



Air Zone Management Response for British Columbia

September 2017



(Photo credit: Alyse Minifie – Clean Air Day contest winner 2017)

B.C. Ministry of Environment and Climate Change Strategy

Executive Summary

The Air Quality Management Systems (AQMS) is a comprehensive management system being implemented across Canada to protect human health and the environment. It does this through the setting of Canadian Ambient Air Quality Standards (CAAQS) for fine particulate (PM_{2.5}) and ground-level ozone and industrial emission requirements for major industry, the implementation of air zone management to improve air quality and keep clean areas clean, enhanced coordination where pollution crosses jurisdictional boundaries, and increased collaboration on actions to reduce transportation emissions.

CAAQS for fine particulate matter (PM_{2.5}) and ground-level ozone were established in 2013. Under the AQMS, air zones are the basis for monitoring, reporting and taking action on air quality to achieve the CAAQS. Air zones are broad areas within a jurisdiction that have similar air quality characteristics, issues and trends. British Columbia (B.C.) has established seven air zones, and began annual reporting on CAAQS achievement in these air zones in 2015, based on 2011-2013 data. To facilitate public reporting and help prioritize actions under the AQMS, B.C. also assigned colour-coded management levels (“green”, “yellow”, “orange” and “red”) on the basis of air quality, where “red” levels indicate that the CAAQS have been exceeded in at least one community within the air zone.

B.C.’s approach to taking action on air quality is to build upon requirements and programs already in place at the federal and provincial level to promote improved air quality province-wide, and through early engagement and technical and strategic funding support to promote local actions to improve air quality in specific communities, beginning with those areas recently exceeding the CAAQS (the so-called “red” communities). Two air zones have remained in the “red” management level since the first air zone reports: the Central Interior (including Vanderhoof, Smithers and most recently Houston) and the Georgia Strait (including Courtenay, Duncan and most recently Port Alberni). The following report summarizes B.C. activities to support CAAQS achievement provincially and locally, focusing on the air zones and specific communities assigned a “red” management level.

Background

The Canadian Council of Ministers of Environment (CCME) is an intergovernmental forum for action on national and international environmental issues. The CCME have addressed a number of air quality issues including acid rain, ozone depleting substances, and standards for toxic substances. In 2012 the CCME endorsed the Air Quality Management system as a comprehensive approach to air quality management in Canada.

The AQMS is being implemented across Canada with the exception of Quebec and includes CAAQS, Base-Level Industrial Emission Requirements, Air Zone Management, increased coordination across jurisdictions and enhanced collaboration to reduce emissions from transportation sources.

CAAQS for PM_{2.5} and ground-level ozone were endorsed by the CCME in 2012 and formally established as air quality objectives under the Canadian Environmental Protection Act in 2013. Under the AQMS, air zones are the basis for monitoring, reporting and taking action to achieve the CAAQS. B.C. has delineated the province into air zones with defined geographic boundaries in which air quality trends and issues are expected to be similar (Figure 1).



Figure 1. Map showing boundaries of 7 B.C. air zones

[Annual air zone reports](#) summarize CAAQS achievement and assign a colour-coded management level for each air zone to help communicate air quality to the public and prioritize actions to protect air quality. Management levels are defined by nationally consistent threshold values, as summarized in Table 1. More comprehensive actions are expected as an air zone approaches or exceeds the CAAQS.

Communities reaching the “red” management level are expected to work towards a goal of achieving the CAAQS through advanced air zone management actions. “Orange” management level communities are expected to improve air quality through active management and “yellow” zones are expected to utilize early intervention and ongoing actions to continuously improve air quality. “green” zones are expected to keep clean areas clean and to proactively manage air quality.

Examples of potential actions associated with each management level are provided in the CCME Guidance Document on Air Zone Management.¹

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					

Management levels assigned to B.C. air zones on the basis of PM_{2.5} and ozone data collected from 2011-2016 are summarized in Tables 2 and 3, respectively. Two air zones are in the “red” management level: Georgia Strait (based on PM_{2.5} levels in Courtenay, Duncan, and most recently, Port Alberni) and Central Interior (based on PM_{2.5} levels in Vanderhoof, Smithers, and most recently Houston). This document will focus on the specific actions and strategies employed in communities that have been assigned a “red” management level since the start of air zone reporting in 2015.

¹ See: http://www.ccme.ca/files/Resources/air/aqms/pn_1481_gdazm_e.pdf.

