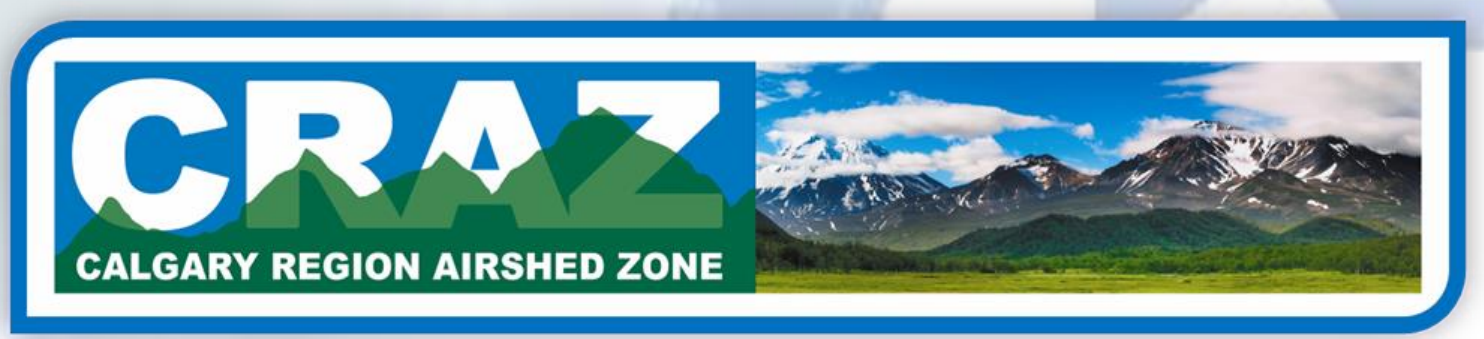


Calgary Region Airshed Zone
Air Quality Management Plan

December 2024

Executive Summary

The Calgary Region Airshed Zone (CRAZ) Air Quality Management Plan (AQMP) is a comprehensive, multi-stakeholder plan outlining the Objectives for air quality management in the CRAZ Region as well as the Strategies and Actions required to achieve the Objectives.

The CRAZ AQMP was first developed in 2008 (then referred to as the *CRAZ PM and Ozone Management Plan)* by a multi-stakeholder committee led by CRAZ. The plan was subsequently updated in 2014 and 2019 to ensure its continued relevance for air quality management in the CRAZ Region. This 2024 update represents the fourth version of the CRAZ AQMP.

CRAZ committees are responsible for the implementation of the CRAZ AQMP. Achievement reports are published regularly to report on progress made under the AQMP. The most recent achievement report is available on the CRAZ website.

Table of Contents

Introduction

The Calgary Region Airshed Zone (CRAZ) Air Quality Management Plan (AQMP) is an action plan for collaborative air quality management in the CRAZ region. The Plan was originally developed in 2008 in collaboration with area stakeholders including Alberta Environment, industry, municipalities, non-governmental organizations, First Nations and Alberta residents.

Since 2008, the Plan has been reviewed and updated on a regular basis to assess progress made under the Plan and to ensure the continued relevance of the Objectives, Actions, Steps and Performance Indicators set out in the Plan. The first progress review of the Plan was completed in 2011 (CRAZ, 2011). Subsequent progress reviews and updates of the Plan took place in 2014 (SNC Lavalin, 2014) and 2018, respectively. The Plan was reviewed for a fourth time in 2023. The outcomes of the 2023 review are summarized in the CRAZ Air Quality Management Plan Achievement Report (CRAZ, 2024). This 2024 update to the Plan incorporates the recommendations from the 2023 review.

Vision

The vision for the 2024 AQMP remains the same as the previous 2019 plan, as follows:

> *"The [Air Quality] Management Plan for the [CRAZ region] will provide the necessary tools, resources and regional technical framework for inter-municipal cooperation for measuring, assessing and sharing emission information on [air contaminants of concern] and will promote efforts to decrease measured ambient levels of [air contaminants of concern] using continuous improvement principles."*

Continuous Improvement

The CRAZ AQMP operates on a principle of continuous improvement. The regular progress reviews and updates to the Plan support the continuous improvement cycle. The steps in the continuous improvement approach utilized by CRAZ are outlined in Figure 1.

