REVIEW
OF
THE WILLIAMS LAKE AIRSHED MANAGEMENT PLAN

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Executive Summary

The Williams Lake Airshed Management Plan (AMP) was developed by the Williams Lake Air Quality Roundtable (WLAQR) and implemented in 2006, spanning a 10-year time frame. This report documents a review of the AMP conducted by Levelton Consultants Ltd. (LCL) in the fourth quarter of 2012 on behalf of the WLAQR.

The review investigates the effectiveness of the WLAQR in meeting the recommendations and air quality objectives contained in the AMP. It also considers the influences of new information regarding human health impacts of particulate matter and changes in air quality monitoring technology on future progress of the AMP and makes recommendations to ensure its continued effectiveness within the current planning time frame.

The review was conducted in two phases, the first of which evaluates achievements of the WLAQR based in part on the AMP objectives in addition to a series of performance indicators and a brief overview of ambient annual air quality trends in the airshed since 2006.

The second phase investigates the effectiveness of the WLAQR in maintaining effective stakeholder relations and community engagement in ongoing activities to improve air quality.

Challenges and roadblocks to progress are identified and recommendations for improvement are presented.

In summary, the work of the WLAQR has been highly successful. All key action items identified in the AMP have been implemented and modest improvements in air quality in response to lower anthropogenic emissions of particulate matter within the airshed have been achieved.

Continued public concern regarding air quality in the region leads to the recommendation that earlier source / receptor dispersion modeling should be revisited, especially in regard to industry point source emissions in Williams Lake and the Airshed.

It is suggested that a workshop be considered inviting interested participants from other airsheds to share experiences as this may facilitate future planning processes. A more formal partnership with a 'sister' airshed either in British Columbia or Alberta may also be considered.

No roadblocks to progress were identified during the review and subsequent to adopting recommendations contained in this report including for example efforts to improve the profile of the WLAQR and encourage wider participation in its activities, the AMP promises to be an effective planning tool in the future.

Acknowledgements

Levelton would like to thank the members of the Williams Lake Air Quality Roundtable for their support and cooperation throughout the project and also the British Columbia Ministry of Environment, in particular Doug Hill, Arvind Saraswat, Earle Plain and Graham Veale for their valuable contributions to this report. We also recognize the contributions made by Bert Groenenberg (Chair), Earle Plain, Norm Zirnhelt and others towards the development of the original Airshed Management Plan.

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1 Introduction

This report presents the findings and recommendations of a review of the Williams Lake Airshed Management Plan (AMP), conducted by Levelton Consultants Ltd. (LCL) in 2012. The AMP was developed by the Williams Lake Air Quality Roundtable (WLAQR) and formally implemented in July 2006. It contains a series of clear goals and objectives for the 2006 – 2016 period aimed at improving air quality through reductions in emissions across all sources (see section 3.2).

The first part of the review evaluates achievements of the WLAQR based in part on the AMP goals in addition to a series of performance indicators and finally, a review of ambient annual air quality trends in the airshed since 2006.

The second part investigates the effectiveness of the WLAQR in maintaining effective stakeholder relations and engaging the community in continuing activities designed to further improve local air quality. In addition to documenting the many successful outcomes of the AMP since implementation, challenges and roadblocks to progress are also identified and recommendations for improvement are presented.

2 Airshed Planning in British Columbia

In general terms, an airshed is a region of the lower atmosphere which is homogeneous in regard to the transport and dispersion of air emissions. Airshed boundaries may be defined by topography, typically valleys surrounded by mountainous terrain within which, under certain weather conditions, limited ventilation results in episodes of poor air quality. In regions of flat terrain, airsheds may be defined by geographical coordinates (e.g. latitude and longitude or survey grid) or municipal, county or township boundaries.

During the mid-1990s the idea of addressing local air quality issues in BC by developing and implementing local solutions gained increasing attention and airsheds effectively became the management units within which these solutions were implemented. Today, a more appropriate definition might be that an airshed is *a defined, geographical region within which air quality can be monitored and managed*.

Early management of air quality in British Columbia focussed on the control of industrial point source emissions. As ambient air quality improved as a result of reductions in industrial emission reductions, the relative contribution from other sectors began to grow in some areas unmasking residual air quality problems from sources previously discounted as minor.

Recognizing this trend, the *Environmental Management Act* (formerly the *Waste Management Act*) was revised during the early 1990s to regulate emissions from area-based sources including woodstoves, open burning, motor vehicle emissions as well as fuel quality and to address growing concerns to human health from particulate matter and ozone. Programs were also introduced to educate citizens on matters relating to air pollution in general. These included ‘Clean Air Day’, ‘Go Green’ and the ‘Wood Stove Exchange Program’ which offers incentives

to purchasers of new, low emission domestic wood burning stoves. At the same time, there was a growing awareness of the effectiveness of the airshed approach to air quality management in the Province. The following regions adopted this approach when they first developed air quality management plans in the years noted below:

- Smithers, 1992
- Greater Vancouver Regional District (GVRD - now Metro Vancouver), 1994
- Bulkley Valley, 1995
- Fraser Valley Regional District (FVRD), 1997
- Prince George, 1998

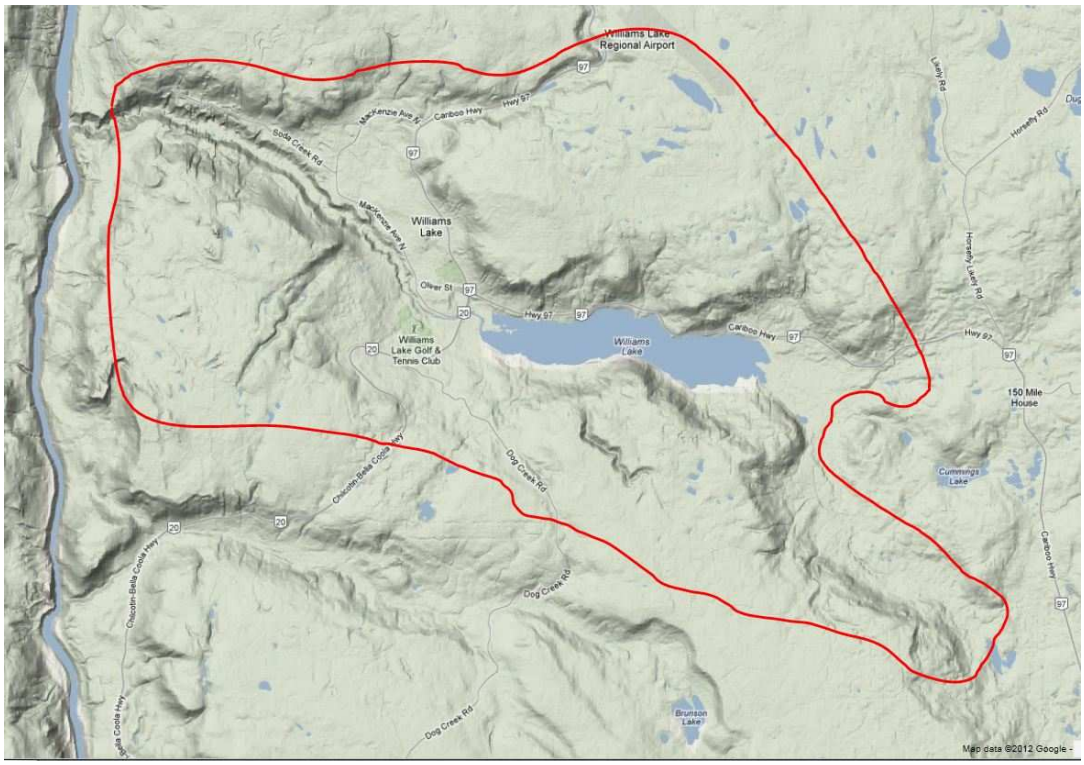
More recently, in keeping with its commitment to implement Canada-wide Standards for air quality and its provisions for Continuous Improvement and Keeping Clean Areas Clean, the British Columbia Ministry of Environment (MoE) has developed a framework for airshed planning for the Province[1]. The MoE also hosts the BC Air Quality[2] website which contains a wealth of practical information relating to air quality management in the province with links to individual airshed plans, and related documents and activities.

The boundary of the Williams Lake Airshed, shown in Figure 2-1, is defined by local topography and closely follows the 850m contour.

[1] See: http://www.bcairquality.ca/reports/pdfs/airshedplan_provframework.pdf

[2] See: http://www.bcairquality.ca/plans/airshed-planning-bc.html

Figure 2-1 Location of the Williams Lake Airshed



3 The Williams Lake Airshed Plan

3.1 Early Development

Between 1990 and 2000, a number of significant steps were taken to improve air quality in Williams Lake. These included the elimination of local beehive burners, construction of the new Williams Lake power plant, a 66MW clean burning biomass facility, and the introduction of a number of regulations and bylaws aimed at reducing air emissions in the region.

These steps, however, were conducted on a piecemeal basis and it was not until December 1999 that an airshed management planning approach was formally adopted to address community air quality issues. Between 2000 and 2006 efforts to more accurately quantify local air quality and further reduce emissions continued and a number of studies were conducted.

The first was a background[3] report on air quality within the airshed summarizing ambient air quality information collected in the 12-year period prior to 2003. The purpose of the report was to determine the direction of further local air quality characterization and to contribute to recommendations for the Airshed Management Plan.

An updated emission inventory[4] was compiled for the region in 2005, the data from which provided input to a source apportionment study[5] which used the CALPUFF model.

The net results of the 1990 to 2005 activities resulted in improvements in ambient air quality, but monitoring data indicated the need for further action. This in turn led to the development of the WLAMP which was implemented in 2006.

[3] Levelton Consultants Ltd., Schutte, A., Newton, T. and E. Plain. 2003 *Williams Lake Airshed Management Planning Background Air Quality Report.* Prepared for Ministry of Water, Land and Air Protection, Cariboo Region, Williams Lake, B.C.

[4] *Inventory of Common Air Contaminants Emitted in the Williams Lake Airshed for the Year 2000*, Plain, Earle, May 2002 (Revised July 2005), Prepared in 2002 by Ministry of Water, Land and Air Protection; issued in 2006 by Ministry of Environment.

