



Air

Status of Ground-Level Ozone in B.C. (2018-2020)

British Columbia operates a network of air monitoring stations that measure ground-level ozone and other air pollutants. This indicator reports on the concentration of ground-level ozone from 2018-2020 and compares it to the [Canadian Ambient Air Quality Standard](#) established by the [Canadian Council of Ministers of the Environment](#).

- **Ground-level ozone is an air pollutant.** While ozone in the Earth's atmosphere occurs naturally, additional ozone at the ground level is a pollutant. It forms through chemical reactions involving nitrogen oxides and volatile organic compounds in the presence of 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 asthma¹. These effects are linked to more emergency room visits, hospitalizations, and absenteeism, and higher health care costs².
- **Ozone levels met the Canadian Ambient Air Quality Standard at 45 of 45 B.C. ozone monitoring stations.** Ozone levels (see box below) from the 45 stations ranged from 38 to 62 parts per billion (ppb). Ozone levels were ≤ 50 ppb at 26 reporting stations (58%). Zero stations reported ozone levels >62 ppb.
- **Ozone levels met the Canadian Ambient Air Quality Standard in six of B.C.'s seven air zones.** 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 ozone metric.

The Canadian Ambient Air Quality Standard value for ozone is **62 parts per billion (ppb)**.

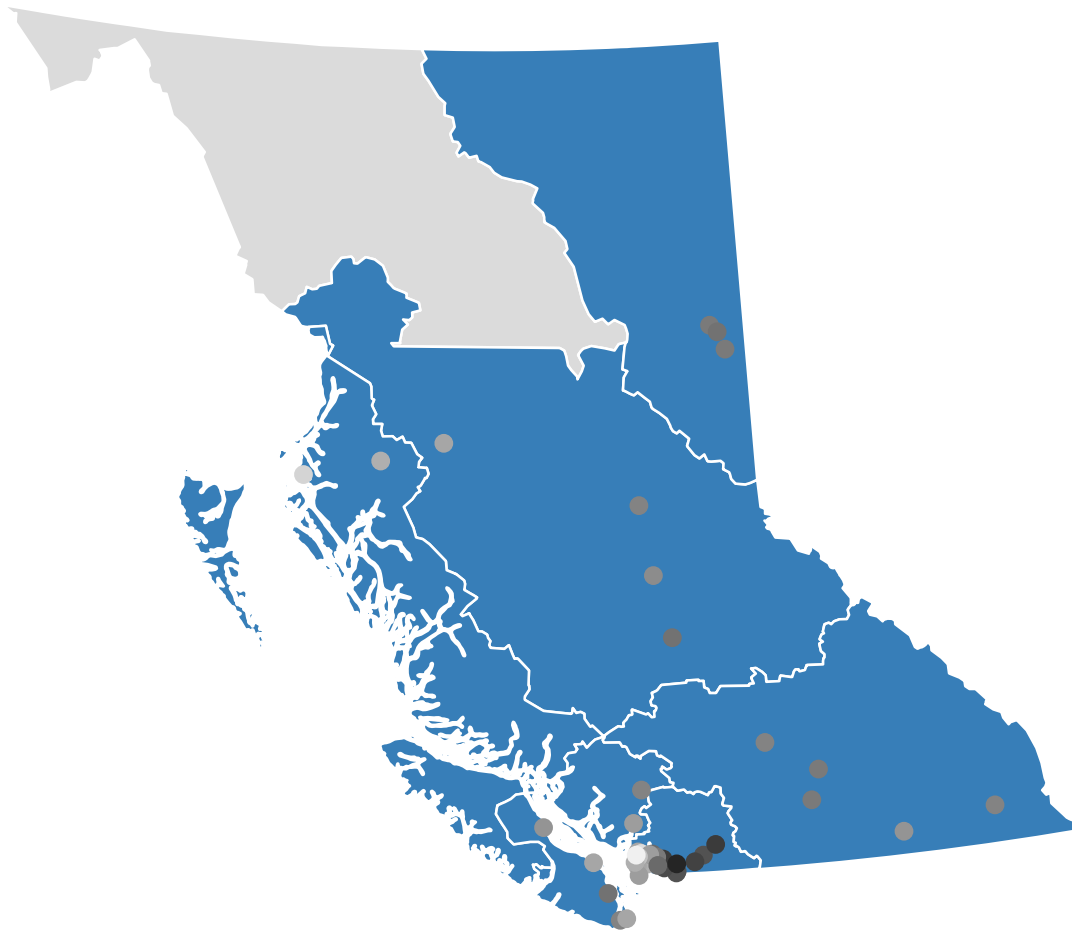
The ozone standard is achieved when ozone levels are ≤ 62 ppb.

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 was available for the 2018-2020 reporting period.


Status of Ground-Level Ozone Levels in B.C. Air Zones (2018-2020)



Airzones:
Ozone Air Quality Standard

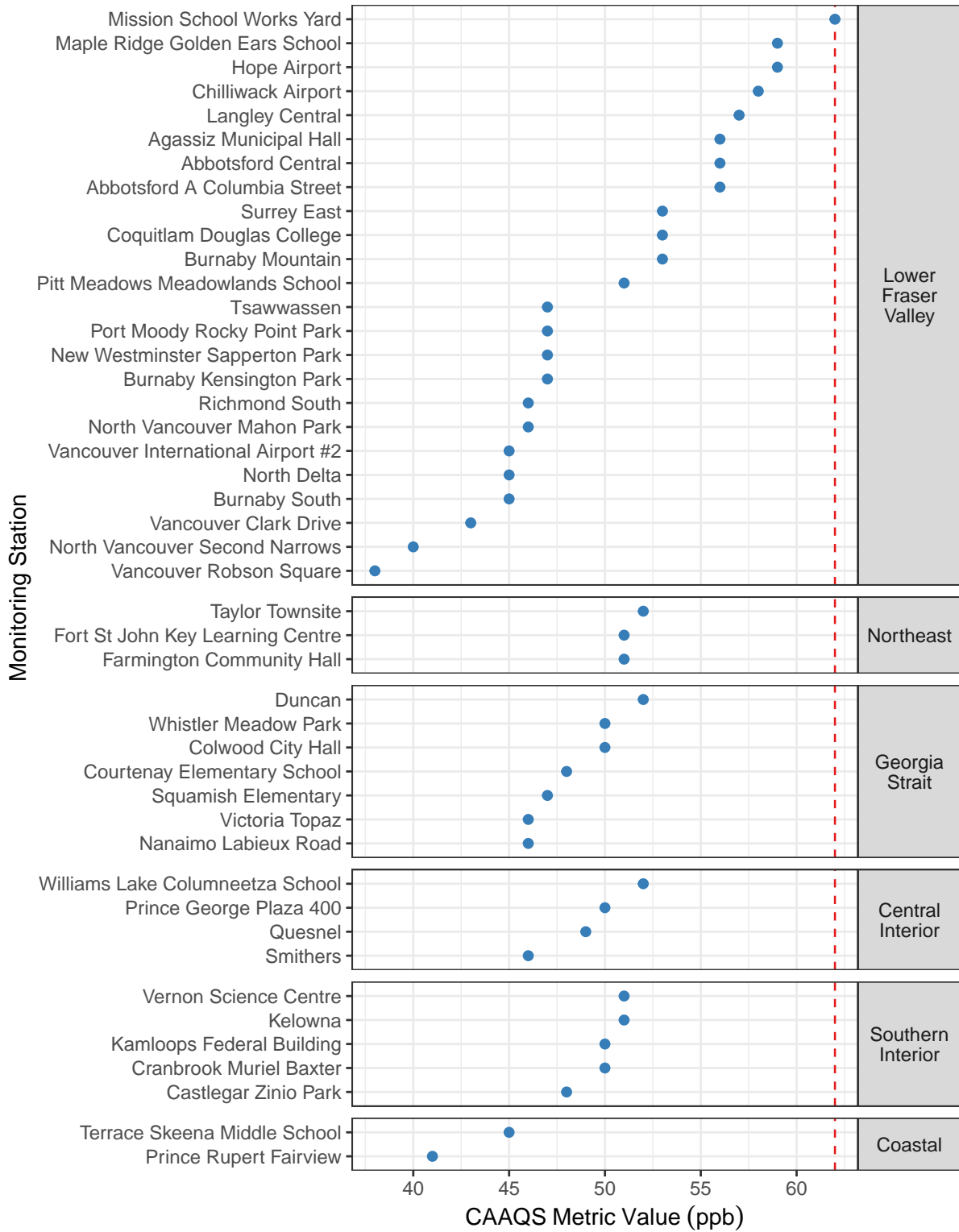
Insufficient Data
 Achieved
 Not Achieved

Monitoring Stations:
Ozone (ppb)



40 45 50 55 60

Ozone Metrics for Air Monitoring Stations within B.C. Air Zones (2018-2020)



More about the Canadian Ambient Air Quality Standard ozone metric:

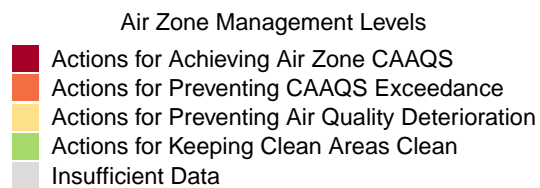
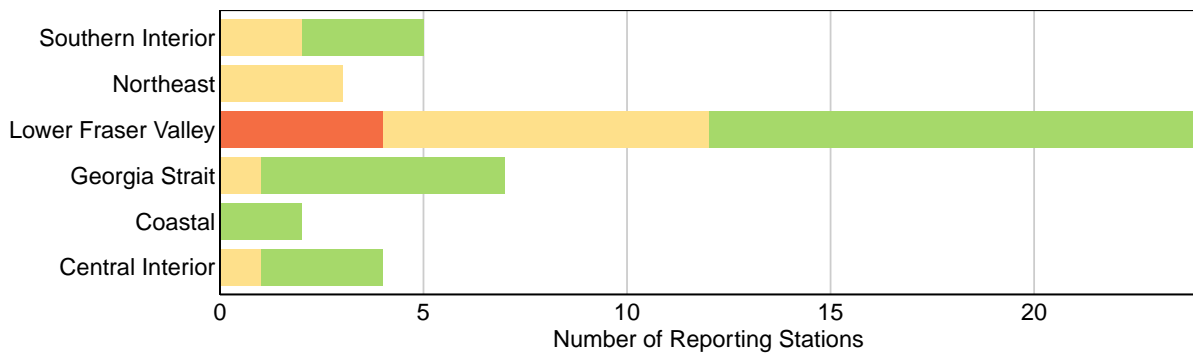
- The statistical form of the Canadian Ambient Air Quality Standard ozone metric is the 3-year average of the annual 4th-highest daily maximum 8-hour rolling average concentration.
- The ozone metric for an air zone is the highest ozone metric reported from monitoring stations within the air zone. Air zone metrics are only taken from stations reporting on two years of data when there are no available three year reporting stations in the air zone.
- Only air monitoring stations with sufficient data on ozone concentrations for the 2018-2020 reporting period were included in this indicator. Visit [Current Air Quality Data](#) for a complete list of air monitoring stations across B.C.
- Data completeness and sufficiency criteria for the ozone metric value are described in the [Guidance Document on Achievement Determination: Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone \(2012\)](#).

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 air zone was assigned to a green management level, the Central Interior, 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 (2018-2020)



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 8 monitoring sites in B.C. on a total of 9 days for the 2018-2020 reporting period. 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

Read individual [Air Zone reports](#) on the achievement of the Canadian Ambient Air Quality Standards for ground-level ozone and fine particulate matter in B.C.