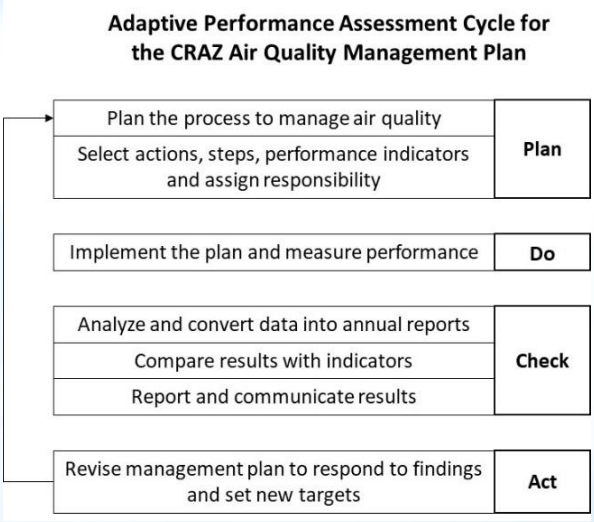


Figure 1: CRAZ Continuous Improvement Approach (CRAZ PM&O3 Management Plan 2008)

Background

The CRAZ Region

The CRAZ region boundary approximately follows the Alberta Health Services Calgary Zone boundary with the exception of the northern border which is defined by the southern border of the Parkland Air Management Zone (PAMZ).

This area includes the cities of Calgary and Airdrie, the towns of Okotoks, Cochrane, Chestermere, Strathmore, High River, Granum, Diamond Valley, Claresholm, Vulcan, Nanton and Canmore and many villages, the Municipal Districts of Bighorn and Foothills, the Counties of Willow Creek, Rocky View, Vulcan and Wheatland, the Improvement Districts of Kananaskis and Banff, and the Siksika, Eden Valley, Tsuu T'ina and Stoney First Nations.

There are four continuous monitoring stations currently operating in the CRAZ region. The Calgary Central-Inglewood Station is located on 9th Ave SE in Calgary adjacent to the Inglewood Bird Sanctuary and has been operational since 2015. The Calgary Varsity station is located at 32 Ave NW and 37th St NW in Calgary on the grounds of the Geological Survey of Canada building and has been operational since 2018. The Calgary Southeast monitoring station is located at 110th Ave SE and 46th St SE in Calgary adjacent to the Calgary Humane Society and has been operational since 2014. The Airdrie monitoring station, is located at the Chinook Winds Park in Airdrie and has been operational since 2017.

CRAZ also actively undertakes short term monitoring through its portable air monitoring vehicle, air quality sensor deployments and historical network of passive monitors. A map of the CRAZ boundary including the continuous monitoring stations in the region is shown in Figure 2.

