bulkley valley - lakes district
airshed management society

BVLD AIRSHED MANAGEMENT PLAN: A COMMUNITY ACTION PLAN *for*

CLEAN AIR

June 21, 2012

Foreward

The Bulkley Valley Lakes District (BVLD) airshed management plan is a community action plan for clean air. Airshed management planning is a holistic, collaborative community process to address the cumulative impact of human activities on air quality. Airshed planning is ongoing. There is always a need for airshed monitoring and evaluation and research. Air pollution sources can change according to changes in human activities. New technologies and new ideas can offer opportunities for air quality improvements. And it takes time to realize air quality improvement and to recognize air quality trends and needs.

As such, this BVLD Airshed Management Plan 2012 is a living document. It builds on previous work (see acknowledgements), it provides a comprehensive documentation of current airshed planning strategies, and it offers a strong foundation on which to continuously build for the future.

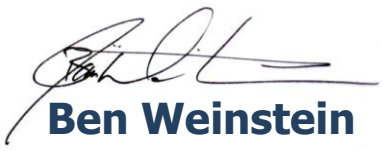
The BVLD airshed management plan was first developed in 2004 by the BVLD Airshed Management Society (AMS), a non-profit society with charitable status governed by an elected board of directors. The society is responsible for overseeing all plan updates and its implementation. The Ministry of Environment (MOE) works closely with the AMS and is responsible for air quality monitoring and assessment, a critical role for supporting airshed management planning.

This living document is for all BVLD citizens who are concerned about the quality of the air we breathe and its stewardship, to stakeholder groups involved in economic and governance activities that can affect clean air, and to educators and researchers in air quality and human health.

This living document is for all BVLD citizens who are concerned about the quality of the air we breathe and its stewardship, to stakeholder groups involved in economic and governance activities that can affect clean air, and to educators and researchers in air quality and human health. We welcome your feedback and your participation in BVLD AMS activities.

David Duncan

President, BVLD Airshed Management Society



Ben Weinstein

Secretary, BVLD Airshed Management Society

Acknowledgements

The BVLD Airshed Management Plan was originally a five year plan and has undergone three reviews to date. The first two were by the AMS board and former facilitator which resulted in the 2006 revision and the 2009 addendums to the plan, and the third was by Levelton (2010). These reviews were used as the basis for this revision to the airshed plan, with the analysis in the 2009 addendums as the starting point.

This revision was done by Cariboo Environmental Quality Consulting Ltd. in conjunction with the BVLD Clean Air Plan Update Committee of the BVLD Airshed Management Society. The Clean Air Plan Update Committee consisted of the following members: AJ Downie, Ben Weinstein, Dave Duncan, Barbara Oke, Doug Bysouth, Paul Schwarz, and Garth Ehalt. Mike Van Arem, (Canfor), Colin Vandergaag (HFP, West Fraser), and Gary Quanstrom (West Fraser, PIR Division) provided valuable feedback to an earlier draft of the revised plan.

The revision process began with recommendations by Cariboo Environmental Quality Consulting Ltd. that were presented at stakeholder workshops held in the area from February 29, 2012 to March 2, 2012 (Cariboo Environmental Quality Consulting Ltd., 2012). There were four workshops, organized by sector: Open Burning, Industrial Sources, Transportation, and Woodstoves/Community Planning. The feedback arising from the workshops has strengthened the revised plan.

Overall this review of the BVLD airshed management plan has determined that the previous plan was well thought out during its development. There have been many successes through the implementation of the plan and several areas where leading edge work has been done, such as custom venting forecasting, an excellent woodstove exchange program, annual burn operator's forums, and woody debris management.

Overall this review of the BVLD airshed management plan has determined that the original plan was well thought out during its development. There have been many successes through the implementation of the plan and several areas where leading edge work has been done such as custom venting forecasting, an excellent woodstove exchange program, annual burn operators forums, and woody debris management. Given the plan's basic strengths and success to date, the emphasis of the revision was therefore on updating and improvement rather than a major review of the plan's fundamentals.

Norm Zirnhelt
www.environmentalquality.ca

Cariboo Environmental Quality Consulting Ltd.

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES AND FIGURES

LIST OF PHOTOS

Executive Summary

Community Action Plan for Clean Air

The BVLD Airshed Management Plan aims to improve air quality in the corridor that stretches from Kitwanga to Endako. This area has a population of approximately 25,000 people[1] and covers 35,000 square kilometers.

Since smoke and road dust have the largest impacts on local air quality, this plan primarily targets a pollutant known as particulate matter, (PM).[2] The Plan presents a set of goals, indicators and strategies that together provide a roadmap to achieving better air quality (with respect to PM) through both continuous improvement and by reducing the frequency, severity and duration of periods of poor air quality, also known as an air quality episodes.

Plan development has involved industry, health officials, Non Government Organizations (NGOs), concerned citizens and government (local, regional and provincial) officials. There is common recognition that PM pollution is a public health concern and can affect economic opportunities in the airshed. In searching for a balance between environmental, social and economic concerns, it became apparent that with improved education, planning and coordination among stakeholders, the goal of improved air quality is achievable.

At the beginning of this planning process it was made clear by the various stakeholders that for the plan to succeed clear goals, indicators, and strategies for each emission source needed to be identified. In order for this emission-specific work to be accomplished, it was also realized that general goals, indicators and strategies for the entire airshed also needed to be set. The BVLD Airshed Management Society's mission is to facilitate clean air solutions in the Bulkley Valley - Lakes District for the Protection and Improvement of the Health of BVLD Residents by Continuously Improving Air Quality. As part of this 2012 update, the two original goals were expanded and enhanced to become five goals:

1. Maintain and improve our understanding of air quality science in the BVLD
2. Meet ambient air quality targets at Ministry of Environment monitoring stations in the airshed
3. Improve stakeholder awareness of and participation in airshed management activities
4. Reduce emissions in all sectors
5. Strengthen the linkage between air quality and human health by identifying specific goals, indicators and strategies as appropriate

These general goals form the basis of discussion at the BVLD Airshed Management Society's Annual General Meeting. Table A elaborates on these overall Goals by presenting their associated Strategies and Indicators in the context of the AMS mission. Table B is a summary of Goals, Strategies, and Indicators by emission sector and includes the key stakeholders responsible for implementing each strategy.

[1] Canadian Census Data 2011: www.bcstats.gov.bc.ca
[2] Chapter 9 introduces more recent AMS work directed to pollutants related to vehicle emissions.

Table A: General Goals, Strategies and Indicators

GENERAL GOAL	STRATEGIES	INDICATORS
1. Maintain and improve our understanding of air quality science in the BVLD	• Maintain ambient monitoring for PM and meteorology • Update micro emission inventory (MEI) • Consider future impact assessment studies • Encourage academia to conduct relevant and local research	• Number and % of instruments that pass MOE audits • MEI not more than 10 years old • Others as developed and suggested by AMS and stakeholders
2. Meet ambient air quality targets[3] at MOE monitoring stations in Smithers, Telkwa, Houston, BL: a. PM_{10} – 50 (24hr Avg) b. PM_{10} – 15 (Annual Avg) c. $PM_{2.5}$ – 25 (24hr 98%ile) d. $PM_{2.5}$ – 8 (Annual Avg) e. $PM_{2.5}$ – 6 (Long-term goal for 2020, confirmed after careful review in 5yrs once new instruments in place: 2017)	• MOE Meteorologist collects, analyzes and annually reports out on data	• Statistics (identifying attainment of 5 targets), as calculated for 4 monitoring stations
3. Improve stakeholder awareness of and participation in Airshed Mgmt activities	• Hire a coordinator • Maintain an updated website • Maintain board representation for the following stakeholder groups: provincial government, industry, local government, heath and the general public (NGOs, etc.) • Develop and deliver community presentations • Develop and implement an annual reporting procedure to track plan implementation	• Number of community presentations delivered • Website updated at least semi-annually • Number of entities reporting annually (at AGM or other venue) • Number of partners contributing to implementation, both financially and in-kind
4. Reduce emissions in all sectors	• See chapters 4-9 for detailed sector-specific strategies	• See chapters 4-9 for detailed sector-specific indicators
5. Strengthen linkage between air quality and human health by identifying specific goals, indicators and strategies as appropriate	• Invite NHA health experts to a board meeting to discuss options • Strike committee to review options and prepare recommendation to board	• Incorporation of health information and/or indicators in an update by June 2013

[3] All targets should be reviewed as part of a plan review in 5 years (2017)

A total of six emission source categories are targeted in this revised plan. These categories are:

- Open Burning
- Industrial Sources
- Wood Burning Appliances
- Backyard Burning
- Transportation – Road Dust
- Transportation – Vehicle Emissions

Detailed information relating to the six sources, along with source-specific Goals, Strategies and Indicators can be found in their respective chapters. A summary of these is included in Table B below.

Since the implementation of the 2004 *Community Action Plan for Clean Air* much progress has been made towards improved air quality. Many of these successes are documented in the source-specific chapters and even more information is available in addendums found online at www.cleanairplan.ca . By updating and enhancing our goals and implementing new strategies, the AMS believes that air quality can be improved even further.

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 4: Open Burning			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with all kinds of open burning	Continue Annual Burn Operators Forum and promotion of BMPs to all stakeholders.	All stakeholders	Number of Advisory Level Days in fall burn season (Oct-Dec) Average $PM_{2.5}$ over 3-month burning season
	Annual sector stakeholder reports to the AMS via Burn Operators Forum	All stakeholders	
	Conduct OBSCR compliance activities	MOE	Number of OBSCR tickets issued to forest sector
1a. Reduce emissions and associated impacts from open burning in forestry sector	Develop and implement Smoke Management Plans (primarily for use by large licensees). Include requirements to use the following Best Management Practices (Custom Venting Forecasts, Piling techniques and seasoning, Smoke release periods, and communication/reporting)	MOE, Large Licensees, BCTS, Woodlots	Number of SMPs developed and signed off by MOE; Number of signatories to the plans (including small operators)
	Promote small operator participation in Smoke Management Planning by conducting outreach seminar	BCTS, Woodlot Associations, AMS	Number of attendees at SMP outreach seminar
	Prepare, publish and distribute an Information Brochure on the OBSCR and BMPs, tailored to small operators	MOE, AMS, BCTS, Cattlemen's and Dairymen's Associations	Number of small licensees receiving brochure

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 4: Open Burning (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1b. Reduce emissions and associated impacts from open burning related to Community Wildfire Protection burning	Develop, publish and distribute information about BMPs for reducing debris burning associated with Wildfire Protection activities, and for minimizing impacts from burning that must occur.	AMS, FLNRO, Local/Regional Governments	Number of communities receiving BMP information
	Review and comment on Draft Community Wildfire Protection Plans	AMS	Number of plans in place and number and % of plans commented on
1c. Reduce impacts from agriculture and land development debris burning	Prepare, publish and distribute an Information Brochure on the OBSCR and BMPs, tailored to agriculture and land development	AMS	Brochure posted online and provided to agriculture associations
	Deliver educational presentation at Cattlemen's/Dairymen's meeting	AMS	Number of educational presentations given
2. Provide a proactive response when air quality is deteriorating by stopping open burning	Use Pollution Prevention Notices (PPNs) as a tool to initiate a burn ban that stops open burning before air quality deteriorates to advisory threshold	MOE	Number of PPN's vs Number of Episodes where advisories were issued during fall open burning season
3. Maintain visibility in BVLD during burn season	Improve two-way communication between burn operators and aircraft operators by inviting aircraft operators to participate in Smoke Management Planning and Burn Operator Forums.	Large licensees, Aircraft Operators	Attendance of aircraft operators at burn operators forum.
	Issue daily burn notifications via email	Licensees	Percent of licensees emailing burn notification.

