CCME

Canadian Council of Ministers of the Environment

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GUIDANCE DOCUMENT ON AIR ZONE MANAGEMENT

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GLOSSARY

Air Quality Management System (AQMS)	A comprehensive approach for protecting and improving air quality in Canada. AQMS is built on a foundation of intergovernmental collaboration and the engagement of stakeholders and interested parties with an emphasis on transparency and accountability to the public.
Air zone	A finite geographic area used to manage local air quality by the province or territory in which it is located.
Airshed	A broad geographic area that encompasses a number of air zones and may cross provincial, territorial, and international boundaries.
Air zone management framework (AZMF)	A framework to manage air quality in air zones. It includes four colour-coded management levels which are associated with a suite of monitoring, reporting and management actions that become progressively more rigorous as air pollutant concentrations approach or exceed the CAAQS.
Canadian Ambient Air Quality Standards (CAAQS)	Health and environmental-based air quality objectives to further protect human health and the environment and to provide the drivers for air quality improvement across the country.
CAAQS metric value	The measured concentrations of an air pollutant calculated in the statistical form of the CAAQS.
CAAQS reporting station	An air quality monitoring station designated to report on the achievement status of the CAAQS by the province or territory in which it is located. All CAAQS reporting stations must meet or exceed the quality assurance and quality control procedures of the National Air Pollution Surveillance (NAPS) program.
Continuous improvement (CI)	Remedial and preventative actions to reduce emissions from anthropogenic sources toward the long-term goal of reducing overall ambient concentrations of pollutants.
Keeping clean areas clean (KCAC)	Preventative measures intended to avoid or minimize increases in overall ambient concentrations of pollutants in air zones in the green management level.

ACRONYMS

AQMS	Air Quality Management System
AZMF	air zone management framework
BLIERs	base-level industrial emissions requirements
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CEPA 1999	*Canadian Environmental Protection Act, 1999*
CI/KCAC	Continuous improvement/keeping clean areas clean
EE	exceptional events
GDAD	guidance documents on achievement determination (for each CAAQS)
GDTFEE	Guidance Document on Transboundary Flows and Exceptional Events for Air Zone Management, 2019
NAPS	National Air Pollution Surveillance
$PM_{2.5}$	airborne particulate matter less than or equal to 2.5 micrometers in aerodynamic diameter, also called fine particulate matter
ppb	parts per billion (by volume)
QA/QC	quality assurance/quality control
TF	transboundary flows
µg/m³	micrograms per cubic metre

1.0 INTRODUCTION

Air quality impacts all Canadians and affects many aspects of our lives and our society, including human health, the natural environment, buildings and infrastructure, crop production, and the economy. Federal, provincial and territorial governments share responsibility for air quality management. Under the Canadian Council of Ministers of the Environment (CCME), federal, provincial, and territorial governments work collaboratively to improve air quality by implementing the Air Quality Management System (AQMS)[1].

This document supersedes the 2012 Guidance Document on Air Zone Management.

Under AQMS, each province and territory is responsible for delineating its territory into one or more air zones. Air zones provide a defined area for stakeholders, other interested parties and governments to work together to improve local air quality and maintain air pollutant concentrations below the Canadian Ambient Air Quality Standards (CAAQS).

This guidance document outlines a structured approach for federal, provincial and territorial governments in managing air quality in air zones under AQMS. The objectives of this document are to:

- provide an understanding of the air zone management framework (AZMF)
- clarify the roles of government regarding air zone management
- provide guidance for assigning management levels to air zones and the related monitoring, reporting and management actions
- formalize the principle that CAAQS are not “pollute-up-to levels” and encourage governments to take action to improve air quality, considering that some pollutants can affect human health even at concentrations below the standards
- encourage actions that prevent deterioration in air quality, promote continuous improvement (CI), and encourage keeping clean areas clean (KCAC) in air zones with pollutant levels well below the CAAQS.

More information on AQMS and guidance on its implementation is available on ccme.ca.

2.0 AIR QUALITY MANAGEMENT SYSTEM

AQMS provides a comprehensive approach for collaborative actions to improve air quality across Canada to further protect the health of Canadians and the environment. Key elements of AQMS include the following:

1. Air zones – geographical areas that are used to manage local air quality within the provinces and territories in which they are located.

[1] Although Québec supports the general objectives of AQMS, it will not implement the System since it includes federal industrial emission requirements that duplicate Québec's Regulation. However, Québec is collaborating with jurisdictions on developing other elements of the system, notably air zones and airsheds.

