



Yukon Air Zone Report 2014

For the years 2012-2014

Summary

This is the first air zone report for the Yukon Air Zone. Air zone reports are a commitment of the Government of Yukon under the national Air Quality Management System (AQMS) to annually report on the achievement of the Canadian Ambient Air Quality Standards (CAAQS) for ground-level ozone and fine particulate matter (PM_{2.5}). Meeting objectives under the Air Zone Management Framework of the AQMS will ensure that poor outdoor air quality improves and that good air quality is maintained. The Air Zone Management Framework defines four colour-coded Management Levels associated with a different intensity of management action and planning. Ambient air quality for PM_{2.5} and ozone is measured against the CAAQS to determine Management Levels for the air zone.

This report summarizes the CAAQS achievement status and management levels for the Yukon Air Zone for fine particulate matter and ground-level ozone concentrations under the Air Zone Management Framework for the year 2014. Yearly metrics are based on the preceding three years of air quality data; thus, this report uses data from 2012 to 2014 to calculate the metric. The 2014 metric for PM_{2.5} (24-hour) is 18.9 µg/kg³, and 5.9 µg/kg³ for PM_{2.5} (annual). The achieved Management Level for PM_{2.5} is Yellow, for which the objective is to improve air quality using early and ongoing action for continuous improvement. The ground-level ozone metric is 51.4 ppb, which also falls within the Yellow Management Level. The two metrics for the Yukon Air Zone were well below the Canadian Ambient Air Quality Standards.



Introduction: Air Quality Monitoring in Yukon

Environment Yukon monitors air quality in Yukon as part of the National Air Pollution Surveillance (NAPS) program and Canada's Air Quality Management System (AQMS). As part of this monitoring program, Environment Yukon operates one air quality station located in downtown Whitehorse that collects real-time data year-round to assess and track ambient air quality levels of various pollutants.

Canadian Ambient Air Quality Standards

In 2012, the Canadian Council of Ministers of the Environment (CCME) committed to implementing a new air management system, the Air Quality Management System; the AQMS provides a framework to protect and improve ambient air quality across Canada. The Canadian Ambient Air Quality Standards, the driver for air quality management under the AQMS, are numerical values (metrics) of ambient air pollutant concentrations. Each provincial/territorial jurisdiction is responsible for measuring, reporting and managing their air zones to ensure that they meet the CAAQS. The CAAQS are voluntary objectives under the *Canadian Environmental Protection Act* and replace the Canada-wide Standards previously used for ozone and PM_{2.5} by setting stricter targets and introducing an annual standard for PM_{2.5}. Fine particulates and ground-level ozone are outdoor pollutants of concern associated with short- and long-term effects to human and environmental health.





Air Zone Management, Threshold Values and Actions

Air zone management is a mechanism to help provincial/territorial jurisdictions achieve continuous improvement in air quality; prevent air quality deterioration; and ensure the CAAQS are not exceeded. The CAAQS are the drivers for four colour-coded Management Levels (Table 1). The Management Levels are separated by threshold values (a specific concentration of a pollutant) and require progressively more rigorous management and actions as air quality within an air zone approaches or exceeds the CAAQS.¹

An air zone metric for each pollutant is calculated to determine the achievement status of a given standard and the associated management level for the air zone. The calculated annual metric for each pollutant is averaged over a three-year period (i.e. the reported value is a three-year running mean). This report therefore reports on data collected from 2012 to 2014, though the reported metric is assigned to the year 2014. The metric is then associated with a Management Level for each pollutant.

¹ Guidance documents and information on the CAAQS, procedures for calculating metrics for each pollutant, and determining Management Levels are available on the CCME website: www.ccme.ca/en/resources/air/aqms.html.

Table 1. Air Management Threshold Values and Actions, based on 2015 CAAQS

Management Level	Management Actions	Air Management Threshold Values		
		Ozone (ppb)	PM _{2.5} 24-hour (µg/m ³)	PM _{2.5} Annual (µg/m ³)
Red 	Actions for achieving air zone CAAQS	63	28	10
Orange 	Actions for prevention CAAQS exceedances	56	19	6.4
Yellow 	Actions for preventing air quality deterioration	50	10	4
Green 	Actions for keeping clean areas clean	0	0	0

The Yukon Air Zone

Under the AQMS, air zones are the basis for monitoring, reporting and taking action on air quality. Air zones are areas that exhibit similar air quality characteristics, issues and trends. In Yukon, there is a single air zone (the “Yukon Air Zone”) for which air quality management and actions are determined under the AQMS.