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 4: Open Burning (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
4. Promote and explore alternatives to all types of open burning	Include alternatives exploration as a reporting item on this sector's "AMS annual report form" Maintain Woody Debris Inventory on AMS website	AMS, Large licensees and small operators AMS	Number and % of stakeholders reporting that they seriously considered alternatives

Chapter 5: Industrial Sources (Stack Emissions)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce air quality impacts from industrial sources	Develop & implement Episode Management Plans (EMP) to reduce impacts during periods of poor air quality	Permittees, MOE	Number of EMPs developed and signed off by MOE; Percentage of episodes where EMPs were implemented
	Maintain compliance with permits by optimizing effectiveness and efficiency of pollution control works (e.g.: control of input temperature to ensure best combustion)	Permittees	Number of relevant non-compliances (reported to MOE or resulting from inspection)
	Conduct compliance assessment activities (e.g.: inspections)	MOE	Percent of compliance assessment activities identifying no non-compliance with air permits[4]
	Upgrade existing facilities towards Best Achievable Technology (BAT) as opportunities arise or as necessitated by environmental impact assessments.	Permittees, MOE	Number or % of BAT upgrades
	Hold annual forum to share ideas and promote continuous improvement Annual sector stakeholder reports to the AMS.	AMS, MOE, Permittees	Participation (%) in Annual Industrial Emissions forums

[4] Looking at non-compliance that directly relates to air quality protection

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 5: Industrial Sources (Stack Emissions) (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
2. Minimize the potential for impact from future growth in this sector	Consider air quality in land use and community planning initiatives	Local / Regional Governments	Number or % of OCP's that recognize air quality Number of zoning referrals and proposed projects responded to by AMS
	Carefully review proposed new projects to identify opportunities to protect air quality	MOE, Local / Regional Governments, AMS	Indicator to be developed for this with different stakeholders
	Consider AQ when reviewing options for locating potential new facilities	Permittees, Local/Regional Governments	Indicator to be developed for this with different stakeholders
	Require BAT for all new facilities	MOE	% of new facilities meeting BAT

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 6: Wood Burning Appliances			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with all wood burning appliances	Continued operation of woodstove subcommittee	AMS	Number of wintertime AQ advisory level days Wintertime average $PM_{2.5}$
	Woodstove change out program.	All stakeholders	Number of woodstoves exchanged
	Develop innovative strategy/rebate program for burning dry wood	AMS, firewood suppliers	Strategy developed, rebates issued
	Public Education campaigns (stove operation and seasoned wood)	MOE, AMS, Local Governments	Number of education campaigns undertaken, brochures, burn it smart, etc (articles, promotions) Number of participants at education campaigns
	Bylaw Development and enforcement	AMS, Local Governments, Fire Chiefs	Number of bylaws in effect Number of violation tickets issued
2. Promote more sustainable home heating systems	Require new subdivisions to have district heating potential	Local Governments, AMS	Number of new subdivisions with district heating potential
3. Improve our understanding of the health effects of wood burning to use as leverage for achieving Goal 1	Support the Woodstove Exchange Study through in-kind work	Universities, MOE, AMS, Local Governments	Studies / publications written connecting health effects of wood burning.

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 7: Backyard Burning			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce air quality impacts attributable to backyard burning	Implement public communications strategy to promote local alternatives to open burning http://www.bcairquality.ca/topics/rcbc-alternatives.html	AMS	Number of new or updated bylaws with provisions relating to air quality protection
	Implement backyard burning bylaws in fringe areas. For references, see: http://www.bcairquality.ca/reports/pdfs/bylaws-2011.pdf http://www.bcairquality.ca/reports/pdfs/aq_bylaws_bc.pdf http://www.bcairquality.ca/reports/model-bylaw-backyard-burning.html	Local/Regional Governments, AMS	Public complaints to local government and/or LOE (especially in fringe areas)

Chapter 8: Transportation - Road Dust			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with road dust from paved surfaces	Sweep city streets as early as safely possible in the springtime	Local government maintenance crew	Number of PM_{10} Advisory Level Days in spring road dust season (Feb-April)
	Hold annual Road Dust Operators forums and (see next page)	AMS, Local/Regional Governments & Hwy maint. crews	Date of commencement of sweeping operations in each community

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 8: Transportation - Road Dust (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with road dust from paved surfaces	Transportation stakeholders workshops to share successes and challenges as well as report on activities toward implementation of the airshed plan	AMS, Local/Regional Governments & Hwy maintenance crews	Number of attendees at Road dust forum
	Investigate opportunity for a pilot program to sweep streets twice during the spring (perhaps green bonus can factor in)	Local government maintenance crews	Pilot program investigated and commenced.

Chapter 9: Transportation – Vehicle Emissions			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce impacts from vehicle idling	Hold stakeholder workshop to further scope the issue and develop refined strategies for raising public awareness about idling impacts	School District, Local Governments, Business Associations	Incorporation of idling strategy and indicator in an update by June 2014
2. Reduce vehicle emissions	Hold stakeholder workshop to further scope the issue and develop refined strategies for promoting low emissions options (e.g.: biking, carpooling, public transportation, etc.)	All stakeholders	Incorporation of emissions reduction strategy and indicator in an update by June 2014
	Explore opportunities for holding vehicle emissions clinics in conjunction with other airsheds	All stakeholders	Number of vehicles participating

Table B: Summary of Goals, Strategies, and Indicators by Emission Sector

Chapter 9: Transportation – Vehicle Emissions (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
3. Reduce or eliminate air quality degradation attributable to rail traffic (primarily idling engines)	Engage CN Rail to identify issues and opportunities for improvement	AMS, CN Rail	Incorporation of rail traffic strategy and indicator in an update by June 2014
4. Reduce or eliminate air quality degradation attributable to trucking (primarily idling engines)	Engage Truckers Association to identify issues and opportunities for improvement	AMS, truckers	Incorporation of trucking traffic strategy and indicator in an update by June 2014

CHAPTER 1

Introduction

The recommended goals, indicators and strategies in this plan represent a consensus of the directors of the Bulkley Valley Lakes District (BVLD) Airshed Management Society. The plan is reviewed annually and updated to reflect emerging concerns and research, as well as successful completion of initiatives in the preceding year. The airshed plan does not have legislative or legal authority, however is meant to provide advice and guidance to provincial, regional, and municipal governments, industry, other stakeholders and the public.

The original Plan published in 2004 was based on consensus by over 50 participants of the BVLD Airshed Management Planning process.

What are the scope and overall goals of this Plan?

The BVLD Airshed Management Plan (AMP) aims to improve air quality in the corridor that stretches from Kitwanga to Endako (see Figure 1-1 and Appendix C) and covers 35,000 square kilometers. This area has a population of approximately 25,000 people.[5]

The overarching goal of this plan is to protect and improve the health of BVLD residents by continuously improving air quality. This is intended to be achieved through pursuit of five general goals and a series of sector-specific goals. In developing the more specific goals and strategies listed in this plan, consideration was given to factors such as economics, feasibility, and practicality among others. The Plan has been developed by the people who will use it, to help ensure all such factors were considered throughout.

Since smoke and road dust have the largest impacts on local air quality, this plan targets a pollutant known as **Particulate Matter, PM**. **PM** consists of tiny solid or liquid particles that come in many shapes and sizes and from many sources, both natural and human-caused. **PM** is classified in terms of particle size. Those that are 10 micrometers or less in diameter are called PM_{10}. **PM** that is 2.5 micrometers or less in diameter is called $PM_{2.5}$ and is often referred to as fine particulates. Note that $PM_{2.5}$ is a subset of PM_{10}, which means that PM_{10} includes $PM_{2.5}$. $PM_{2.5}$ is largely associated with combustion sources (smoke), while the larger particles in PM_{10} (those greater than 2.5 micrometers) are associated more with crustal sources such as dust. Furthermore, scientific research has shown that smaller particles are more closely related to adverse health effects on people. (Refer to Chapter 2 for more information on **PM** and human health.) To put these sizes into perspective, one micrometer is a millionth of a meter, so PM_{10} is roughly the same size as bacteria - and like bacteria, PM_{10} is invisible to the naked eye and small enough to be breathed into our lungs. In this plan, we address human-caused sources of **PM** that contribute to episodes of poor air quality.

[5] Canadian Census Data 2011: www.bcstats.gov.bc.ca

Who is this Plan written for?

This plan is written by and for citizens who live in the BVLD, from Kitwanga to Endako. Poor air quality affects our health, the overall quality of our lives as well as with the economic well being of our communities. The emission-source specific chapters will be a valuable resource for those people directly involved with controlling emissions of PM. This includes but is not limited to:

- Provincial government
- Local governments
- First Nations
- Energy and heating system specialists
- Environmental Regulators
- Forest harvesting and processing personnel
- Industry managers
- Forestry contractors
- Wood burning appliance owners and operators
- Farmers and ranchers
- Rural residents who conduct open burning
- Concerned citizens

In addition, those who address quality of life as part of their work will also want to act on this plan, including those involved in:

- Economic development
- Environmental health education
- Environmental research
- Land development and real estate

How emission sources were selected

A total of seven source categories were originally selected in 2004 by members of Community Working Groups (CWGs) based on their experience with air quality issues in the airshed**.** The seven categories were:

1) Beehive Burners
2) Other Regulated Sources (i.e**.** stack emissions and asphalt paving plants)
3) Forest Harvest Debris Burning
4) Agriculture, Land Development and Small Sawmill Debris Burning
5) Residential and Commercial Space Heating
6) Backyard Burning
7) Road Dust (from paved roads)

Extensive deliberation within the CWGs took place to reduce the total number of sources from many to a list of the most important. The final categories were representative of both scientific evidence as well as people's viewpoints derived from observation. It should be noted that the categories were chosen based on their PM emissions. While these sources emit more than just PM, the BVLD Airshed Management Plan is focused on this pollutant because it typically drives air quality in the airshed.

Beehive burners are no longer an emission source in the BVLD airshed and the other sources have been amalgamated into four main areas comprising six chapters of the airshed plan. Stakeholder workshops were held in the area in early 2012 for four sectors as part of the process of updating this plan: Open Burning, Industrial Emissions, Transportation, and Woodstoves/Community Planning.

The new source categories in this version of the Plan are:

1) Open Burning
2) Industrial Sources
3) Wood Burning Appliances
4) Backyard Burning
5) Transportation – Road Dust
6) Transportation – Vehicle Emissions

Other contributing emission sources

While other sources of PM do exist, their relative contribution to the overall scope of emissions is considered lower than the primary sources. Depending on resources available, these sources may be addressed individually in the Plan at a later date. Emission sources identified by CWGs in 2004 that are not specifically dealt with in the updated Airshed Management Plan include aircraft, space heating with fuel other than wood, lawnmowers and other small engines, refuse disposal and municipal landfill waste, forest fires, industrial food and agriculture (fish and meat smoking, coffee roasting, methane, etc), restaurants, home barbeque and tobacco use.

How to use this Plan

The Plan is divided into stand-alone chapters on each of the emission source categories listed above. This format makes it easy for anyone to find the information they need to make a positive contribution to clean air. Each chapter contains a set of goals, indicators, and strategies for reducing **emissions** from that source. Additional chapters provide an overview of the science used to develop goals and strategies, the relationship with air quality to other community planning and environmental issues, and the impacts of PM on human health.

Who oversees the Plan?

The BVLD AMS is comprised of a Board of Directors and society members that meets quarterly. The board represents various air quality stakeholders. An Airshed Plan Coordinator[6] position supports the board and society and this position is responsible for overseeing the Plan's implementation under the direction of the board. A budget and workplan is developed annually to implement the Plan. Through annual presentations to local governments and other stakeholders, displays at community and regional events and a website, the AMS ensures that residents of the BVLD are aware of the Clean Air Plan and the opportunity to be part of the team that refines the Plan each year at our AGM and Community Forum.

In addition, project teams (subcommittees) are often formed to further define and implement strategies for specific emission sources and they meet as needed. See Chapter 10, Implementation.

General Goals, Strategies, and Indicators

At the beginning of this planning process it was made clear by the various stakeholders that for the plan to succeed clear goals, indicators, and strategies for each emission source needed to be identified. In order for this emission-specific work to be accomplished, it was also realized that *general* goals, indicators and strategies for the entire airshed also needed to be set. The BVLD Airshed Management Society's mission is to facilitate clean air solutions in the Bulkley Valley - Lakes District for the *Protection and Improvement of the Health of BVLD Residents by Continuously Improving Air Quality.* As part of this 2012 update, the two original goals were expanded and enhanced to become five goals:

1. Maintain and improve our understanding of air quality science in the BVLD
2. Meet ambient air quality targets at Ministry of Environment monitoring stations in the airshed
3. Improve stakeholder awareness of and participation in airshed management activities
4. Reduce emissions in all sectors
5. Strengthen the linkage between air quality and human health by identifying specific goals, indicators and strategies as appropriate

These goals form the basis of discussion at the BVLD Airshed Management Society's Annual General Meeting. Table A elaborates on these overall Goals by presenting their associated Strategies and Indicators in the context of our mission.

[6] At the time of writing of this plan revision, there is no confirmed funding for the coordinator position, however the BVLD AMS will be actively seeking funding in 2012.

