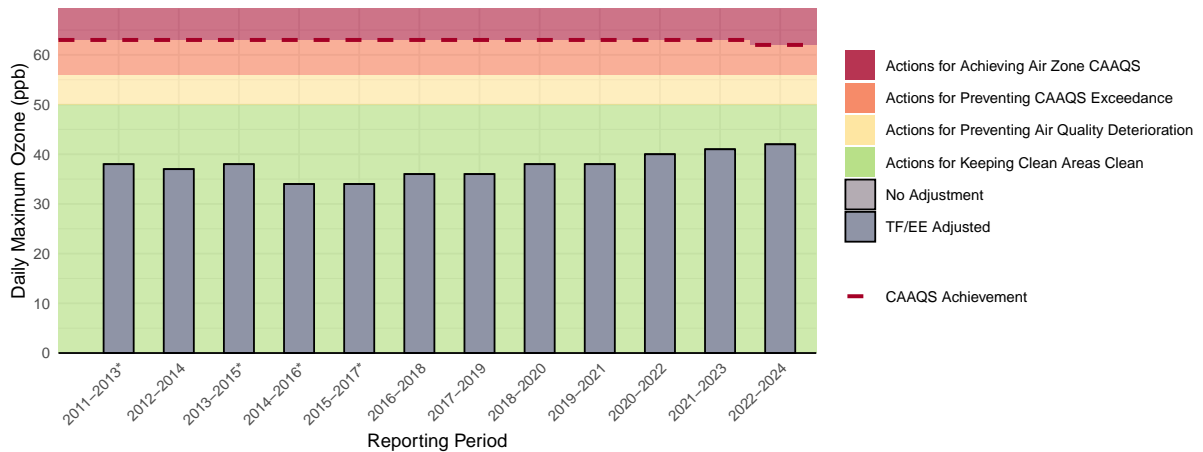


**Air Zone:** Lower Fraser Valley

**Monitoring Station:** Vancouver Robson Square

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 42 ppb (3 year average)



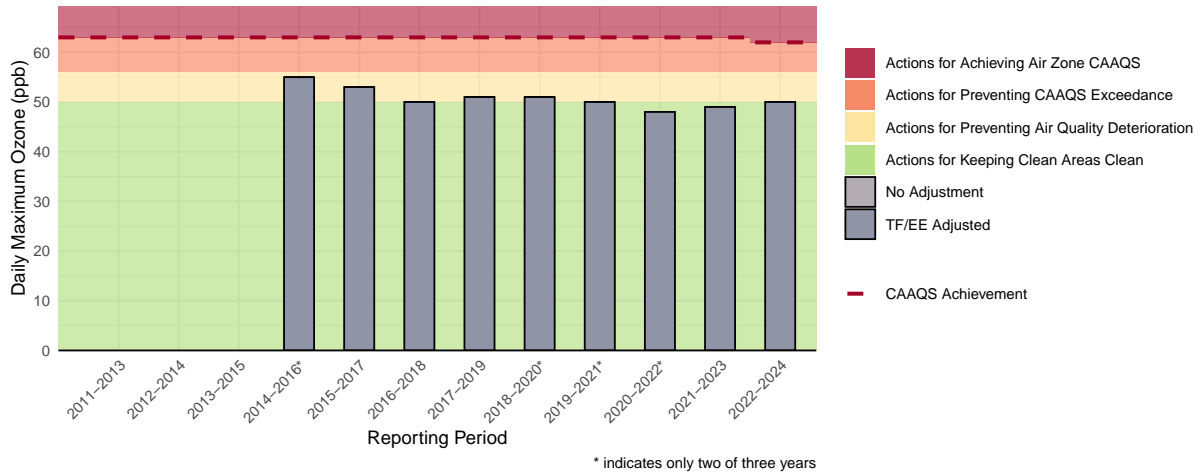
\* indicates only two of three years

**Air Zone:** Northeast

**Monitoring Station:** Fort St John Key Learning Centre

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 50 ppb (3 year average)