Major anthropogenic air emissions sources in the Yukon Air Zone include emissions from fossil fuel burning (from transportation and power generation), wood burning, waste disposal (incineration and open burning), and fugitive dust from roads, quarrying and construction. Natural sources of particulate matter include forest fires, wind-blown dust, pollen and transboundary flows and exceptional events.

Results: Yukon Air Zone in 2014

In 2014, the Yukon Air Zone's pollutant metrics were all below CAAQS exceedance thresholds (Table 2). For particulate matter, the Management Level is based on the higher of the achieved Management Levels of the PM_{2.5} annual and 24-hour metrics; for 2014, both metrics achieved a Yellow Management Level. There were two days in 2014 that had daily mean values of particulate matter concentrations exceed the CAAQS of 28 µg/m³.

For ozone, the achieved Management Level is also Yellow. There were no days throughout 2014 that exceeded the 63 ppb CAAQS for ozone.

Table 2. Yukon Air Zone Metric Values

	2014 Results ²	Management Level	Management Action
PM _{2.5} - 24-hour (µg/m ³)	18.9		Actions for preventing air quality deterioration
PM _{2.5} – Annual (µg/m ³)	5.9		Actions for preventing air quality deterioration
Ozone - 8-hour average (ppb)	51.4		Actions for preventing air quality deterioration

Influence of transboundary flows and exceptional events

Ambient air quality can be influenced by emission sources that are outside of Yukon; these influences are called transboundary flows and exceptional events (TF/EE). Transboundary flows are defined as the transport of air pollution across provincial/territorial boundaries, or between Canada and the United States. Exceptional events are events that contribute to air pollution in an air zone that are not reasonably controllable or preventable; are caused by human activities which are unlikely to recur; or are natural sources.

If the influence of a TF/EE has impacts or is suspected to have impacts on the achievement of a given Management Level, CCME guidance³ indicates that these influences should be considered when

² 2014 results for all three reporting metrics are based on two years of data instead of the recommended three years due to data loss.

³ Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (Available online at www.ccme.ca/files/Resources/air/aqms/pn_1483_gdad_eng.pdf).



implementing management actions. Although Yukon generally has a high standard of air quality, it is still susceptible to pollution from TF/EEs.

A preliminary weight of evidence analysis was conducted for the 2014 ozone metric to investigate whether the result may have been influenced by TF/EEs and tilted the metric into the Yellow Management Level. Procedures outlined by CCME guidance⁴ indicated that elevated levels of ozone during the first week of May 2014 (May 1-7) may have been influenced by a TF/EE. However, removal of this data from the calculation of the metric yielded a result at the same Management Level (Yellow); therefore, the investigation into the influence of TF/EEs is inconclusive. Further, elevated levels of ozone at high latitudes

Air Zone Management

For the Yukon Air Zone in 2014, the Management Level is Yellow. Environment Yukon continues to strive to ensure that monitoring devices are operational to collect data to sufficiently characterize air quality trends and influences. It should be noted that yearly reporting requirements under the AQMS includes three-year running averages, but that insufficient data for this reporting period has resulted in the metrics being reported with data from two of three years. While two years of data is adequate to calculate metrics according to CCME guidelines, the loss of data may have an impact on overall trends.

Environment Yukon is striving to work with stakeholders to improve awareness in the public of air quality. Yukon government implemented the Air Quality Health Index in June 2016 which was accompanied by a public education campaign regarding the importance of air quality.

Environment Yukon has also partnered with the Department of Health and Social Services (Government of Yukon) and the City of Whitehorse to monitor fine particulate matter at various sites around Whitehorse to better characterize air quality and particulate matter pollution throughout the topographically diverse area. Data will be used to determine the levels of pollution in various neighbourhoods, and help decision-making on actions to be taken in high-pollutant neighbourhoods.

⁴ Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (Available online at www.ccme.ca/files/Resources/air/aqms/pn_1483_gdad_eng.pdf).