Table 2. Summary of air zone management levels for PM_{2.5}.

Air Zone	Three-year Reporting Periods			
	2014-2016	2013-2015	2012-2014	2011-2013
Central Interior	Houston Vanderhoof	Smithers Vanderhoof	Smithers Vanderhoof	Smithers Vanderhoof
Coastal	Kitimat sites	Kitimat sites	Kitimat sites ²	Kitimat Terrace
Georgia Strait	Courtenay Port Alberni	Courtenay Duncan Port Alberni	Courtenay Duncan	Courtenay Duncan
Lower Fraser Valley	Several sites	Langley Abbotsford	Several sites	Several sites
Northeast	N/A	N/A	N/A	N/A
Northwest	N/A	N/A	N/A	N/A
Southern Interior	Several sites	Several sites	Several sites	Castlegar Kamloops Vernon

Table 3. Summary of air zone management levels for ozone.

Air Zone	Three-year Reporting Periods			
	2014-2016	2013-2015	2012-2014	2011-2013
Central Interior	Prince George Quesnel	Prince George Quesnel	Prince George Quesnel	Several sites
Coastal	Terrace	N/A	N/A	N/A
Georgia Strait	Duncan Whistler	Duncan Whistler	Whistler	Whistler
Lower Fraser Valley	Hope Agassiz	Hope	Hope	Burnaby Chilliwack Hope
Northeast	Fort St. John	N/A	N/A	N/A
Northwest	N/A	N/A	N/A	N/A
Southern Interior	Kamloops Kelowna	Kelowna Vernon	Kelowna Vernon	Kelowna

It should be noted that in the most recent 2014-2016 air zone reports, Smithers and Duncan dropped below the “red” threshold but the respective air zones remain in the “red” management level due to elevated PM_{2.5} concentrations in neighbouring communities.

² Port Alice-Rumble Beach Hospital site was assigned an “orange” management level for this period, but based on two years of data. Management levels are preferentially assigned on the basis of three complete years of data.

Air Zone Management in B.C. – A Collaborative Approach

Air zone management is a relatively new concept across Canada. However, local air management has been an important approach to managing local air quality issues since the 1980's, with the development of local airshed plans in Smithers and the Greater Vancouver Regional District (now Metro Vancouver) and that now include areas such as the Bulkley Valley-Lakes District, Prince George, Quesnel, Williams Lake, Central Okanagan Regional District, Boundary Region, Merritt, Fraser Valley Regional District, Metro Vancouver, Sea-to-Sky Airshed and the Cowichan Valley. Local airshed management was borne out of the realization that many sources can affect local air quality, and that the management of these sources requires collaboration across all affected stakeholders, including different levels of government (federal, provincial and regional/local), industry and the public.

The provincial approach to air zone management is to:

- build upon existing regulations and programs to protect air quality across B.C. and
- support additional activities at the local level, with a priority on those areas that exceed the CAAQS (i.e. the “red” management areas).

Local action is supported through early engagement, technical support and strategic funding to support local initiatives. Local air management plans are a key element of this response.

Current federal and provincial responsibilities and activities to protect air quality are summarized below, followed by specific activities by “red” management areas to address local air quality issues.

Federal Responsibilities for Airshed Management

The federal government has regulations, standards and guidelines that are related to air quality for vehicles, engines and fuel, marine vessels and rail.

The federal government also provides guidance research and support on air quality management through the AQMS.

Transboundary emissions are addressed as part of the Georgia Basin – Puget Sound International Airshed strategy as well as through Transboundary project reviews, referrals and sharing of information across the border.

Provincial Responsibilities/Initiatives

The B.C. government has a number of initiatives and projects related to supporting airshed management and improving air quality throughout the province.

The Province regulates air emissions for industrial sources and prescribed wastes through the [*Environmental Management Act*](#).

There are also a number of [regulations](#) that govern the release of air contaminants in the Province. These regulations cover asphalt plants, agricultural waste, fuel and gasoline, motor vehicle

emissions, oil and gas waste, open burning, ozone depleting substance, solid fuels burning appliances, and wood residue incinerators.

Of particular significance to reducing particulate matter are the [Solid Fuel Burning Domestic Appliance Regulation](#) which sets standards for wood burning appliances and the [Open Burning Smoke Regulation](#) which governs the burning of vegetative material resulting from a number of activities including land clearing and forestry operations. The Open Burning Smoke Control regulation encourages vegetative reuse and sets conditions to minimize smoke releases. The regulation is currently under review and revision.