2. Airsheds – broad geographic areas that encompass a number of air zones and may cross provincial, territorial, and international boundaries. They provide a framework for interjurisdictional collaboration to address transboundary air quality issues.
3. CAAQS – health and environmental-based air quality objectives to further protect human health and the environment and to provide the drivers for air quality improvement across the country.
4. AZMF – a framework to manage air quality in air zones.
5. Base-level industrial emissions requirements (BLIERs) – emission requirements that are intended to apply to major industrial sectors or equipment types to ensure that significant industrial sources achieve a good base-level of performance.
6. Mobile sources – work that builds on the existing range of federal, provincial and territorial initiatives aimed at reducing emissions from mobile sources.

2.1 Continuous Improvement and Keeping Clean Areas Clean

Several principles underpin AQMS including CI and KCAC.

CI refers to remedial and preventative actions to reduce emissions from anthropogenic sources, toward the long-term goal of reducing overall ambient concentrations of pollutants.

KCAC refers to preventative measures that are intended to avoid or minimize increases in overall ambient concentrations of pollutants in air zones that are assigned a green management level.

The guiding principles of CI/KCAC are intended to ensure that air quality does not deteriorate but is maintained or improved to the extent practicable. Maintaining or improving air quality minimizes risk to human health and the environment for the benefit of future generations. The CI/KCAC principles are inherently incorporated in the AZMF.

3.0 CANADIAN AMBIENT AIR QUALITY STANDARDS

All CAAQS consist of three inter-related elements:

1. an averaging time
2. a concentration “standard” (or “numerical value”) associated with the averaging time
3. the statistical form for the standard.

The CAAQS as of the date of publication of this document are listed in Appendix 1.

The averaging time refers to the averaging period over which the corresponding standard applies. The statistical form describes the calculation method for the specific concentration which must be used for comparison to the standard to determine if the concentrations measured at a monitoring station exceeded the standard. For example, the 1-hour SO_2 standard of 70 ppb (for 2020) means that the standard applies to 1-hour average SO_2 concentrations and the statistical form of the standard means that the concentration to use to determine if 70

ppb was exceeded at a monitoring station is the 3-year average of the annual 99th percentile of the daily-maximum 1-hour average concentrations measured at the station.

To simplify terminology, the concentrations measured at a monitoring station calculated in the statistical form of a standard are referred to as "CAAQS metric values" or simply "metric values." A CAAQS is achieved at a monitoring station if the corresponding metric value is less than or equal to the standard, otherwise it is exceeded. To ensure that consistent procedures are used to calculate metric values, CCME publishes GDADs for each of the pollutants that have CAAQS. These documents will be available on the CCME web site as they are developed. Metric values are also used to determine the management level for air zones; this is discussed in sections 4 and 5 of this document.

Text Box 1 provides an example for the calculation of metric values for the 1-hour SO_2 CAAQS. The 3-year period for this example is 2018-20 and this implies that it is the 2020 standard of 70 ppb which applies. The 99th percentile of the measured daily-maximum 1-hour average SO_2 concentrations were first calculated for each station and for each year in the 3-year period 2018-20 based on the procedures specified in the GDAD for SO_2. The 3-year average of the annual 99th percentiles were then calculated and rounded as specified in the GDAD, and these rounded averages are the 1-hour CAAQS metric values which are used for comparison to the standard of 70 ppb. For the 3-year period 2018-20, the SO_2 1-hour CAAQS for 2020 was achieved at Station A (since the metric value of 44 ppb is less than the standard of 70 ppb) and exceeded at Station B.

Text Box 1: Example for the calculation of the SO_2 1-hour CAAQS metric value

	Annual 99th percentile of the SO_2 Dmax 1-hour		
	2018	**2019**	**2020**
Station A	39.4 ppb	55.6 ppb	38.0 ppb
Station B	92.7 ppb	85.6 ppb	70.5 ppb

	3-year average of the annual 99th percentile	1-hour SO_2 CAAQS metric value for 2018-2020
Station A	(39.4+55.6+38.0)÷3 =133÷3 = 44.333 ppb	44 ppb
Station B	(92.7+85.6+70.5)÷3 =248.8÷3=82.933 ppb	83 ppb

For most pollutants CAAQS were established for more than one averaging time, as shown in Appendix 1, because the effects of some pollutants on health and environment can occur over various exposure times and at various concentrations. For example, SO_2 has both a 1-hour CAAQS and an annual CAAQS.