[Learn more about the implementation of the Air Quality Management System in British Columbia](#)

[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 Environmental Sustainability Indicators: Air Indicators](#)

¹United States Environmental Protection Agency. February 2013. [Integrated Science Assessment of Ozone and Related Photochemical Oxidants \(600/R-10/076F\)](#)

²Willey, 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 2018-2020](#) (Licence: [Open Government Licence - British Columbia](#))



Environmental Reporting BC

- [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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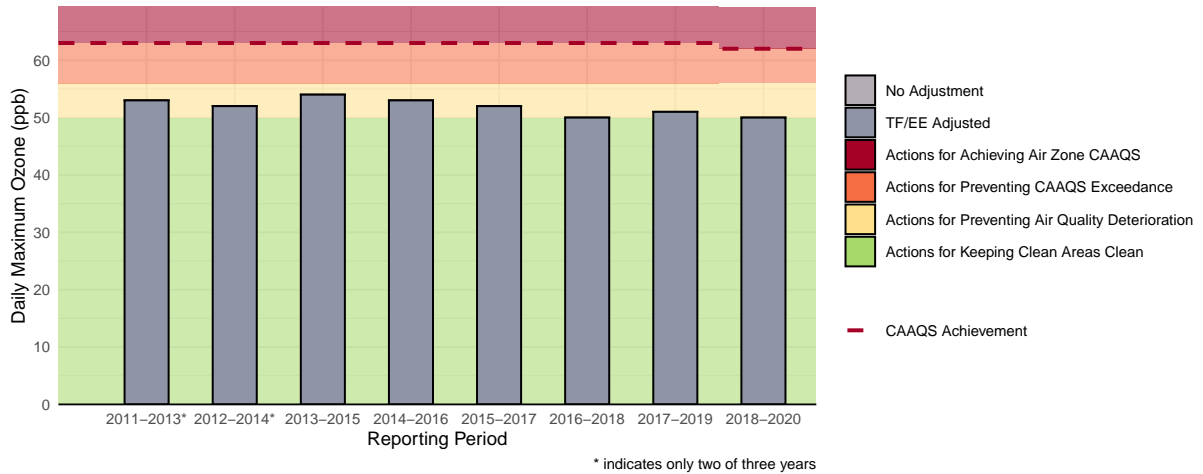
Appendix: Detailed Ground-Level Ozone Canadian Ambient Air Quality Standard Results for Monitoring Stations within Air Zones in B.C. (2018-2020)

Air Zone: Central Interior

Monitoring Station: Prince George Plaza 400

Ozone Air Quality Standard: Achieved

Ozone Metric: 50 ppb (3 year average)

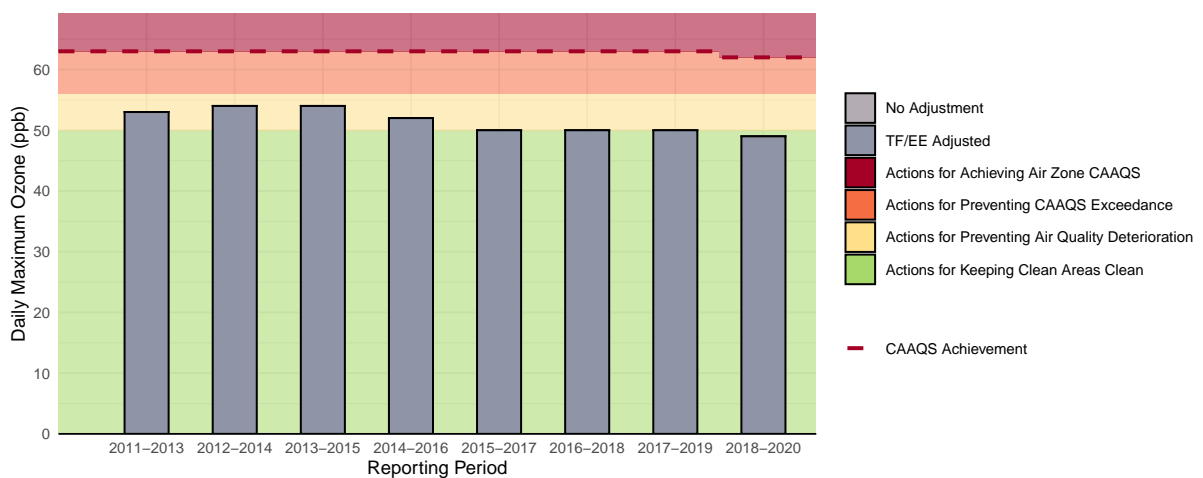


Air Zone: Central Interior

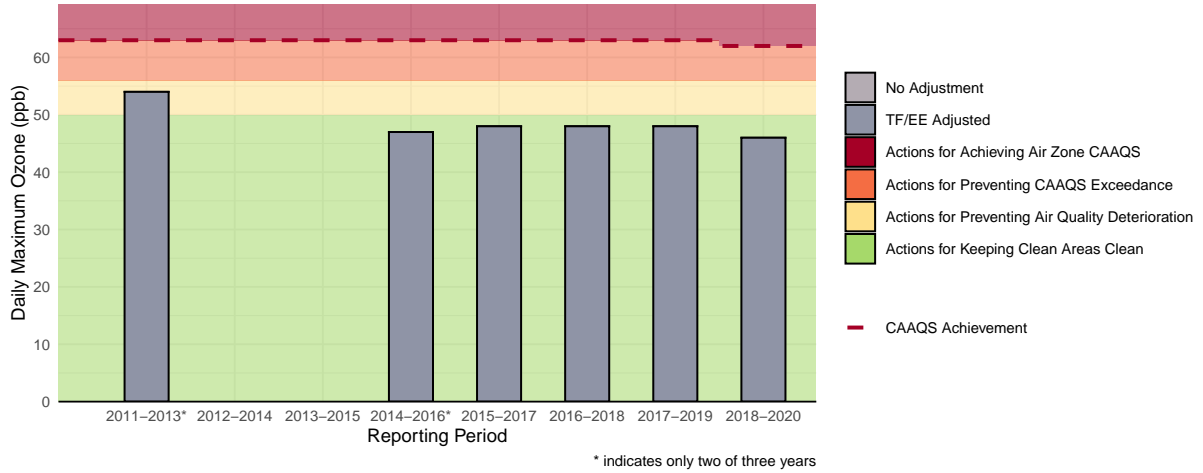
Monitoring Station: Quesnel

Ozone Air Quality Standard: Achieved

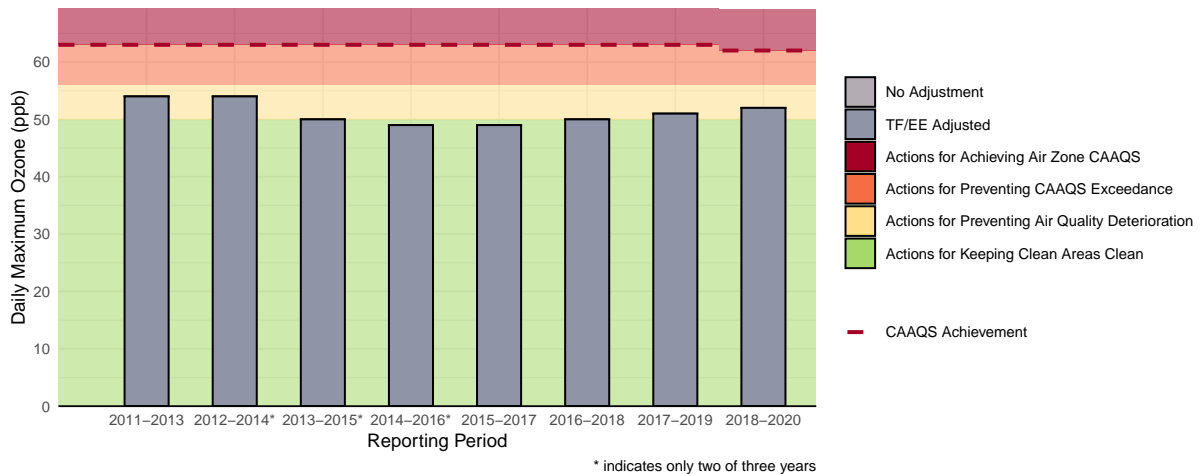
Ozone Metric: 49 ppb (3 year average)



Air Zone: Central Interior
Monitoring Station: Smithers
Ozone Air Quality Standard: Achieved
Ozone Metric: 46 ppb (3 year average)



Air Zone: Central Interior
Monitoring Station: Williams Lake Columneetza School
Ozone Air Quality Standard: Achieved
Ozone Metric: 52 ppb (3 year average)

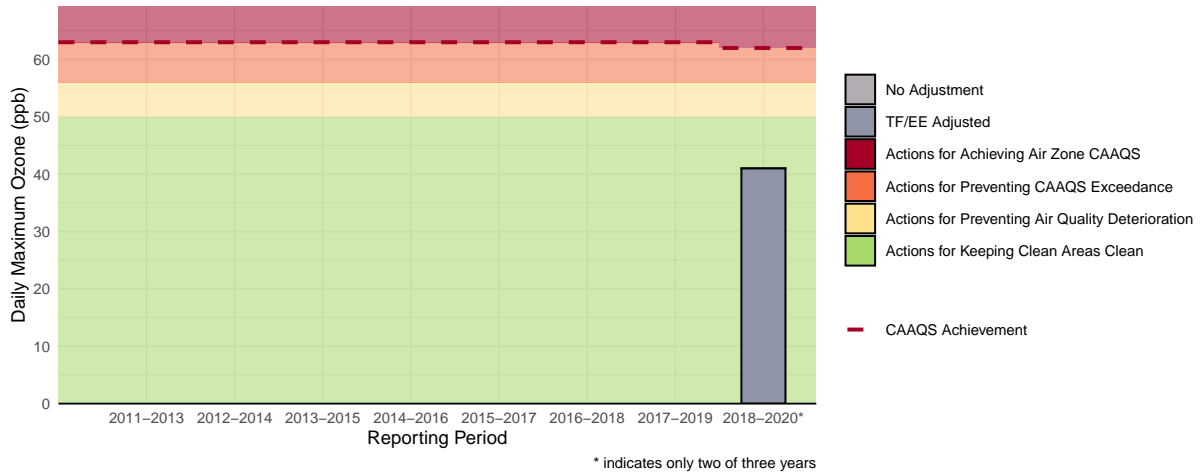


Air Zone: Coastal

Monitoring Station: Prince Rupert Fairview

Ozone Air Quality Standard: Achieved

Ozone Metric: 41 ppb (2 year average)

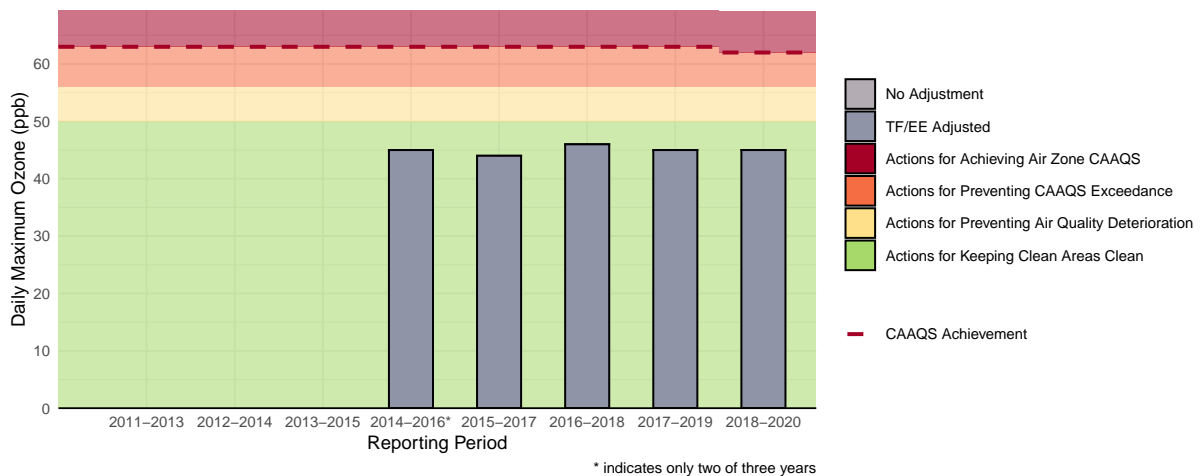


Air Zone: Coastal

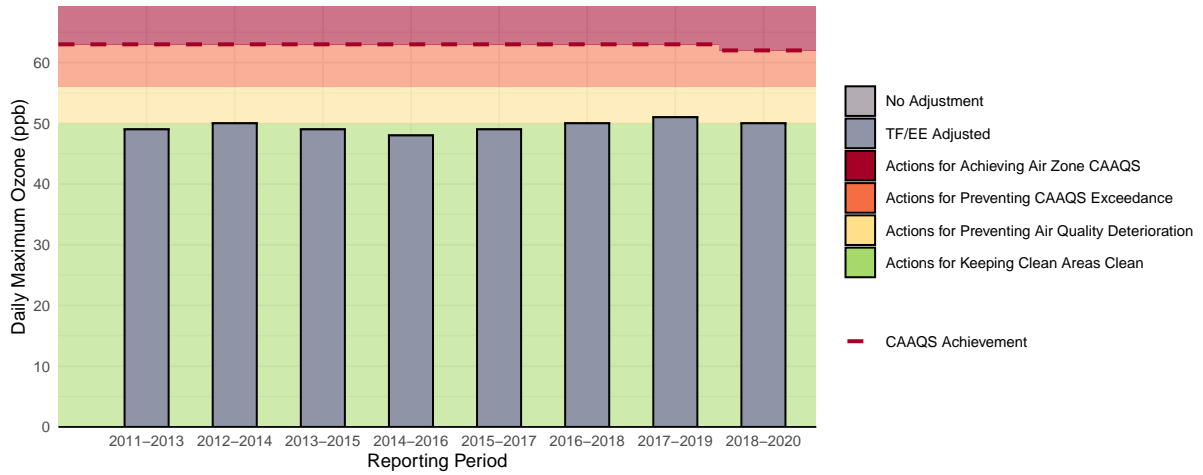
Monitoring Station: Terrace Skeena Middle School