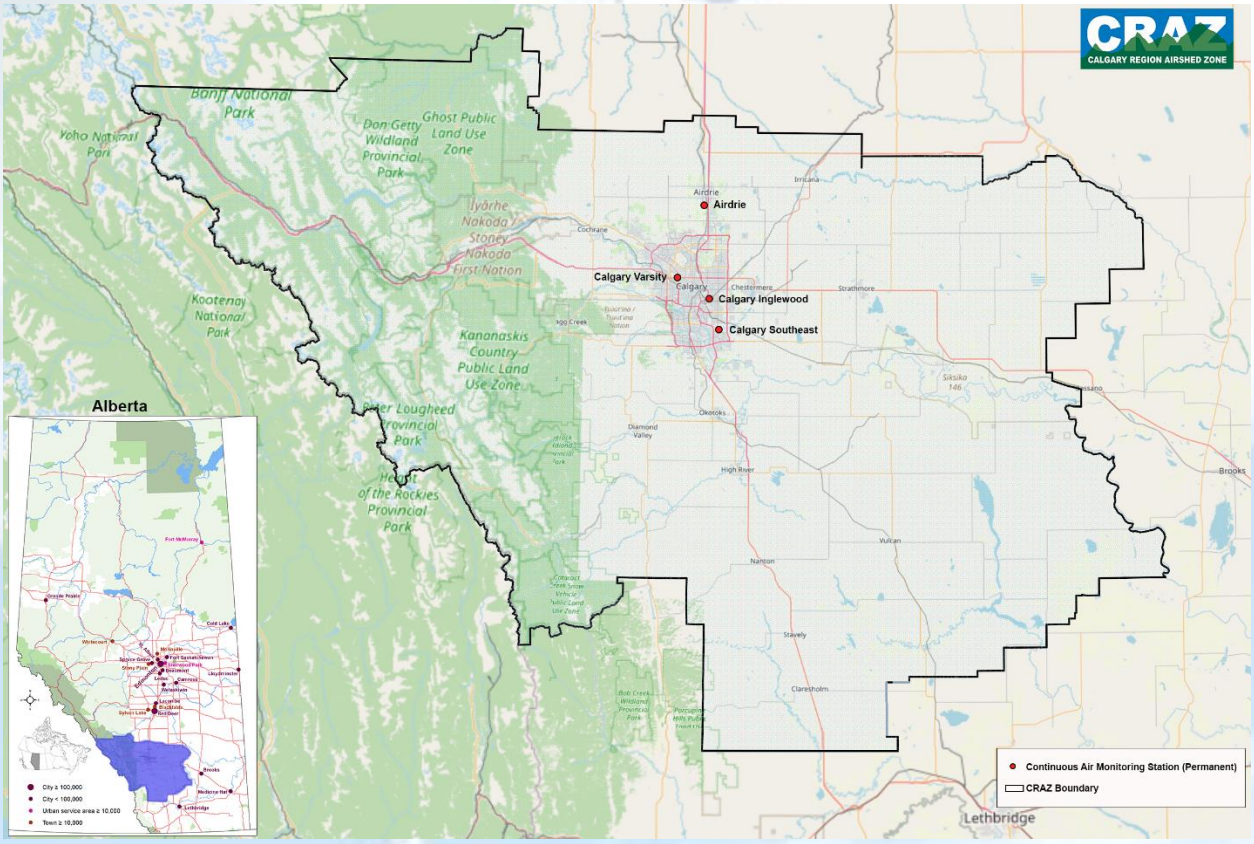


Figure 2: The CRAZ boundary including continuous monitoring stations in the region.

History of the CRAZ AQMP

CRAZ was established on January 16, 2007 to serve as a coordinating body to manage air quality issues in the Calgary Census Metropolitan Area (CMA) in response to an ozone exceedance for the Calgary CMA under the Clean Air Strategic Alliance (CASA) Particulate Matter and Ozone (PMO_3) Management Framework.

The CASA PMO_3 Management Framework, established in 2003, was a guidance document for ensuring achievement in Alberta of the Canada Wide Standards (CWS) which were numeric air quality standards for particulate matter and ozone developed by the Canadian Council of Ministers of the Environment (CCME). The CASA PMO_3 Management Framework established "action triggers", based on the CWS, against which ambient monitoring data was to be compared. Each reporting period, an "action level" was assigned to each station based on the status of ambient air quality in comparison to the action triggers. Differing levels of management actions were required for each level assigned. The action levels, as defined under the CASA PMO_3 Framework were: baseline monitoring and data gathering, surveillance actions, management plans and mandatory plans to reduce below the CWS.

During the initial reporting period, the Calgary CMA was placed in the "management plan" action level for ozone, triggering the need for the development of an air quality management plan for the region. CRAZ was formed to lead the collaborative development of the CRAZ Particulate Matter and Ozone Management Plan which was released in 2008. The inclusion of $PM_{2.5}$ in the Plan was proactive given that the "management plan" action level had not been triggered for $PM_{2.5}$ at the time.

Implementation of the Plan is an ongoing and collaborative effort between CRAZ, its various committees and its members.