Federal, provincial and territorial governments work together to develop CAAQS through a consensus-based process with industry stakeholders, non-governmental health and environmental organizations, and Indigenous organizations. CAAQS are designed to become

increasingly more stringent over time and periodically reviewed to ensure continuous improvement to further protect the health of Canadians and the environment. Once endorsed by CCME, the federal government establishes the CAAQS as environmental quality objectives under sections 54 and 55 of the *Canadian Environmental Protection Act, 1999*.

3.1 Implementation of the CAAQS

AQMS recognizes jurisdictional flexibility as a key principle that enables jurisdictions to implement the CAAQS in a manner that is consistent with their specific management practices and circumstances. Jurisdictions may consider a number of principles and guidelines as they implement the CAAQS such as[2]:

- CAAQS are intended to drive continuous improvement in air quality and should not function as "pollute-up-to" limits.
- While CAAQS are established to further protect health and the environment, measures mandated to achieve the CAAQS and associated management levels should take into account technical achievability, practicality, and implementation costs.
- CAAQS are intended to be used in air zones as standards for ambient air quality management, consistent with the information presented in this guidance document as well as other CCME guidance, including the AQMS Roles and Responsibilities document, GDADs for each CAAQS and the GDTFEE.
- CAAQS were not developed as facility level regulatory standards. Rather, they are used by provinces and territories to guide air zone management actions intended to reduce ambient concentrations below the CAAQS and prevent CAAQS exceedances.
- Management actions should consider all important sources of air pollution emissions in an air zone. In the context of management actions, provinces and territories have primary regulatory authority governing local aspects of environmental management, including policy frameworks for land-use and resource management, as well as establishing environmental regulations and standards, and issuing permits and authorizations.

Provinces and territories may consult with different stakeholders or interested parties to guide the prioritization and implementation of air zone management actions that are informed by the AZMF discussed in section 4.

4.0 AIR ZONE MANAGEMENT FRAMEWORK

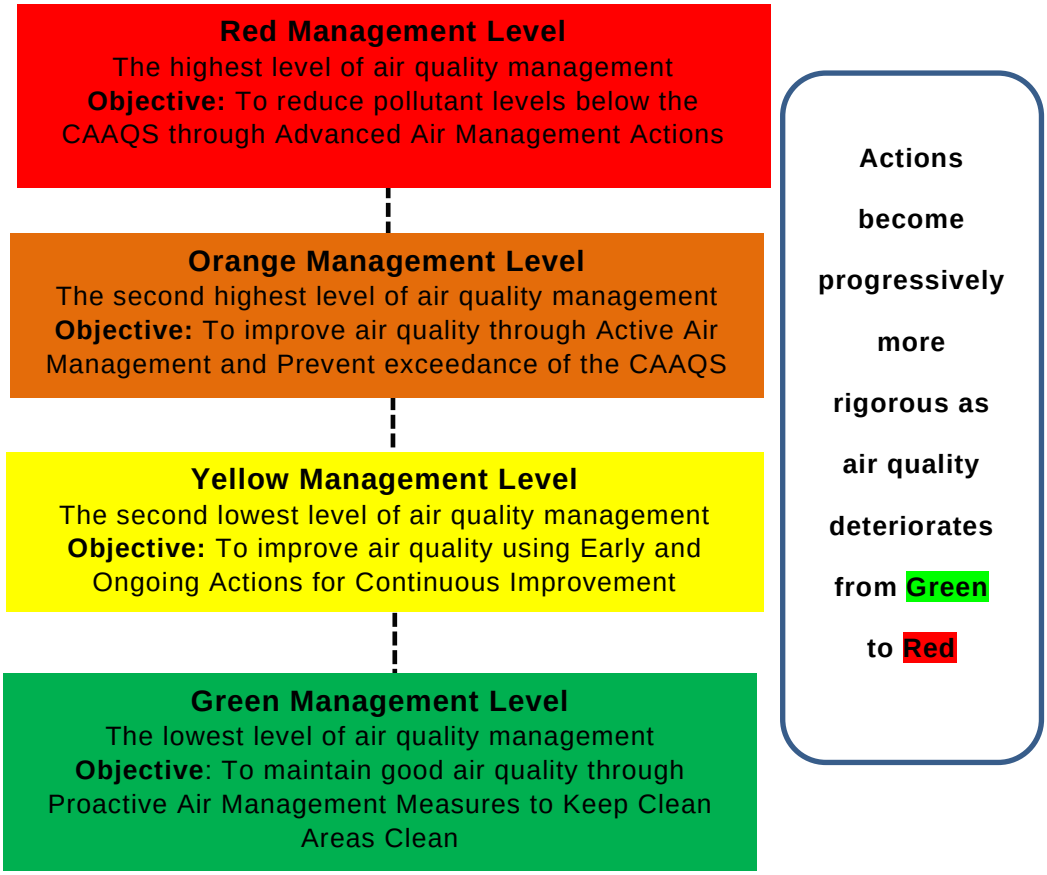
Under AQMS, each province and territory is responsible for delineating air zones in its jurisdiction. Air zones are geographic areas that may be delineated by considering meteorology, wind patterns, topography, level of industrial activity, population density, and other factors that may contribute to similar air quality characteristics and trends in the area.