Table A: General Goals, Strategies and Indicators

GENERAL GOAL	STRATEGIES	INDICATORS
1. Maintain and improve our understanding of air quality science in the BVLD	• Maintain ambient monitoring for PM and meteorology • Update micro emission inventory (MEI) • Consider future impact assessment studies • Encourage academia to conduct relevant and local research	• Number and % of instruments that pass MOE audits • MEI not more than 10 years old • Others as developed and suggested by AMS and stakeholders
2. Meet ambient air quality targets[7] at MOE monitoring stations in Smithers, Telkwa, Houston, BL: f. PM_{10} – 50 (24hr Avg) g. PM_{10} – 15 (Annual Avg) h. $PM_{2.5}$ – 25 (24hr 98%ile) i. $PM_{2.5}$ – 8 (Annual Avg) j. $PM_{2.5}$ – 6 (Long-term goal for 2020, confirmed after careful review in 5yrs once new instruments in place: 2017)	• MOE Meteorologist collects, analyzes and annually reports out on data	• Statistics (identifying attainment of 5 targets), as calculated for 4 monitoring stations
3. Improve stakeholder awareness of and participation in Airshed Mgmt activities	• Hire a coordinator • Maintain an updated website • Maintain board representation for the following stakeholder groups: provincial government, industry, local government, heath and the general public (NGOs, etc.) • Develop and deliver community presentations • Develop and implement an annual reporting procedure to track plan implementation	• Number of community presentations delivered • Website updated at least semi-annually • Number of entities reporting annually (at AGM or other venue) • Number of partners contributing to implementation, both financially and in-kind
4. Reduce emissions in all sectors	• See chapters 4-9 for detailed sector-specific strategies	• See chapters 4-9 for detailed sector-specific indicators
5. Strengthen linkage between air quality and human health by identifying specific goals, indicators and strategies as appropriate	• Invite NHA health experts to a board meeting to discuss options • Strike committee to review options and prepare recommendation to board	• Incorporation of health information and/or indicators in an update by June 2013

[7] All targets should be reviewed as part of a plan review in 5 years (2017)

Figure 1-1: Summary of Goals, Strategies, and Indicators by Emission Sector

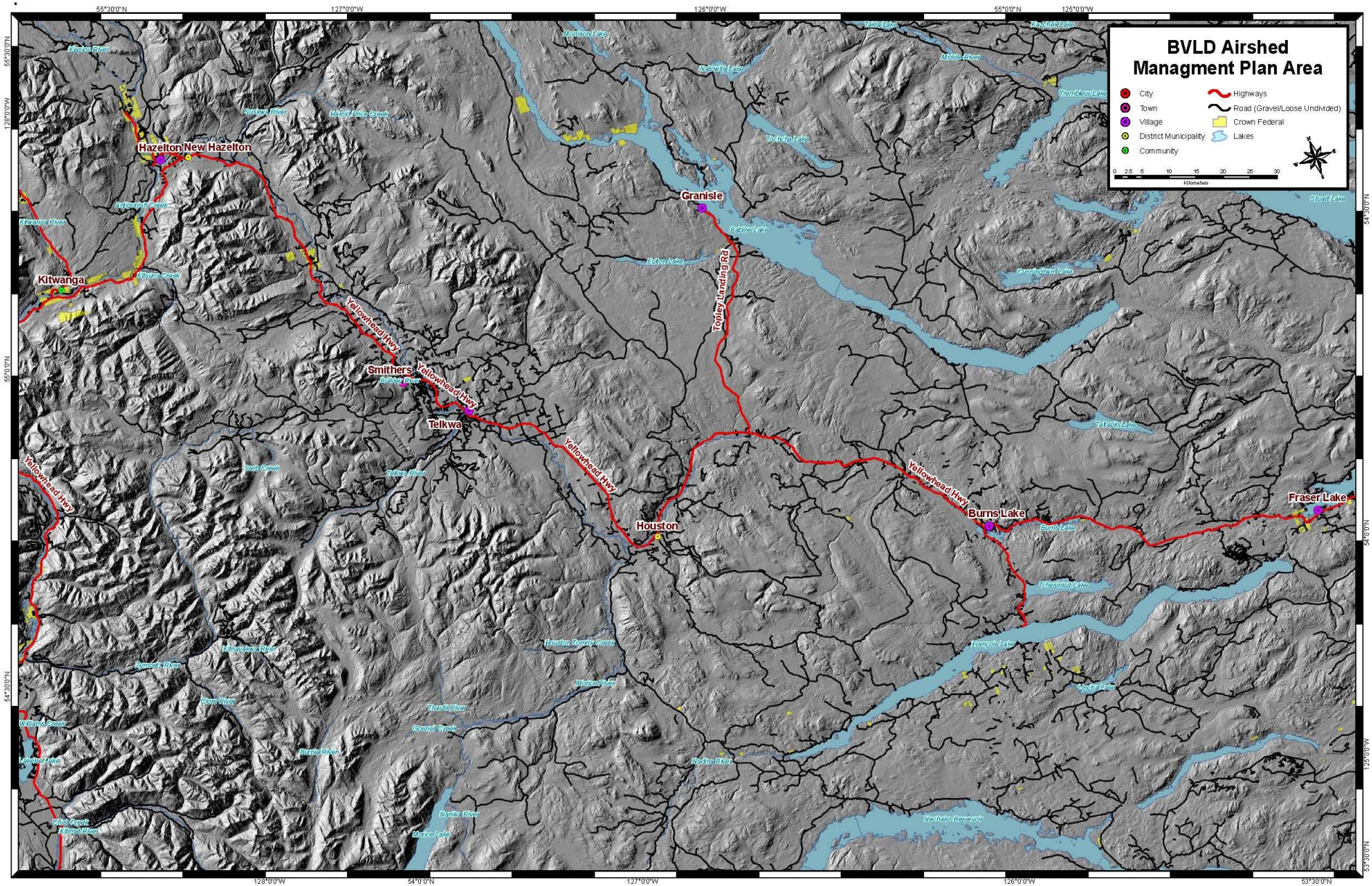


Figure -1-2: A Closer Look at the BVLD Planning Area

CHAPTER 2

Particulate Matter Pollution

2.1The burden of Air Pollution

Air pollution affects human health. The World Health Organization estimates that air pollution causes approximately 2 million premature deaths worldwide each year[8]. More locally, the Canadian Medical Association (CMA) estimated that for British Columbia in 2008, air pollution would result in 306 acute premature deaths, 1,158 hospital admissions, 8,763 emergency department visits, 62,112 doctor's office visits and 2,526,900 minor illnesses. The economic loss through lost productivity, healthcare costs, pain and suffering and loss of life was estimated to be over 900 million dollars.[9] As noted in Chapter 1, the most significant air pollutant in the BVLD is fine particulate matter, $PM_{2.5}$. A study conducted by Elliot and Copes (2011) has estimated that between 16 to 74 deaths each year are attributable to fine particulate matter concentrations in Northern and Interior Health Regions alone[10].

The health effects of air pollution are often illustrated in a triangle, as depicted below. The width of the triangle represents the number of people that are affected while the different layers illustrate different health impacts, increasing in severity as one moves up the triangle. What this triangle illustrates is that while only a relatively small portion of the population may die from air pollution, a much larger group will experience symptoms that will trigger the use of the health care system. An even larger portion of the population will manage their symptoms on their own or experience only subtle symptoms but will still be adversely affected. What health professionals are beginning to understand is that the entire population, including healthy young individuals, will experience some physiological effects from air pollution. Although these may go unnoticed by the individual, they can lead to more serious and chronic illnesses over time. In other words, one death resulting from air quality represents a much larger burden of illness.

[8] World Health Organization. 2002. World Health report; reducing risks, promoting healthy life. Geneva
[9] Canadian Medical Association. 2008. No Breathing Room; National Illness Costs for Air Pollution; Summary Report. Available online (may 31, 2012): http://www.cma.ca/multimedia/CMA/Content_Images/Inside_cma/Office_Public_Health/ICAP/CMAICAPTec_e-29aug.pdf
[10] Elliot C.T. and R. Copes. 2011. Burden of Mortality Due to Ambient Fine Particulate Air Pollution (PM2.5) in Interior and Northern BC. Canadian Journal of Public Health. 102(5):390-393.

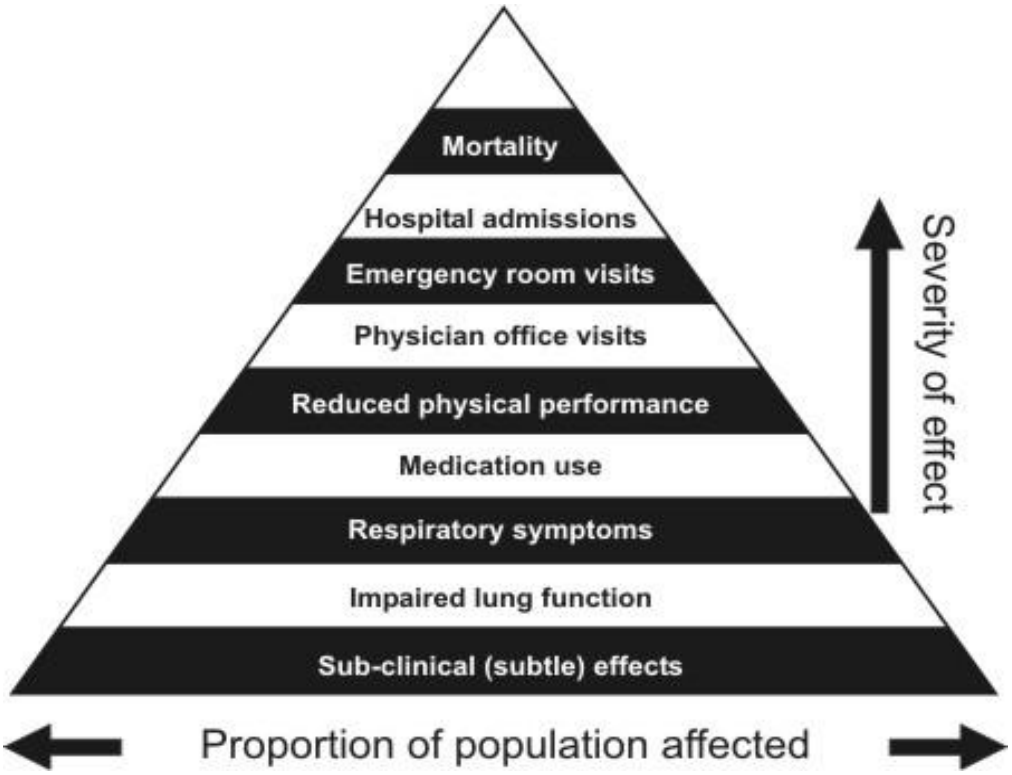


Figure 2-1: The health effects of air pollution. From Henderson 2012[11]

2.1The Health Effects of Particulate Matter

Exposure to particulate matter can have both immediate and long-term health effects. Short term exposure to relatively high concentrations of PM, such as those experienced during episode or air quality advisory days, can trigger breathing problems, increase the severity and occurrences of asthma attacks, trigger heart attacks, cause eye, nose and throat irritation and result in acute premature deaths. These symptoms will generally be experienced by a subset of the population identified as sensitive individuals: the elderly, children, pregnant women and those with pre-existing respiratory and cardiovascular conditions.

Long-term exposure to PM, even at relatively low levels, can put the entire population at an increased risk of developing heart and lung diseases, including chronic bronchitis, emphysema, pneumonia and lung cancer. Long-term exposure to fine particulate matter has also been linked to pre-term births, low birth weight babies, acute respiratory infections and middle ear infections in children.

While much of the media attention and public pressure is around short-term episodes (e.g. air quality advisories days), the majority of health impacts appear to be the result

[11] Henderson S. 2012. PM2.5 in the case of This vs. That. Power Point Presentation given to the Health Authority Air Quality Council on January 25, 2012

from chronic exposure over many years. For instance, the CMA report cited above found that 87% of the estimated air pollution-related deaths in 2008 were due to chronic exposure. This is important to keep in mind when developing management strategies for addressing air quality issues within an airshed.

2.2 Size Matters…and so does composition

As was noted in Chapter 1, fine particulate matter is a complex mix of suspended matter which is generally classified into two different categories based on size: PM_{10} and $PM_{2.5}$. PM_{10}, also sometimes referred to as respirable particles, are able to penetrate into the lungs and deeper parts of the airways compared to their larger counterparts (those greater than 10 micrometers in diameter) that usually get filtered out in the nose and throat. $PM_{2.5}$, a subset of PM_{10}, can penetrate even deeper into the lungs and enter into the gas exchange areas of the lungs where they can have more adverse health effects.