Ozone Air Quality Standard: Achieved

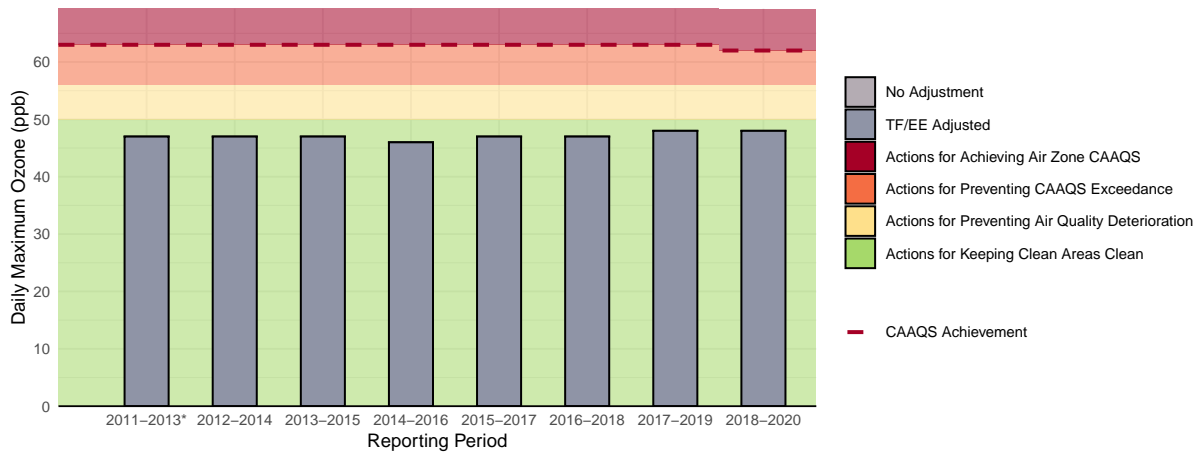
Ozone Metric: 45 ppb (3 year average)



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: 48 ppb (3 year average)



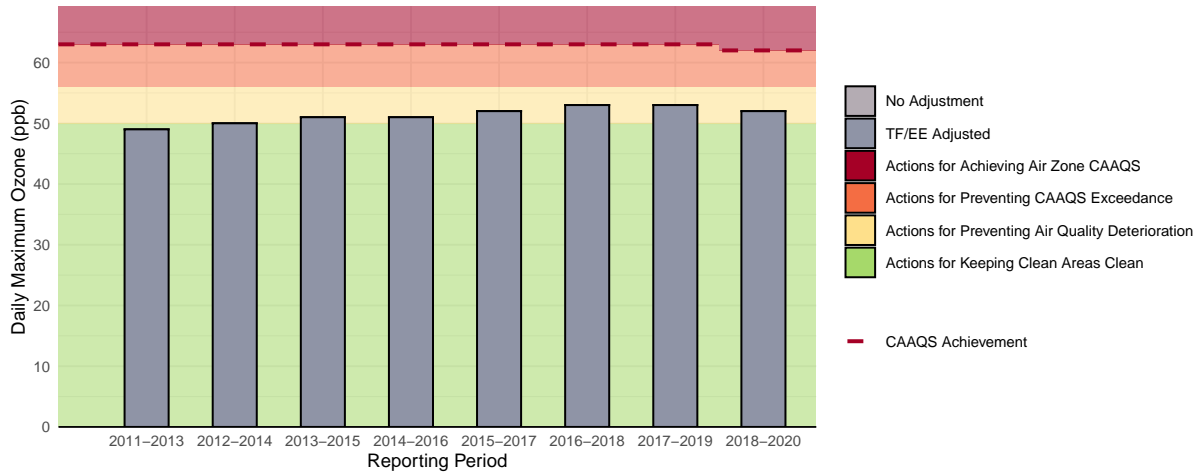
* indicates only two of three years

Air Zone: Georgia Strait

Monitoring Station: Duncan

Ozone Air Quality Standard: Achieved

Ozone Metric: 52 ppb (3 year average)

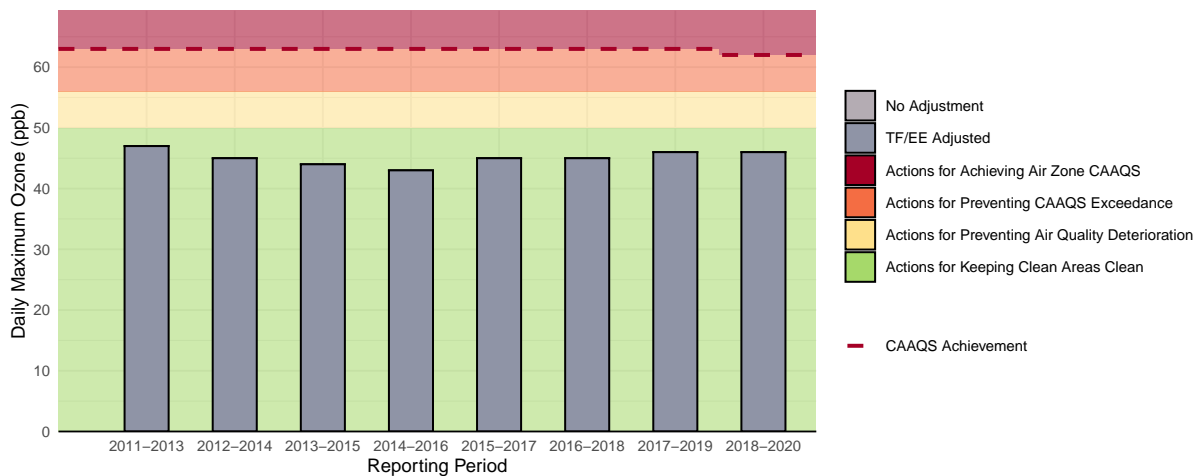


Air Zone: Georgia Strait

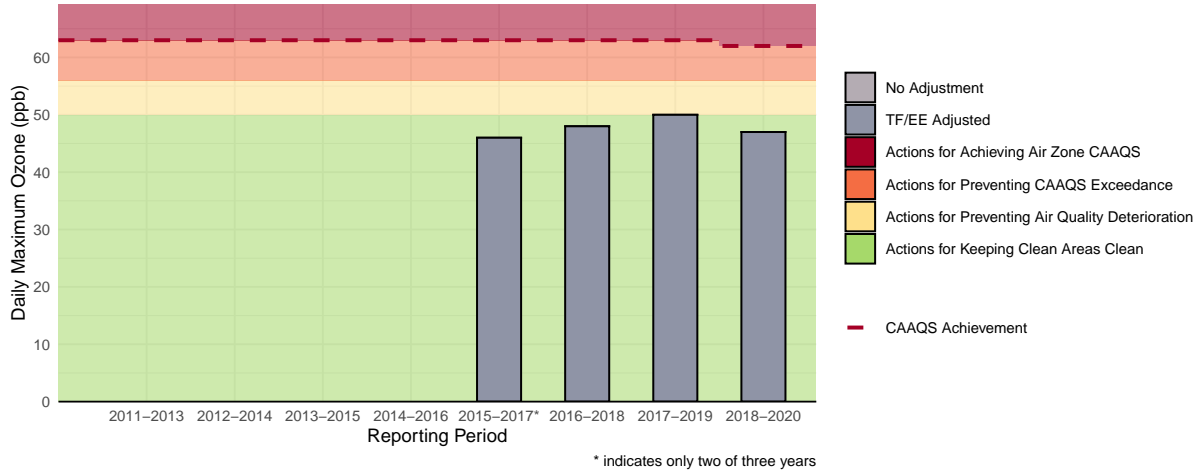
Monitoring Station: Nanaimo Labieux Road

Ozone Air Quality Standard: Achieved

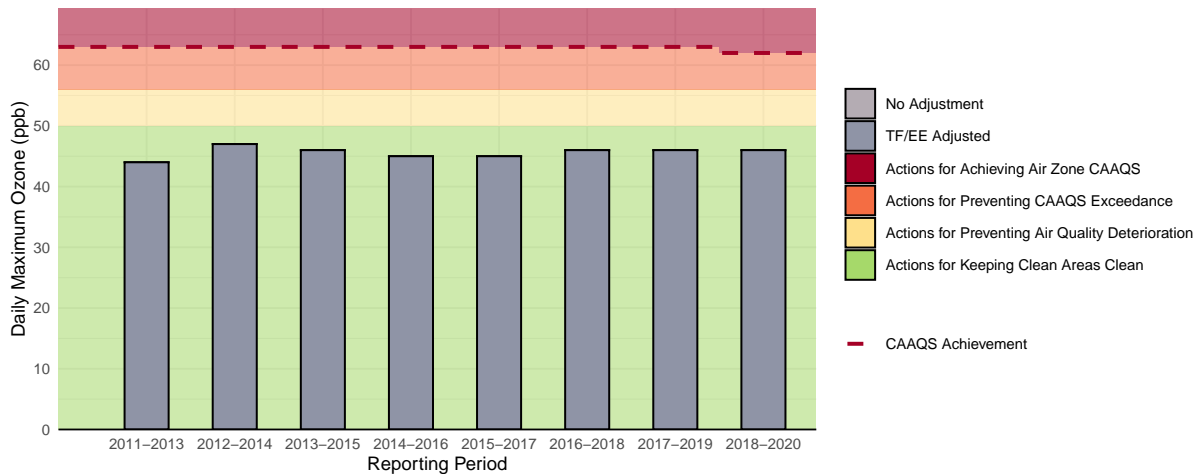
Ozone Metric: 46 ppb (3 year average)



Air Zone: Georgia Strait
Monitoring Station: Squamish Elementary
Ozone Air Quality Standard: Achieved
Ozone Metric: 47 ppb (3 year average)



Air Zone: Georgia Strait
Monitoring Station: Victoria Topaz
Ozone Air Quality Standard: Achieved
Ozone Metric: 46 ppb (3 year average)

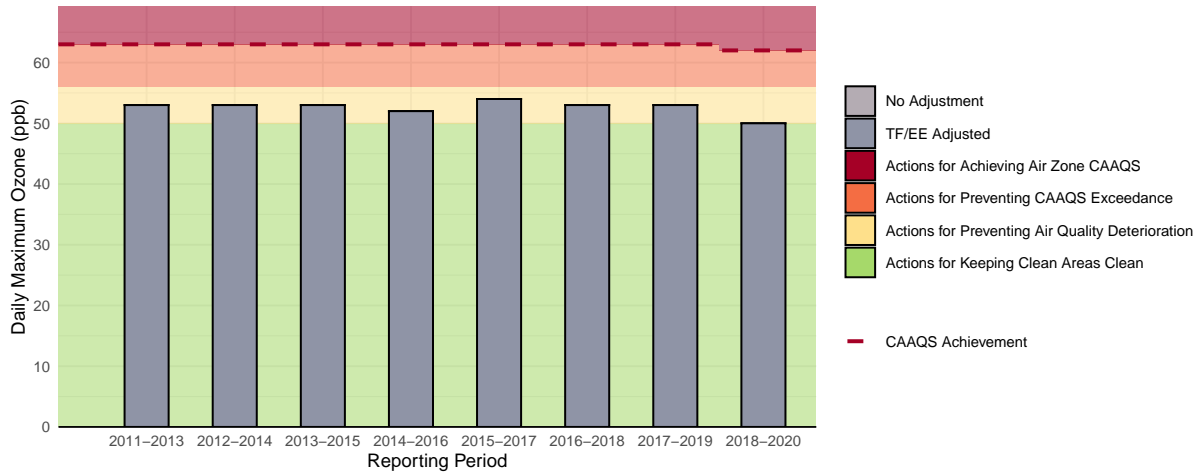


Air Zone: Georgia Strait

Monitoring Station: Whistler Meadow Park

Ozone Air Quality Standard: Achieved

Ozone Metric: 50 ppb (3 year average)