[Woodstove Exchange](#) Program is a provincial initiative available to communities. The program is designed to encourage the change-out of older wood stoves for appliances with lower emissions.

The Province has also drafted a [model municipal bylaw for backyard burning](#). This supports community efforts to control smoke from a local government perspective.

The Province is also involved in initiatives to retrofit diesel buses, setting emission reductions for heavy duty vehicles, reducing fleet emissions, phasing out beehive burners, working toward improved emission technologies for industry and developing biomass burning emission limits for electricity generation and industrial operations.

The Province also sets air quality standards for common air contaminants and provides air quality data to the public through the [B.C. Air Quality](#) website. The Province partners with other agencies to provide visibility information to the public through the [Clean Air B.C.](#) website. The Province also partners with other Provinces and the US to deliver the [BlueSky Canada](#) wildfire smoke forecasting program and [BlueSky Playground](#), an online interactive smoke dispersion program to assist in determining smoke impacts arising from wildfires, pile burns and prescribed burning.

The Province has compiled an [inventory of air quality bylaws](#) that exist in B.C. communities. The inventory covers anti-idling bylaws, open burning, campfires and beach fires, backyard burning and wood burning appliances. The inventory was last updated in 2015.

Management Responses for “Red” Air Zones

Georgia Strait

Georgia Strait Air Zone covers the coastal areas of southwestern B.C. outside the Lower Fraser Valley. Within the Georgia Strait Air Zone, the communities of Courtenay and Duncan exceeded the PM_{2.5} annual and/or PM_{2.5} daily mean national standards in the air zone reports up to and including the 2013-2015 period. In the most recent (2014-2016) report Port Alberni emerged as an additional community of concern whereas levels in Duncan fell below the CAAQS. Management efforts are focused on regions surrounding these communities. Initiatives to improve air quality in Courtney are described in the Comox Valley section of this document and actions to reduce air

emissions in Duncan are described in the Cowichan Valley section. Port Alberni actions are described in the Alberni Valley section.

The local airsheds in these valley communities are similar in that all are bound by mountains and complex valleys which facilitate trapping of pollutants and frequent inversions during the winter. Open burning, woodstove use and forest fires contribute to the particulate matter levels in the region.

Cowichan Valley

The Cowichan Valley Regional District has finalized its [Cowichan's Regional Air Protection Strategy](#) to identify actions that will allow the Region to respond to air quality issues. The plan was created by a cross jurisdictional committee that included representatives from provincial and local government, industrial and commercial operators, residents, NGO groups, First Nations, school boards, and health professionals.

The Plan brings together actions already underway with additional actions proposed to reduce particulate matter levels in the region. The Cowichan's Regional Air Protection Strategy focuses on PM_{2.5}, identifying it as the contaminant of greatest concern and as a result the actions are concentrated on reducing sources of PM_{2.5} including reducing open burning and wood burning appliance emissions and ensuring that industrial sources are in compliance with provincial and federal regulatory requirements. The Cowichan Valley Regional District and Partners were highlighted in [B.C. Lung's 2017 State of the Air Report](#).

The Cowichan Valley regional District was a recipient of PlanH funding which has been used to engage two professional facilitators and organize three change management sessions to assist in plan implementation. PlanH is a partnership between the B.C. Healthy Communities Society and Healthy Families B.C., which "supports local government engagement and partnerships across sectors for creating healthier communities."

Our Cowichan Community Health Network will oversee the implementation of the Air Protection Strategy including facilitation and coordination of work groups and bi-annual roundtable meetings.

Key Actions listed in the Cowichan's Regional Air Protection Strategy are:

Raise public awareness on the health impacts of wood smoke, the alternatives, best practices and rules.

Develop consistent airshed wide regulatory approach for open burning.

Contribute to provincial efforts to control wood smoke through participation in wood smoke strategy discussions.

Explore options for a curbside pickup of yard and garden materials to overcome barriers to open burning alternatives.

Implementation of the strategy is expected to have a positive impact on ambient PM_{2.5} level in this region.

The Cowichan Valley Regional District is also involved in the Province's woodstove exchange program which provides funding to communities to support replacing old inefficient woodstoves with either higher efficiency wood burning appliances, or cleaner heating options like natural gas or heat pumps.