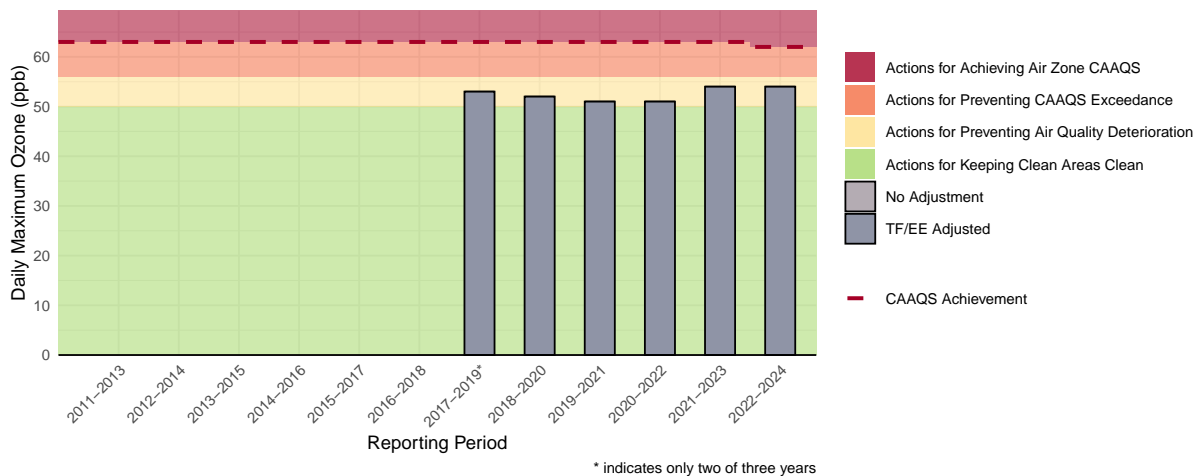


**Air Zone:** Northeast

**Monitoring Station:** Taylor Townsite

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 54 ppb (3 year average)