[2] Although Québec supports the general objectives of AQMS, it did not implement the System since it includes federal industrial emission requirements that duplicate Québec's Regulation. However, Québec is collaborating with jurisdictions on developing other elements of the system, notably air zones and airsheds.

AQMS includes the AZMF which provides guidance to jurisdictions on the level of monitoring, reporting and management actions to implement in air zones depending on the level of prevailing concentrations of air pollutants. The AZMF includes four air quality management categories, or levels, denoted by the colours green, yellow, orange and red. Each of these management levels is associated with a corresponding range of concentrations of air pollutants which were established during the CAAQS development process. The management levels that have been developed as of the date of publication of this guidance are presented in Appendix 2. Prevailing air quality in the red management level corresponds to exceedances of standards, while prevailing air quality in the green management level corresponds to clean air quality.

The structure of the AZMF is outlined in Figure 4-1. Key objectives of the AZMF are KCAC, support CI and prevent the CAAQS from being exceeded. By its very nature, the AZMF stipulates that the CAAQS are not pollute-up-to levels and that proactive actions be taken to prevent CAAQS exceedances. Accordingly, under the AZMF actions become progressively more rigorous as air quality deteriorates from the green to the red management level. The AZMF applies to all air pollutants for which CAAQS have been established. Detailed information on the guidance for the suite of monitoring, reporting and management actions under each management level is provided in section 6.

Figure 4-1: The Air Zone Management Framework



5.0 ASSIGNING THE MANAGEMENT LEVEL TO AIR ZONES

As mentioned in section 4, under AZMF provinces and territories assign management levels to their air zones for each of the pollutants with CAAQS. In the simplest case, assigning the management level to an air zone essentially involves determining which management level the highest CAAQS metric values fall into, and then assigning to the air zone that management level. The next two sections provide detailed procedures for assigning management levels. In assigning management levels, jurisdictions have the options of considering the influence of transboundary flows (TF) and exceptional events (EE). Information on the consideration for TF-EE influences can be found in the GDTFEE.

5.1 For Pollutants with a Single CAAQS

Pollutants with a single CAAQS are pollutants for which CAAQS have been established for a single averaging time. For example, ozone CAAQS have been established only for an 8-hour averaging time (as of the date of publication of this guidance). The main steps for assigning managements level to air zones for CAAQS with a single averaging time are provided in Table 5-1. Specifically note that management levels are to be assigned based on the highest metric value in the air zone.

Table 5-1: Assigning the management level for pollutants with a single CAAQS

	Action
Step 1	Calculate the actual CAAQS metric value[3] for each reporting station in the air zone.
Step 2	Optional – consider influences of TF-EE and calculate the (TF-EE) adjusted metric values[4] as applicable.
Step 3	Select the highest metric value in the air zone – including both the actual metric values for stations not influenced by TF-EE, and the adjusted metric values for stations influenced by TF-EE.
Step 4	Determine in which management level the highest metric value falls by comparing the highest metric value to the management levels provided in Appendix 2.
Step 5	Assign to the air zone the colour-coded management level determined in Step 4

Table 5-2 provides an ozone example for assigning management levels to air zones using the steps in Table 5-1. The ozone management levels are presented in Table A2-1 in Appendix 2. The 3-year period for this example is 2019-21, meaning that it is the 2020 ozone management levels that apply.

[3] *Actual* CAAQS metric values are those calculated based on *all* measured concentrations.