Ultrafine particles is an even smaller fraction of $PM_{2.5}$ that is used less commonly by those monitoring and managing air quality, but one whose importance to health is becoming more and more apparent. It refers to very small particles that are less than 100 nanometers in diameter. These tiny particles are of particular interest since they are able to penetrate into the deepest reaches of the lung and consequently into the bloodstream. Once in the bloodstream they can then be distributed to other organs in the body. While they usually only constitute a very small percentage of the $PM_{2.5}$ mass, they can constitute a large percentage of the total number of particles in a $PM_{2.5}$ or PM_{10} mixture. In comparison to the larger fractions these tiny particles also have a very large surface area to mass ratio and a higher deposition efficiency which has the potential to affect their toxicity[12].

[12] Howard. V.C. 2009. Statement of Evidence. Particulate Emissions and Health; Proposed Ringaskiddy Waste-to-Energy Facility.

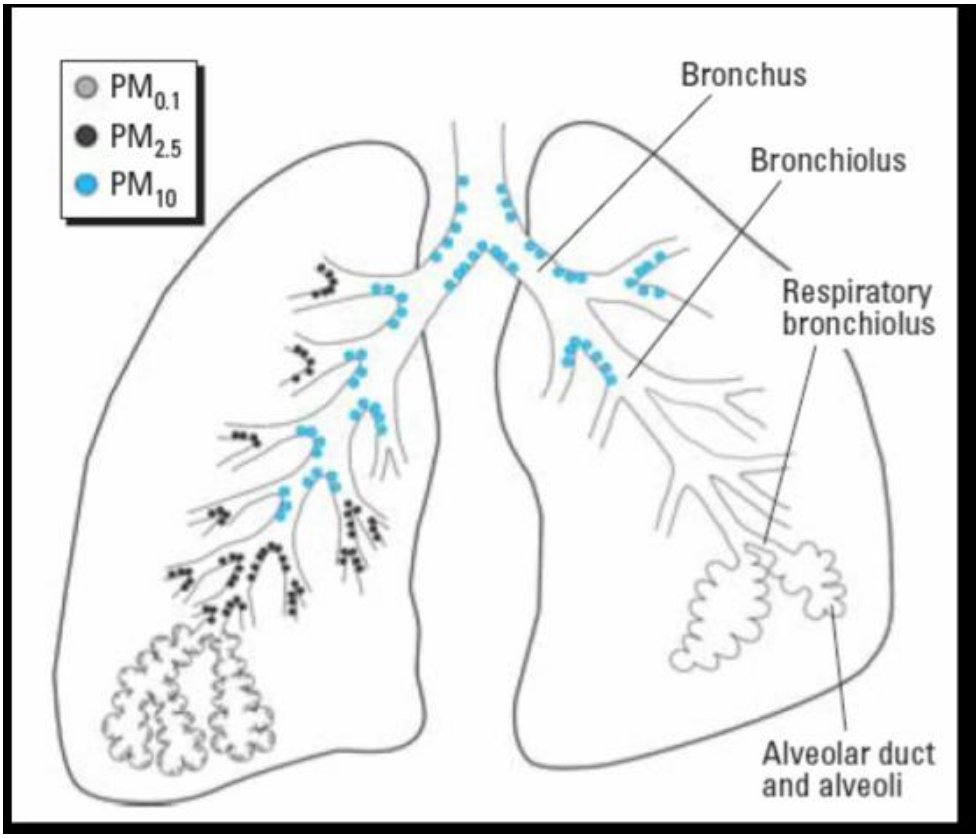


Figure 2-2: Distribution of PM in the airways. From Cormier, et al. 2006[13]

There is a general scientific consensus that the finer the particles, the more harmful they are to human health. Nevertheless, it is important to note that even the "coarser" PM_{10} particles have been linked to premature deaths, COPD, asthma and respiratory admissions.[14,15]

It is not only the size of the particles that play a role in their health impacts, but also their composition. Particulate matter mixtures are complex and can be comprised of thousands of different chemicals, minerals, and compounds, each with their own size, toxicity and health impact. It has been said, that the PM mixture for a community is like its fingerprint, since the PM profile is rarely the same from one community to the next. As a result, it is not only important to think about the different sizes of PM, but also the different compositions of PM when managing for its health impacts. For instance, emerging research is finding that different combustion technologies and practices result in

[13] Cormier S.A., S. Lomnicki, W. Backes and B. Dellinger. 2006. Origin and Health Impacts of Emissions of Toxic By-Products and Fine Particles from Combustion and Thermal Treatment of Hazardous Wastes and Materials. Environmental Health Perspetives 11(6): 810-817.
[14] Meister K., C. Johansson and B. Forsberg. 2012. Estimated Short-term Effects of Coarse Particles on Daily Mortality in Stockholm, Sweden. Environmental Health Perspectives 120(3): 431-436.
[15] Brunekreef B. and B. Forsberg. 2005. Epidemiological evidence of effects of coarse airborne particles on health. European Respiratory Journal 26: 309-318.

the creation of different wood smoke particles, which vary in their level of toxicity, as illustrated below[8].

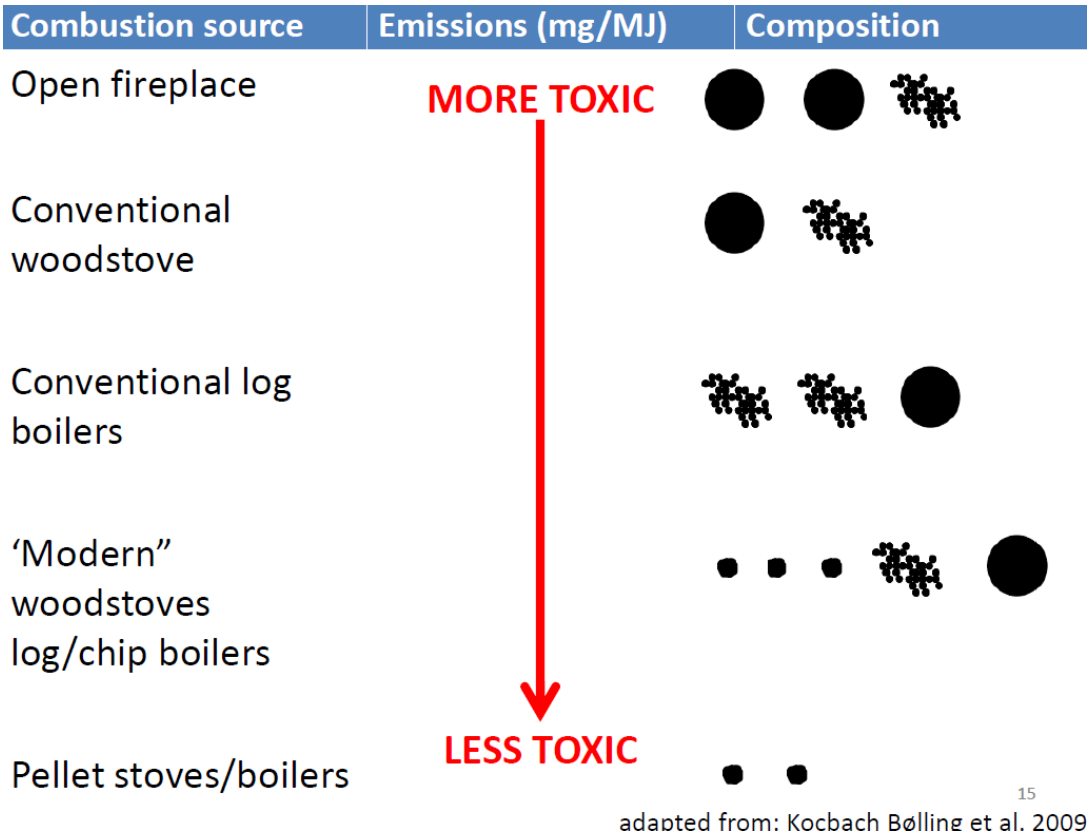


Figure 2-3: Toxicity levels of different wood combustion particulates take from Brauer, 2012[16] where ● is organic carbon, ▪ is soot and • is inorganic ash particles.

2.3 No 'safe' levels of particulate matter

There is generally agreement that health impacts from PM follows a 'linear non-threshold' model relationship. What this means is that there are currently no known 'safe' levels of particulate matter and that health impacts can be observed, even at relatively low levels of exposure. As a result, when managing air quality for the purpose of improving health, the focus should be on continuous improvement and to lowering ambient concentrations to as low as possible. From a human health perspective, less PM pollution is always better.

[16] Brauer M. 2012. Woodsmoke and health. Power Point presentation given for the BC Lung Association Webinar on February 9, 2012.

2.4 BC Air Quality Objectives for PM2.5 & PM10

Objectives for $PM_{2.5}$ were adopted by the Province of B.C. in 2009. The 24-hour and annual average air quality PM $_{2.5}$ objectives (AQOs) are the primary air management tools used to guide decisions on environmental impact assessments and authorizations, airshed planning efforts and regulatory development. The 24-hour $PM_{2.5}$ AQO is also used to guide decisions on whether or not to issue an **air quality advisory,** while the 24 hour PM_{10} AQO is used to guide decisions on a whether or not to issue a **dust advisory.**

British Columbia's long term planning goal is for communities to strive for. The planning goal is intended as a voluntary target to guide airshed planning efforts and encourage communities to maintain good air quality in the face of economic growth and development. The concentrations are:

Table 2-1: Air Quality Objectives for BC

	$PM_{2.5}$ ($\mu g/m^3$)	**PM_{10} ($\mu g/m^3$)**	**Time Period**
BC Air Quality Objective	25	50	24 Hr.
BC Air Quality Objective	8	N/A	Annual Average
BC Air Quality Objective Long Term Planning Goal	6	N/A	Annual Average

At the time of writing of the airshed plan in 2004, there were no Air Quality Objectives for $PM_{2.5,}$ only for $PM_{10.}$ The 2012 version of the BVLD airshed plan has adopted these as goals (Table A).

CHAPTER 3

Supporting Science and Technical Information

3.1 BVLD Ambient Air Quality Concentrations

The purpose of this chapter is to provide the reader with a background of the science used to support airshed management planning, specifically for the BVLD AMS.

3.1.1 Overview

Air quality in the BVLD airshed is typically driven by emissions of particulate matter (PM) from either combustion or dust sources. In addition to the nature of emissions (when and where they occur, how much is emitted, and whether they're smoke or dust related), weather and topography also play a defining role in determining ambient air quality and a person's exposure to PM at any given time. In order to better understand the relationship between emissions, weather and topography, we rely on local knowledge, monitoring and modeling. By using these tools effectively, strategies can be developed to reduce the burden of air pollution on people living in the BVLD airshed.

Ambient PM concentrations are measured with monitoring equipment located in communities throughout the BVLD. Table 3-1 shows the communities with PM and meteorological monitoring instruments within the BVLD airshed planning area. Burns Lake, Houston and Smithers have continuous monitoring of both $PM_{2.5}$ and PM_{10}, while Telkwa has continuous monitoring for $PM_{2.5}$. Non-continuous $PM_{2.5}$ monitoring is ongoing in the Hazeltons until the end of 2012 as well as Telkwa and Smithers. Further information on the various PM monitoring programs in the BVLD can be found in Appendix E.

