

Introduction

This is the second air quality report for the Northeast Air Zone. Annual air zone reporting is a commitment under the national Air Quality Management System (AQMS). This report describes achievement of the Canadian Ambient Air Quality Standards (CAAQS) for ground-level ozone (O₃) and fine particulates (PM_{2.5}), the associated management levels and recent actions to improve air quality. A province-wide summary can be found at: <http://www.env.gov.bc.ca/soe/indicators/air/>.

Background

The AQMS is the national approach to managing air quality in Canada. Under the AQMS, the CAAQS are developed to drive action to protect human health and the environment. Air zones are areas that exhibit similar air quality characteristics, issues and trends, and that form the basis for monitoring, reporting and taking action on air quality. The Northeast Air Zone (see Figure 1) is one of seven broad air zones across the province. Under the AQMS, progressively more rigorous actions are expected as air quality approaches or exceeds the CAAQS. The level of action is guided by the Air Zone Management Framework outlined in Table 1.



Figure 1. Northeast Air Zone.

Table 1. Air zone management framework for ground-level ozone and PM_{2.5}. The CAAQS define the upper threshold, separating the “red” and “orange” management levels.

Management Level	O ₃ (ppb)		PM _{2.5} – Annual (µg/m ³)		PM _{2.5} - 24h (µg/m ³)	
	2015	2020	2015	2020	2015	2020
Red	Actions for Achieving Air Zone CAAQS					
Threshold (CAAQS)	63	62	10	8.8	28	27
Orange	Actions for Preventing CAAQS Exceedance					
Threshold	56		6.4		19	
Yellow	Actions for Preventing Air Quality Deterioration					
Threshold	50		4		10	
Green	Actions for Keeping Clean Areas Clean					

Ozone Levels

Ozone monitoring was initiated in 2015 at the Fort St. John Key Learning Centre. Based on data collected between 2015 and 2016, ozone concentrations at this site reached 54 ppb. This level was below the national standard of 63 ppb.¹

PM_{2.5} Levels

PM_{2.5} refers to inhalable particles up to 2.5 micrometres in diameter. PM_{2.5} monitoring was initiated in 2015 at the Fort St. John Key Learning Centre. Between 2015 and 2016, only one complete year of data was acquired. For this reason, achievement of the national standards (which are based on at least two of three years of data) could not be determined. Based on 2016 data only, a daily concentration of 16 µg/m³ and an annual mean of 5.6 µg/m³ were obtained,² indicating that PM_{2.5} levels at this site are generally below those of the national standards of 28 and 10 µg/m³, respectively.

Air Zone Management Levels

Air zone management levels are assigned on the basis of the highest concentrations within an air zone, excluding contributions from transboundary flows (TF) and exceptional events (EE) such as wildfires. This is done so that long-term management strategies are not developed on the basis of events that are beyond local or provincial control.

In the Northeast Air Zone, wildfires are the primary contributor to TF/EE. The methodology for identifying wildfire-influenced data is provided in Appendix I.

Table 2 summarizes ozone concentrations as measured and after consideration of any TF/EE influences. No TF/EE influences were identified. Consequently, the Northeast Air Zone is assigned a “yellow” management level. This indicates that any ozone-related actions should focus on preventing further air quality deterioration.

There was insufficient data to assign PM_{2.5} management levels for the current reporting period. It is expected that PM_{2.5} management levels will be assigned in the 2015-2017 air zone report.

¹ Concentrations based on 4th highest daily 8-hour maximum, averaged over three years (2014-2016).

² The 24-hour concentration is based on the annual 98th percentile of 24-hour values. The annual mean concentration is based on the annual average of 24-hour values.

Table 2. Summary of ozone concentrations as measured and air zone management levels for the Northeast Air Zone (based on 2015-2016 data).

Location	No. Valid Years	4 th Highest Daily 8-hour Maxima (ppb)		Air Zone Management Level
		As Measured	TF/EE Influences Removed	
Fort St. John	2	54	54	Goal: Preventing Further Deterioration

Actions to Protect Air Quality

Air quality activities in the Northeast Air Zone have largely focussed on characterizing air quality in this region and identifying potential impacts from the oil and gas sector. As part of the Northeast Air Quality Monitoring Project, surveillance monitoring has been conducted in a number of smaller communities that are closer to oil and gas production. For more information on the Northeast Air Quality Monitoring Project, see: <http://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-quality/measuring/monitoring-ne-bc>.

A description of other activities underway in B.C. air zones can be found in the “Air Zone Management Response for British Columbia” (see: www.gov.bc.ca/bcairquality).

Appendix I – Approach to Identify Wildfire-influenced Data

Summertime air quality in British Columbia is periodically influenced by wildfire smoke – from local fires as well as long-range transport from outside of the province. The wildfire season in B.C. typically occurs between May and September, when warm and dry conditions prevail.

A myriad of different pollutants are emitted from wildfires, including PM_{2.5} and gases that include nitrogen oxides and volatile organic compounds (VOCs) that can react in the atmosphere to form ground-level ozone and additional PM_{2.5}.

Given that smoke-affected areas may be extensive, and that smoke may linger for days before being fully dispersed from an airshed, the current analysis has focussed on those periods when wildfire smoke may have contributed to an exceedance of the CAAQS levels for PM_{2.5} levels. Criteria used to flag and evaluate wildfire-influenced data included the following:

- 24-hour PM_{2.5} concentrations exceeded the CAAQS level of 28 µg/m³ or 8-hour daily maximum ozone levels exceeded the CAAQS level of 63 ppb between May and September,
- Wildfires of interest were identified based on data from B.C. Wildfire Management Branch,
- Wildfire smoke advisories had been issued by the Ministry of Environment & Climate Change Strategy during the period of interest,
- MODIS satellite images indicated smoke impacts over the region,
- Multiple monitoring sites in the area of concern exhibited similar air quality characteristics, suggesting a common source or contributing source, and
- Modelling studies identify enhanced pollutant concentrations due to wildfire smoke.