[4] *Adjusted* CAAQS metric values are those calculated after the removal of concentrations found to be influenced by TF-EE.

Table 5-2: Example for assigning the ozone management level to air zones

Air Zone	CAAQS reporting station	Actual metric value (ppb)	Adjusted metric value after consideration of TF-EE (ppb)	Highest metric value in air zone (ppb)	Air zone management level
A	1	61	Not applicable	61	**Orange**
B	1	75	63	63	**Red**
	2	58	51		
	3	54	Not applicable		

In this example, Air Zone A has only one CAAQS reporting station and the actual metric value (before consideration of TF-EE) is 61 ppb. Analyses indicated that this station was not influenced by TF-EE, and this implies that the actual metric value is used to determine the ozone management level. The metric value of 61 ppb falls in the orange level (Table A2-1) and therefore Air Zone A is assigned the orange management level.

Air zone B has three reporting stations. The actual metric values are 75, 58 and 54 ppb respectively. Analyses indicated that the first and second stations were influenced by EE while Station 3 was not influenced by TF-EE. Consideration of EE leads to adjusted metric values of 63 ppb for Station 1 and 51 ppb for Station 2. With these adjusted metric values, and the actual metric value for station 3, the highest metric value is now 63 ppb and this value falls in the red level. Air Zone B is therefore assigned the red management level for ozone.

5.2 For Pollutants with Multiple CAAQS

Pollutants with multiple CAAQS are pollutants for which CAAQS have been established for more than one averaging time. For example, nitrogen dioxide (NO_2) CAAQS have been established for a 1-hour and annual averaging times. For these pollutants, only a single management level will be assigned to the air zone, corresponding to the highest of the management level associated with each averaging time.

The steps for assigning the management level to air zones for pollutants with multiple averaging times essentially involves first determining a management level associated with each averaging time based on steps 1-4 in Table 5-1, and then assigning to the air zone the highest of these management levels.

Table 5-3 provides a NO_2 example for assigning the management level for pollutants with multiple CAAQS. For this example, a management level associated with each averaging time

was first determined by applying steps 1-4 in Table 5-1. The air zone was next assigned the higher of the 1-hour and annual management levels.

Table 5-3: A NO_2 example for assigning the management level for pollutants with multiple CAAQS

Air Zone	1-hour CAAQS management level	Annual CAAQS management level	NO_2 management level assigned to air zone
A	Green	Yellow	Yellow
B	Red[5]	Orange	Red
C	Orange	Green	Orange

6.0 GUIDANCE ON ACTIONS WITH EACH MANAGEMENT LEVEL

Table 6-1 at the end of this section provides guidance for the suite of monitoring, reporting and management actions that are associated with each management level. Jurisdictions can help improve air quality by developing and implementing an air quality management plan for a given pollutant based on the assigned management level. These plans:

- should consider the potential for co-benefits of multiple pollutant reduction programs
- should consider interactions between air pollutants to determine where a decrease in one air pollutant may result in increased concentrations of another air pollutant
- may engage a broad range of participants, communities, health and environmental organizations and Indigenous organizations to ensure that all participants are represented and have the opportunity to contribute to improving air quality.

Jurisdictions should also consider implementing actions for continuous improvement of air quality regardless of the management level, because some air pollutants (e.g. $PM_{2.5}$, ozone, NO_2) can have negative impact on human health even at concentrations below their standards.

The suggested actions in Table 6-1 relate to medium or long-term measures to improve air quality. During poor air quality episodes where meteorological conditions contribute to producing elevated concentrations of air pollutants[6], jurisdictions may choose to issue air quality advisories and could request immediate actions by local community members to

[5] It should be noted that the highest management level that can be assigned is red. This means that for a given pollutant with CAAQS for multiple averaging times, once it is assessed that a metric value is in the red level for a given averaging time, the air zone will necessarily be assigned the red management level for that pollutant.

[6] Real-time and forecasted health risk associated with air pollution is available for many communities across Canada through the web-based Air Quality Health Index (AQHI) at: https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index.html.

reduce the contribution of air pollutants. Some jurisdictions have the authority to issue mandatory emission curtailment orders during air pollution episodes[7].

6.1 The Role of Governments

Air quality management is a responsibility shared by federal, provincial and territorial governments[8]. These governments have agreed to work collaboratively to implement AQMS, recognizing that[9]:

- good air quality is important for Canadians to protect health and the environment
- air quality is affected by many factors such as meteorological conditions, anthropogenic sources (e.g., industrial activities, mobile sources and residential wood burning), natural sources (e.g., wind-blown dust), TF, and EE (e.g., forest fires)
- Canadians and all orders of government have a responsibility to prevent the air quality from deteriorating.