Photo 1: The Smithers St. Josephs Air Quality Monitoring Station

Photo 2: Inside the Station

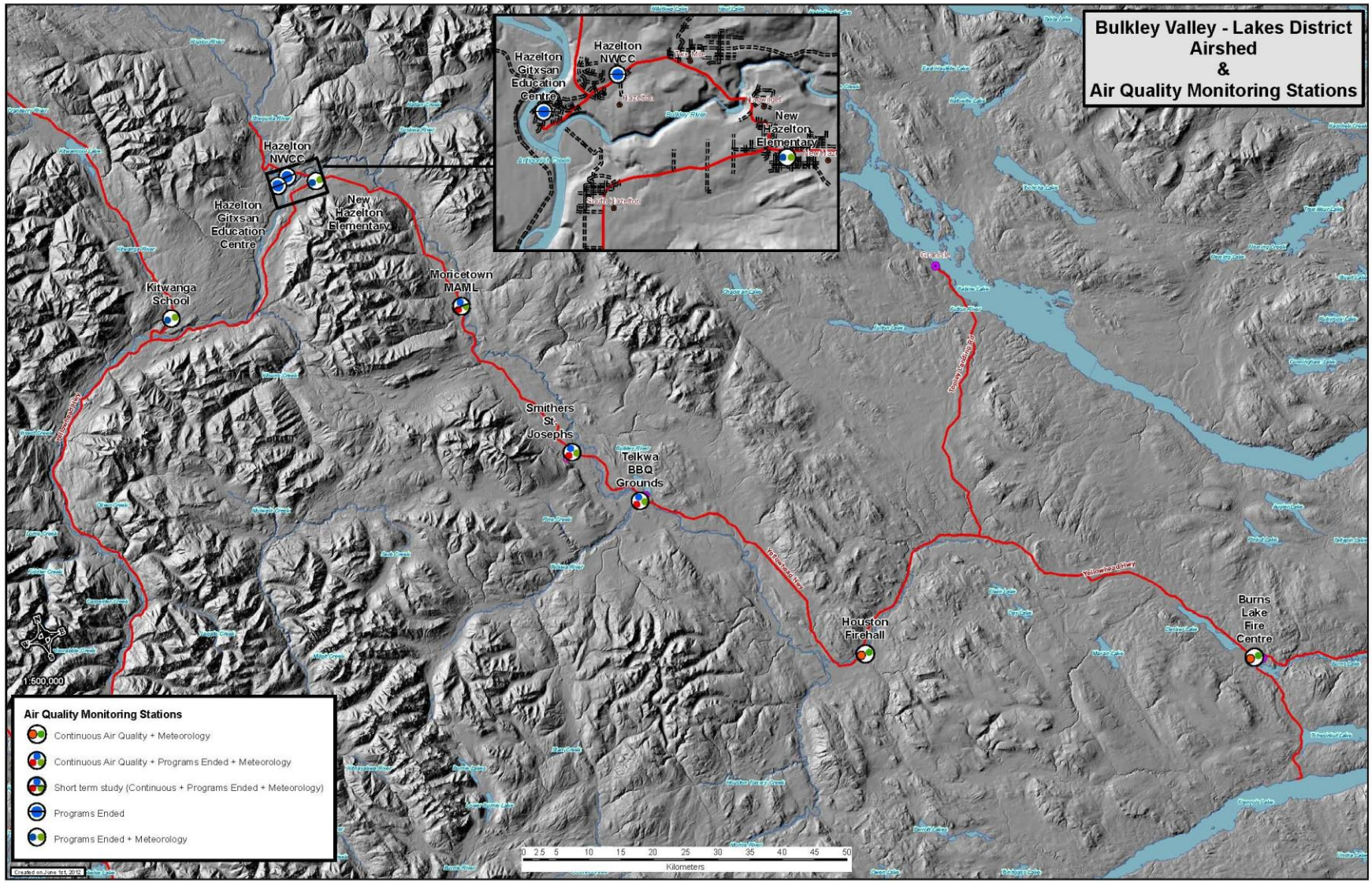


Figure 3-1: Air Quality Monitoring Stations in the BVLD

There is a long record of PM_{10} measurements in the BVLD Airshed. PM_{10} monitoring began in most communities in 1997 and is ongoing to this day, as it is critical for understanding the contribution of road dust and other larger particles to overall ambient air quality. Figure 3-2 displays annual average PM_{10} concentrations in the BVLD. In Houston there is strong evidence of improvement in annual PM_{10} concentrations over the years while in Smithers and Burns Lake there insufficient evidence to conclude that there is an improving trend.

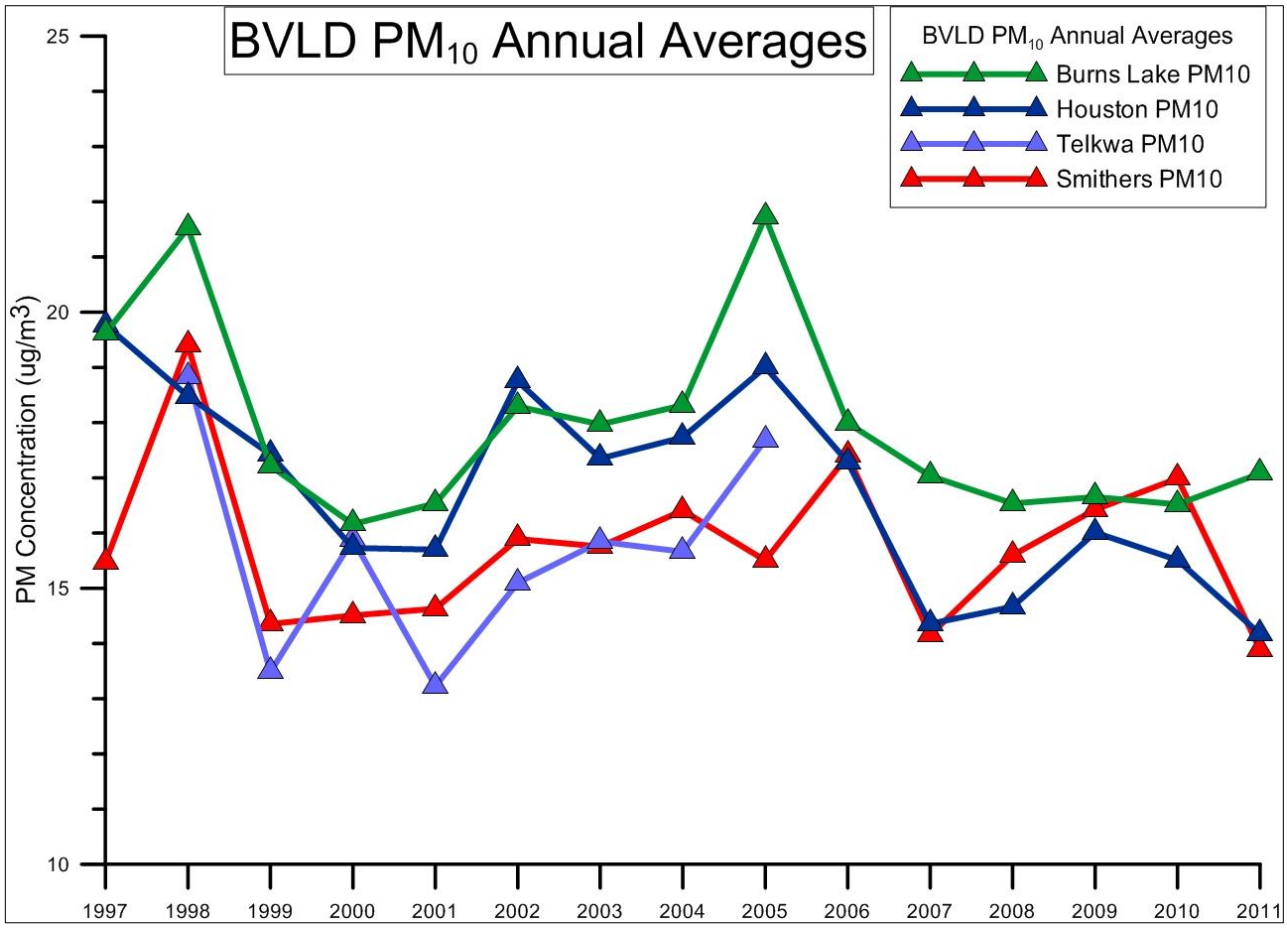


Figure 3-2: Annual Average PM10 Concentrations in the BVLD

Many changes in the air quality monitoring network have occurred since airshed planning began in the BVLD in 2002. Most notably, $PM_{2.5}$ instruments were added to the network where only PM_{10} instruments existed before. Because these additions were made somewhat recently (Smithers in 2004, Telkwa in 2006 and Burns Lake in 2006) it is too early to assess air quality trends in all communities.

In Houston, however, $PM_{2.5}$ monitoring began in 2001 and there exists enough data to analyze for an indication of a trend. Figure 3-3 shows $PM_{2.5}$ concentrations in all communities in the BVLD with continuous monitoring. Using statistical analysis, it is possible to state that there is evidence of an improving trend in Houston's $PM_{2.5}$ concentrations.

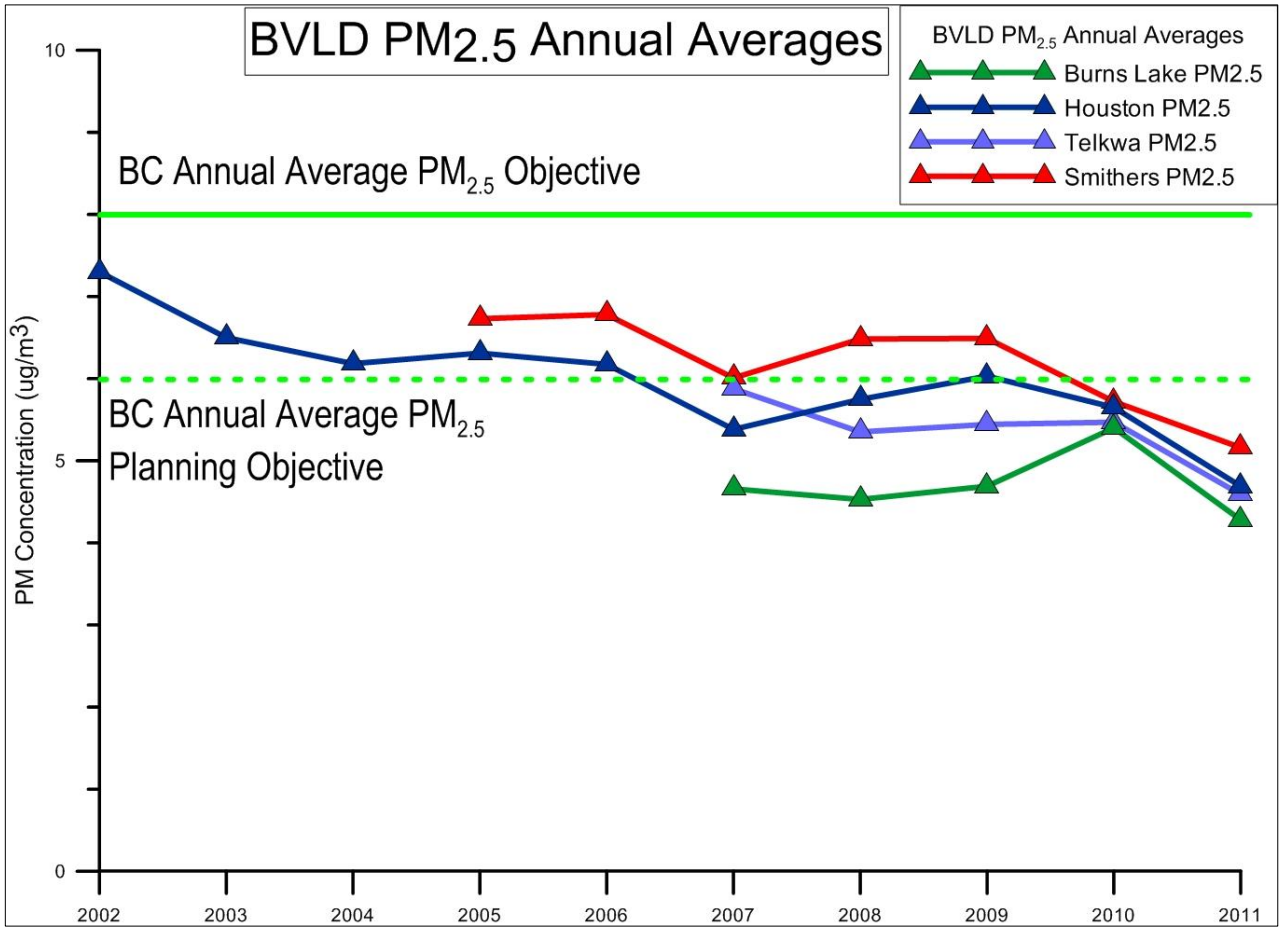


Figure 3-3: Annual Average PM2.5 Concentrations in the BVLD

Based on current data, all communities in the BVLD are achieving the provincial $PM_{2.5}$ annual average objective (8 ug/m^3) and have recently come into conformance with the airshed planning objective (6 ug/m^3).

Another provincial metric for air quality is the annual 98th percentile daily value (ie: approximately the 8th worst day of the year). As is presented in Figure 3-4, all BVLD communities are achieving the numerical value of this objective which is 25 µg/m^3. In Houston there is some evidence of an improving trend, however in other communities more data is required.