[5] *Fine Particulate Source Apportionment Update for the Williams Lake Airshed Based on Calpuff Modelling* , Koscher C, and A. Schutte, Levelton Consultants Ltd., 2005, prepared for the Ministry of Environment Cariboo Region, Williams Lake, B.C.

3.2 Summary of Goals and Objectives

The recommended actions of the AMP are summarized in Table 3-1 and specific air quality goals through the planning timeframe are shown in Table 3-2. (The intent of the AMP is for action items in Table 3-1 to be incorporated into community and industry planning activities as opportunities arise within the 2006–2016 time frame).

Table 3-1 Summary of Action Items, Indicators and Strategies of Williams Lake AMP

AMP Action Items	Indicators	Strategies
1. Dust mitigation from paved and unpaved road surfaces.	Reduced concentrations of ambient particulate matter.	Various strategies including dust suppression, increased sweeping frequencies, use of liquid de-icers in lieu of winter sand/salt application on roads in addition to more paved roads and alleys as well as bylaw recommendations.
2. Reduce emissions from backyard burning.	Reduced concentrations of ambient particulate matter.	Request[6] that the MoE issue stage 1 (voluntary) and stage 2 (mandatory) burning advisories within the Williams Lake airshed.
3. Reduce emissions from wood burning appliances.	Reduced concentrations of ambient particulate matter.	Request that the City of Williams Lake and the Cariboo Regional District fringe area implement a bylaw to regulate domestic wood fired boilers and furnaces.
4. Transportation.	Reduced concentrations of ambient particulate matter and ozone precursors.	Recommend bike lanes on new roads, enhanced trail and public transit networks. Request Environment Canada to support biennial vehicle emission clinics.
5. Community and Regional Planning.	Periodic review of Gaussian plume model (GPM) predictions based on updated emissions inventories. Include the WLAQR in all regional planning initiatives. (City and Cariboo Regional District).	Request the BC MoE to provide comprehensive emission estimates within the airshed on a five year cycle.
6. Public Education.	Reduction of anthropogenic air emissions from improved lifestyle habits.	Implement educational programs and workshops to engage public support in efforts to reduce air emissions.

[6] The MoE has since adopted a policy of issuing advisories.

Table 3-2 Clean Air Goals 2006-2016

Year	PM_{10} Goals* ($\mu g/m^3$)	$PM_{2.5}$ Goals** ($\mu g/m^3$)	Items for Annual Review
2006	50*	**30****	Ensure all permits consistently meet current standards and are in compliance
2007	"	"	
2008	"	"	
2009	50**	20**	Review attainment of 2009 targets
2010	"	"	
2011	"	"	Confirm 2012 targets
2012	40**	18**	Establish 2016 targets in light of health info., new technology and monitoring data
2013	"	"	
2014	"	"	
2015	"	"	
2016	"	"	

* 24-hour average not to be exceeded

** 24-hour average – achievement based on 98th percentile ambient measurement annually averaged over 3 consecutive years (allows for 7 days of exceedances per year)

4 The Williams Lake AMP Review

4.1 Methodology

Review criteria were based on the activities and indicators in Table 4-1 which were developed from those used in a 2009 provincial airshed review[7] and modified with input from the WLAQR to fit the needs of the Williams Lake AMP review.

Table 4-1 Summary of WLAQR Activities and Evaluation Criteria

Activity	Indicator

Public Outreach	• Is the commitment to public outreach being maintained?
	If so, list the most recent activities.
	• Of the following programs supported by the WLAQR, which are actively being maintained?
	  • Educational program promoting rules and guidelines for open burning
	  • Alternatives to burning including chipping and re-use and /or chipping and composting of vegetable materials
	  • Lifestyle impacts on air quality through media, school programs, etc.
	  • Anti-idling
	• Has any other agency undertaken similar activities aimed at improving air quality since 2006?
	• Are there any tangible measures of public opinion change?
	• Are the numbers of attendees at scheduled events, e.g. Clean Air Day, available?
	• Are 'hit' counter stats available that would indicate trends in web site visits?
	• If applicable, how has the WLAQR interacted with other environmental interest groups (to share information, mentor, get new ideas, etc.)?
	• Is there any material available to the public outlining Williams Lake Air Quality priorities and actions?
	• Is the public aware of the Roundtable and its role?
	• Are people more knowledgeable today (compared with 2006) regarding regional air quality?
	  • How do we know this?

Stakeholder Engagement	• Has the level of support from the BCMoE changed since 2006? • Is the WLAQR active? (Summarize current activities). • Have AGM attendance numbers changed significantly over time? • Are there any stakeholders *not* represented on the WLAQR? • Are there opportunities for stakeholders other than WLAQR members, to engage in society activities? • Does the WLAQR have a 'champion' in local government?

[7] "Review of Airshed Planning in British Columbia" Levelton Consultants Ltd., 2009

Activity	Indicator
Technical and Regulatory	• Have specific, quantifiable objectives been defined (e.g. source emission rates, acceptable receptor concentrations etc.)? • When was the emissions inventory last updated? • Have milestones been established (specific activities towards implementation including end dates)? • If so, has progress been made towards implementation [% milestones reached or (a) on schedule, (b) behind schedule]? • What is the current status regarding proposed amendments to the Open Domestic Appliance Regulation projected for implementation in October Burning Smoke Control Regulation and the Solid Fuel Burning 2012? • Have improvements in air quality been observed that would indicate that planned targets are being met due to implemented actions? • Have changes been made to legislation, e.g. permit amendments, burning bylaws etc.? Focus will be on changes resulting from AMP activities. • Has consideration been given to reducing reliance on carbon based fuels thereby reducing GHGs since the implementation of the GGCRTA? • Identify emissions outside the boundaries of the Williams Lake Airshed that may potentially impact air quality within the airshed.
WLAQR Dynamics	• Has the level of engagement of stakeholders remained the same or changed over time? • Are stakeholder groups more knowledgeable today regarding air quality than when the AMP was first implemented in 2006? • How are current stakeholder representatives supportive of on-going actions to improve air quality in the Williams Lake airshed? o Please describe and provide examples as necessary. • Are stakeholders willing to continue contributing resources to airshed management planning? • Beyond time spent conducting administrative activities, what are these resources and who will provide them? • Is there a consistent level of trust between stakeholders? If not, what has occurred to erode or enhance the level of trust? • Are contributions of individual stakeholders adequately recognized? • Evaluate WLAQR membership trends (how many new members attracted by year?). Increasing, decreasing or static? • Has the WLAQR conducted a self-evaluation recently and if so, what were the findings? • List current committees (review rationale and recent activity). • Are meeting agendas and minutes compared and reconciled? • Are action items identified with responsible parties assigned and tracked to completion? • Does the WLAQR have a communications plan?

4.1.1 Phase 1 Review

This was primarily a desktop exercise intended to identify past and current activities of the WLAQR primarily with reference to web based materials and response to the first of two questionnaires. The first questionnaire was designed to poll for facts rather than opinions and was sent only to one WLAQR member, deliberately unidentified in the report to minimize the risk of internal bias.

In addition to reviewing the recommended actions of the AMP summarized here in Table 3-1, Levelton also reviewed annual data of ambient particulate concentrations both for less than 10µm sized particles[8] (PM_{10}) and less than 2.5µm sized particles ($PM_{2.5}$) to determine to what extent actions taken since 2006 have resulted in improved local air quality.

While the project scope does not include a comprehensive emission inventory we referred to the following data sources to identify any significant changes in emissions from each of the above noted categories. Those data sources included:

- Industry permits. New, revoked or amended permits where effluent discharge have significantly changed.
- Change in number of industrial operators in the region.
- Specific initiatives taken including plans and studies aimed at reducing emissions.
- Protocols, community plans (e.g. the Community Energy Plan), etc., to reduce emissions.
- Annual ambient air quality data summaries for the region since 2006.
- Changes to the ambient monitoring station network including technology upgrades.

The blank Phase 1 Questionnaire is provided in Appendix A.

4.1.2 Phase 2 Review

This phase examines the social mechanisms which significantly contribute to the success of an airshed management plan. Both the level of community support and continued commitment to air quality improvement initiatives were examined, in addition to the internal functionality of the WLAQR. A ‘blind’ questionnaire using web based ‘Survey Monkey’ software was compiled based on performance indicators shown in Table 4-1 under activities titled "Stakeholder Engagement" and "WLAQR Dynamics". Input from returned questionnaires in addition to telephone discussions with WLAQR members was used to identify challenges and roadblocks that may limit ongoing effectiveness of the plan. This forms the basis for recommendations for continued success and highlights areas for improved future performance.

Questions and detailed responses to the Phase 2 (second) Questionnaire are provided in Appendix B.

[8] One micrometer (1µm) is equivalent to one millionth of a metre.

5 Review Findings

5.1 Phase 1 Findings

All action items identified in the 2006 Airshed Management Plan (summarized here in Table 3-1) have been implemented and strategies for their continued support are being actively maintained.

5.1.1 Progress Achieved Since 2006

Dust Mitigation: Table 3-1, Action Item 1: Arguably, the most significant area of achievement has been in dust suppression and avoidance, most notably in the industrial and transportation sectors. Examples of ongoing initiatives include:

- Auditing trucks for dust removal prior to departing industrial sites.
- Specific facility improvements to minimise dust, e.g. from exposed conveyors.
- Periodic clean-up of outdoor storage areas to minimize accumulation of dust.
- Seasonal dust suppression using water hoses or spray trucks to remove winter build-up of sand from paved roadways in addition to as-required water spraying throughout the rest of the year.
- Spring street cleaning to remove winter build-up of traction material in the municipality and application of dust suppressants to unpaved lanes in the City.