Provinces and territories are responsible for managing air quality in their air zones with early efforts focussed on areas where the standards are exceeded or where a significant population is at risk of pollutant exposure. For emission sources and lands that fall under federal authority (such as transportation sources, federal lands and national parks) the federal government will collaborate with provinces and territories on air quality management.

Regarding the influence of transboundary flows from one Canadian jurisdiction to another, the affected downwind jurisdiction should engage in discussions with the upwind source jurisdiction. The federal government collaborates with provinces and territories to better understand the flow of air pollution among airsheds. For transboundary flows from the United States, the federal government uses provisions set out under the Canada-United States Air Quality Agreement and lead the discussions in collaboration with the affected provinces or territories.

An outline of the federal, provincial and territorial roles and responsibilities to improve air quality under AQMS can be found on the CCME website.

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[7] For example, the Ontario Ministry of the Environment, Conservation and Parks can issue orders for the curtailment of the operation of sources of air pollution during air pollution episodes under Ontario Regulation 419/05.

[8] In some areas of Canada air quality management is a responsibility also shared with municipal (e.g. Montréal, Metro Vancouver) governments.

[9] Although Québec supports the general objectives of AQMS, it did not implement the System since it includes federal industrial emission requirements that duplicate Québec's Regulation. However, Québec is collaborating with jurisdictions on developing other elements of the system, notably air zones and airsheds.

Table 6-1: Suggested actions under the air zone management framework

Action	Green	Yellow	Orange	Red	Responsible jurisdiction
Characterizing air pollutant concentrations in air zones	Basic monitoring to establish baseline concentrations and trends, potentially via passive sampling, remote sensing or modeling. Refer to the NAPS monitoring protocol.	Ensure air pollutant monitoring is adequate to capture spatial and temporal variability in concentrations. Refer to the NAPS QA/QC guidelines. Air quality modelling may be a useful tool for jurisdictions when choosing monitoring locations.			Provinces and territories with assistance from federal government as required and as possible.
Compilation of emission inventories in air zones	Not applicable (NA)	Compile, as required, emissions inventory for air zones to evaluate main sources of air pollutants. Use of national, provincial, and territorial emissions inventories, supplemented with local emissions may assist this activity.			
Airshed coordination	NA	Initiate airshed coordination if there are transboundary issues.			The federal government will collaborate with provinces and territories to better understand the flow of air pollution among airsheds. The federal government leads international air pollution discussions.
Stakeholder engagement	NA	Engage local stakeholders as appropriate.	Engage local stakeholders with roles and deliverables identified.		Provinces and territories.

Action	Green	Yellow	Orange	Red	Responsible jurisdiction
Development of an air zone management plan	NA	Develop an air zone management plan if required to prevent air quality deterioration. Consider all important sources of air pollutants, and provincial and territorial policies. The plan should consider CI/KCAC and may consider current and future projections of air quality, defined air zone goals, the role of stakeholders, priority emission sources, mechanisms to achieve air quality improvements, and any additional monitoring and inventory required.	Develop a comprehensive air zone management plan to improve air quality. Consider all important sources of air pollutants, provincial and territorial policies, including short, medium and long-term milestones and targets. The plan should consider CI/KCAC and may identify key emissions sources, consider current and projected air quality based on ambient air pollutant trends, and set out actions to be undertaken by governments and stakeholders to reduce emissions.	Develop a comprehensive air zone management plan to reduce concentrations below the CAAQS. Consider all important sources of air pollutants, provincial and territorial policies, including short, medium and long-term milestones and targets. The plan should consider CI/KCAC and current and future directions in air quality based on trends or projections, and include: actions to be undertaken by governments and stakeholders to reduce emissions with short, medium and long-term milestones and targets; and detailed modeling to show how planned actions will improve air quality.	Provinces and territories to lead the development of air zone management plans. All orders of government have a responsibility to ensure that pollutant levels do not increase and that CAAQS are not exceeded.
Implement air zone management plan	NA	Implement the air zone management plan that outlines the roles and responsibilities of all participants, estimated timelines, and the process for review.			Provinces and territories to lead. All orders of government have a responsibility to ensure CAAQS are not exceeded.