A series of five articles on woodsmoke were produced and published in a local newspaper to raise awareness of local air quality issues in the Cowichan Valley and are available online at: [Woodsmoke 101: It's in the air](#), [Backyard burning](#), [Burning garbage](#), [Heating with wood – what's in the smoke?](#), [Managing air quality in the CVRD](#).

Other actions currently underway include developing public outreach materials and partnership projects with the Ministry of Environment and Climate Change Strategy (MOECCS) including an [emissions inventory](#), and a regional [air quality study](#) for the Cowichan Valley. Additionally the district is undertaking an Open Burning reduction Study which has two phases:

- a) a study to identify key areas for management of open burning, and
- b) a set of recommendations for reducing open burning emissions including:
 - a yard and garden waste feasibility assessment
 - best practices for management of garden debris, and
 - debris management in agricultural areas.

The Cowichan Valley Region District also partnered with MOECCS to install an additional air quality monitoring station. The region now has four stations to characterize air emissions for the region. There is initial discussion on the feasibility of installing low cost sensors to further characterize possible air quality hot spots in the region. This is expected to help with public outreach and communication of air quality issues.

The Cowichan Valley Region District also has bylaws in place which regulate backyard burning in 6 electoral areas and 4 municipalities. Additionally, the municipalities and the district are working to harmonize and improve air quality regulations throughout the region.

Comox Valley Regional District

The communities of Courtenay, Comox and Cumberland are located on the East Coast of Vancouver Island at the base of the Comox Valley in the Comox Valley Regional District. Air quality concerns were raised due to the prevalence of open burning and woodstove use in the valley. Emissions from these activities are trapped in the valley bottom by inversions in the winter where they can build up to unacceptable levels.

The Comox Valley Regional District has met with Provincial representatives to discuss a path forward to respond to elevated PM_{2.5} levels. A [forum on air quality](#) was attended by elected officials

and experts in the field of air quality. This forum illustrated the importance of woodstoves and open burning contributions to overall emissions in the region and set the stage for future development of strategies to address these concerns. The Regional District is also participating in the Provincial woodstove exchange program and is expected to produce educational materials, brochures, outreach materials and increasing incentives to improve public uptake in the program

Initiatives in the Comox Valley are gaining momentum as a group of concerned citizens are working to increase awareness of air quality issues in the Region. A website, Facebook page and informative pamphlets have been organized to educate and increase communication about air issues in the region. The group called [Breathe Clean Air Comox Valley](#) provides residents a forum to constructively discuss air quality, coordinate action and drive change. This group, led by Jennell Ellis, was recognized as a Clean Air Champion in [B.C. Lung's 2017 State of the Air](#) report for their work in the Region.

In Cumberland, delegations made of community members have approached council to request action on woodsmoke and backyard burning. The Village of Cumberland has been responsive, taking action to ban yard waste fires as of February 2017. Additional bylaws related to open burning are being considered in the region.

The MOECCS is completing an air quality report for the valley and also partnered with the University of British Columbia to complete a spatial monitoring study for PM_{2.5}. The results from both of the pieces of work will support next steps.

Alberni Valley

Port Alberni exceeded the CAAQS for particulate matter in the 2014-2016 Georgia Strait Air Zone Report, and as a result MOECCS will meet with representatives in the Port Alberni to discuss actions that could target and reduce particulate matter emissions. The community has already established an effective [Air Quality Council](#) (AQC) that will assist in implementing further strategies to improve PM_{2.5}. The AQC membership consists of provincial and local government officials, community members, First Nations, and industrial representatives. The group has been active in the Alberni Valley since 2006 and has been instrumental in public outreach and local government bylaw development to date.

Air Recent progress includes banning open burning within Port Alberni City limits and regulating woodstoves in the city, producing open burning guidelines for the Regional District, completion of a comprehensive [Air Quality Report](#), public outreach and awareness initiatives, including a B.C. Lung sponsored Air Quality public forum in May 2016 and a [Review of Open Burning Bylaws on Vancouver Island](#). The AQC also plans to complete a woodstove survey in the community to assist local government with next steps.

Central Interior Air Zone

The Central Interior Air Zone includes the communities of Prince George, Williams Lake, Quesnel, Smithers, Houston, Burns Lake, Valemount and Vanderhoof. Emission sources for PM_{2.5} include

residential wood heating, open burning of forestry waste and transportation. Industrial sources also contribute, with large sources including the pulp and paper mills in Prince George and Quesnel, a petroleum refinery in Prince George and various wood manufacturing facilities throughout the air zone.