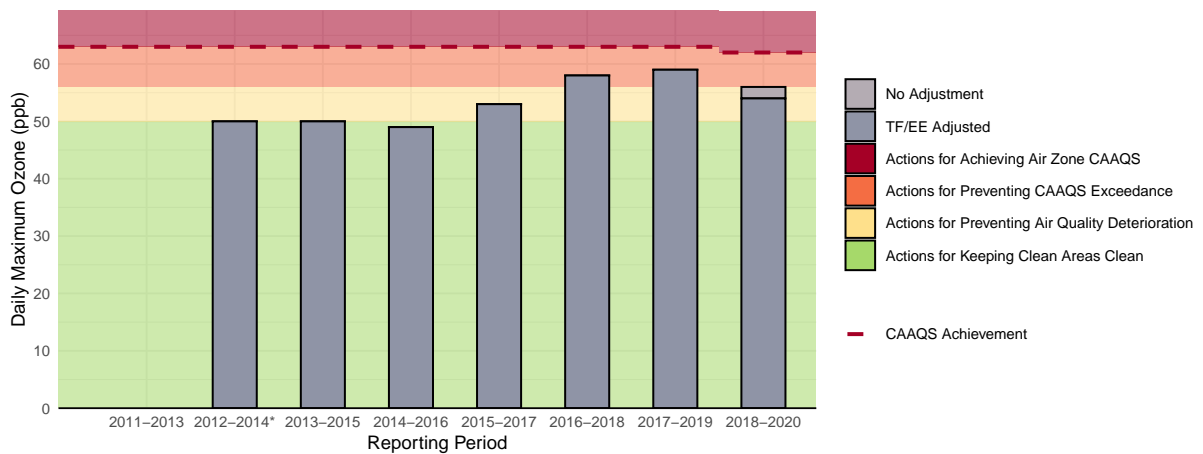


Air Zone: Lower Fraser Valley

Monitoring Station: Abbotsford A Columbia Street

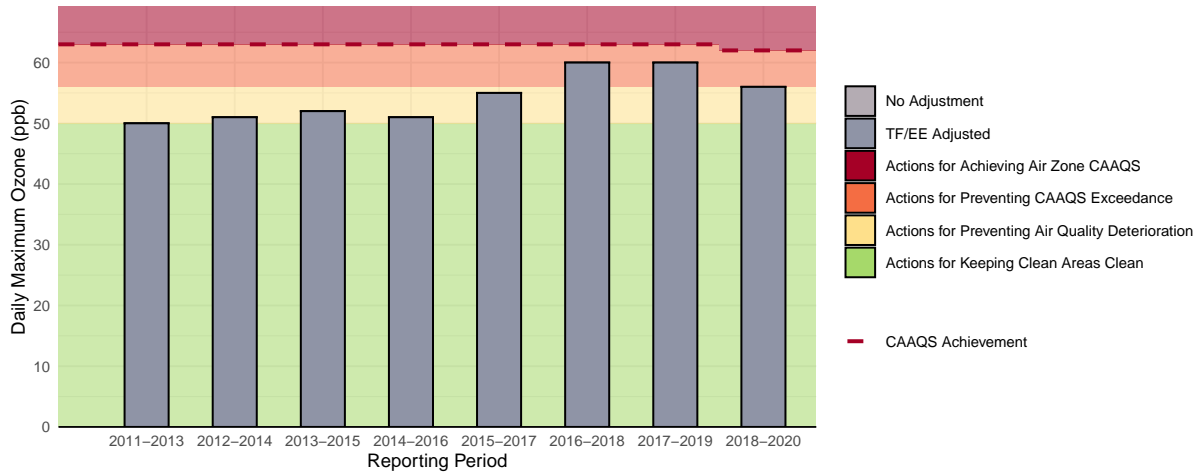
Ozone Air Quality Standard: Achieved

Ozone Metric: 56 ppb (3 year average)

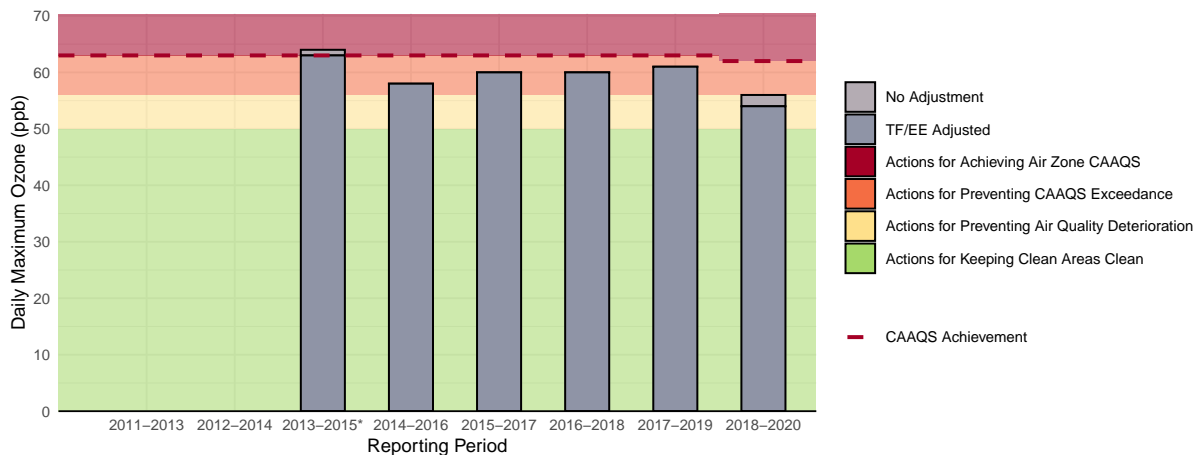


* indicates only two of three years

Air Zone: Lower Fraser Valley
Monitoring Station: Abbotsford Central
Ozone Air Quality Standard: Achieved
Ozone Metric: 56 ppb (3 year average)

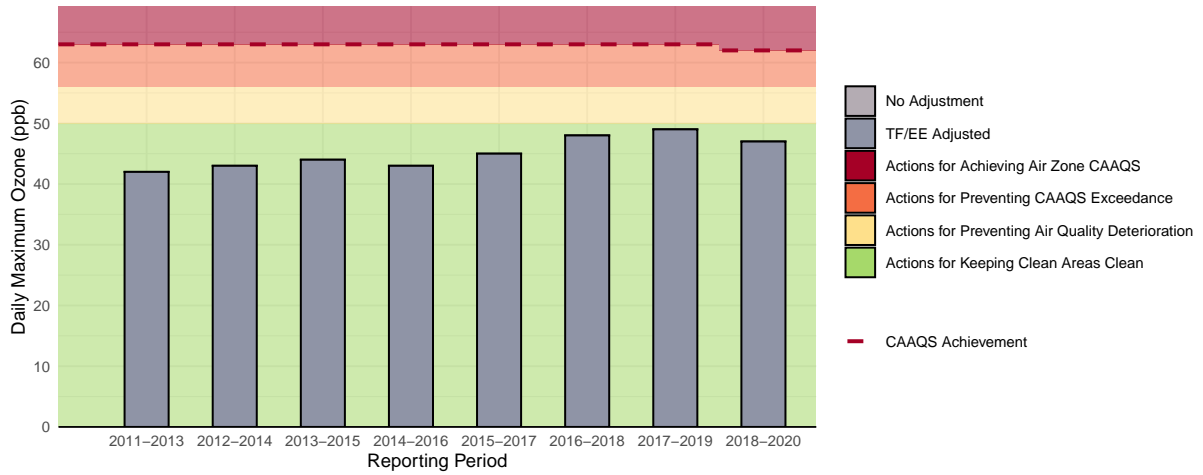


Air Zone: Lower Fraser Valley
Monitoring Station: Agassiz Municipal Hall
Ozone Air Quality Standard: Achieved
Ozone Metric: 56 ppb (3 year average)

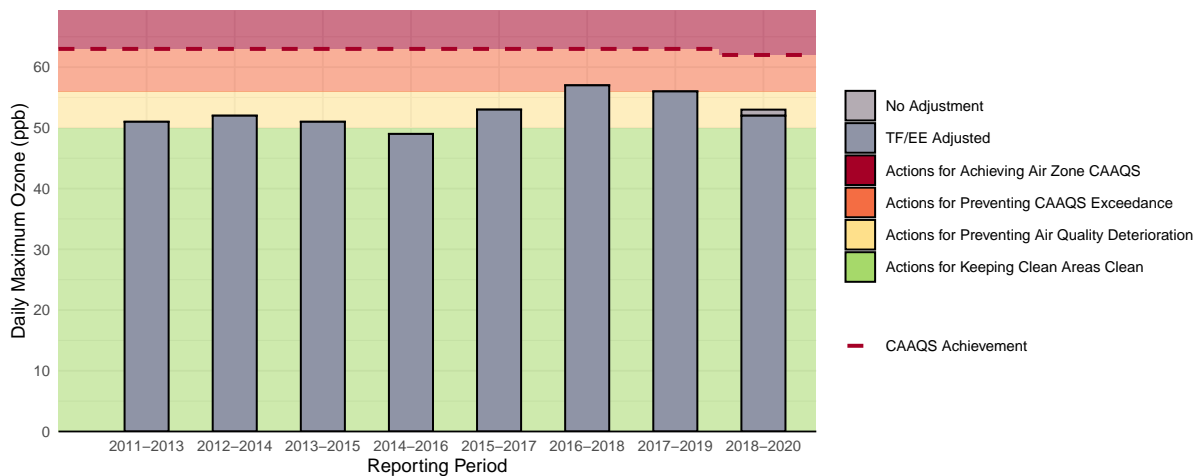


* indicates only two of three years

Air Zone: Lower Fraser Valley
Monitoring Station: Burnaby Kensington Park
Ozone Air Quality Standard: Achieved
Ozone Metric: 47 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)

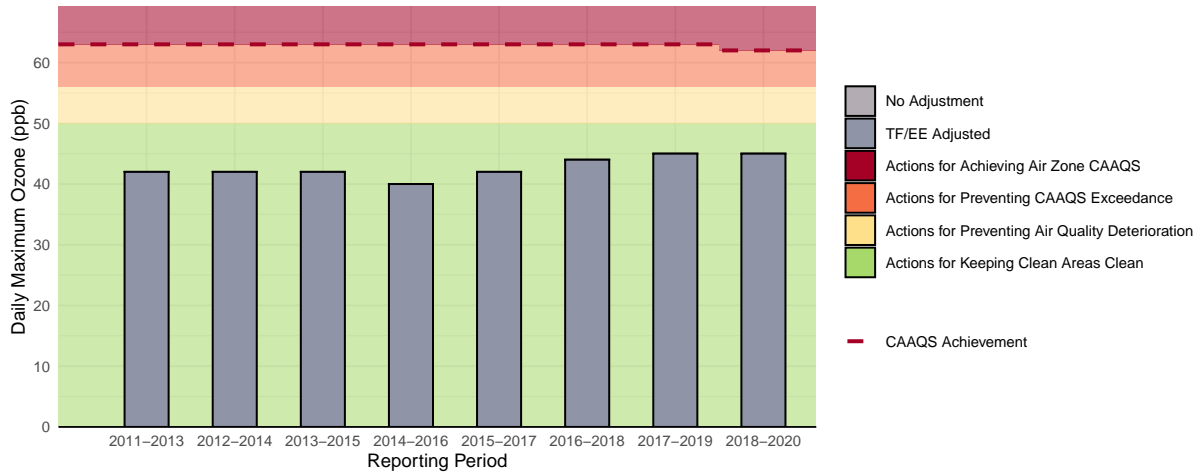


Air Zone: Lower Fraser Valley

Monitoring Station: Burnaby South

Ozone Air Quality Standard: Achieved

Ozone Metric: 45 ppb (3 year average)