In the interest of continuous improvement, the Plan is regularly reviewed and updated. The first review of the Plan took place in 2011, and the findings were documented in an achievement report (CRAZ, 2011). During later reporting periods, the Calgary CMA triggered the "management plan" action level for $PM_{2.5}$. Therefore, the 2014 review of the Plan included consideration of whether $PM_{2.5}$ was adequately addressed in the Plan. An updated version of the CRAZ Particulate Matter and Ozone Management Plan was released in 2014 (SNC Lavalin, 2014). As the air quality management system evolved, further contaminants were added to the reporting regime. The third plan review in 2018, assessed the plan achievement since 2014 and broadened the considered air contaminants. The plan was updated and renamed in 2019 to reflect the expanded scope to the CRAZ Air Quality Management Plan.

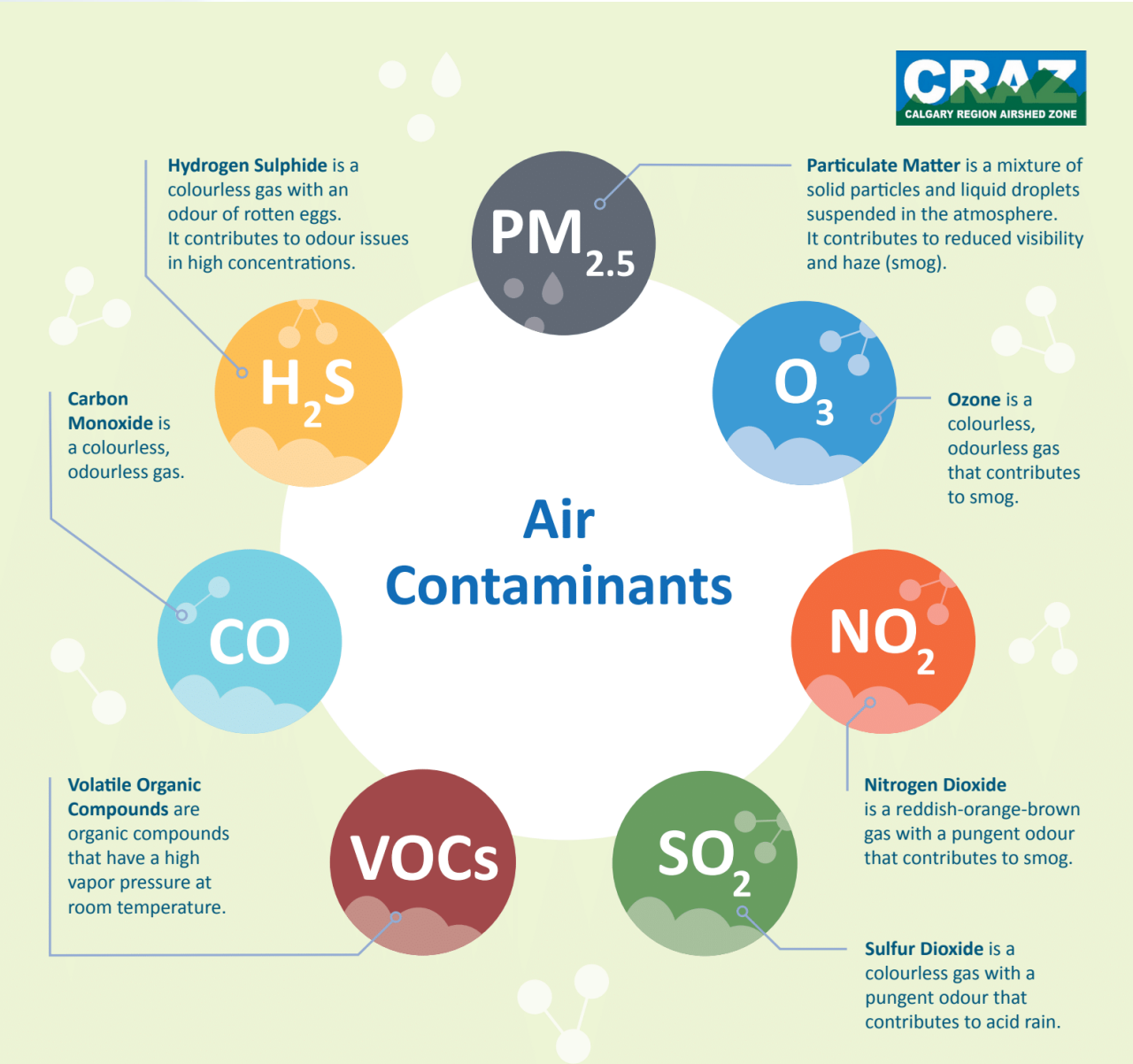
Evolving Air Quality Management Systems

In 2012, the CCME replaced the Canada Wide Standards with new Canadian Ambient Air Quality Standards (CAAQS) and introduced the national Air Quality Management System (AQMS). The AQMS has strong similarities with the CASA PMO_3 Management Framework in that it identifies numerical triggers and limits and assigns a management "level" based on the status of ambient air quality in relation to the triggers and limits. To date, CAAQS have been established for fine particulate matter, ozone, sulphur dioxide, and nitrogen dioxide.

The air quality management system in Alberta is multi-faceted ranging from regulatory activities managing industrial emissions, monitoring, evaluation and reporting, planning and non-regulatory activities such as engagement and outreach. An example of a planning initiative relevant to the CRAZ region is the 2014 establishment of the South Saskatchewan Regional Plan (SSRP) and the accompanying Air Quality Management Framework (SSR AQMF) under the Alberta Land Use Framework (LUF). This system replaced the former CASA PM and O_3 Management Framework and the CRAZ region falls within the South Saskatchewan Region (SSR) under the LUF.

The SSR AQMF provides guidance for managing $PM_{2.5}$, O_3 and NO_2 in the region. The 2015 CAAQS for particulate matter and ozone were adopted directly into the SSR AQMF as "triggers" and "limits". The NO_2 "triggers" and "limits" were derived from Alberta Ambient Air Quality Objectives (AAAQOs) as the NO_2 CAAQS had not been released at that time. Reporting under the SSR AQMF and the CAAQS have indicated