Reduce Emissions from Backyard Burning: Table 3-1, Action Item 2:

- In 2012 the BC MoE adopted a policy for issuing air quality advisories in BC
- The City of Williams Lake has introduced bylaw 1947 which requires that:

> No person shall light, ignite, start or maintain, or allow or cause to be lighted, ignited started or maintained, any open air fire, except:
>
> (a) Outdoor cooking fires provided the fire is contained in a device or fixture designed for such purpose and the fire is only burning clean dry wood or briquettes;
>
> (b) Outdoor fires in pits approved by the Fire Chief for use in licensed campgrounds or tourist parks;
>
> (c) Fires deemed necessary for municipal burning; and
>
> (d) Fires lit for Fire Department training exercises.

Reduce Emissions from Wood Burning Appliances: Table 3-1, Action Item 3:

The wood stove exchange program was implemented in 2002 to reduce emissions from wood burning appliances. See also Public Education, Action Item 6. The City of Williams Lake passed a bylaw to regulate wood fired boilers and furnaces.

The City introduced Bylaw 2087 (the Solid Fuel Burning Appliances Bylaw) which regulates indoor and outdoor appliances (i.e. it includes both residential appliances and outdoor wood-fired boilers). It requires appliances to be CSA emissions certified but does not deal specifically with excessive smoke issues, sunset clauses, etc.

Transportation: Table 3-1, Action Item 4:

The City of Williams Lake has demonstrated its commitment to reducing emissions from the transportation sector through its Community Energy and Emissions Plan documented in the Official Community Plan (OCP) that will include a set of detailed actions in support of energy and emissions policies to support the GHG reduction targets and general policies. Shortly after the April 2011 publication of the OCP, the Green Fleets Strategy was announced. This summarizes the research completed and identifies actions to be undertaken by city staff and managers in order to reduce emissions of the fleet. It allows for the City to make an organized and directed approach to improving the overall efficiency of the City's fleet during its operations. This also has the positive side effects of reducing fuel and maintenance costs, improving the resiliency of the fleet, and promoting environmentally conscious actions to the community. See also the Green Fleets Strategy document[9].

The City has since developed a bike lane on Mackenzie Avenue, installed two additional bike racks on city buses and actively promotes the "Bike to Work Week" program.

Community and Regional Planning: Table 3-1, Action Item 5

In keeping with the strategy for action item 5 a request was made to the BC MoE to provide comprehensive emission estimates within the airshed on a five year cycle and for a periodic review of Gaussian plume model predictions to be made. The most recent emissions inventory update and GPM modeling was conducted in 2004/5 and Gaussian modeling based on updated emission estimates is recommended.

An additional indicator of community and regional planning activities was to include the work of the WLAQR in all regional planning activities. Airshed management is clearly documented (pp 9-11) in the OCP[10].

[9] http://www.williamslake.ca/files/1/doc_devel_green_fleet_strategy_FINAL.pdf

[10] http://www.williamslake.ca/files/1/doc_OCP_Final_April_2011.pdf

Public Education: Table 3-1, Action Item 6

The wood stove exchange program is the most noteworthy indicator of success in reducing anthropogenic emissions from improved lifestyle habits. The following points highlight the ongoing success of that program since 2002:

- The wood stove exchange program in the Cariboo district has resulted in 391 'change outs' since it was first introduced in 2002. The program continues to receive support from the provincial government and during the 2011-2012 operating year 25 wood stoves were exchanged.
- The exchange program will run again through 2012-2013, but will be administered through the Regional Coordinator of the Baker Creek Enhancement Society in Quesnel.
- There are approximately 20 rebates left for the entire Cariboo region and these will be issued on a first-come first-served basis within the region.

Numerous actions to minimize emissions from combustion of both industrial and forestry activities are ongoing and include:

- Plans to coordinate forestry sector burning, the object being to take better advantage of favourable venting conditions during the fall months compared with poorer winter dispersion conditions.
- Increased use of wood chippers is resulting in lower volumes of wood being burned, thus reducing air emissions. (Commercial uses for wood chips include biomass solid fuel feedstock, wood pulp, organic mulch in gardening, landscaping, restoration ecology and mushroom cultivation.)

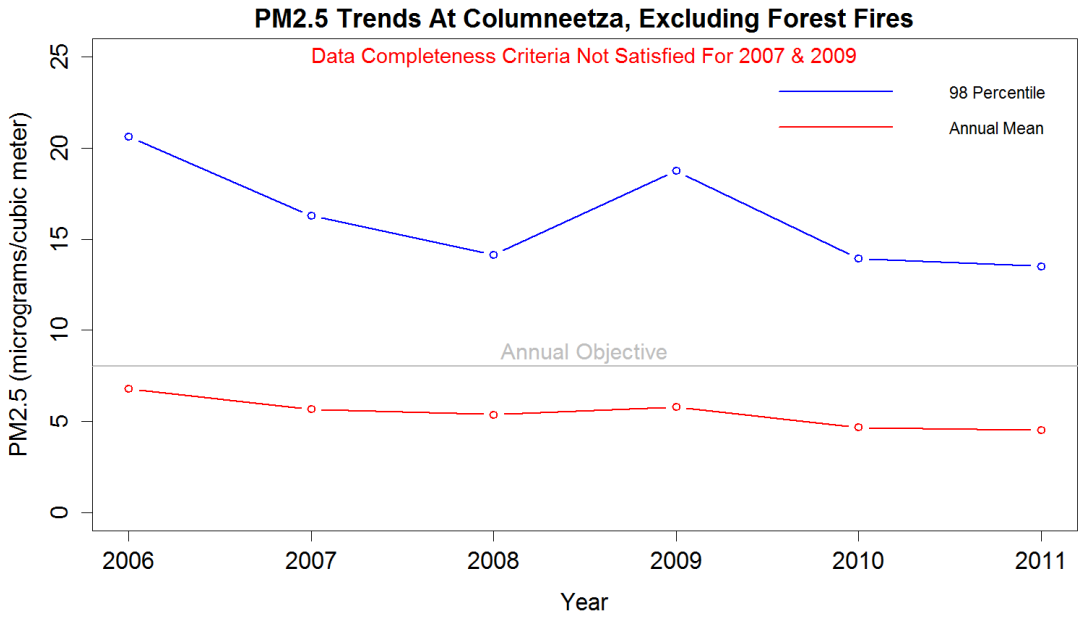
Additionally, stakeholders have agreed to participate in a five-year (2013-2018) particulate monitoring program. Under the auspices of the WLAQR, contributors to the program will include:

- The BC MoE will be responsible for providing instrumentation (other than monitoring pursuant to permit requirements)
- Permitted operations emitting more than 1% of the total fine particulate matter (FPM) discharged into the Williams Lake airshed from that sector on an annual basis. Funding from these sources provided by each company in proportion to their annual total particulate matter emissions into the Williams Lake airshed.
- School District 27, the City of Williams Lake, the Cariboo Regional District, the Ministry of Transport & Infrastructure and the Cariboo Fire Centre will provide in-kind contributions and direction as required.

5.1.2 Trends in Ambient Air Quality Since 2006

Levelton's in-house review of the complete sets of ambient monitoring data between 2006 and 2011 for the Columneetza and CRD Library monitoring sites found no evident long-term trends in $PM_{2.5}$ readings at either location. However, the graphs[11] compiled and presented by the MoE at the May 2012 WLAQR meeting selectively excluding data collected during the major forest fire events indicate clear downward trends in levels of ambient particulate matter between 2006 – 2012 at both sites. This suggests that efforts to reduce anthropogenic emissions since the implementation of the AMP have been effective.

Figure 5-1 Trends in Ambient $PM_{2.5}$ Excluding 2010 Forest Fires 2006 – 2011 Columneetza Monitoring Site



[11] *Ambient Air Quality in Williams Lake: A Summary*. MoE presentation to the WLAQR, May 4th 2012. See: http://www.breatheasywilliamslake.org/resources/Resources/WLAQRT-presentation2012.pdf

Figure 5-2 Trends in Ambient $PM_{2.5}$ Excluding 2010 Forest Fires 2006 – 2011 CRD Library Monitoring Site

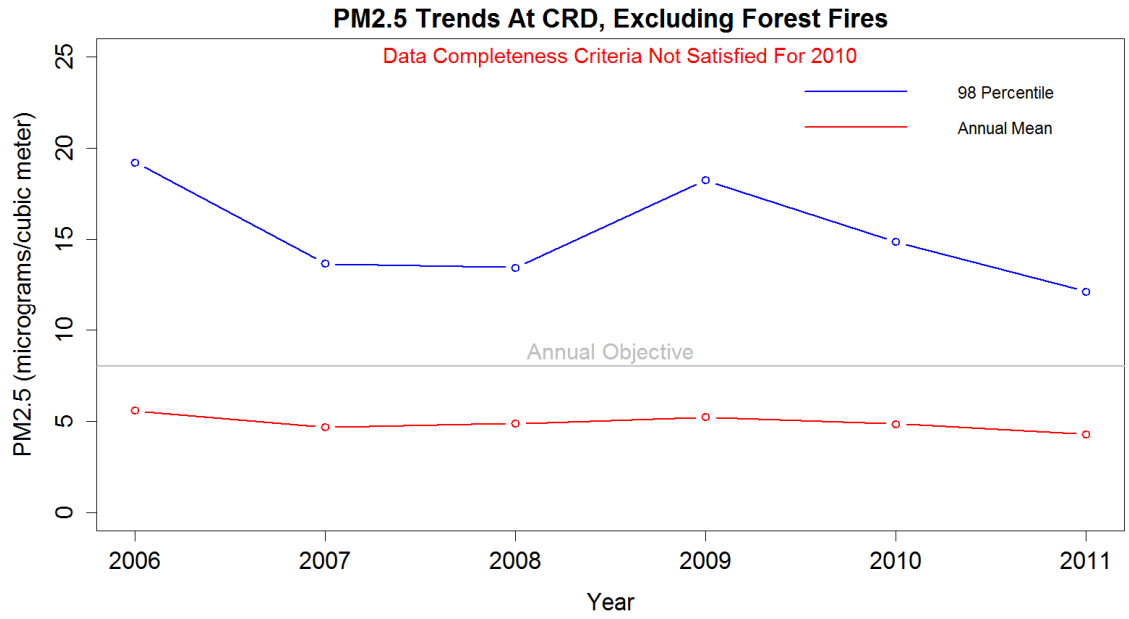


Figure 5-3 $PM_{2.5}$ Trendlines (98th Percentile, 3 Year Moving Average) 2006 – 2011 Columneetza and CRD Library Monitoring Sites (Excluding 2010 Forest Fires)