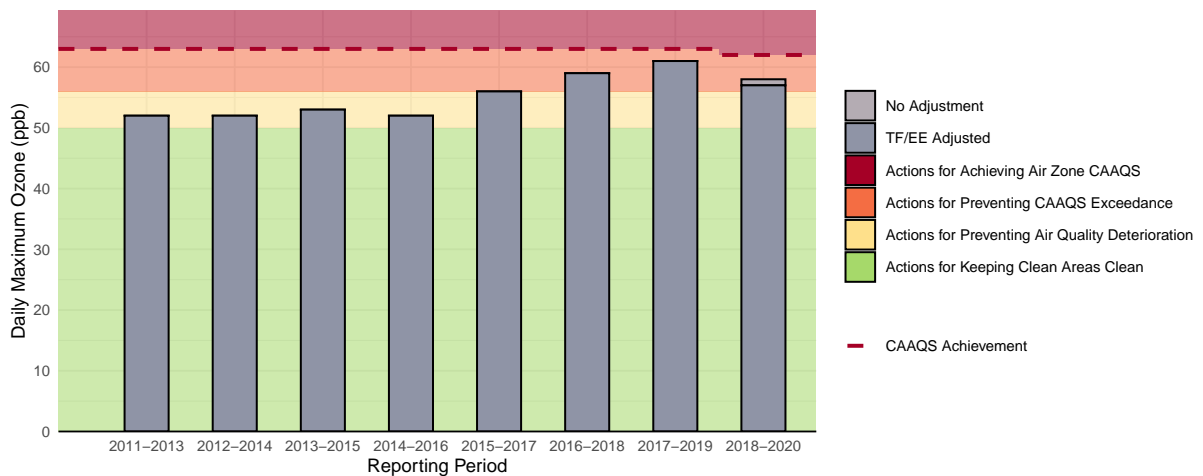


Air Zone: Lower Fraser Valley

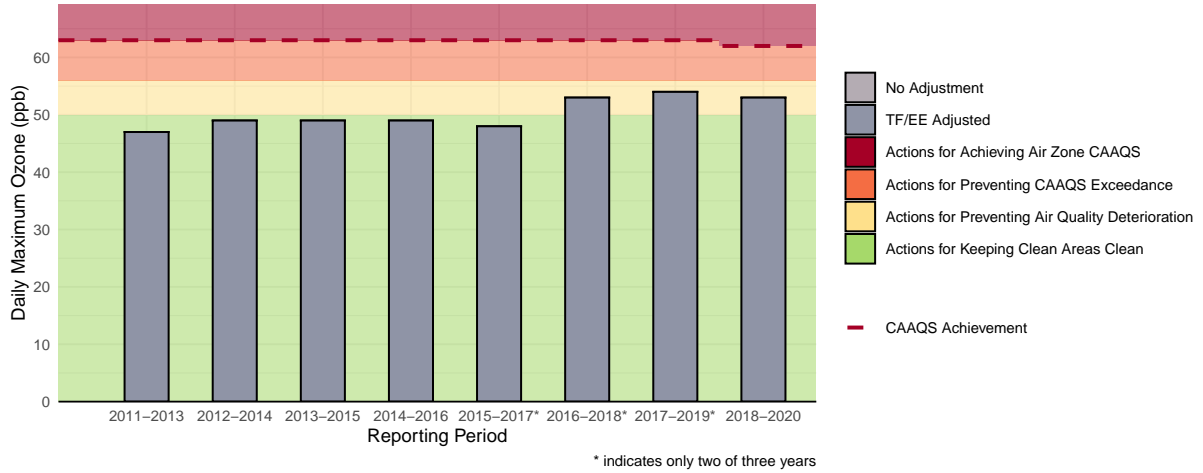
Monitoring Station: Chilliwack Airport

Ozone Air Quality Standard: Achieved

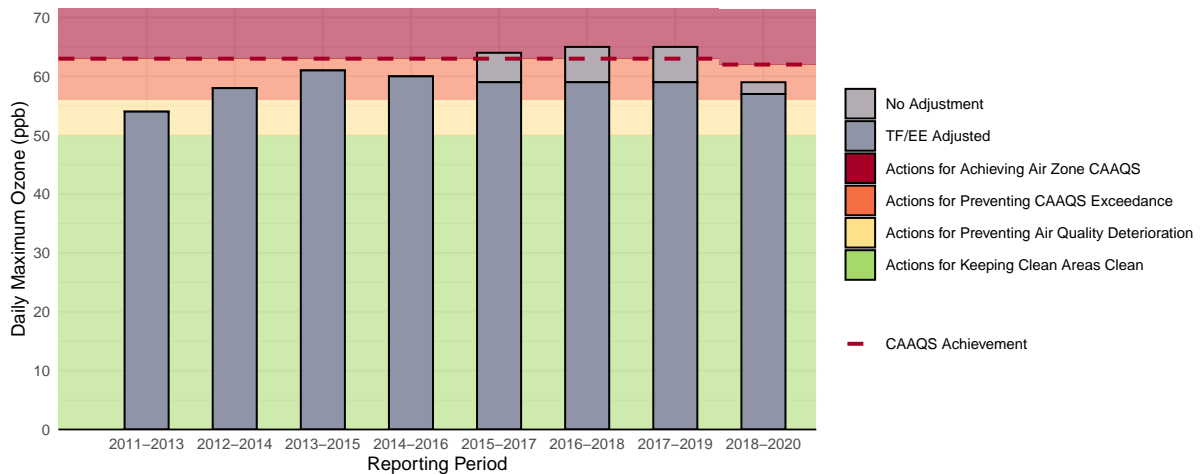
Ozone Metric: 58 ppb (3 year average)



Air Zone: Lower Fraser Valley
Monitoring Station: Coquitlam Douglas College
Ozone Air Quality Standard: Achieved
Ozone Metric: 53 ppb (3 year average)



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

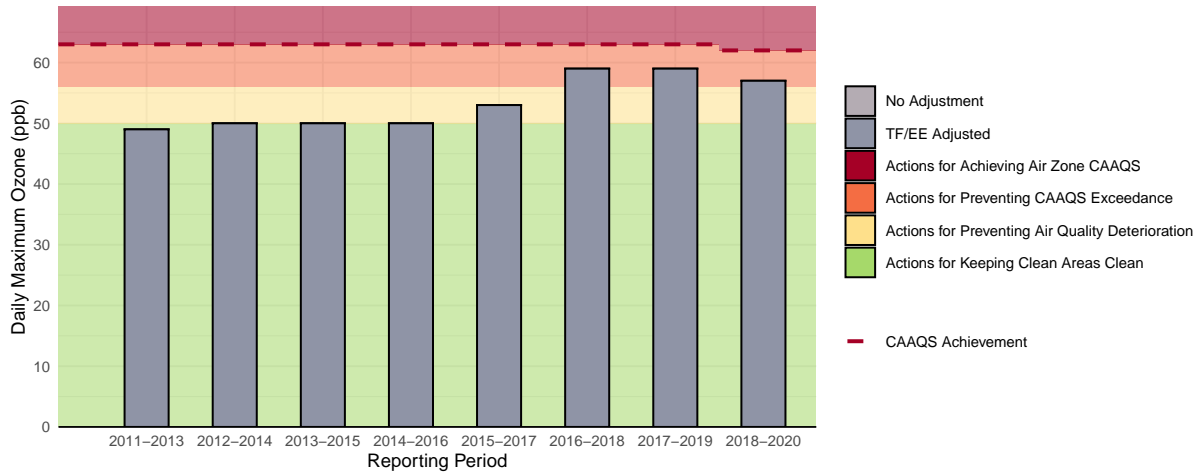


Air Zone: Lower Fraser Valley

Monitoring Station: Langley Central

Ozone Air Quality Standard: Achieved

Ozone Metric: 57 ppb (3 year average)

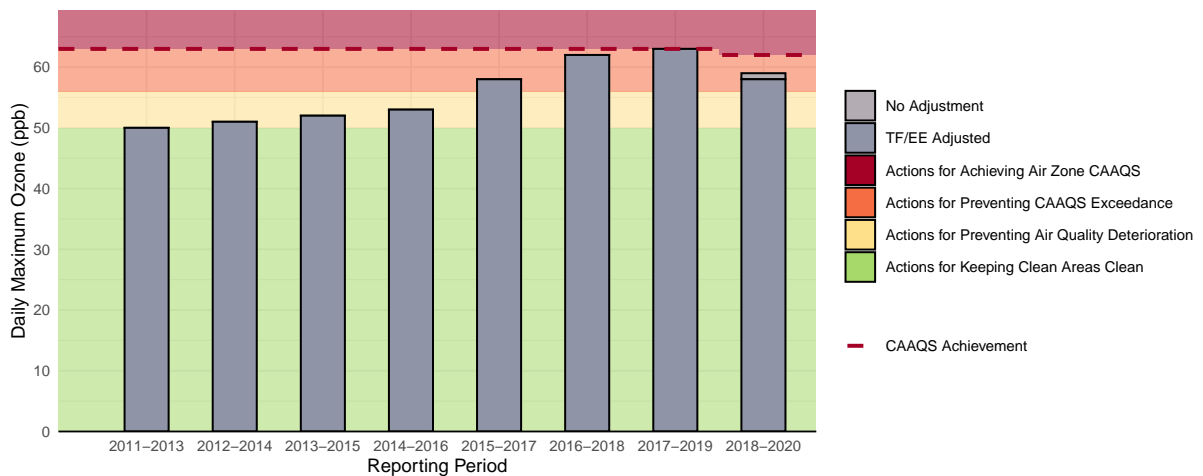


Air Zone: Lower Fraser Valley

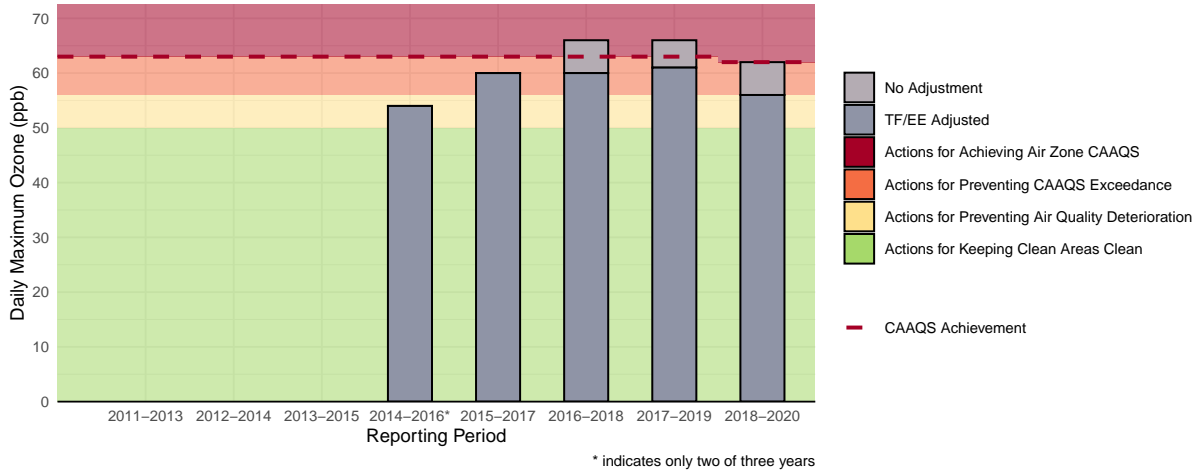
Monitoring Station: Maple Ridge Golden Ears School

Ozone Air Quality Standard: Achieved

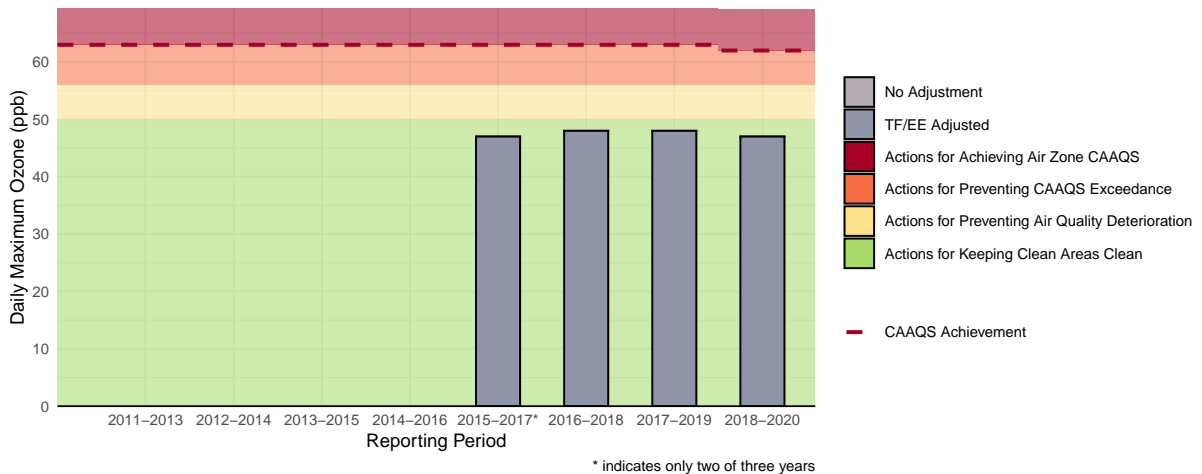
Ozone Metric: 59 ppb (3 year average)