that the monitoring data in the Calgary region continues to trigger the need for air quality management planning. As a part of the 2023 review and this 2024 update to the AQMP, the Objectives, Actions, Steps and Performance Indicators in the Plan were considered and updated if necessary to ensure that the updated Plan considers the air contaminants of concern and that actions are relevant to the current air quality situation in the region.

Air Contaminants of Concern in the CRAZ Region



Health Effects

- **PM2.5**: Irritates the respiratory system, exposure associated with asthma, emphysema, bronchitis, and cardiovascular effects.
- **O3**: Constricts airways resulting in breathing difficulty, coughing, and aggravation of respiratory conditions such as asthma, emphysema, and chronic bronchitis.
- **NO2**: Irritates the respiratory system, increases asthma-related respiratory symptoms and can lower resistance to respiratory infections.
- **SO2**: Can cause breathing problems and contribute to respiratory and cardiovascular diseases.
- **VOCs**: Linked with elevated cancer risks.
- **CO**: Reduces the delivery of oxygen to the organs and tissues resulting in headaches, drowsiness, dizziness, confusion, and eventually death.
- **H2S**: Can cause eye tearing, headaches, nausea, vomiting, and serious health effects at higher concentrations.

Emission Sources

Transportation
Aviation, rail, and road transportation

Industry
All types of industry including power generation, manufacturing, petroleum exploration and production

Agriculture
Activities including fertilizing, burning, and livestock waste

Biogenic
Natural emissions from biological sources such as plants, trees, and soil

Commercial & Residential Heating
Including wood, gas, and oil

Construction
Commercial, residential, and industrial construction emissions

General Solvent Use
Consumer and commercial solvent use

Formation of Contaminants

$PM_{2.5}$	O_3	NO_2	SO_2	VOCs	CO	H_2S
Transportation, Construction, Agriculture, Industry. Also formed from transformations of NO_x, SO_2, VOCs, and NH_3	Formed from chemical reactions between NO_x and VOCs in the presence of sunlight	Transportation, Industry, Product of combustion	Industry, Transportation Product of combustion	Transportation, Industry, Agriculture, Biogenic, and General Solvent Use	Transportation, Product of combustion	Industry, Agriculture, and Biogenic

2024 CRAZ Air Quality Management Plan

The 2024 CRAZ AQMP consists of 33 Steps that are contained within 13 Actions and 5 Objectives.