Action	Green	Yellow	Orange	Red	Responsible jurisdiction
Publish air zone management plan	NA	Provinces and territories review and publish the air zone management plan, ensuring it is achievable and consistent with provincial/territorial policies.			Provinces and territories.
Assess progress	NA	Assess progress in implementing the air zone management plan, track the implementation of the management plan, and demonstrate how the management actions contribute to improved air quality. The air zone management plan to be revised as needed to achieve continuous improvement in air quality.			Provinces and territories.
Air zone reports	Prepare and publish annual reports summarizing current ambient air quality levels, ambient and emissions trends, air zone management levels, and management actions to reduce air pollutant levels.				Provinces and territories.
Public outreach	Educate the public on local air quality. Publish best practices guides on how the public may contribute to improving air quality. Include information on websites about actions individuals can undertake to improve air quality.				Provinces and territories.

7.0 EFFECTIVE MANAGEMENT LEVEL

Annual variations in emissions of air pollutants and meteorological conditions can cause variations in CAAQS metric values and this in turn can cause variations in the management level assigned to an air zone between years. For example, an air zone could be in the red management level for sulphur dioxide in one year and in the yellow the next. This raises possible issues from management and communication perspectives.

7.1 Addressing Management Perspective

When an air zone is in the red management level (for example) in a reporting-year, the jurisdiction should initiate the development and implementation of actions to try to improve air quality below the CAAQS and try to prevent future exceedances.

Developing and implementing an action plan to improve air quality is a process that can span many years. As such, if an air zone drops from a higher management level in one year to a lower level the next, the jurisdiction must choose what course to follow for the management plan. Depending on the air zone situation, the jurisdiction may:

- amend the development and implementation of the plan to manage instead at the lower level, which could include scaling back actions proposed in the original implementation plan
- continue developing and implementing the plan at the higher level.

Unless improvements in air quality have occurred to make a return to a higher management level unlikely, jurisdictions are encouraged to maintain actions at a consistent management level, even if the management level in subsequent years drops to a lower level. This approach is recommended to protect air quality and reduce the risk of deterioration. This would also be consistent with the principle of continuous improvement.

7.2 Communicating Change in Management Levels

Jurisdictions can communicate in their air zone reports variations in management levels between years. Some options for this communication include:

1. report only the “reporting-year” management level, which is the management level obtained for the reporting period under consideration (e.g. 2016 to 2018)
2. report the management level which is actually (or effectively) being implemented based on a higher level from a previous year
3. report both the reporting-year management level and the management level actually being implemented.

For cases where the actions being developed and implemented are those from a higher management level from a previous year, the jurisdiction should consider communicating this in its air zone reports. For option 3, the reports could say that while the reporting-year

management level for an air zone is yellow, for example, the air zone is actually assigned a higher level because in a previous year the management level assigned to the air zone was higher and the zone is still being managed to the higher level.

8.0 COMMUNICATION AND REPORTING

Communicating with the Canadian public is an important component of AQMS. Each jurisdiction will regularly publish reports on air quality for each of their air zones and these reports will include the actual metric values and achievement status of the CAAQS for each CAAQS-reporting station and air zone. Other common elements which could be part of these reports include:

1. adjusted metric values (as applicable) after the consideration of TF-EE influences
2. achievement status of the CAAQS for each CAAQS-reporting station and air zone based on adjusted metric values
3. weight of evidence analyses to support the occurrence of influences from TF-EE
4. reporting-year management level (after consideration of TF-EE as applicable) for the air zone and the effective management level (as applicable)
5. management actions taken to reduce emissions or preventing emissions from increasing
6. information on any management plan being developed or implemented (as applicable).

Air zone reports are typically available on the web site of each jurisdiction. In addition, CCME also provides an interactive web-based State of the Air report titled Canada's Air. Canada's Air provides an overview of the status of air quality across Canada, including:

- information on ambient concentrations of air pollutants and emission sources
- the impact of air pollutants on human health and the environment
- actions Canadians can undertake to improve air quality.

Canada's Air is updated regularly to complement annual air zone reports compiled by jurisdictions.