Air Zone: Lower Fraser Valley
Monitoring Station: Mission School Works Yard
Ozone Air Quality Standard: Achieved
Ozone Metric: 62 ppb (3 year average)



Air Zone: Lower Fraser Valley
Monitoring Station: New Westminster Sapperton Park
Ozone Air Quality Standard: Achieved
Ozone Metric: 47 ppb (3 year average)

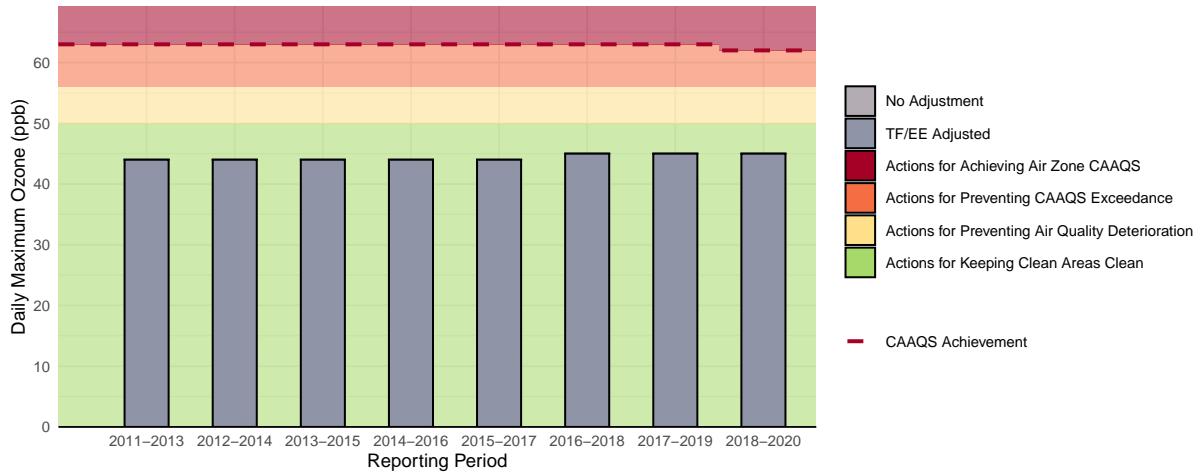


Air Zone: Lower Fraser Valley

Monitoring Station: North Delta

Ozone Air Quality Standard: Achieved

Ozone Metric: 45 ppb (3 year average)

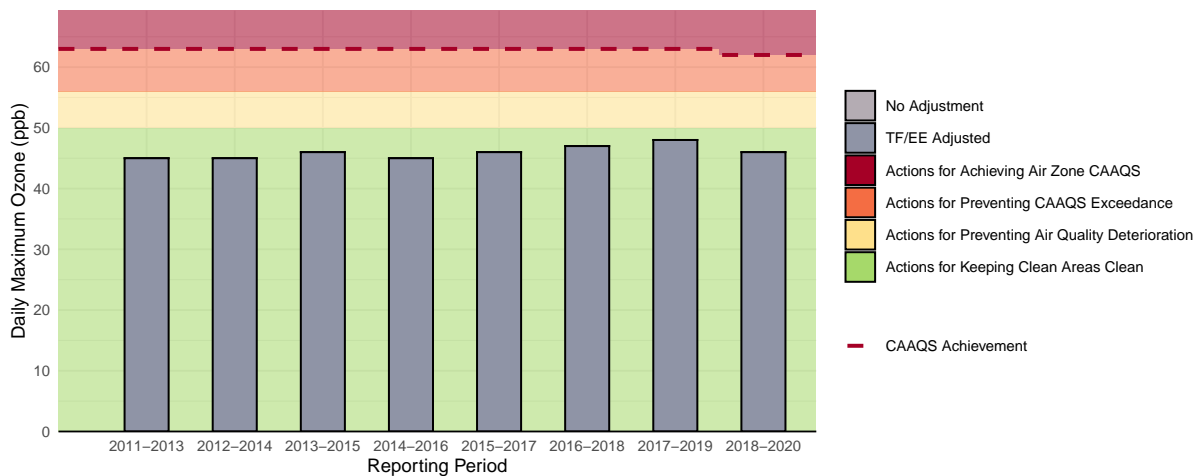


Air Zone: Lower Fraser Valley

Monitoring Station: North Vancouver Mahon Park

Ozone Air Quality Standard: Achieved

Ozone Metric: 46 ppb (3 year average)

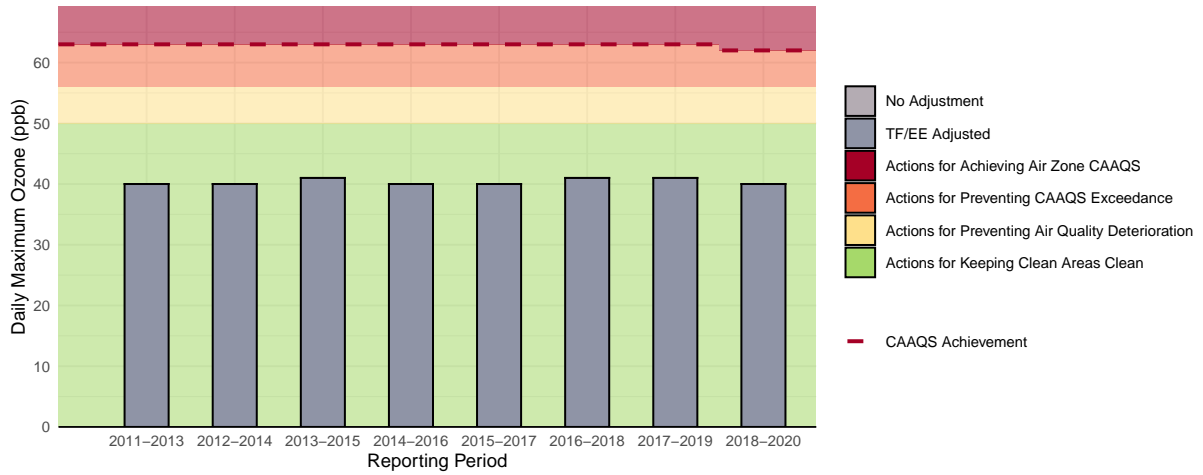


Air Zone: Lower Fraser Valley

Monitoring Station: North Vancouver Second Narrows

Ozone Air Quality Standard: Achieved

Ozone Metric: 40 ppb (3 year average)

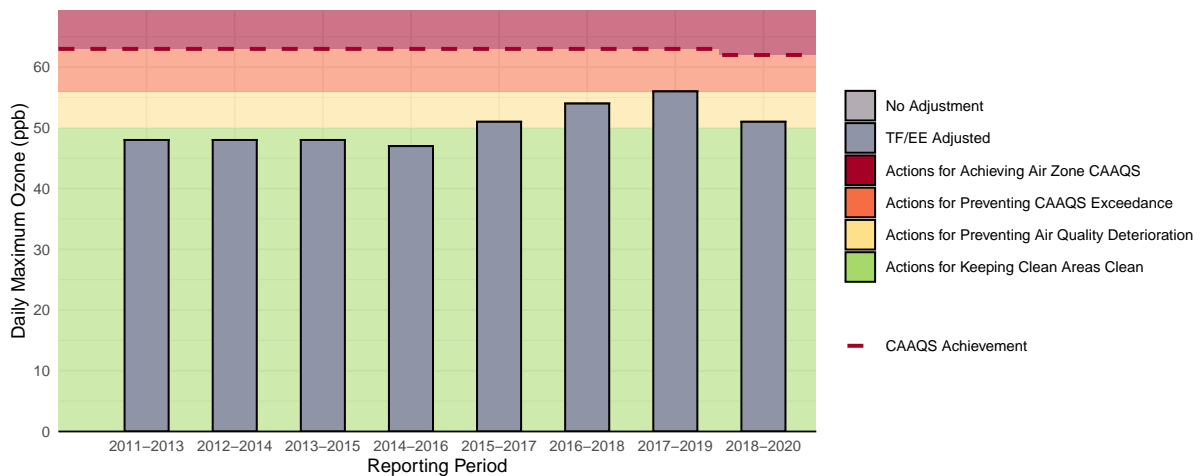


Air Zone: Lower Fraser Valley

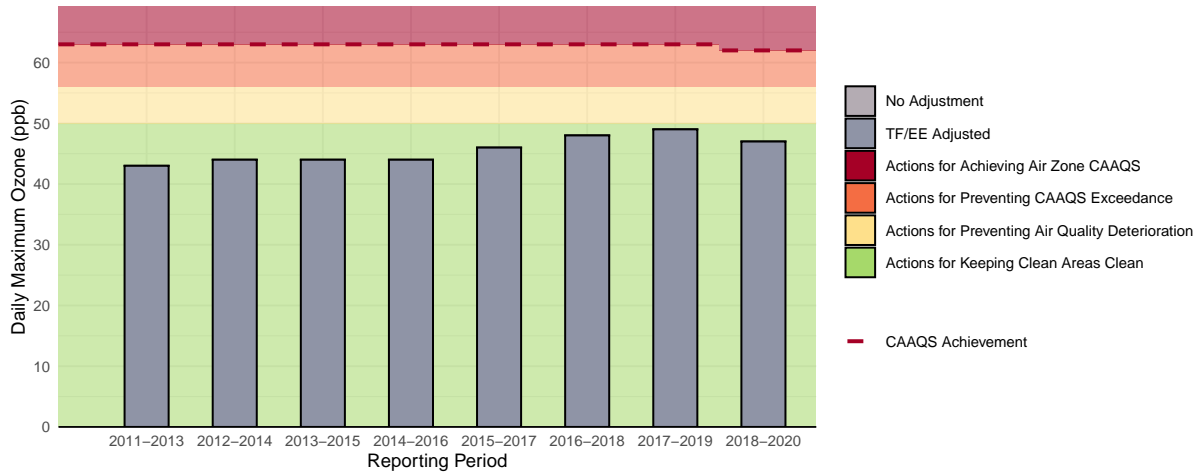
Monitoring Station: Pitt Meadows Meadowlands School

Ozone Air Quality Standard: Achieved

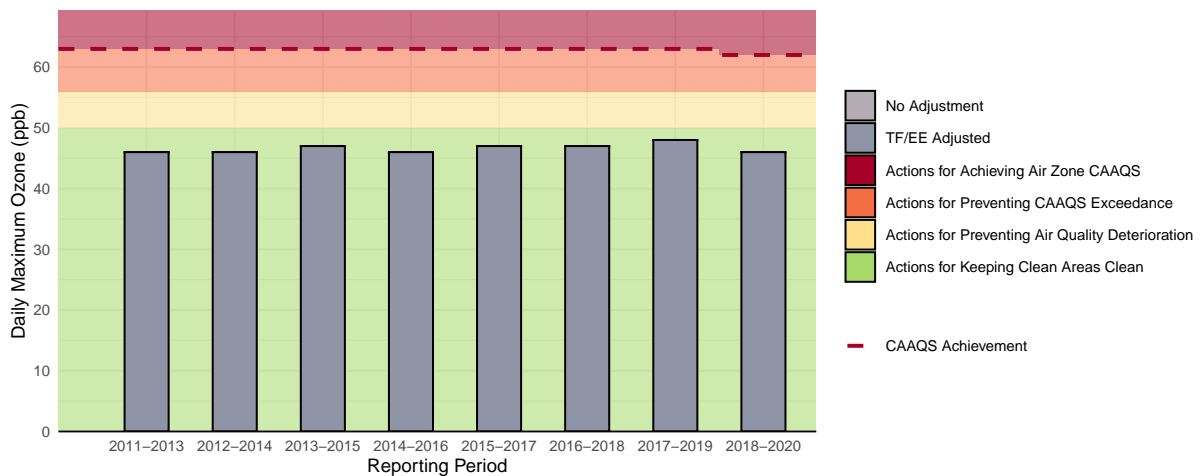
Ozone Metric: 51 ppb (3 year average)