The Objectives of the Plan are as follows:

Objective 1: CRAZ will consistently and transparently be one of the best managed air quality regions in Canada

Objective 2: Regional land use planning will encourage and promote improvements in air quality

Objective 3: Build and promote awareness of air quality issues

Objective 4: Stakeholders will work collaboratively to improve air quality and to share environmental responsibility

Objective 5: Encourage, pursue and support air quality science and research

The 13 Actions in the Plan each fall under one of the 5 Objectives. Similarly, the 33 Steps in the Plan each fall under one of the 13 Actions. The Steps were designed to be specific, measurable, achievable, reasonable and timely (SMART).

To achieve the SMART criteria, performance indicators were identified for each Step to support assessment and measurement of performance. Time frames were also identified for each Step, represented as continuous (carried on indefinitely), short-term (within zero to two years), medium-term (within three to five years), or long-term (five years or more).

As well and as done as part of the 2019 Plan revision (CRAZ, 2019) each Step has been assigned to a lead CRAZ Committee identified in **bold** (i.e. CRAZ Board, Administration, AQMP Committee, Technical Committee, Engagement Committee and Policy & Research Committee), with supporting committees also identified in some cases.

The updated 2024 AQMP is shown on the following pages.

Objective 1*:* CRAZ will consistently and transparently be one of the best managed air quality regions in Canada

Action	Step	Performance Indicator	Time Frame	Lead Committee
1. Air quality monitoring and reporting is continuously improved for air contaminants of concern.	i) Air quality network is rationalized and includes urban and rural considerations	Uptime & downtime percentage of CRAZ air quality monitoring	C	**Technical**
	ii) Air quality monitoring is publicly available	Annual basis, number of monthly air quality monitoring reports that are available publicly (Targeting 12/12 annually)	C	**Technical**
	iii) Encourage and support CRAZ members (municipal, industry) to expand site specific air quality monitoring where appropriate.	Maintain list (or map) of known locations where CRAZ members are monitoring their own sites/operations.	C	**Technical**
2. The Air Quality Management Plan will be reviewed regularly, implementation tracked, and adapted to ensure it is current, implementation is actionable, and indicators are meaningful.	iv) The Air Quality Management Plan will be reviewed and updated every 3 - 5 years.	Number of years since the AQMP was updated (or year of last review).	MT	**AQMP**
	v) Ensure continued consultation with all stakeholder groups (government, industry, public) on the AQMP.	Identify number of municipalities engaged; Number of industry members and non-members engaged; Number of public engagement events held	C	**AQMP**
	vi) Incorporate short term actions in the Air Quality Management Plan into CRAZ strategic plans on a 3-4 year cycle	Annually, upon review of CRAZ Strategic Plan, assess integration of AQMP actions.	C	**Board/ Administration**
3. The Air Quality Management Plan will be consistently, fairly, and equitably funded	vi) Ensure the organization has adequate funding.	Annual funding received compared against annual operating budget.	C	**Board/ Administration**
	vii) Ensure that AQMP projects receive funding.	Identify number of AQMP projects funded and dollar amount that went	C	**Administration** AQMP

		to funding AQMP projects.		
	ix) Pursue no-cost and nominal-cost opportunities to improve local air quality (such as partnering with co-beneficial organizations; supporting co-beneficial projects and programs; and supporting municipal bylaws, policies, and programs that support improved air quality).	Identify organizations/projects partnered with; events, not hosted by CRAZ, that CRAZ took part in; projects CRAZ provided comment/feedback/expertise/ recommendations	C	**AQMP**
	x) Continue liaising with all levels of government, researchers, and other funding sources.	Identify funding breakdown from all levels of government, other sources, new sources, and grants.	C	**Finance/ Administration**

Time Frame: short-term (ST), medium-term (MT), long-term (LT) and continuous (C).