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APPENDIX 1 – THE CANADIAN AMBIENT AIR QUALITY STANDARDS [10]

Pollutant	Averaging time	Standard[11] (numerical value)			Statistical form of the standard
		2015	2020	2025	
Ozone[12]	8-hour	63 ppb	62 ppb	60 ppb	The 3-year average of the annual 4th highest of the daily- maximum 8-hour average concentrations.
Fine particulate matter ($PM_{2.5}$)[13]	24-hour	28 $\mu g/m^3$	27 $\mu g/m^3$		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.
	1-year (annual)	10.0 $\mu g/m^3$	8.8 $\mu g/m^3$		The 3-year average of the annual average of the daily 24-hour average concentrations.
Sulphur Dioxide (SO_2)[14]	1-hour		70 ppb	65 ppb	The 3-year average of the annual 99th percentile of the daily-maximum 1-hour average concentrations.
	1-year (annual)		5.0 ppb	4.0 ppb	The arithmetic average over a single calendar year of all 1-hour average concentrations.
Nitrogen Dioxide (NO_2)[15]	1-hour		60 ppb	42 ppb	The 3-year average of the annual 98th percentile of the daily-maximum 1-hour average concentrations.
	1-year (annual)		17.0 ppb	12.0 ppb	The arithmetic average over a single calendar year of all 1-hour average concentrations.

[10] Consult the CCME web site for the most up to date list of CAAQS.

[11] The metric values for comparison to the standard must be rounded to the same number of digits as the standard.

[12] 2015 and 2020 CAAQS established as ambient air quality objectives by the federal government on May 25, 2013; 2025 CAAQS on June 29, 2019 (Canada Gazette Part 1).

[13] Established as ambient air quality objectives by the federal government on May 25, 2013 (Canada Gazette Part 1).

[14] Established as ambient air quality objectives by the federal government on October 28, 2017 (Canada Gazette Part 1).

[15] Established as ambient air quality objectives by the federal government on December 9, 2017 (Canada Gazette Part 1).

APPENDIX 2 – THE MANAGEMENT LEVELS [16]

Table A2-1: Management levels for ozone

Management level	2015	2020	2025
Red	> 63* ppb	> 62 ppb	> 60 ppb
Orange	57 to 63 ppb	57 to 62 ppb	57 to 60 ppb
Yellow	51 to 56 ppb		
Green	≤ 50 ppb		

*The concentrations have the same statistical form as the corresponding CAAQS and the metric values for comparison to the concentrations must be rounded to the same number of digits as the shown concentrations.

Table A2-2: Management levels for $PM_{2.5}$

Management level	$PM_{2.5}$ 24-hour		$PM_{2.5}$ annual	
	2015	2020	2015*	2020
Red	> 28* μg/m^3	> 27 μg/m^3	> 10.0 μg/m^3	> 8.8 μg/m^3
Orange	20 to 28 μg/m^3	20 to 27 μg/m^3	6.5 to 10.0 μg/m^3	6.5 to 8.8 μg/m^3
Yellow	11 to 19 μg/m^3		4.1 to 6.4 μg/m^3	
Green	≤ 10 μg/m^3		≤ 4.0 μg/m^3	

*The concentrations have the same statistical form as the corresponding CAAQS and the metric values for comparison to the concentrations must be rounded to the same number of digits as the shown concentrations.

[16] Consult the CCME web site for the most up to date list of management levels.

Table A2-3: Management levels for sulphur dioxide

Management level	SO_2 1-hour		SO_2 annual	
	2020	2025	2020*	2025
Red	> 70* ppb	> 65 ppb	> 5.0 (CAAQS)	> 4.0 ppb
Orange	51 to 70 ppb	51 to 65 ppb	3.1 to 5.0 ppb	3.1 to 4.0 ppb
Yellow	31 to 50 ppb		2.1 to 3.0 ppb	
Green	≤ 30 ppb		≤ 2.0	

*The concentrations have the same statistical form as the corresponding CAAQS and the metric values for comparison to the concentrations must be rounded to the same number of digits as the shown concentrations.

Table A2-4: Management levels for nitrogen dioxide

Management level	NO_2 1-hour		NO_2 annual	
	2020	2025	2020*	2025
Red	> 60 ppb	> 42 ppb	> 17.0 ppb	> 12.0 ppb
Orange	32 to 60 ppb	32 to 42 ppb	7.1 to 17.0 ppb	7.1 to 12.0 ppb
Yellow	21 to 31 ppb		2.1 to 7.0 ppb	
Green	≤ 20 ppb		≤ 2.0 ppb	

*The concentrations have the same statistical form as the corresponding CAAQS and the metric values for comparison to the concentrations must be rounded to the same number of digits as the shown concentrations.