Smithers and Vanderhoof were assigned “red” management levels for PM_{2.5} in air zone reports up to and including the 2013-2015 period. In the most recent air zone report (2014-2016) the District of Houston emerged as an additional “red” zone community, Vanderhoof remained at the “red” management level and Smithers levels improved, dropping below the CAAQS and into the “orange” management level.

In response to the “red” management level representatives of the MOECCS met with the communities of Smithers and Vanderhoof. The meetings focused on building a supportive foundation for air quality actions related to PM_{2.5}. Future meetings will be planned with the District of Houston.

Vanderhoof

MOECCS and Vanderhoof representatives met to discuss potential actions to respond to the “red” management level classification. As a result, Vanderhoof has taken a proactive approach to airshed management and have proposed a number of initiatives to reduce PM_{2.5} emissions.

Vanderhoof is conducting a woodstove survey designed to collect information on wood burning habits, the number of woodstoves in the community and whether those stoves are certified. The survey will also provide residents an opportunity to comment on local air quality. The MOECCS is supporting Vanderhoof in this initiative.

Data from the survey will feed into a proposed wood burning bylaw in the community that will address woodstove requirements. From a Provincial perspective the information will assist in developing targeted education materials and woodstove changeout programs.

Vanderhoof is also considering allocating funds to assist in woodstove changeout programs.

To reduce the amount of backyard burning biannual yard waste collection options are being

In reaction to the “red” Management Level classification, the community of Vanderhoof is considering an air quality bylaw that could include a prohibition on yard waste and grass burning, limitations on woodstove use during air quality advisories and requirements for upgrading solid fuel burning appliances to meet established Canadian or American standards.

considered. Additionally, to support these initiatives and potential wood burning bylaw, Vanderhoof plans to provide public consultation on the bylaw and an education campaign focused on options to reduce open burning and residential wood stove emissions.

To reduce vehicle emissions, Vanderhoof has anti-idling signs in the community to encourage residents and visitor to reduce vehicle emissions and promotes awareness and education to prevent unnecessary idling.

Additionally, in November, 2016 a B.C. Lung [Air Pollution and Health forum](#) was held in the community. This forum was designed to increase awareness of air quality concerns in the region.

Smithers

In 2012 Smithers and the Bulkley Valley area updated their [Clean Air Plan](#). The Plan focuses on improving fine particulate pollution in the region. It is expected that the communities will continue to work toward the goals in those plans. The community of Smithers also completed a [woodstove survey](#) to better understand burning practices and the number and type of stoves in the community. This may assist in evaluating hot spot areas for wood smoke in which targeted education could be initiated.

Smithers also continues to participate in the woodstove changeout program and is increasing public education by conducting bylaw outreach where a bylaw officer visits door to door to advise household of woodstove restrictions that are in place during air quality advisories as per their [Wood Burning Appliance Smoke Control bylaw](#).

Smithers is also expected to fund a micro-emission inventory for the region with support from the MOECCS, this will be an update to a similar study conducted in 2003. The Plan Committee is also evaluating the option of installing low cost sensors to enhance public outreach and to gain information on air quality hot spots. There are currently four low cost sensors being tested in the community.

Additionally, in November, 2016 an [Air Pollution and Health forum](#) was held in the community. The forum was well attended and included experts in woodsmoke health effects and air quality.

Houston

The District of Houston was assigned a “red” management level for the first time in the most recent 2014-2016 air zone report. The ministry intends to engage the local government on the community’s air quality and to begin working with them with them on ways to reduce particulate matter in the community. Actions will likely build on the Bulkley Valley Lakes District Airshed Management Society’s Clean Air Plan which includes the District of Houston.

Summary

This report provides an opportunity to share information on the range of activities being taken to improve PM_{2.5} in B.C. communities that are exceeding or have recently exceeded the CAAQS, and to



highlight collaborative efforts at the local level. The provincial approach to air zone management is to build upon federal and provincial programs to protect air quality across B.C. and support local actions with the highest priority assigned to communities with “red” management levels. This would include Courtenay, Duncan and Port Alberni in Georgia Strait Air Zone and Smithers, Houston and Vanderhoof in Central Interior Air Zone as a result of elevated PM_{2.5} levels.

The province supports local efforts through early engagement, technical support and strategic funding and recognizes that local airshed management plans are an important part of these ongoing efforts.