Objective 2*:* Regional land use planning will encourage and promote improvements in air quality

Action	Step	Performance Indicator	Time Frame	Lead Committee
1. Air quality management will be integrated into municipal urban planning	i) Promote air quality initiatives within environmental management plans, municipal development plans, or other organizational charters in the region (e.g., environmental management plans, SSRP)	In coordination with municipal survey(s), compare on-going initiatives to prior years to determine if increasing, to identify new opportunities, and/or identify gaps.	MT	**AQMP**
	ii) Expand the implementation of the Municipal Toolkit. Review and revise, as needed, annually	Identify number of municipalities that have adopted use of or worked with Municipal Toolkit; Assess whether toolkit requires review and updating.	C	**Policy & Research**
2. Support multi-modal transportation systems	iii) Promotion and/or development programs that promote/incentivise positive air quality initiatives for transportation	Build understanding of potential or available programs and tools that incentivize positive air quality initiatives for transportation; Identify best option(s) for implementation and report on implementation	MT	**AQMP Technical**
	iv) Evaluate the air quality impacts of transit/transportation initiatives	Seek out and review available studies on the impacts of transit/ transportation initiatives on air quality. Provide recommendations on how/what steps or initiatives were taken to improve air quality	MT	**AQMP**
3. Increase natural filters	v) Support and promote urban tree planting policies and programs for municipalities and individual residents or communities	Maintain a baseline understanding of trees and/or natural assets in CRAZ region. Provide resources/ information to CRAZ	MT	**Engagement**

		members;		
	vi) Encourage the implementation of green roofs and other LEED-style building practices in municipal, industrial and commercial building requirements.	Develop a baseline understanding of benefits and opportunities for implementation of green roofs and other LEED-style building practices. Provide resources/ information. Maintain an inventory of green roofs, LEED-style development and other low emissions construction initiatives	MT	**Engagement**

Time Frame: short-term (ST), medium-term (MT), long-term (LT) and continuous (C).

Objective 3: Build and promote awareness of air quality

Action	Step	Performance Indicator	Time Frame	Lead Committee
1: Educate about area air emissions and reduction plans	i) Find opportunities to coordinate with local schools to enhance air quality education in alignment with school curriculum.	Number of partnerships established, educational materials developed; Feedback and assessments from school visits/events	C	**Engagement**
	ii) Collaborate with local events and other relevant initiatives to enhance visibility and engagement.	Number of partnerships established, audience reach, materials developed to support; Feedback and assessments received from events & initiatives	C	**Administration** Engagement
	iii) Develop a coordinated promotion plan that aligns with key community activities and partners, to amplify reach and impact	Identify campaign(s) that were implementation and/or promotion plans that exist and are being implemented.	ST	**Engagement**
	iv) Identify partner organizations to develop and implement targeted behavioural campaigns.	Identification of new partners from the past 5 years; Identification of opportunities where maintenance/ reconnection with former partners occurred	C	**Administration**
2. Educate about area air emissions and reduction plans	v) Advance a communication and education strategy that addresses air contaminants of concern in the CRAZ Region.	Review existing Communications Strategy and refine regularly (consider bi-annually or associated with AQMP review); Describe successes and challenges; note feedback received	C	**Air Quality Program Manager** Engagement

	vi) Ensure CRAZ remains the reliable source of information	Collate stats including social media and website hits, media and other inquiries	C	**Engagement** Program Manager
	vii) Prepare the public for changes in regulatory direction	Note recent (last 5 years) changes in regulatory directions; List actions that were completed to inform the public	C	**Policy & Research** Engagement

Time Frame: short-term (ST), medium-term (MT), long-term (LT) and continuous (C).