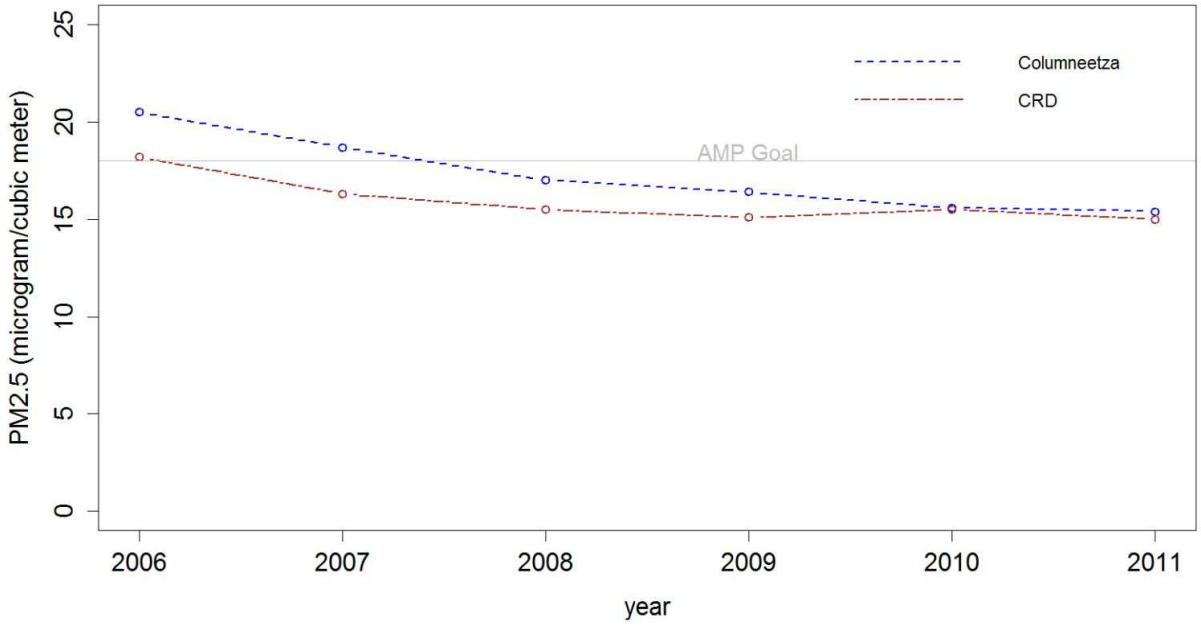
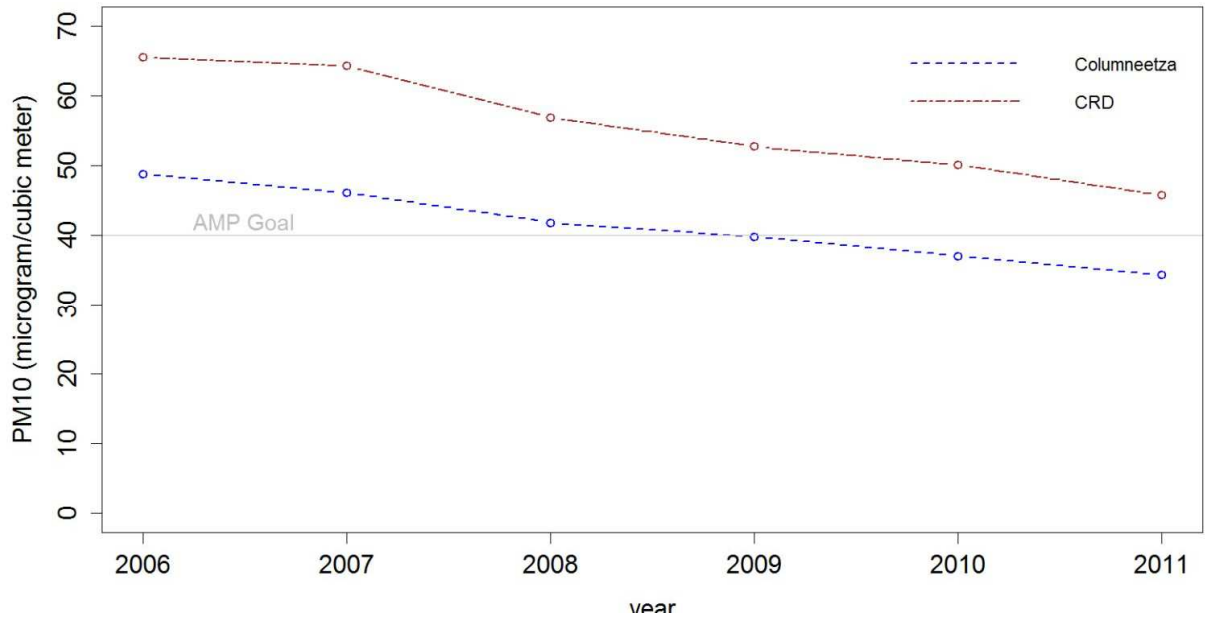


Figure 5-4 PM_{10} Trendlines (98th Percentile, 3 Year Moving Averages) 2006 – 2011 Columneetza and CRD Library Monitoring Sites (Excluding 2010 Forest Fires)



5.2 Phase 2 Findings

This section contains a summarized account of the 10 returned Phase 2 Questionnaires, full details of which are given in Appendix B.

Air quality has been identified as a major environmental concern by the residents of Williams Lake but many members of the public are unaware of the Williams Lake Air Quality Roundtable (WLAQR) and the work it is engaged in.

The Roundtable's website, http://www.breatheasywilliamslake.org/, as well as the City of Williams Lake website are the principal mechanisms of public communication, and the website should be regularly maintained to reflect current events and to allow dissemination of most recent reports and data. Currently, the air quality educator (funded by the MoE) plays an important role in public outreach. Roundtable members suggested utilizing radio messaging further, and appearing at more public events.

Many respondents felt that air quality stakeholders were missing from the WLAQR, such as CN Rail, School District 27, Thompson River University, First Nations Bands and additional industry representatives, but noted that they are welcome to attend meetings. Roundtable members are supportive of ongoing actions to improve air quality in Williams Lake, including the sustained contribution of resources. Interest lies in reducing emissions through industry changes, anti-idling campaigns, improved monitoring equipment and burning protocol. The

majority of respondents did not feel the contribution of stakeholders was adequately recognized. Respondents noted that while the Cariboo Regional District and the City of Williams Lake are represented, neither could currently be considered a “champion” for the WLAQR. Engagement could improve with better communication.

Little consideration has been given to reducing use of carbon-based fuels and thereby greenhouse gas emissions. All respondents felt the Airshed Management Plan has made a positive difference in air quality by reducing emissions from specific industries, and many noted the value in setting goals and developing strategies to work toward them and striving to continuously improve. Some respondents thought that regulations are not strict enough or sufficiently broad reaching to sustain continuous improvement.

The WLAQR is considered active, especially in regard to coordinating dust management activities, individual stakeholder action (i.e. reducing 'track-out' from a lumber plant) and education and awareness. Roles at the Roundtable are ‘somewhat’ defined. It has been suggested that the Prince George Roundtable[12] could be used as a template for organizational structure.

As with the findings of the Quesnel airshed planning review[13], new membership at the Roundtable is welcome, and it was recommended that an informational package be compiled and distributed to potential invitees. Respondents indicated that the quality of work done by the Roundtable is good, but that the workload (quantity) could be increased.

The biggest challenges facing the WLAQR currently are the lack of a communications plan, shortage of staff and interest from the broader community. From an air quality perspective, a challenge will be conveying to stakeholders and the public that more still needs to be done to improve air quality, even in the absence of obvious problems (visibility, odours etc.); forest fires and long range transport from outside the airshed mask local air quality improvements.

[12] The PGAIR Phase III implementation plan can be viewed and downloaded at the Prince George Air Improvement Roundtable at http://pgairquality.com/about-pgair

[13] *Quesnel Airshed Management Plan Review – 2011*, Cariboo Environmental Quality Consulting Ltd., June 2011.

6 Potential External Influences on Future AMP Goals

Since 2006, research into health impacts of air pollutant species and advances in ambient air quality monitoring technologies have changed considerably. While discussion will focus on fine particulate matter, other recently emergent issues will be considered, (including a discussion on the significance of radon as an indoor air contaminant in the region) and options for addressing these issues.

6.1 Summary of Findings on Health Effects of Air Contaminants Since 2006

The following discussion summarizes the most up to date scientific understanding relating to human health impacts from various airborne contaminants.

6.1.1 Particulate Matter

Health research on particulate matter since 2006 has increasingly been focussing on smaller particle sizes, especially the fine particulates ($PM_{2.5}$) and ultrafine particles (UFP), and mounting bases of evidence on cardiovascular systemic effects and physiological mechanisms have been published. The origins of such particles are wide ranging but typically they are products of combustion and include internal combustion engines (emissions from cars, sport utility vehicles, minivans, other light and heavy trucks, buses, aircraft, railways, marine vessels, and non-road engines such as agricultural, construction, recreational, and lawn and garden equipment), as well as incinerators, forest fires and even domestic and commercial grilling and broiling.

6.1.1.1 Fine Particulates ($PM_{2.5}$)

$PM_{2.5}$ is a significant concern from a health perspective as, when respired, particles can reach the alveoli (gas exchange region of the lungs), contributing to a multitude of adverse respiratory and cardiovascular outcomes, including those listed above. PM_{10} impacts further up the respiratory tract than $PM_{2.5}$ and also causes unfavourable health outcomes such as triggering and exacerbating asthmatic and sinus episodes.

Fine particulate matter has been specifically found to induce systemic inflammatory changes, affecting platelets and blood coagulation, contributing to angina and myocardial infarction[14].