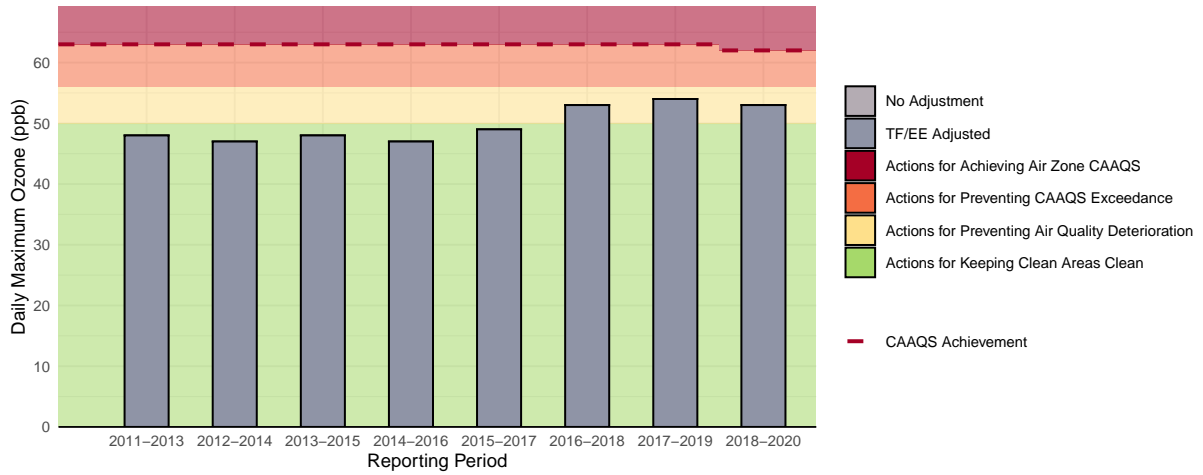
Air Zone: Lower Fraser Valley
Monitoring Station: Port Moody Rocky Point Park
Ozone Air Quality Standard: Achieved
Ozone Metric: 47 ppb (3 year average)



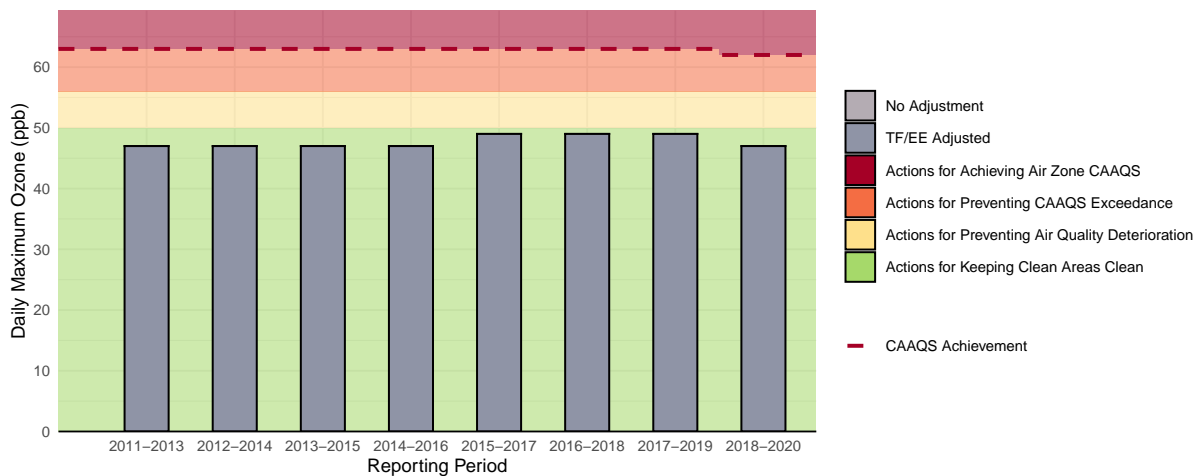
Air Zone: Lower Fraser Valley
Monitoring Station: Richmond South
Ozone Air Quality Standard: Achieved
Ozone Metric: 46 ppb (3 year average)



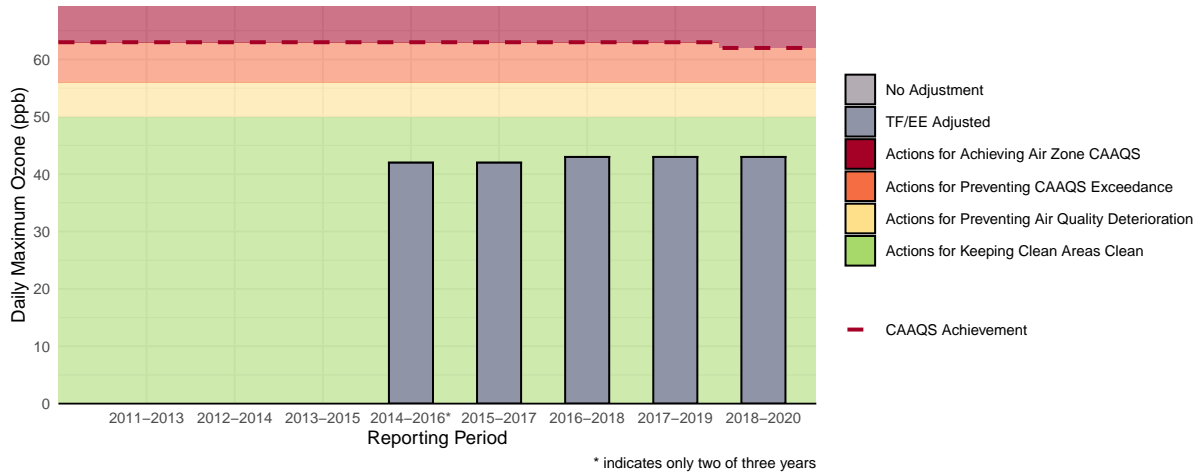
Air Zone: Lower Fraser Valley
Monitoring Station: Surrey East
Ozone Air Quality Standard: Achieved
Ozone Metric: 53 ppb (3 year average)



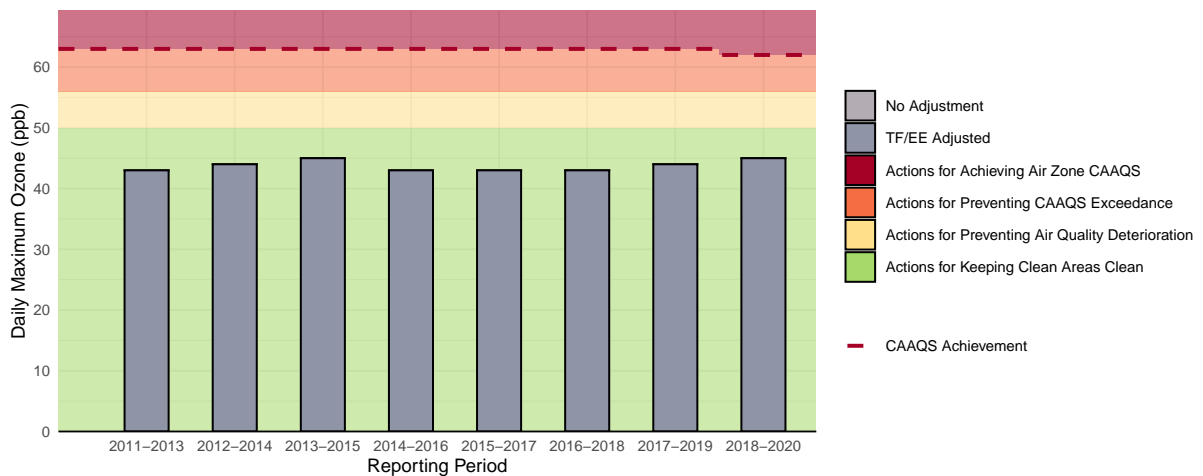
Air Zone: Lower Fraser Valley
Monitoring Station: Tsawwassen
Ozone Air Quality Standard: Achieved
Ozone Metric: 47 ppb (3 year average)



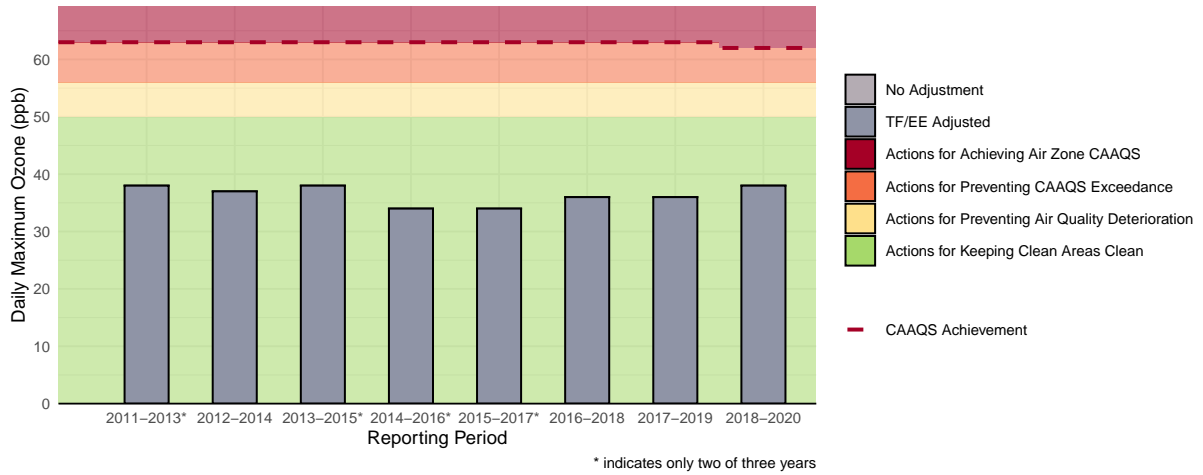
Air Zone: Lower Fraser Valley
Monitoring Station: Vancouver Clark Drive
Ozone Air Quality Standard: Achieved
Ozone Metric: 43 ppb (3 year average)



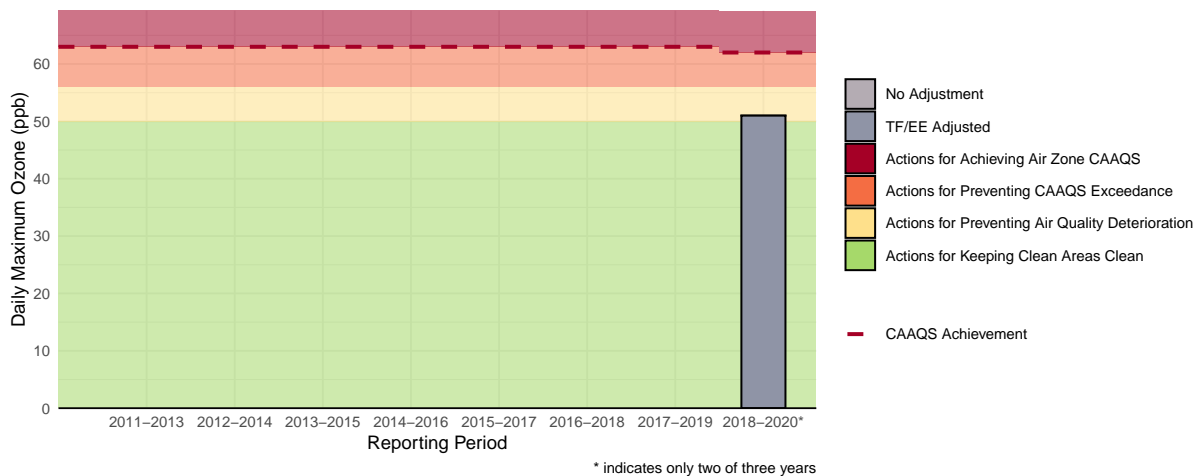
Air Zone: Lower Fraser Valley
Monitoring Station: Vancouver International Airport #2
Ozone Air Quality Standard: Achieved
Ozone Metric: 45 ppb (3 year average)