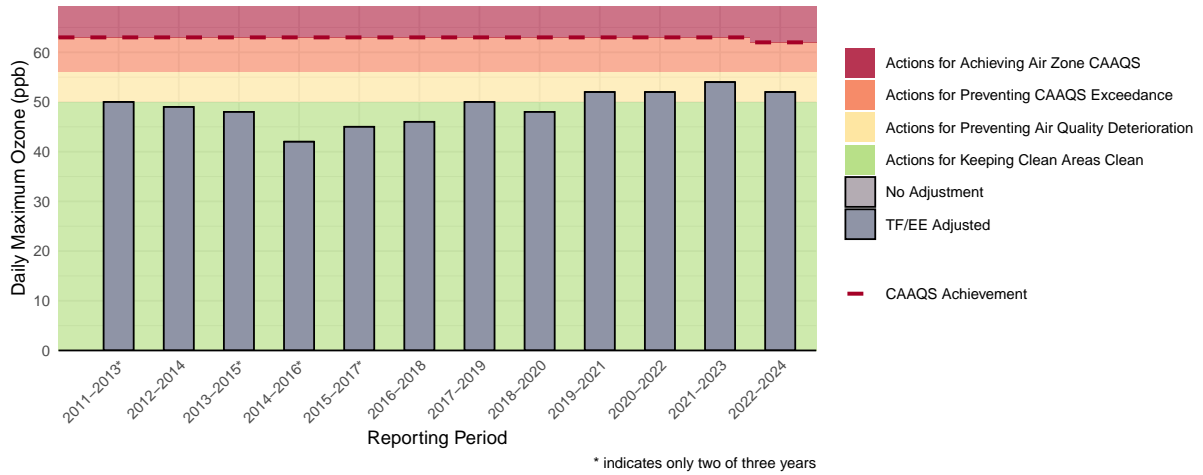


**Air Zone:** Southern Interior

**Monitoring Station:** Castlegar Zinio Park

**Ozone Air Quality Standard:** Achieved

**Ozone Metric:** 52 ppb (3 year average)

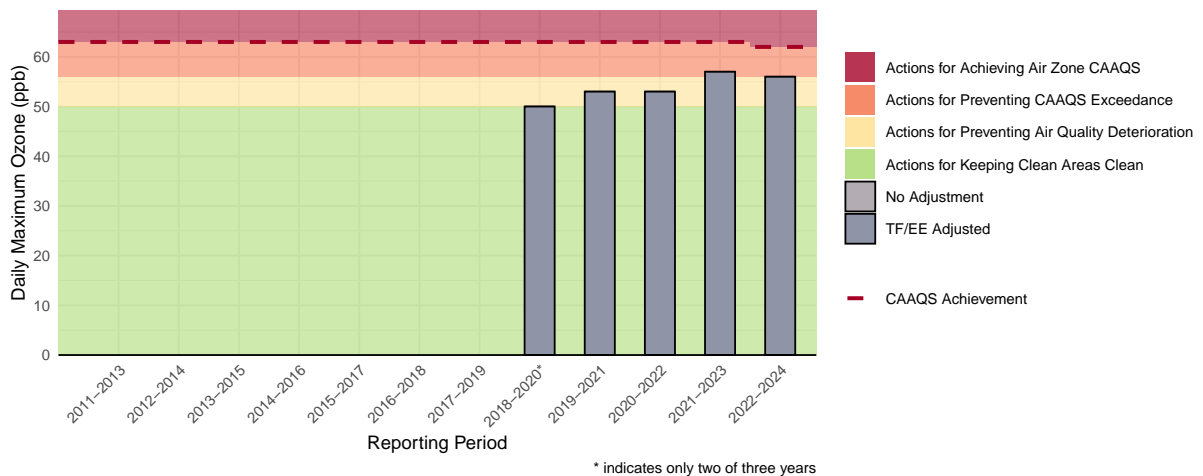


**Air Zone:** Southern Interior

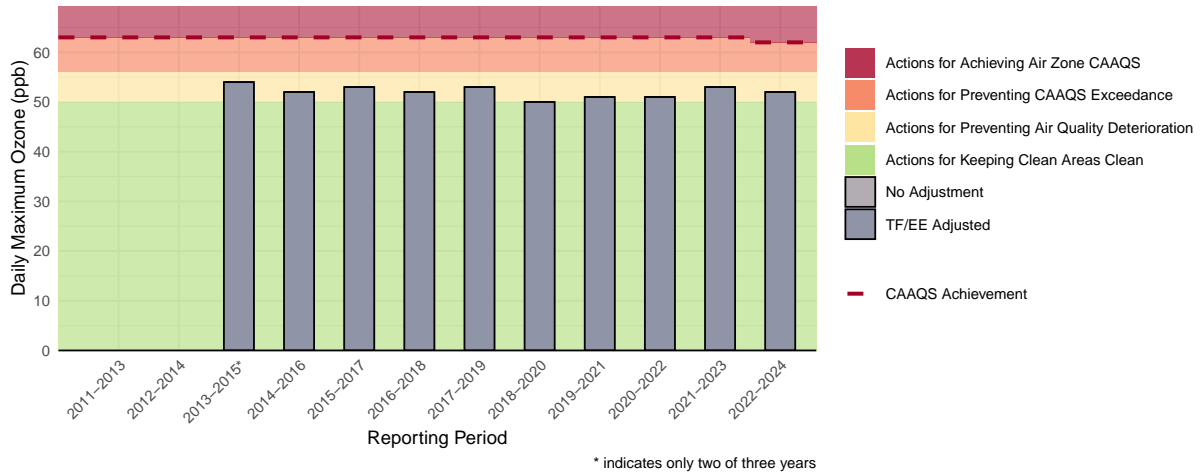
**Monitoring Station:** Cranbrook Muriel Baxter