A recent research news item published by Science Daily[15] noted that older adults may be susceptible to increased risk of hospitalization for lung and heart disease as well as stroke and diabetes following long term exposure to fine particulate air pollution. Studies investigating the links between long term health effects and $PM_{2.5}$ exposure estimated zip code concentrations of $PM_{2.5}$ particles. These particles, such as soot from vehicles, and other particles from power plants, wood burning, and certain industrial processes, are a significant health risk when they

[14] Kampa M, Castanas E. Human health effects of air pollution. Environmental Pollution. 2008 Jan;151(2):362–7.

[15] "Long Term Exposure to Air Pollution Increases Risk of Hospitalization for Lung, Heart Disease", Science Daily, April 17th 2012. See: http://www.sciencedaily.com/releases/2012/04/120417221835.htm

lodge in the lungs, causing inflammation there and in the rest of the body, and contributing to lung and heart disease. The results showed an association between long-term exposure to fine air particles for all hospital admissions examined. For example, for every 10-μg/m^3 increase in long-term $PM_{2.5}$ exposure, the researchers found a 4.22% increase in respiratory admissions, a 3.12% increase in cardiovascular disease admissions, a 3.49% increase in stroke admissions, and a 6.33% increase in diabetes admissions.

A similar article also published by Science Daily[16] documented a study led by researchers at the Harvard School of Public Health (HSPH) which found an association between reductions in fine particulate matter and improved life expectancy in 545 counties in the U.S. between 2000 to 2007. It noted that this was the largest study to date to find beneficial effects to public health of continuing to reduce air pollution levels in the U.S.

6.1.1.2 Ultrafine Particles (UFP)

UFP are a fraction of PM defined as having a diameter less than 0.1μm[17]. UFP are often a direct product of combustion, though some secondary atmospheric formation occurs[18]. UFP are prevalent in urban areas and can account for over 90% of outdoor airborne particles by number[17].

Due to the size and number, UFP represent a large surface area to contact the body, come in a variety of shapes, and can have other contaminants such as metals attached to them. UFP are one type of PM linked to adverse health outcomes and could be partially responsible for the effects observed in epidemiologic studies that typically link exposure to NO_X with health outcomes, often at levels below those showing effects in controlled exposure studies[19, 20]. Further, the small size of the particles makes them respirable, permitting entry to the gas exchange area of the lung (alveoli), as well as enabling entry into the circulatory system and cell penetration via nonphagocytic[21] means[17]. UFP interactions within cells generate reactive oxygen species, leading to oxidative stress (an imbalance of destructive reactive oxygen species and the body's ability to repair damage), which in turn leads to considerable cardiovascular damage[22].

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16 "Declining Air Pollution Levels Continue to Improve Life Expectancy in U.S.", Science Daily, December 3rd 2012. See: http://www.sciencedaily.com/releases/2012/12/121203163538.htm

17 Geiser M, Rothen-Rutishauser B, Kapp N, Schürch S, Kreyling W, Schulz H, et al. Ultrafine Particles Cross Cellular Membranes by Nonphagocytic Mechanisms in Lungs and in Cultured Cells. Environ Health Perspect. 2005 Nov;113(11):1555–60.

18 Zhu Y, Hinds WC, Kim S, Shen S, Sioutas C. Study of ultrafine particles near a major highway with heavy-duty diesel traffic. Atmospheric Environment. 2002 Sep;36(27):4323–35.

19 Sioutas C, Delfino RJ, Singh M. Exposure assessment for atmospheric ultrafine particles (UFPs) and implications in epidemiologic research. Environ. Health Perspect. 2005 Aug;113(8):947–55.

20 Cyrys J, Pitz M, Heinrich J, Wichmann H-E, Peters A. Spatial and temporal variation of particle number concentration in Augsburg, Germany. Sci. Total Environ. 2008 Aug 15;401(1-3):168–75.

21 Phagocytes are the cells that protect the body by ingesting (phagocytosing) harmful foreign particles, bacteria, and dead or dying cells.

22 Xia T, Li N, Nel AE. Potential Health Impact of Nanoparticles. Annual Review of Public Health. 2009;30(1):137–50.

One paper described an expert European panel (clinicians, toxicologists and epidemiologists) that followed systematic methods to determine the likelihood that UFP exposure contributes to health outcomes[23]. The panel generally agreed that short-term exposure to high UFP concentrations was likely to contribute to all-cause mortality, cardiovascular hospital admissions, aggravation of symptoms in asthma patients and decreases in lung function. With long-term exposure, the experts tended to believe UFP are causally linked to all-cause mortality and cardiovascular morbidity. The panel emphasized that spatially resolved UFP estimates are needed in order to conduct much needed long-term epidemiologic studies.

There are currently no routine monitoring efforts or air quality objectives for ultrafine particles anywhere in North America. However, a wealth of emerging research is pointing to this fraction of particles for serious health effects. Exploration into measurement and monitoring technologies to record ultrafine particle concentrations is recommended. One option available is the TSI Ultrafine Particle Monitor 3031[24].

6.1.2 Diesel Exhaust

Another major advancement in particulate matter health effects knowledge is that in June 2012, diesel exhaust was reclassified as a Group 1 carcinogen, known to cause cancer in humans (since 1988 it had been a Group 2A, probable carcinogen)[25]. Efforts to reduce diesel exhaust emissions therefore have the effect of reducing airborne carcinogens as well as both $PM_{2.5}$ and UFPs.

Diesel exhaust management policies should be considered, to reduce diesel exhaust emissions from all sources in the Williams Lake Airshed. Anti-idling policies pertaining to heavy-duty diesel trucks, and truck route planning are examples of methods of attempting to reduce diesel exhaust emissions and exposure. Diesel exhaust management policy is related to reductions in $PM_{2.5}$ and will also assist in meeting current goals.

6.1.3 Short-lived Climate Forcers

Short-lived climate forcers are substances that remain in the atmosphere for a short period of time, relative to the long-lived greenhouse gas CO_2, and have climate change and air quality impacts[26]. As such, all substances can have indirect human health impacts through their contribution to climate change, and its multitude of impacts, in addition to the direct effects outlined below. The three principal species to be discussed are black carbon, methane and ozone.

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[23] Knol A, Hartog J de, Boogaard H, Slottje P, Sluijs J van der, Lebret E, et al. Expert elicitation on ultrafine particles: likelihood of health effects and causal pathways. Particle and Fibre Toxicology. 2009 Jul 24;6(1):19.

[24] TSI Group. Ultrafine Particle Monitor 3031, Particle Counters [Internet]. 2012 [cited 2012 Oct 5]. Available from: http://www.tsi.com/ultrafine-particle-monitor-3031/#Accessories

[25] IARC. Diesel Exhaust Carcinogenic [Internet]. International Agency for Research on Cancer; 2012 Jun. Available from: http://press.iarc.fr/pr213_E.pdf

[26] United Nations Environment Programme. Near-term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived Climate Forcers - A UNEP Synthesis Report [Internet]. Nairobi, Kenya: United Nations Environment Programme; 2011 p. 78. Available from: http://www.unep.org/publications/ebooks/slcf/

6.1.3.1 Black Carbon and Methane

Black carbon is a major component of fine particulate matter ($PM_{2.5}$). Toxicological studies show that black carbon, with a range of possible chemicals attached to it, may facilitate uptake of these substances into the body with a wide spectrum of health implications. Epidemiological evidence associates black carbon exposure with cardiopulmonary morbidity and mortality[27].

Methane is often associated with co-emitted pollutants, such as VOCs, which have health impacts and contribute to ozone, as well as other air toxics such as benzene (a carcinogen), tetrachloride and chloroform[26]. Methane itself, a relatively long-lived atmospheric contaminant, is only known to have human health impacts above 50000 ppm when it acts as an asphyxiant[28].

6.1.3.2 Ozone

As previously mentioned, ozone is a regulated criteria air contaminant. Ambient air quality monitoring in the Williams Lake airshed confirms that ozone concentrations are in compliance with Canada wide standards; however, it was recognized in the AMP that NOx and VOC emissions from the transportation sector can contribute to secondary ozone formation.

6.1.4 Radon

Long-term exposure to elevated concentrations of radon is associated with an increasing risk of developing lung cancer[29]. It is estimated that 16% of lung cancer deaths in Canada can be attributed to radon exposure, and after smoking, it is the second leading cause of lung cancer. Compounding smoking and radon exposure leads to a significantly increased risk of developing lung cancer. It should be borne in mind that radon is an indoor air pollutant and not within the mandate of the WLAQR, which is concerned primarily with ambient, outdoor, air quality issues and their resolution. However, additional information regarding radon programs may be obtained by contacting the Interior Health Authority[30].

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[27] World Health Organization. Health effects of black carbon [Internet]. Copenhagen; 2012 p. 96. Available from: http://www.euro.who.int/__data/assets/pdf_file/0004/162535/e96541.pdf

[28] Canadian Centre for Occupational Health and Safety. 2-Health Effects of Methane : OSH Answers [Internet]. 2006 [cited 2012 Sep 28]. Available from: http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/methane/health_met.html

[29] Health Canada. What are the Health Effects of Radon? [Internet]. 2012 [cited 2012 Sep 25]. Available from: http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/effects-effets-eng.php

[30] Interior Health Authority, 220 - 1815 Kirschner Road, Kelowna, B.C. V1Y 4N7. Phone: (250) 862-4200, Fax: (250) 862-4201

6.1.5 Formaldehyde

Short-term health effects of formaldehyde exposure include mucosal, respiratory and dermal irritation and nausea[31]. In 2006, IARC declared formaldehyde a known human carcinogen[32].

The most significant anthropogenic source of formaldehyde is from the exhaust of motor vehicles not equipped with catalytic converters. Formaldehyde also occurs naturally as a byproduct of the oxidation of hydrocarbons in the troposphere. Formaldehyde is also an intermediary in the methane cycle, with low background concentrations. It is one of the volatile compounds formed in the early stages of the decomposition of plant residues in the soil.