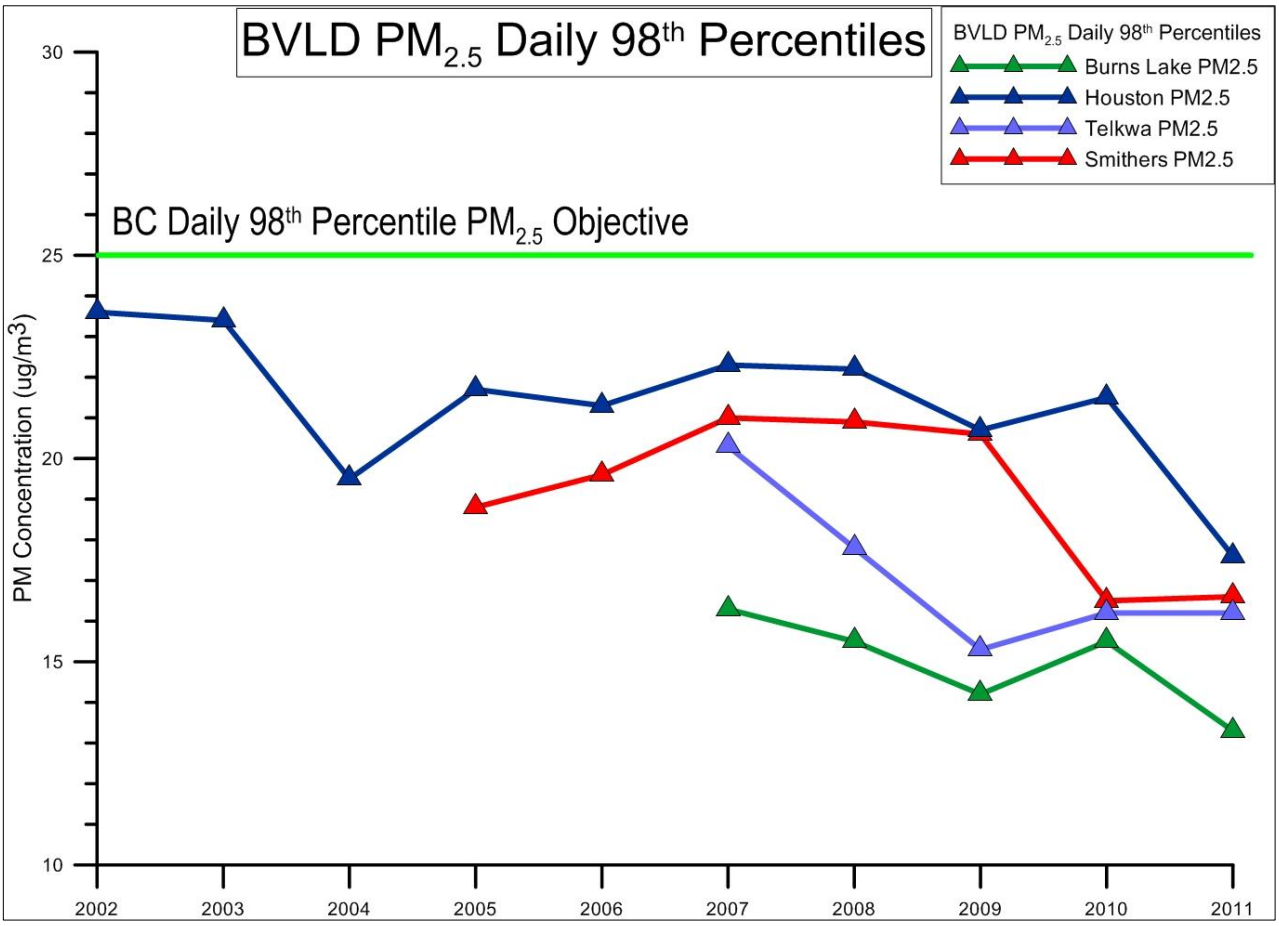


Figure 3-4: Annual 98th Percentile PM2.5 Daily Values for the BVLD

3.1.2 Seasonality of Advisory Level Days

Despite what appear to be some decreases in air quality concentrations over the past decade, the BVLD still experiences seasonal advisory level days. Elevated PM_{10} concentrations typically occur in spring when road surfaces dry and exposed traction material is driven into the air from traffic. This is commonly referred to as road dust, and the road dust season tends to persist until streets are cleaned. Elevated $PM_{2.5}$ typically occurs in the autumn and winter months when dispersion is poor and many different emission sources (industry, space heating, open burning) are active. Because the BVLD experiences long periods of stagnant air, the cumulative emissions from all sources can cause $PM_{2.5}$ to accumulate and drive concentrations over the threshold for when an advisory is to be issued.

Tables 3-1 and 3-2 illustrate the seasonality of advisory level days for PM_{10} and $PM_{2.5}$ in the BVLD. A day is considered an advisory level day if the daily (24-hour) concentration is greater than the provincial objective of 50 ug/m^3 for PM_{10} and 25 ug/m^3 for $PM_{2.5}$.

Table 3-1: Summary of Air Quality Advisory Level Days for PM_{10}

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
January							3				1	1			2
February	2	6						1	5	4	2	2	1	3	
March	5	13	4	7	4	3	8	8	7	8	4	8	3	12	9
April	6	4	3	1	7	7	2	1		5	5		6	1	3
May	2	1				1							1		
June			1			1									
July															
August					1									4	1
September														1	
October	4	2					1								
November	1	2	6			8	5		1	1		1	1		
December	1			1								2			
Total	21	28	14	9	12	20	19	10	13	18	12	14	12	21	15

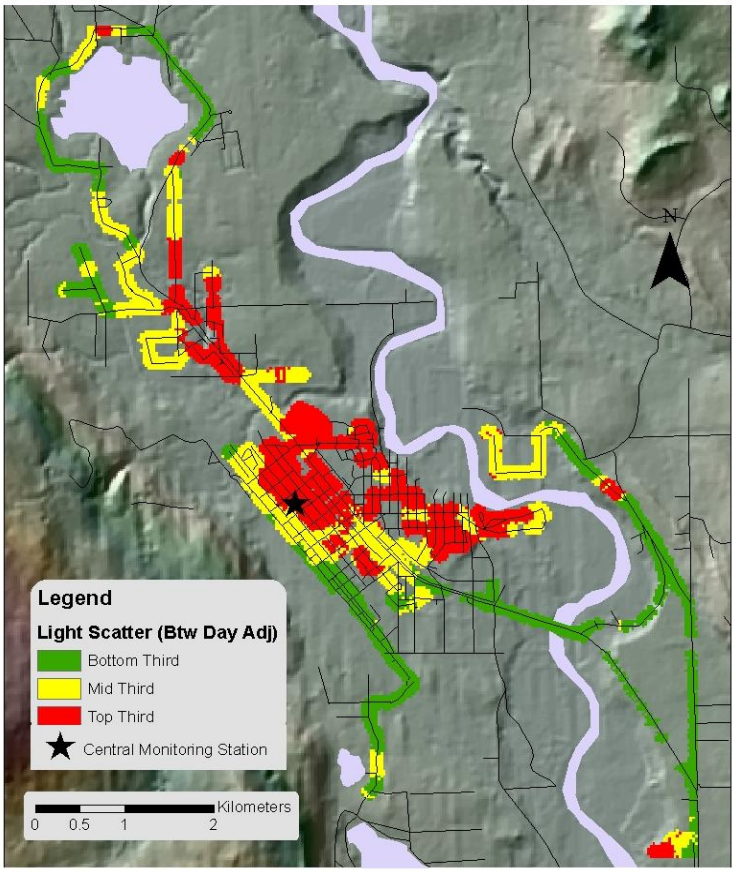
Table 3-2: Summary of Air Quality Advisory Level Days for $PM_{2.5}$

Month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
January			1	2	2		1	1			
February			1				2		1		
March			1								
April											
May											
June											
July									1		
August										5	
September											
October		1									
November	4	3	2	5		2				1	
December			2	2	1	2	1	6	1		1
Total	4	4	7	9	3	4	4	7	3	6	1

Note: number of days includes the first day of an advisory or ban being issued and the last day on which the advisory or ban was in effect.

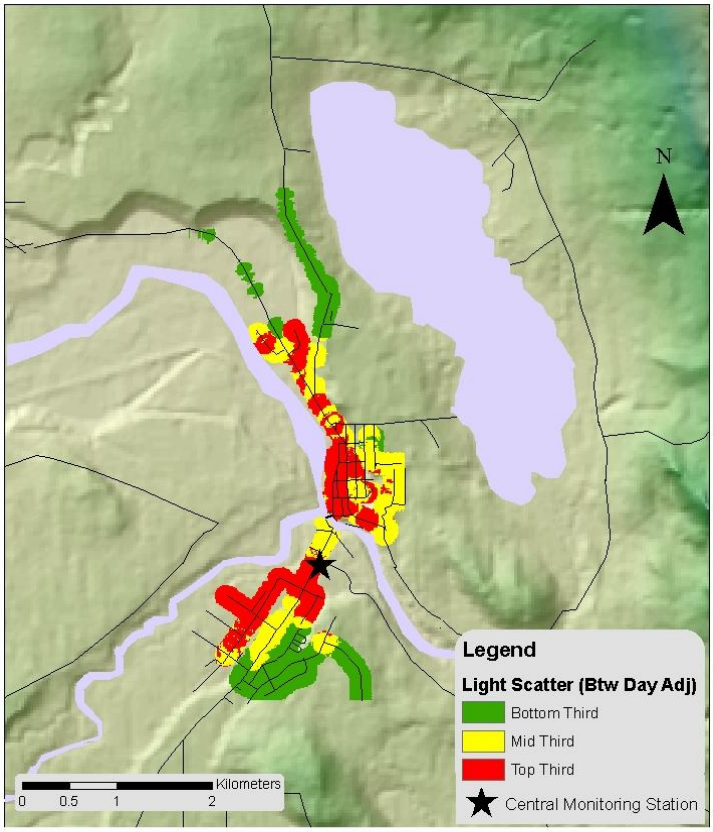
3.1.3 Spatial Distribution of PM

The AMS has been involved in a university research project which assessed the spatial distribution of $PM_{2.5}$ within Burns Lake, Houston, Telkwa and Smithers in 2007 using **nephelometry**. Based on the results, maps depicting the spatial variation were developed for each community and are presented below in Figures 3-5 through 3-8. What is most apparent is that higher $PM_{2.5}$ concentrations tend to occur in older, denser neighborhoods and trailer parks. For more information on this research and other work carried out by a team of universities, please visit www.woodstove.spph.ubc.ca.



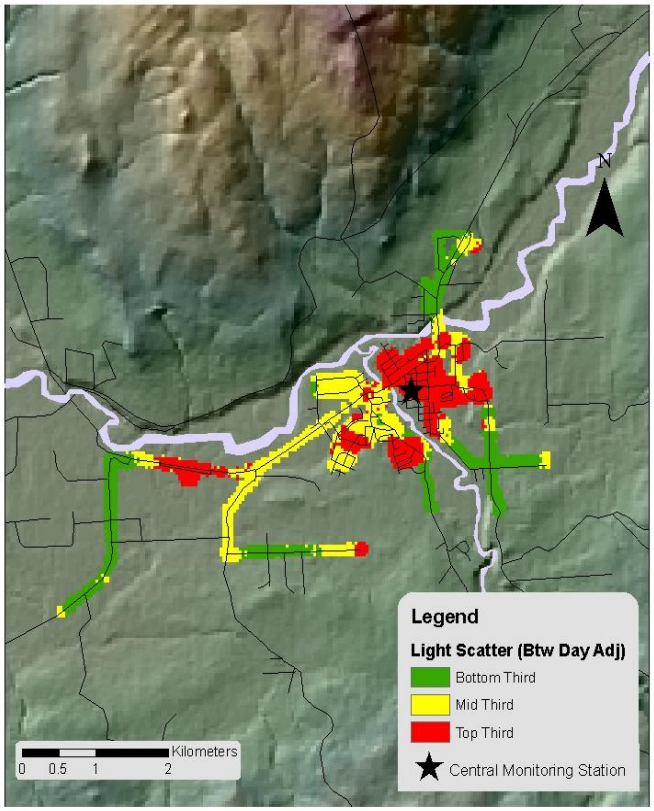
Evenings Monitored: 20,21,22,23,24 November 2007; 16, 24 January 2008; 19,20,21,22 February 2008

Figure 3-5: Spatial Distribution of PM2.5 in Smithers



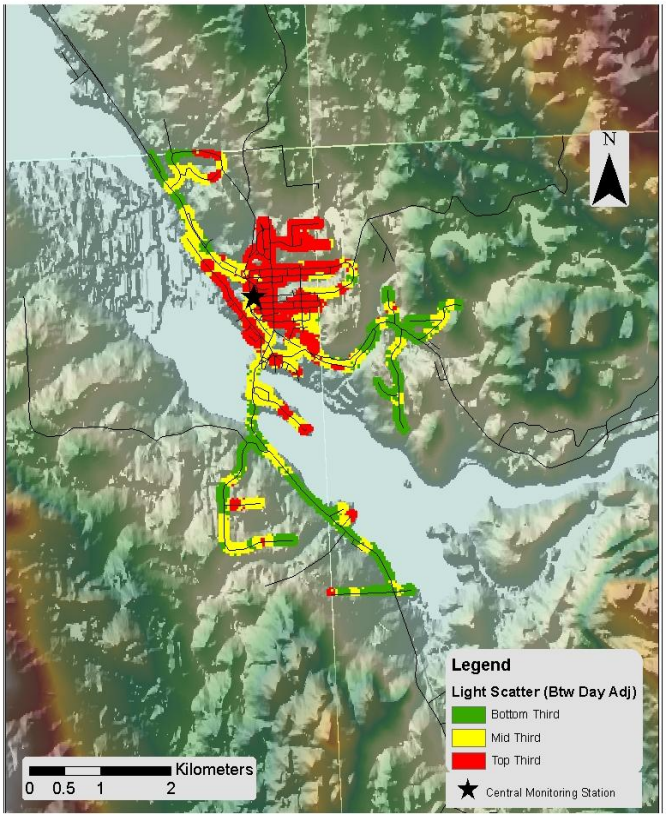
Evenings Monitored: 20,21,22,23,24 November 2007; 16, 24 January 2008; 19,20,21,22 February 2008