Air Zone: Lower Fraser Valley
Monitoring Station: Vancouver Robson Square
Ozone Air Quality Standard: Achieved
Ozone Metric: 38 ppb (3 year average)



Air Zone: Northeast
Monitoring Station: Farmington Community Hall
Ozone Air Quality Standard: Achieved
Ozone Metric: 51 ppb (2 year average)

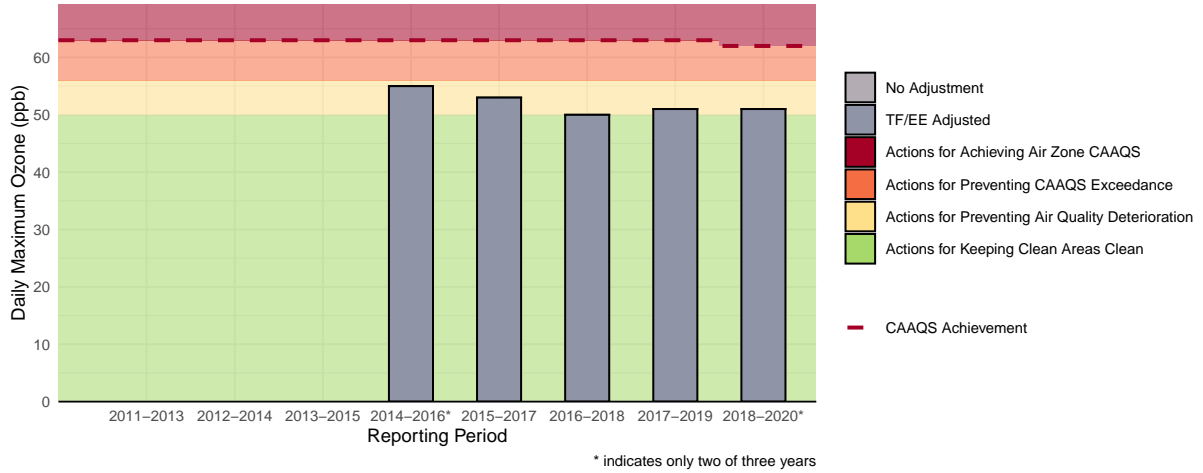


Air Zone: Northeast

Monitoring Station: Fort St John Key Learning Centre

Ozone Air Quality Standard: Achieved

Ozone Metric: 51 ppb (2 year average)

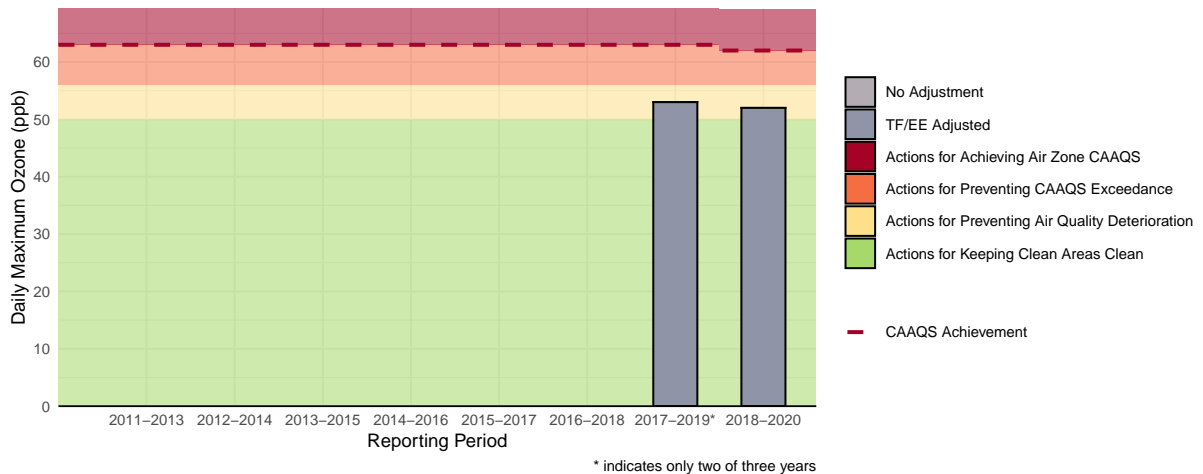


Air Zone: Northeast

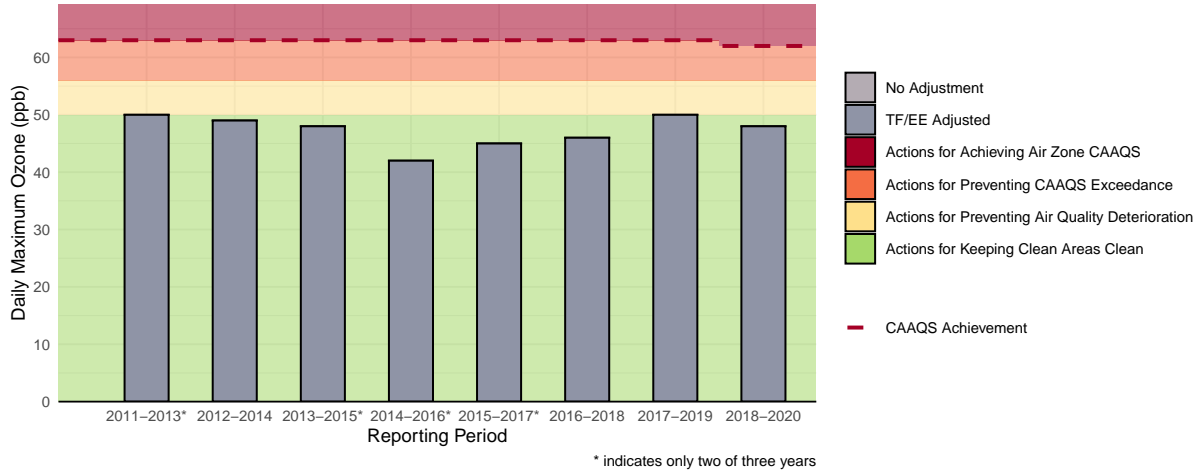
Monitoring Station: Taylor Townsite

Ozone Air Quality Standard: Achieved

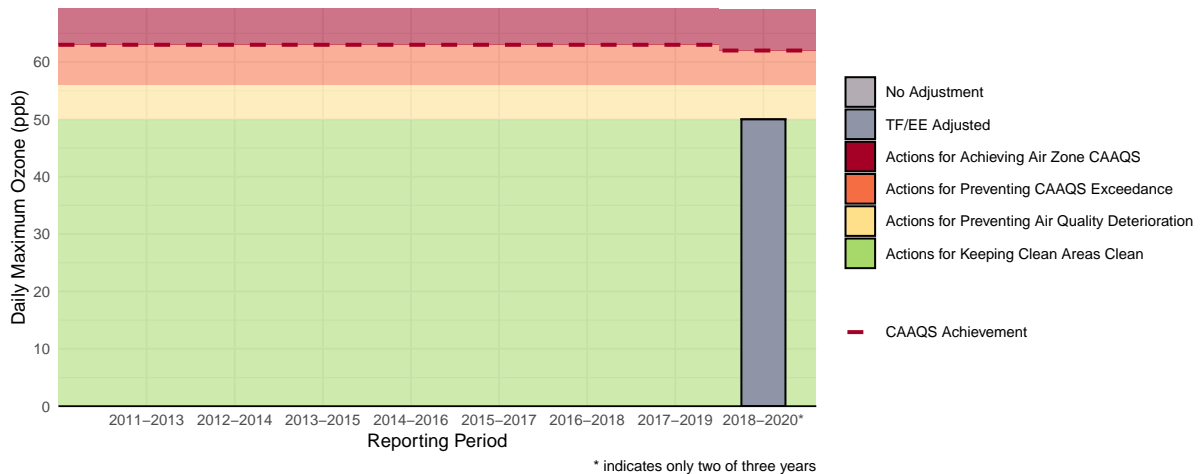
Ozone Metric: 52 ppb (3 year average)



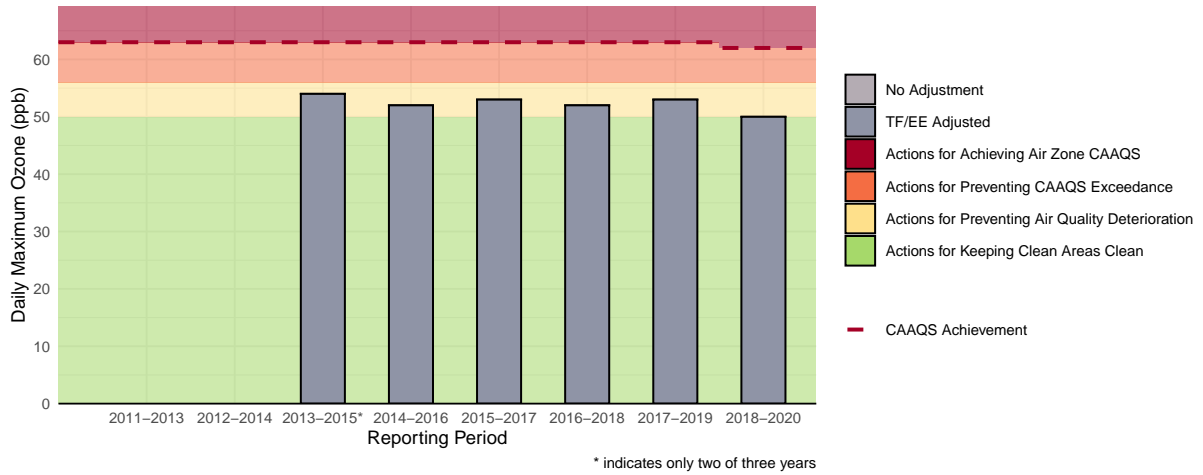
Air Zone: Southern Interior
Monitoring Station: Castlegar Zinio Park
Ozone Air Quality Standard: Achieved
Ozone Metric: 48 ppb (3 year average)



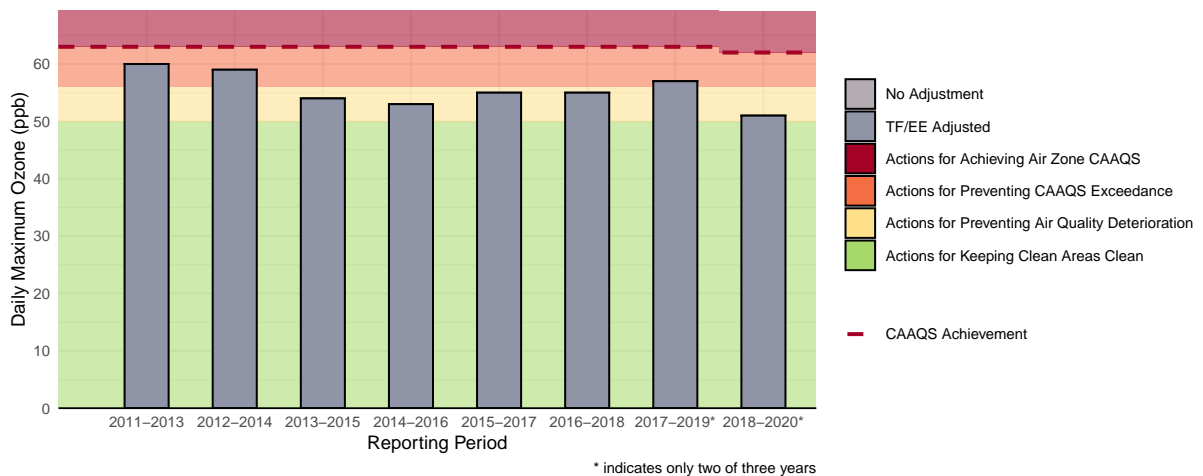
Air Zone: Southern Interior
Monitoring Station: Cranbrook Muriel Baxter
Ozone Air Quality Standard: Achieved
Ozone Metric: 50 ppb (2 year average)



Air Zone: Southern Interior
Monitoring Station: Kamloops Federal Building
Ozone Air Quality Standard: Achieved
Ozone Metric: 50 ppb (3 year average)



Air Zone: Southern Interior
Monitoring Station: Kelowna
Ozone Air Quality Standard: Achieved
Ozone Metric: 51 ppb (2 year average)



Air Zone: Southern Interior

Monitoring Station: Vernon Science Centre

Ozone Air Quality Standard: Achieved

Ozone Metric: 51 ppb (3 year average)