6.1.6 Summary of Air Quality Objectives in 2012

Ambient air quality objectives for British Columbia were updated in 2009 to include a more stringent objective for concentration of $PM_{2.5.}$ compared with the 30 $\mu g/m^3$ 24-hour Canada Wide Standard. Accordingly, a 24-hour provincial objective of 25 $\mu g/m^3$ was established and annual arithmetic mean objectives and planning goal levels were also added.

Table 6-1 Changes to Air Quality Objectives Since 2006

Species	Averaging Period	Provincial Objective (year updated)
$PM_{2.5}$	24 hour	25 $\mu g/m^3$ (2009)
	Annual arithmetic mean	8 $\mu g/m^3$ – objective (2009)
	Annual arithmetic mean	6 $\mu g/m^3$ – planning goal (2009)

6.2 Implications for Future Ambient Monitoring Data Post FEM Switch

The scheduled switch from older technology ambient monitoring of particulate matter to Federal Equivalent Method (FEM) technology in 2013 has raised some questions regarding comparability of existing data with those that will be collected from the new monitors.

BC is in the process of improving $PM_{2.5}$ air quality monitoring. Old monitoring technology is being replaced with new FEM monitoring technology. The FEM monitors are the accepted standard in the United States and Canada[33]. The old monitors result in a lower $PM_{2.5}$

[31] National Cancer Institute. Formaldehyde and Cancer Risk [Internet]. 2012 [cited 2012 Sep 26]. Available from: http://www.cancer.gov/cancertopics/factsheet/Risk/formaldehyde#r2

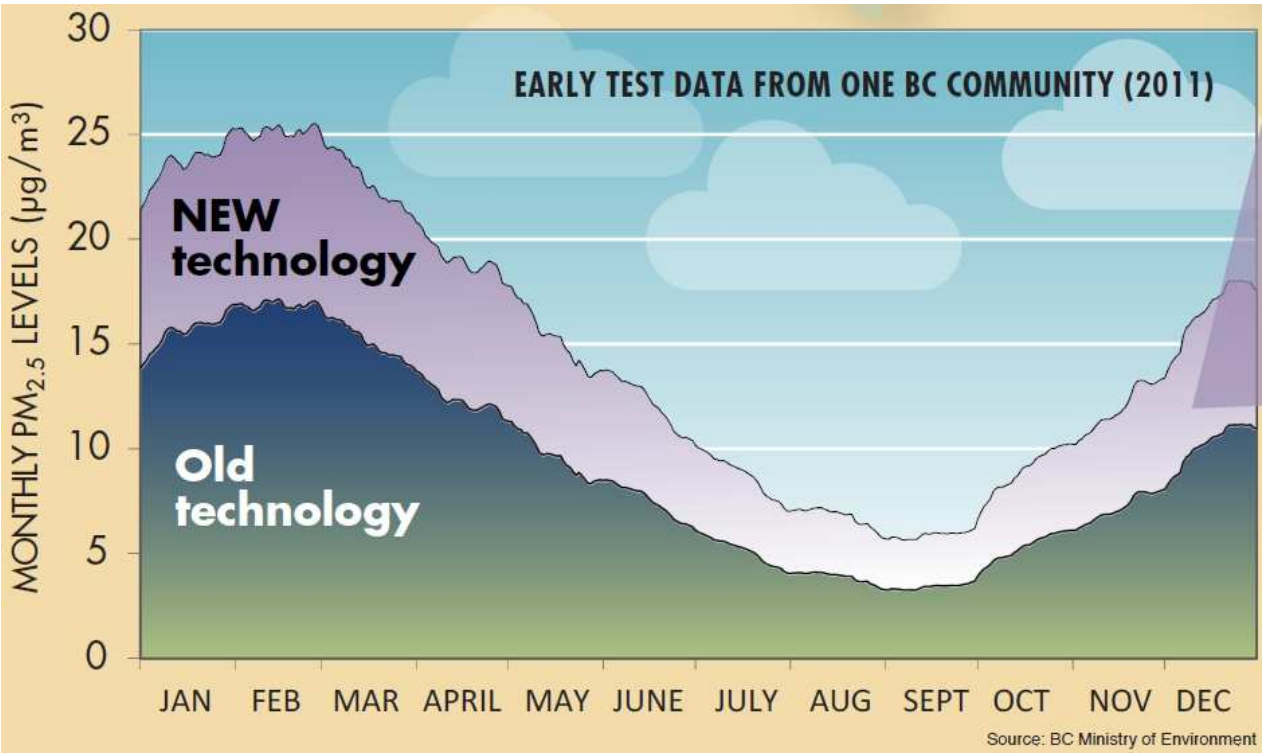
[32] IARC. IARC Monograph 88 - Formaldehyde [Internet]. Lyon, France; 2006. Available from: http://monographs.iarc.fr/ENG/Monographs/vol88/mono88-6.pdf

[33] BC Ministry of Environment, BC improves air quality monitoring of $PM_{2.5}$, http://www.bcairquality.ca/reports/pdfs/faqs_new_pm25_monitoring_june2012.pdf (visited November 28th, 2012)

measurement due to loss of volatile aerosol. The new monitors provide a more accurate measurement of $PM_{2.5}$ by limiting the loss of volatile aerosol.

As a result of the upgrades, measured levels of $PM_{2.5}$ may seem to increase. The magnitude of the increase will vary between monitoring locations, and will also be dependent on the type of particulate matter in the monitoring area and the local temperature. Early test data from one BC community for 2011 is shown in Figure 6-1 below. This figure shows a distinct seasonal variation with the largest $PM_{2.5}$ concentration increases being observed during the winter months.

Figure 6-1 Early $PM_{2.5}$ Test Data from One BC Community (2011)[34]



[34] BC Ministry of Environment, Measuring BC's air quality – changes for the better http://www.bcairquality.ca/reports/pdfs/air_infographic.pdf (visited November 28, 2012)

7 Summary and Recommendations

Significant progress has been made since the 2006 implementation of the AMP and the key action items identified in the plan have all been addressed. Efforts to reduce particulate emissions have resulted in improved trends in ambient air quality and continued initiatives to lower emissions hold promise for additional reductions in ambient total particulate matter.

However, concerns continue to be expressed to the Ministry of Environment from members of the public in Williams Lake which suggest that industry point source emissions may still be contributing to episodes of poor regional air quality. This, supported by action item 5 in Table 3-1, provides rationale for the recommendation for further source/receptor modelling to be conducted based on updated emissions information. Inherent uncertainties and assumptions associated with fugitive dust and woodstove emissions should be excluded to establish a clearer picture of the effects of industry point sources alone on ambient air quality.

The work conducted to date by the WLAQR has been action-oriented but may not have been adequately communicated to the community at large as documented in questionnaire comments. Recommendation is made for the development of a comprehensive communications plan to foster a better understanding of the work of the WLAQR in the community and to encourage more public support in future activities relating to improving air quality in the airshed. The following items may also be considered as part of an enhanced communications strategy:

- Press releases summarizing the proceedings of the WLAQR meetings are recommended. (Public outreach and education were highlighted in the July 2006 findings of stakeholder consultations[35] as vital to the airshed planning process.)
- Promotion of awareness of WLAQR activities may be improved by attendance at public events, hosting educational sessions in schools and with community groups.
- A supporting secretariat should be considered to maintain the pace of work both during and between WLAQR meetings.
- Encourage other air quality stakeholders to support the work of the WLAQR through the development and distribution of information materials.

A working session to extend the life of the AMP beyond 2016 is recommended. Original actions and strategies summarized in Table 3-1 that have been completed (e.g. recommendations for the MoE to issue burning advisories) may be deleted or revised to reflect ongoing efforts.

[35] "A Provincial Airshed Planning Framework: Summary of Findings from Stakeholder Consultations" Elevate Consulting in association with The Sheltair Group, July 2006.

7.1 Future Challenges

Experience garnered from reviews of other airshed plans in British Columbia suggests that implementation of early actions to reduce emissions results in the quickest returns in terms of improving ambient air quality. In the case of the Williams Lake airshed, eliminating emissions from beehive burners prior to the implementation of the AMP arguably had a more significant impact on ambient air quality than actions taken since 2006 although, as discussed, further improvements are evidenced by trends towards lower ambient particulate levels in the airshed. A gradual decrease in the rate of improvement should not, however, indicate that the work of the WLAQR is largely complete. Ambient monitoring in the Palliser Airshed in Alberta continues to demonstrate that air quality in the region is essentially pristine but air quality management efforts continue with the objective of 'keeping clean areas clean' and with the proactive strategy that future population growth and associated anthropogenic emissions may at some point begin to impact air quality.

- An airshed workshop should be considered, potentially a facilitated session inviting interested participants from other airsheds to share experiences, which may facilitate future planning processes. A more formal partnership with a 'sister' airshed either in British Columbia or Alberta may also be considered.

Finally, as discussed in section 6.3, the transition to FEM monitoring technology will result in greater accuracy and a shift towards higher than previously recorded ambient $PM_{2.5}$ values. Interpretation of results following the transition should be documented to include an adequate explanation of the change, therefore avoiding any suggestion that ambient air quality had taken a step change.

7.2 Closing Comments

The work of the WLAQR both during the development of the AMP and following its 2006 implementation has been exemplary. Unlike other provincial airsheds, the enthusiasm of the participants is notable and symptoms of 'board fatigue' are notably absent. At this point, other than the challenges discussed in section 7.1, there appear to be no roadblocks to progress and subsequent to following the recommendations contained in this report the AMP will continue to be an effective planning tool in the future.