Figure 3-6: Spatial Distribution of PM2.5 in Telkwa



Evenings Monitored: 28,29,30 November 2007; 1,2 December 2007; 21,22,23 January 2008; 2,3 February 2008

Figure 3-7: Spatial Distribution of PM2.5 in Houston



Evenings Monitored: 6,8 December 2007; 9,11 January 2008; 13 March 2008; 19,20,21,22 April 2008

Figure 3-8: Spatial Distribution of PM2.5 in Burns Lake

3.2 Looking Forward

3.2.1 Changes to Monitoring Technology

With the exception of the spatial monitoring, $PM_{2.5}$ data used in the above analysis were obtained by TEOM instruments. TEOMs were the first continuous $PM_{2.5}$ monitors employed in the B.C. monitoring network and offered a significant improvement to our understanding of ambient air quality insofar as there was no continuous $PM_{2.5}$ information before they were deployed. However, TEOMs are known to under-measure $PM_{2.5}$ concentrations, especially during colder winter months in areas where wood smoke is prevalent. Over the past few years newer continuous technologies have been developed which provide a more complete measure of $PM_{2.5}$. These newer instruments have obtained Federal Equivalent Method (FEM) status by the U.S. Environmental Protection Agency (EPA) and/or by National Air Pollution Surveillance (NAPS) Canada, a designation that means the measurements should be comparable to those obtained using the Federal Reference Method (FRM) samplers which are considered a gold standard but provide only a daily average concentration after the samples are sent to the lab for analysis. (FRM

samplers are referred to as non-continuous.) For this reason all TEOMs in B.C. are being replaced with FEM-equivalent instruments by December 31st, 2013.

FEM instruments will measure higher concentrations of $PM_{2.5}$ in the BVLD, especially in the winter. A SHARP FEM instrument was installed in Smithers in the summer of 2010 and has been operating since then in the background. As is evident in Figure 3-9, $PM_{2.5}$ concentrations measured by the SHARP were considerably higher than the $PM_{2.5}$ concentrations measured by the TEOM. In many cases the concentrations exceeded the provincial ambient 24-hour objective of 25 µg/m^3 during the 2010/11 cold season.

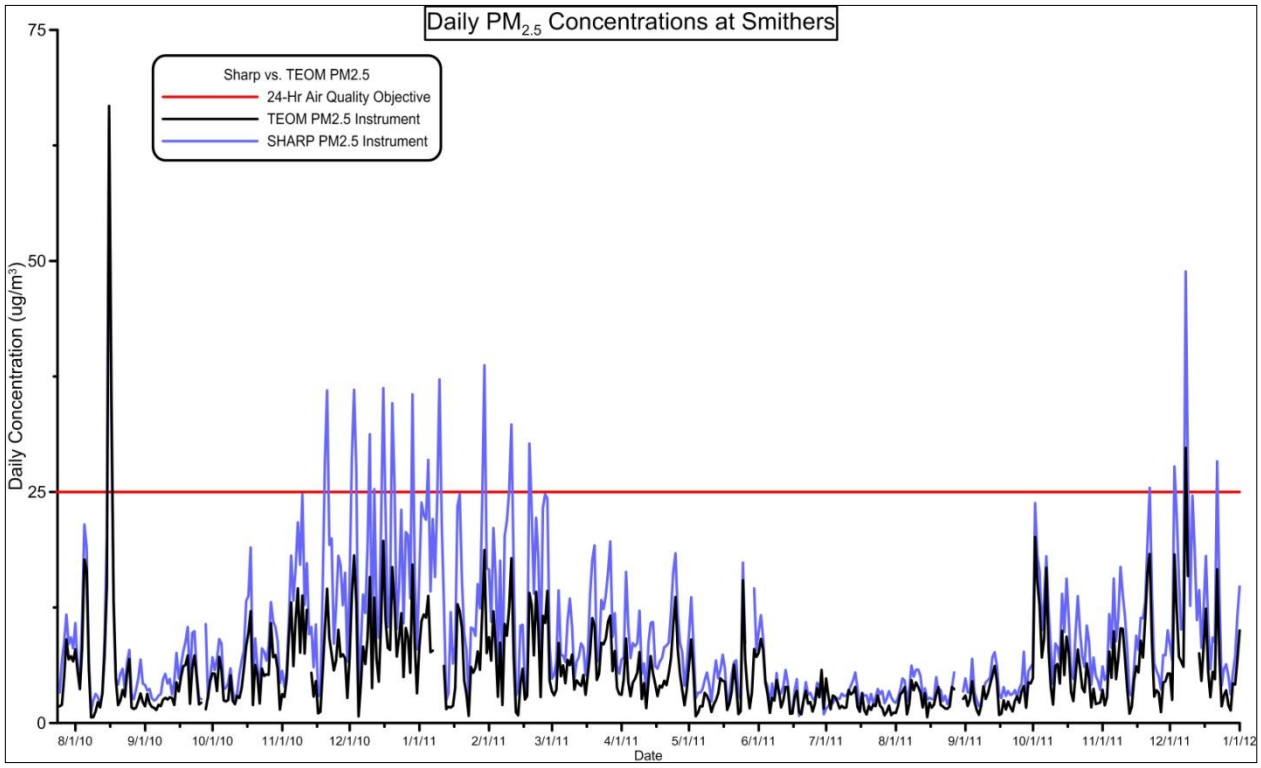


Figure 3-9: Comparison of PM2.5 Concentrations in Smithers: SHARP FEM and TEOM

3.2.2 Future Work

It must be recognized that ambient PM instruments in the BVLD cannot differentiate one source from another. For that reason, more detailed impact assessment work is needed. In 2005 MOE released a draft Micro Emissions Inventory (MEI) for the BVLD Airshed for the years 2001 and 2002. An emission inventory is an accounting of all sources of air pollution within a defined geographic area. Emission data from the inventory is used to provide information regarding the percentage of total emissions in an airshed coming from each source. Additionally, the emissions data can be used in further impact assessment work such as dispersion modeling to estimate the contribution of those emissions to ambient air quality. The relationship between how much a source emits, and

how much it contributes to ambient air quality is not a simple one, and warrants further study.

This report was reviewed internally but never formally published. Results for 2002 are presented below in Figures 3-9 and 3-10.

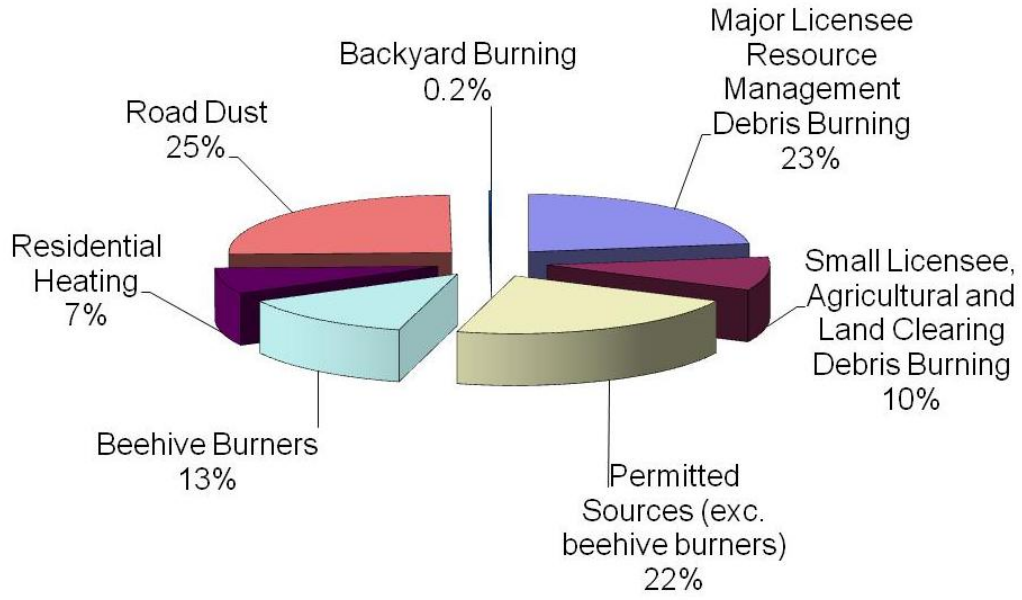


Figure 3-10: MEI Total PM10 Emissions 2002

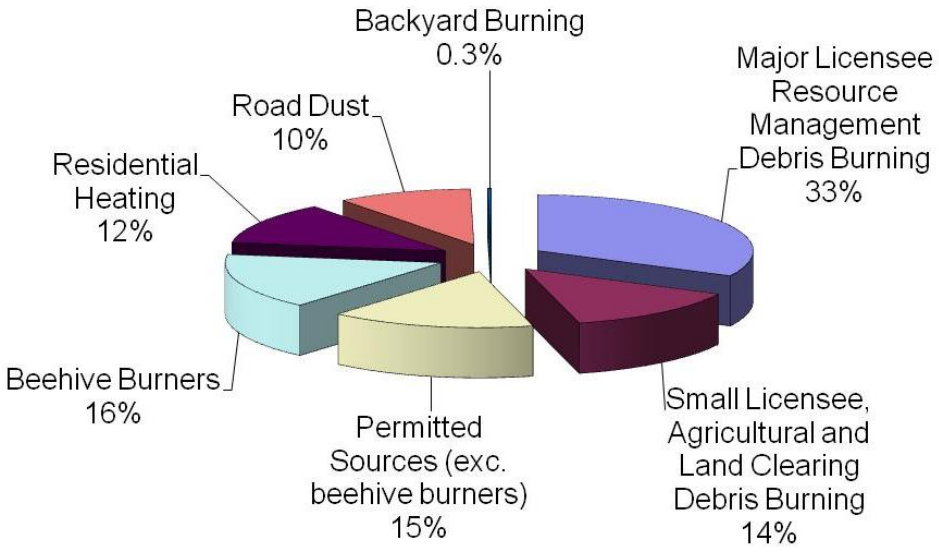


Figure 3-11: MEI Total PM2.5 Emissions 2002

Since the release of the MEI there have been substantial changes to the composition of emissions in the BVLD. For example, there are no longer beehive burners operating anywhere in the BVLD. A new MEI which accounts for new and emerging sources along with the changed nature of existing sources is necessary for the BVLD Airshed. The MOE and Ministry of Forests, Lands and Natural Resources Operations (FLNRO) have both requested funding in 2012 for compiling an undated MEI for the BVLD Airshed.

Once the MEI has been updated more impact assessment work can be completed. For example, results from the MEI can be used in a dispersion model, a tool that takes emissions, weather and topographical data to predict maximum ambient air quality concentrations. Dispersion modelling had been initiated for some aspects of emissions in the BVLD, however, the process was never completed. In addition to dispersion modelling, more impact assessment work is possible. An excellent primer on air quality impact assessment is called *Air Quality Assessment Tools, A Guide for Public Health Practitioners*, and is available from the B.C. Centre for Disease Control.

3.2.3 Conclusion

While air quality appears to be improving in some communities in the BVLD, the transition to FEM instruments (which more completely measure current conditions) will cause almost every community in the BVLD to exceed both provincial $PM_{2.5}$ objectives (annual and daily 98^{th} percentile) and will result in many more air quality advisories being issued in the cold season. Improving air quality will require effort from all sectors and sources. The extent of the effort will be determined through continued participation in airshed planning by all stakeholders.

CHAPTER 4

Open Burning

4.1 Background

The term "open burning" is specifically defined in the Open Burning Smoke Control Regulation (OBSCR) and means: *the combustion of material with or without control of the combustion air and without a stack or chimney to vent the emitted products of combustion to the atmosphere*.