**Ozone Air Quality Standard:** Achieved

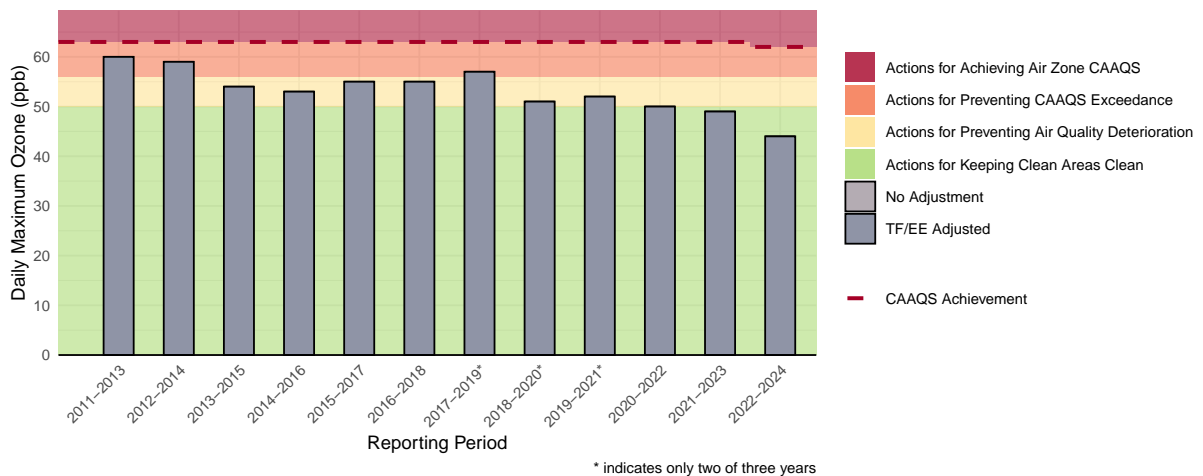
**Ozone Metric:** 56 ppb (3 year average)



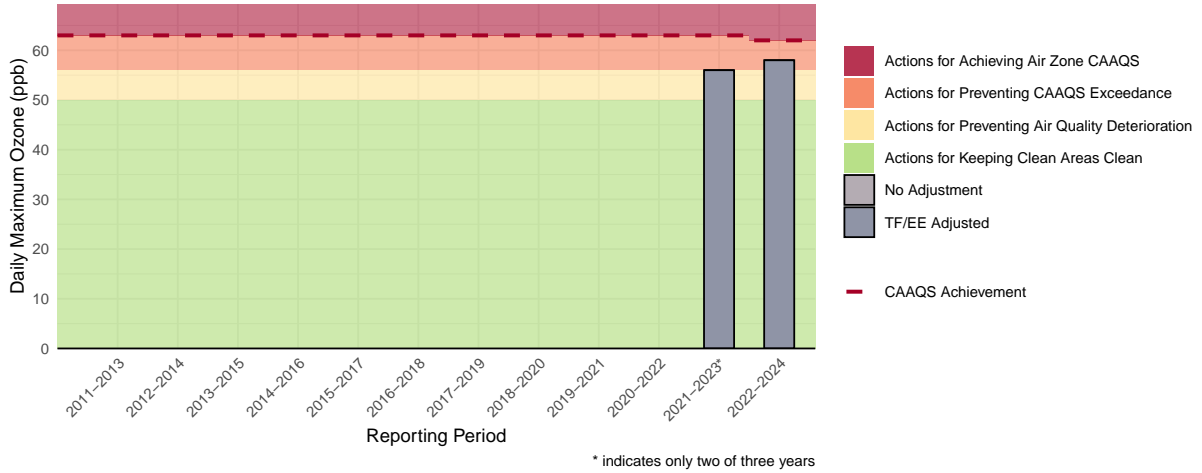
**Air Zone:** Southern Interior  
**Monitoring Station:** Kamloops Federal Building  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 52 ppb (3 year average)



**Air Zone:** Southern Interior  
**Monitoring Station:** Kelowna  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 44 ppb (3 year average)



**Air Zone:** Southern Interior  
**Monitoring Station:** Sparwood Centennial Square  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 58 ppb (3 year average)



**Air Zone:** Southern Interior  
**Monitoring Station:** Vernon Science Centre  
**Ozone Air Quality Standard:** Achieved  
**Ozone Metric:** 49 ppb (3 year average)