Appendix A – Blank WLAQR Questionnaire #1

Williams Lake Airshed Management Plan Review – Questionnaire

Please complete the following questions to the best of your knowledge. You may fill in the form electronically or print, complete and scan the responses.
Please return the completed questionnaire by e-mail to: rhopkinson@levelton.com *on or before October 26th 2012.*
This questionnaire has been developed by Levelton Consultants Ltd. for use by the British Columbia Ministry of the Environment and the Williams Lake Air Quality Roundtable to assist in evaluating the Williams Lake Airshed Management Plan and providing recommendations for future direction.
If you have any questions regarding this survey please contact Levelton at:

Rolf Hopkinson, M.Sc., EP
760 Enterprise Crescent
Victoria, BC, V8Z 6R4
Phone: 250-475-1000
Cell: 250-812-7299
Fax: 250-475-2211
E-mail: rhopkinson@levelton.com

Name:
Company/Agency (e.g. industry, BC MoE etc):

1. Of the following programs supported by the WLAQR, which are currently active? (Select all that apply)
☐ Educational programs promoting optimal open-burning methods and associated regulations/guidelines
☐ Promotion of alternatives to burning, such as chipping and re-use, and/or chipping and composting
☐ Anti-idling campaign
☐ Workshops and public or school events communicating lifestyle impacts on air quality
☐. Issuance of the air quality index daily, and air quality advisories during periods of reduced air quality
☐ Other (please describe)

2. Which methods of public outreach have been utilized since 2006? (Select all that apply)
☐ Radio
☐ Television
☐ Print - newspaper
☐ Print – flyers/pamphlets
☐ Public posters or billboards
☐ Public open houses with related professionals (real estate agents, insurance agents, retailers, chimney sweeps, building inspectors, fire fighters, health professionals etc)
☐ Interactive computer education programs or air quality kiosks in schools, libraries, public spaces
☐ Websites - City of Williams Lake and Cariboo Regional District with links to air quality resources or other sites
☐ In-school presentations and the inclusion of air quality into science curricula for local elementary and secondary students
☐ Annual air quality status reports made available to the public
☐ Signage for anti-idling
☐ Workshops with retailers to promote lower emission products
☐ Other (please describe)

3. Has the WLAQR interacted with other environmental groups to facilitate their work?
☐ Yes
☐ No
If yes, which groups have the WLAQR worked with, and in what capacity?

4. Are the number of attendees at relevant community events, such as Clean Air Day, available?

☐ Yes
☐ No

5. Are 'hit' site visit counter statistics available for relevant air quality websites?
☐ Yes
☐ No

6. Are publicly available air quality reports produced in the region?
☐ Yes
☐ No
If yes, how often are they issued?

7. Have AGM attendance numbers stayed the same, increased or decreased significantly since 2006?
☐ Stayed about the same
☐ Increased significantly
☐ Decreased significantly

8. What is the WLAQRT membership trend over the last six years? Is the number of members remaining constant, increasing or decreasing?
☐ Staying about the same
☐ Increasing
☐ Decreasing

9. Has the WLAQRT conducted a self-evaluation since 2006?
☐ Yes
☐ No
If yes, what were the findings?

10. What are the current committees of the WLAQR? What projects are each working on?

11. Are meeting agendas and minutes compared and reconciled?
☐ Yes
☐ No

12. Are action items identified with responsible parties assigned and tracked to completion?
☐ Yes
☐ No

13. Have specific, quantifiable air quality goals been defined for Williams Lake? (e.g. source emission rates, acceptable receptor concentrations)
☐ Yes
☐ No
If yes, what are they?

14. Have milestones been established (specific activities working toward implementation of the overall objective)?
☐ Yes
☐ No
If yes, what is the progress on completing the milestones? (What percentage or number of milestones have been reached, or are on schedule, or are behind schedule?)

15. When was the emissions inventory for the Williams Lake airshed last updated?

16. Have changes been made to legislation e.g. permit amendments, burning bylaws etc.? Focus will be on changes resulting from WLAQR activities.

17. Identify emissions outside the boundaries of the Williams Lake Airshed that may potentially impact air quality within the airshed.

18. Do you have any other comments on the content covered in this questionnaire? (Please note: a subsequent questionnaire will be provided to all members of the Roundtable in which additional questions will be asked and further opportunities for comment will be provided.)

Appendix B – Completed WLAQR Questionnaire #2

In all, ten responses to the second questionnaire were received. The following provides the full text of all returned responses, transcribed from the original 'Survey Monkey' format.

Is the commitment to public outreach outlined in the 2006 Williams Lake Airshed Management Plan being maintained?

6 yes – 4 no

Comments:

Mainly through the air quality educator now. But it took some years to get outreach to this level, mainly through the website and recent news articles. But given that few know us, there is room for improvement.

Attending public events with info -pilot campaign at elementary schools and TRU for anti idling - partnering with other non profit and community groups to get the air quality message out -wood stove exchange -articles in newspaper -keeping website up to date with info

public information sessions, websites, etc.

MOE funding for contract with local environmental group to conduct public education

Annual reviews and report outs by stakeholders

The 4 'nos' offered no further comment

Has any other agency undertaken similar activities aimed at improving air quality since 2006?

3 yes – 5 no – 2 didn't know

local industries are installing air friendly equipment

I don't know

unknown if other agencies have undertaken any actions

unclear question

The municipality

Has there been any observed change in public opinion on regional air quality since 2006

5 yes – 3 no – 2 declined (1 did not have enough history to comment)

While there has been a very gradual improvement, the summer fire events and more recently, Pinnacle Pellet have caused a perception of a *decline* in air quality.

Yes,I think so but don't know how much. Most people comment that things have been better since the bee hives were removed but that was long before 2006 I would guess so...not sure. Just found out from a City of Williams Lake phone survey carried out May 2011 (400 participants) that AQ is number 1 environmental concern but most people I speak to have never heard of the Roundtable.

not on the round table in 2006 so not sure if there has been improvement

Public comment and employee observations

Candid discussion around town. Less complaints to industry.

Is there any material available to the public describing Williams Lake air quality priorities and actions?

10 yes

On the website www.breatheasywilliamslake.org, Round Table, About. It takes some looking for though.

The Plan

There is an Executive Summary document that I have come across that highlights the concerns from the initial management plan. It is put out at most public education / community events I attend but I don't know if there has been anything else. It is in the work plan for 2012-13 that such a document be created. I believe it is needed and this should also go in the newspapers and on the welcome to Williams Lake website, City and CRD sites etc.

information on breatheasy website. I.e. anti-idling week.

at breatheasywilliams.ca lake website

Website

I believe info is available thru the Williams Lake city website

on the city website

Yes, on the WL roundtable web site (http://breatheasywilliamslake.org/) the public can access the Williams Lake Airshed Management Plan: 2006 - 2016 and other information. Problem is that the web site is not well publicized.

Is the public aware of the Roundtable and its role?

5 yes – 5 no

Through news articles, the wood stove exchange program, previous vehicle testing clinics and the website. But many still don't know us.

only moderately aware. just personal belief

Through website and city council meetings and reference.

on the city website

Are members of the public more knowledgeable today (compared with 2006) regarding regional air quality?

7 yes – 3 no

My perception is that the overall improvement is small. The issue has to interest people or they won't notice.

should be an option to choose: I don't know

not known - assumed due to readily available info on the web.

more media coverage

Radio announcements and advisories

public reports, air quality reports by MOE

Do you have any other comments on the current state of public engagement regarding air quality in Williams Lake?

There is still a lot of room for improvement. But since we don't and are not mandated to involve ourselves in hot air quality issues as they arise, a less controversial way has to be found to get the message across.

I can see that it is not up to the mark. I don't know how we can improve it...

Hardly anyone I speak to has ever heard of the Roundtable. I think there should be more info given / put out in the public. When people don't SEE or SMELL a problem, they don't think about it/don't seem concerned. Seems people aren't interested or care much about getting more stakeholders at the Roundtable meetings. To get more info out to the public and have engagement I think we need more money to operate the RT differently see Prince George as an example.

radio is an effective means of communication. Good to have the local air quality meteorologist on the air this year during times of poor air quality but always room for improvement.

engagement of public has to be ongoing since there is always people new to town

no

Need to provide a clear picture of what our organization wants to achieve. Not sure what type of communications activities have taken place in the past or how often. Do not believe enough has be done to get our message out to the public. Also believe we are missing major communications opportunities (i.e., trade shows, community events (rodeo), school programs, local organizations, etc.) Some news in the local newspaper but not much. Web page also in need of updating.

Has the level of support from the BC Ministry of Environment changed, technically or financially, since 2006?

4 yes – 4 no – 2 declined

It has improved over time

I don't know

again, not on the round table in 2006 so not sure whether there has been improvement or not

less grants available

More restrictive on fugitive dust

Are there any stakeholders not represented on the Williams Lake Air Quality Roundtable (WLAQR)?

7 yes – 3 no – 3 declined

CN Rail, Parallel Wood Products and the School Board. The WL Construction Ass'n hasn't attended recently.

School district

First Nations, School District (largest employer in area), hospital staff, medical community, CN, public, reps from child care perspective, Interior Health locally (not our contact in Kelowna), Chamber of Commerce, Thompson Rivers University, other non profit groups

Williams Lake Indian Band, school district 27

First nations

Walmart, wood heater distributors, highways,

Cariboo Regional District, some industries (CN, Trucking Co., small to medium size manufacturers/industries (Sigurdson, United Concrete, Peterson Bros Asphalt)

Are there opportunities for stakeholders that are not current WLAQR members to engage in Roundtable activities?

6 yes – 3 no – 1 declined

The school board can work with us on reduced vehicle idling. Through one or two schools, it has started at a grassroots level through the Air quality educator.

attend meetings

to attend roundtable meetings, or get on distribution list for roundtable updates

Take part in Roundtable planning and discussions.

Williams Lake Power Plant

have been previously invited.

Has the level of engagement of stakeholders remained the same or changed over time?

6 said 'remained the same' – 1 said 'increased' – 1 said 'decreased' – 2 declined

Are stakeholder groups more knowledgeable today regarding air quality than in 2006?

9 yes – 1 declined

Discussion at the table has made us all more aware of the issues. Ideas are shared. For a time, a subcommittee on fugitive dust was active. The result was improvements in log truck cleaning from Tolko's Lakeview yard.

it looks so

the answer again is: I don't know

more available information

regular attendance at roundtable meetings and sharing information between stakeholders

experience

Education and awareness

MOE results and data.

Don't know

Are current stakeholder representatives supportive of on-going actions to improve air quality in the Williams Lake airshed?