Objective 4*:* Stakeholders will work collaboratively to improve air quality and to share environmental responsibility

Action	Step	Performance Indicator	Time Frame	Lead Committee
1. CRAZ will work with stakeholders to share resources and knowledge related to regional air quality	i) CRAZ will host forums, workshops, guest speakers, etc. to inform, educate and engage stakeholders	Annually, keep track of events hosted by CRAZ and report regularly	C	**Engagement** Program Manager
	ii) Collect and share available data and results with partner organizations on feasibility of alternative fuels for public transportation	Review of actions related to sharing information on alternative fuels	MT	**AQMP**
2. CRAZ stakeholders will adopt a voluntary commitment model for reduction activities suitable to their industry/municipality	iii) CRAZ will promote incentives, deterrents, and programs that encourage reduction of emissions of air contaminants of concern (e.g., rebates, pick-up and disposal for old refrigerators and furnaces, solar panels, window upgrades, diesel school buses, gas powered lawn mowers, wood-stove change out program, etc.)	Maintain list of available incentives, deterrents, and/or programs; Annually, review for changes/updates to programs	MT	**AQMP**
	iv) CRAZ will undertake periodic surveys to identify and understand initiatives that are underway in the region	Document number of survey requests and response rates	MT	**AQMP**
	v) CRAZ will consult with partner organizations to understand needs related to emissions reductions and/or green energy	Undertake a needs assessment to inform future initiatives; Determine priorities for where/how to provide continued support	MT	**Policy and Research**

Time Frame: short-term (ST), medium-term (MT), long-term (LT) and continuous (C).

Objective 5: Encourage, pursue and support air quality science and research

Action	Step	Performance Indicator	Time Frame	Lead Committee
1. In areas of poor air quality or during times of poor air quality, advance work to provide relevant information and updates to stakeholders.	i) Support and review studies to locate poor air quality "hot spots" and studies and methodologies that distinguish smoke-influenced air quality data from local air quality data.	List reports, studies, and other work that have been reviewed; Provide links, as available, to ensure they are publicly available to CRAZ members and others	C	**AQMP**
	ii) Utilize air quality forecasting to inform poor air quality events (e.g., AQHI, BlueSky).	Air quality forecasts are made available for the CRAZ region	C	**Air Quality Program Manager**
2. Determine impact of poor air quality on CRAZ residents	iii) Leverage results from studies to identify health effects to local target groups (e.g., asthmatics or elderly)	Compile a list of references for health effects of air quality; Undertake a regular review of health impacts projects (e.g., Health Canada reports);	ST	**AQMP**
3. Leverage existing reporting summaries, emissions inventories, and scientific and other reports to improve understanding of regional emissions (e.g. sources, emission intensity, etc.)	iv) Extract emission information relevant to CRAZ region from publicly accessible resources and find opportunities to link CRAZ EI with other relevant inventories and initiatives for the region.	Compile references for CRAZ emissions; Assessment of quality/relevance of available regional emissions information	LT	**AQMP** Technical Air Quality Program Manager
	v) Advocate and support regular updating of the inventory and modelling of pollutants in the airshed	List initiatives undertaken to support emissions inventory updates or modelling projects	MT	**AQMP** Technical Administration

Time Frame: short-term (ST), medium-term (MT), long-term (LT) and continuous (C).

Reference Documents

CRAZ Air Quality Management Plans

Calgary Region Airshed Zone (CRAZ), 2019. *CRAZ Air Quality Management Plan 2019.* CRAZ Air Quality Management Plan 2019

Calgary Region Airshed Zone (CRAZ), 2014. *Particulate Matter and Ozone (PM and O3) Management Plan December 2014. 2014 Particulate Matter and Ozone Management Plan*

Calgary Region Airshed Zone (CRAZ), 2008. *Particulate Matter and Ozone (PM and O3) Management Plan.*

CRAZ Air Quality Management Plan Achievement Reports

Calgary Region Airshed Zone (CRAZ), 2023. 2023 *Achievement Report: CRAZ Air Quality management Plan*

Calgary Region Airshed Zone (CRAZ), 2018. *2018 Achievement Report: CRAZ Particulate Matter and Ozone Management Plan. 2018 Achievement Report*

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