9 yes – 1 declined

West Fraser's plywood plant reduced emissions significantly a few years ago. Tolko's vehicle trackout is reduced as is the track-out from West Fraser to Atlantic Power. Many wood stoves have been replaced reducing emissions. Vehicle idling is somewhat reduced due to a city policy a few years ago. Ant-idling signs are more frequent.

in general everyone is supportive.

-interested in the monitoring stations, and potentially putting in money to support their use -other than that, I don't know

numerous... watering for dust control, tarping for dust control, promotion of alternatives to open burning, open burning during appropriate and favourable conditions, wood stove exchange program, ppm monitoring equipment, etc.

e.g. consideration of impacts from smoke by fire centre and staff working on interface fuel reduction program

Spending money on emissions control and fugitive dust reduction.

Show support by attending a round table meeting.

Are stakeholders willing to continue contributing resources to airshed management planning?

8 yes – 2 declined

Beyond time spent conducting administrative activities, what are these resources and who will provide them?

Pinnacle Pellet is paying for a air quality monitor at the new firehall. MoE supplies most resources. The City supplies the meeting room, some staff support and lunches for the meetings.

I don't know

-only thing I have heard is the monitoring stations; coming up with a way to figure out contributions perhaps based on emissions

identified on an ongoing basis

continuing meetings outside official roundtable meetings to discuss issues of mutual concern (e.g. interface fires, local monitoring network)

All stakeholders need to contribute.

Is there a consistent level of trust between stakeholders?

8 yes - 1 no - 1 declined

If no, what has occurred to erode or enhance the level of trust?

Inconsistent support

Are contributions of individual stakeholders adequately recognized?

3 yes – 6 no – 1 declined

If yes, what types of recognition are currently in place?

Don't know but I think we should have an award that is perhaps part of the Chamber of Commerce Awards that is for AQ...idea in the work plan; could also give recognition in newspapers but it is hard to say how effective papers are these days

None

Does the WLAQR have a 'champion' in local government?

6 no – 4 declined

If yes, who are they and how do they 'champion' the WLAQR?

There is a rep from both the City of WL and the CRD; would I call them 'champions'? not at present

Do you have any other comments on the current state of stakeholder engagement regarding air quality in Williams Lake?

Stakeholder engagement would be improved by a supporting secretariat to work at and in between meetings. Now, some work which should be done isn't getting done.

There is a need for a communications plan

Meetings are not inspiring for stakeholder engagement but maybe that's the way people want it -if people don't see it as a need then there is no engagement -where are there opportunities to get involved?

Local government needs to take an active role in leading the work of the roundtable

Has consideration been given to reducing reliance on carbon based fuels thereby reducing GHGs?

3 yes – 6 no – 1 declined

If yes, please describe.

Only discussed once for the city to buy biodiesel for its equipment.

“No idling” policy

In your opinion, has the Williams Lake Airshed Management Plan made a difference? Please describe.

Yes. Track out on roads is less from Tolko Lakeview. West Fraser Plywood emissions are way down. City Hall equipment and vehicles have reduced emissions. In the past year, I see more people bicycling.

Certainly, there is information flow. There has been improvement is air quality as well.

-it has given WL priorities and targets, so even if the public doesn't know what's happening, others have been making changes

some positive gains. The creation of a plan itself is a positive difference. increasing awareness of the plan and implementing change is always a challenge given the demographic nature of the community. Some will "buy in" some won't...

raising awareness of local industry and local government on what actions they can take to promote improved air quality

yes, it is a start to thinking differently.

Awareness and education I believe has brought about a change in the way of thinking about the effects industry is causing to the environment. Controls that can be put in place to reduce damage are being implemented in certain sectors more readily than others.

yes. accountability of all stakeholders. But still missing key members including efforts by residents.

Yes, small but consistent reduction in PM2 has been recorded.

Is air quality in Williams Lake getting better? Please describe.

Yes, gradually. The most obvious is that we rarely see a new layer of dusk coming down in a short time. Air quality advisories see to be fewer over time.

yes

-according to Min of Enviro yes, but there is always room and NEED for continuous improvement/ there are NO safe levels of air pollution....THESE are the messages that needs to get out there and I don't think it is -when people see it has improved, they move on

unsure

slightly

Not sure whether improvements have outweighed increases in emissions due to increased population and industrial activity.

Yes. Fugitive dust is a lot better. Streets are cleaner.

yes

Slightly from 2006

Do you have any other comments on technical and regulatory matters pertaining to air quality in Williams Lake?

No

I think the CALMET / CALPUFF modelling needs to be redone

-seems to me regulations aren't strict enough -do they have enough staff to enforce -what are the penalties/ are they high enough? -when they can say they are within their emission perimeters, what recourse is there / incentive for improvement?

regulatory approaches can only affect the portion of the emissions that are permitted, other sources require a different approach

no

Would you consider the WLAQR active?

9 yes – 1 no

If yes, what are the activities the WLAQR has been working on recently?

The mid-term review seeing where we go from here.

Dust management

-as individual companies only, see website for minutes that contain what people have been doing (breatheasywilliamslake.org) -doesn't seem to be any collective initiatives

more activity by individual stakeholder than as a group in my opinion. The group supports awareness and education initiative.

maintaining stakeholder communications, promoting education activities, maintaining a focus on improving air quality as a priority

Decreasing levels of fugitive dust,

Does the WLAQR have a communications plan?

2 yes – 5 no – 3 declined

If yes, please describe.

I don't know. Doubt it from what I've seen. No one is/was submitting info to the paper following meetings. Someone volunteered a year ago and the paper didn't print it. There is VERY limited time in the Educator position so if this was going to fall to that person more time (and therefore money) is needed. Again, look to Prince George as a model

Read it on the website

Email and postings in the newspaper and a link on the city website

How many years in total have you occupied a Roundtable position?

From the very beginning. My records go back to 1999 so that would be 13 years. Before that it was semi-active as a city committee.
1
6 months
one
01/02/2012
10
3
4

2

As a Roundtable member, what have been your responsibilities / tasks over the years?

Initially represented the Williams Lake Environmental Society and still do. Then I was co-chair with a CRD representative. Since his defeat at the polls, I have been the sole chair.

reporting on trends, technical issues (monitoring network instrumentation/configuration) and others

Public education and I was note taker my first meeting. I don't feel like my role is WELL defined on the RT, it is somewhat defined. Seems to me this is part of public education, the RT members, but there doesn't seem to be a role for that...and frankly if there was I'd need more time. I report what I have been doing on public education to the RT at the meetings. My main task this year was the Cariboo Wood Stove exchange, attend public events with AQ display/info, articles, outreach to community groups to get our AQ info embedded in materials, pilot anti idle campaign.

reporting measures taken by my agency (as a stakeholder) to improve air quality and what activities are contributing to reduced air quality.

providing updates on regulatory and compliance initiatives, providing leadership to MOE contribution to roundtable

regular reports

I report on the progress of the company I represent

Compliance reporting

How are disagreements resolved at Roundtable level?

Sometimes we had to clarify the reason for the meeting. When we had to decide what level of air improvement, we went around the table and voted. The majority won.

yes, I guess

unknown

through consensus building

discussion

Few disagreements

How would you encourage new membership?

By invitation.

not sure

I think a member pack needs to be put together that outlines the goals of the RT, background info on AQ priorities for WL, FAQ's, expectations of membership/requirements and what they get out of it. I am talking to the community all the time and can ask people to become members, info can be placed about town and at displays, a committee could be struck who approach businesses etc. to be part of the RT. Maybe this could be done once a year so that it is easier to manage...? e.g. we welcome new members at the May meeting each year. Suggestions can be put forward as to who to approach and then the volunteers have time to visit them, chat, make a formal 'invitation' or maybe we just say an open invitation to attend a May meeting and whoever RSVP's is sent the member package before the meeting.

by advising interested parties to be a voice at the table

directly reach out to groups or individuals

not sure

environmental stewardship.

Yes and do

How would you describe the quality and quantity of work done by the WLAQR?

To improve the air quality of Williams Lake (getting tired now)

work done is excellent but there is a need to engage more people

I'm new so I'm not sure but I was a little surprised at the lack of collective initiative. Certainly industry have made positive changes from what I can tell.

quality - satisfactory quantity - moderate (depending on the role). the education coordinator being active and involved to a greater degree than most of the rest perhaps

good quality, but quantity could be improved

As a result of my membership my company has undertaken significant expense to improve air quality issues at our plant.

Do you feel that your contribution to the WLAQR is valued?

7 yes – 2 no – 1 declined

If so, are you satisfied with your current role?

7 yes – 3 declined

Do you hope to continue be a WLAQR member?

8 yes – 2 declined

Overall, do you think the work of the WLAQR been effective during the past 3 years?

Yes

Good

Don't know.

Generally yes

Yes, but we need to engage general public more and get more leadership in this area by local government

It can improve but it has made a difference

Yes, but need to make the public much more aware of the activities of the WLAQR and its members.

What is the greatest challenge currently being faced by the WLAQR?

To continue to make a difference.

Communications plan is non-existent

-seems low on interest, time and motivation -funding

public awareness and many people's unwillingness to change current practices/ beliefs

maintaining commitment to airshed goals

Funding, leadership

The WLAQR is not a regulatory body and therefore holds no enforcement abilities

Communications, funding, membership

What do you expect will be the greatest challenge faced by Williams Lake from an air quality perspective?

To continue making air quality improvements.

Fugitive dust and exceedances due to inversions

-getting people engaged when they don't see a problem -jobs over health -forest fires ?

public awareness and many people's unwillingness to change current practices/ beliefs

long range transport and forest fires masking improvements in average air quality

growing population base

The amount of fugitive dust along the streets especially Mackenzie Ave.

Public perceptions and attitudes.

Do you have any other comments on the current state of WLAQR dynamics?

-seems a little like 'us and them'--- Min of Envir and Industry; Industry to Industry (finger pointing);

good group of interested people

need consistent participation by stakeholders

Do you have any other comments on the WLAQR or the Williams Lake Airshed Management Plan?

-have to make info simple for people to understand and show them what they can DO and also show them other business/industry/ government has been doing their part too

goals of airshed plan focused on extreme events (i.e. 98th percentile values) rather than a longer term average.