Open Burning is typically used to describe burning and associated activities undertaken for a variety of reasons, including:

- Land-clearing burning (e.g., residual slash from forestry-related timber harvesting or from site development);
- Industrial burning (e.g., sawmills, log sorts);
- Agricultural burning (field burning and other wastes);
- Construction waste burning; and
- Resource management open fires used to achieve land management objectives (e.g., forest health, wildlife habitat and range modification, fire hazard reduction).
- Residential or backyard burning (e.g., "burn barrels," burning of yard and household waste);

Burning can be a legitimate management tool, as in the case of certain land management objectives, or simply as an easy method of waste disposal. Regardless of the reason for open burning, what was once considered a harmless or entirely beneficial practice is now recognized as a significant potential source of air pollution because the smoke generated by open burning can have significant impacts on air quality.

Photo 3: Burning at the Smithers Airport Nov 10, 2007

In the BVLD airshed, open burning is commonly done by the forestry industry (including large and small licensees), the agricultural sector, land developers, private landowners, the Ministry of Forests, Lands and Natural Resource Operations (FLNRO) and local governments who are involved in community wildfire protection initiatives. With proper attention and during favourable conditions, open burning has been shown to have little impact on the residents of the BVLD. However, when conducted poorly smoke from open burning can travel great distances and can impact residents both close to and far away from the locations of the burns. Emissions from open burning include $PM_{2.5}$, PM_{10}, NO_x and VOCs, the quantity of which depends largely on pile shape, content and curing time. These factors are discussed in greater detail in section 4.4. The following is a short summary of the common open burning activities conducted in the BVLD, which are addressed in this chapter:

4.1.1 Open Burning in the Forest Sector

Through logging, **residual debris** (tree limbs and tops, rotten wood, etc) is created which, if not properly managed, forms a fire and insect-spread hazard. FLNRO forest managers require that these hazards be abated in a timely manner[17], and on-site open burning is a frequently used abatement technique because it is considered to be a safe, practical and economic way to manage this residual debris. Indeed, in many cases the alternatives to burning are cost prohibitive to the forest sector.

Open burning of debris as it relates to forest harvesting takes three general forms:

- Burning of piled debris
- Broadcast burning of debris "as is" on the ground (as opposed to being piled into distinct piles), and
- "Fall and Burn" of individual/small groups of bark beetle infested trees.

Each one of these forms is unique insofar as it requires special attention to ensure that the impact from smoke generated is abated. "Fall and Burn" activities generate little smoke because the piles are generally quite small and can be burned in less than a day, while broadcast burning is conducted over many hectares and generates a significant amount of smoke. Burning of piled debris is the most common form of open burning in the forestry sector. Large forest licensees burn between 10,000 to 20,000 piles in any given year in the BVLD airshed, which represents the vast majority of open burning that occurs in the airshed.

[17] The time period for abatement for **non qualified holders** (private land owners, small scale salvage operators etc) is 6 months if within 2 km of a municipal boundary or a regional fire protection response area and 12 months if it's outside the 2 km boundary. For '**qualified holders**' the abatement period is 24 months within the 2 km boundary or 30 months outside of the 2 km boundary.

Photo 4: Open Burning in the Lakes District, Oct 28, 2005

4.1.2 Open Burning to Support Agriculture and Land Development

Agriculture is common throughout the BVLD and has helped to build the foundation on which the communities and economy have been based. Clearing of forests and woody areas occurs in order to increase the land base for agricultural use. In many cases the alternatives to burning this land clearing debris are cost prohibitive to the agricultural sector.

Similarly, land developers utilize open burning to manage debris generated for clearing land for the purpose of developing it. Land developers often have opportunities to recover the cost of hauling away the debris to a landfill (when the property sells), however many developers prefer to minimize their costs and burn the debris.

4.1.3 Open Burning for Community Wildfire Protection

Ever since the devastating Okanagan fires in 2003, FLNRO and the Union of B.C. Municipalities (UBCM) have assisted communities in developing community wildfire protection plans. These plans identify **interface areas** and identify high hazard fuel types around communities where there is need to reduce the amount of available fuels in the event of a wildfire. Usually, reducing the available fuel involves thinning out tree density and open burning small trees, **ladder fuels**, or other material that would allow wildfires to threaten populated areas. FLNRO does not specifically conduct this open burning but instead provides funding for communities to develop these plans and then execute those using small contracts.

4.1.4 Open Burning of Wood Waste at Landfills and Transfer Stations

Local and regional governments are responsible for managing the waste generated by their populations. Most of this waste is ultimately removed to landfills, however MOE does allow both the Regional District of Bulkley Nechako and the Regional District of Kitimat Stikine to open burn clean wood waste (mostly consisting of unpainted and untreated dimensional lumber) at transfer stations and landfills across the BVLD. This allows the local and regional governments to minimize costs associated with handling clean wood waste.

4.1.5 Residential Open Burning

Some municipal governments, through their fire departments, allow residents to conduct open burning for various purposes such as yard clean-up. This kind of open burning is typically allowed on larger properties and only at specific times of the year. Residential open burning is addressed specifically in Chapter 7.

4.2 Key Stakeholders

As suggested in the introduction, there are many stakeholders involved in open burning in the BVLD airshed, ranging from large forestry companies to small land developers. Originally in 2004 this chapter of the airshed plan was written by selected members of the Resource Management Burning Subcommittee, a subset of the former Community Working Groups. Membership on this subcommittee was comprised of ecologists, biologists, air quality scientists, foresters, and woodlot operators working for government (MOE, FLNRO), industry (large and small licensees) and charter flight operators Others consulted in the development of the original airshed plan were the Cattlemen's Association, Dairymen's Association, and the Regional District of Bulkley-Nechako.

The following is a list of the key stakeholders involved with this sector in the 2012 edition of the BVLD Airshed Management Plan:

Large Forestry Licensees:

- West Fraser Ltd.
  - Pacific Inland Resources
  - Houston Forest Products
- Canadian Forest Products Ltd.
  - Canfor Houston
- Hampton Mills Ltd.
  - Babine Forest Products

Woodlot Licensees (as represented through):

- The Bulkley Woodlot Association
- The Nadina Woodlot Association

Community Forests:

- Wetzin'kwa Community Forest Corp.
- Burns Lake Community Forest

Provincial Government Agencies:

- B.C. Timber Sales
- FLNRO Protection Branch (Northwest Fire Centre)
- FLNRO District Offices (Nadina and Skeena Stikine)
- MOE Environmental Protection Division (Skeena Region)

Local and Regional Government Agencies:

- Fire Departments in:
  - Burns Lake
  - Houston
  - Telkwa
  - Smithers
  - The Hazeltons

Charter Airlines

- Alpine Lakes Air

4.3 Relevant Legislation & Plans

In general, two provincial government agencies participate in the management of open burning. FLNRO regulates fire hazard abatement while MOE regulates the smoke generated from this activity. Inside municipalities with burning bylaws, the local government bylaw takes precedence over the abatement of fire hazard but not over rules related to smoke management. More information is presented below:

FLNRO: The *Wildfire Act* and the Wildfire Regulation address issues pertaining to hazard

assessment, abatement, fire control and specific direction with respect to how fires must be executed.

MOE: The *Environmental Management Act* (EMA) regulates most types of open burning through the Open Burning Smoke Control Regulation (OBSCR). The OBSCR applies to the burning of vegetative material on the parcel of land that it originated.[18] The current version of the OBSCR which was enacted in 1993 requires burn operators to take measures to limit impacts on nearby homes, schools and hospitals, and to ensure that atmospheric conditions are favourable to smoke dispersion (i.e., "good venting conditions") prior to initiating an open burn. The regulation also limits burn duration and the number of burns allowed within municipal boundaries. MOE is currently in the process of re-drafting the OBSCR. This section of the AMP may be modified at a later date to reflect changes of the new OBSCR.

Smoke Management Plans: Smoke Management Plans (SMPs) are a plans referenced in the new OBSCR that, when approved by MOE, allow licensees to open burn debris using site-specific and locally developed criteria, including relaxed venting conditions (see section 4.4.1 for more details on venting conditions). To date a pilot SMP has been developed for the Bulkley TSA. Older SMPs have been developed and are often referred to as Burn Plans and essentially have the same effect as the new SMPs, however they exist *extralegally* and are no longer supported by MOE.

Municipal Government: If a municipality has an open burning bylaw, this bylaw takes the place of the requirements in the *Wildfire Act*. It cannot, however, supersede the OBSCR unless the bylaw is more restrictive. Usually a local bylaw will stipulate that a permit be obtained, or require that burning activities only occur during a specified time period or for specific purposes. If a permit is required the Fire Chief is usually responsible for issuing them.

4.4 Significance of Source to Ambient Air Quality

The majority of forest debris burning occurs during the fall and early winter periods. As a result, this burning is expected to have a greater contribution to levels of fine particulates and air quality advisory level days during those seasons. Although venting conditions typically improve in the spring and are best during mid summer, the decision to burn debris must be balanced with the increased fire hazard associated with warmer months and the risk of **hangover fires**. Forest harvest debris disposal by open burning requires coordination of several factors including:

[18] If the requirements in the OBSCR cannot be met, it is possible to apply for a site-specific authorization under EMA, however this is discouraged.

- moisture content of debris (ease of ignition/smoke output)
- forest moisture content (fire hazard)
- completion and timing of harvest (bark beetle emergence)
- weather factors (such as snow level)
- suitable venting conditions (for good smoke dispersion)

Typically, there is a three-month period in the Fall when these factors are optimally balanced, resulting in tens of thousands of piles of debris being burned in that short time period each year in the BVLD.

As mentioned earlier, with proper attention and during favorable conditions, open burning has been shown to have little impact on the residents of the BVLD. Factors that affect the degree of pollution associated with burning include: the type and quality of material being burned; the meteorological conditions at the time of burning; and the location of the burn in relation to sensitive receptors and piling techniques. Burning debris that is mixed with soil, stumps, garbage and other contaminants – or that is not seasoned – results in much more emissions than burning clean dry debris. Once smoke enters the atmosphere, its concentration at any one place or time varies with transport and dispersion mechanisms

4.4.1 Influence of Meteorological Conditions

Impacts from open burning are highly dependent on meteorological conditions. When the atmosphere is unstable and there is both vertical and horizontal movement in the atmosphere rapid dispersion of smoke is possible. When the air is not unstable (ie: it is stable), vertical movement is limited and smoke emitted into this layer will not disperse rapidly. In these circumstances plumes of smoke can stay very concentrated for great distances and have significant impacts on air quality in populated areas. Because of this, in most cases, open burning must occur when the atmosphere is able to rapidly disperse smoke.

The **Ventilation Index** is a measure of atmospheric instability (the more unstable the atmosphere the higher the index value) and combines the height to which smoke will rise on a given day with the average wind speed within that column of air. This index is translated into 'good', 'fair' and 'poor', and unless modified by a SMP, the OBSCR requires that venting must be good on the day an operator wishes to initiate an open burn and 'fair' or better on the following day.

4.4.2 Influence of Location

An important aspect of meteorology is that atmospheric dispersion almost always is at a minimum overnight. Typically, within hours of sunset, emissions from open burning no longer have the ability to penetrate high into the atmosphere and end up following drainage pathways similar to watercourses. Because of this, open burning emissions directly upstream of communities tend to have the greatest impact, especially overnight. Communities farther away can still be impacted from open burning if the emissions are of significant quantity to channel the distance, and this sometimes does occur. To prevent overnight smoke from impacting people in populated areas of the BVLD, efforts are made to ignite piles such that the majority of emissions are emitted during the day, on the day of ignition.

Photo 5: Smoke from Open Burning Draining Down a Hill Towards Smithers, October 12, 2011

4.4.3 Influence of Piling

Emissions from open burning are highly dependent on piling techniques. With proper equipment and techniques and appropriate timing, burn operators have demonstrated that they can successfully burn without negatively impacting the airshed. Techniques for open burning vary from sector to sector and within a sector from operator to operator. In general, larger operations often have different equipment such as excavators that can more readily build clean (no dirt) piles. Smaller operations are often equipped with bulldozers and tractors which tend to incorporate more soil into debris piles, which increases smoke generation.

4.4.4 Overall Contribution to Airshed Loadings

Open burning of piled land clearing debris, forestry harvesting debris and agricultural debris – activities governed under the Open Burning Smoke Control Regulation – are the largest single source of $PM_{2.5}$ in BC outside the Lower Mainland. These activities account for over ¼ of the total $PM_{2.5}$ emissions in the province.

In the BVLD, five large forest licensees conduct a huge majority of the open burning that occurs in the airshed. While much of this activity occurs in more remote regions of the airshed, some burning does occur close to communities. However, these licensees have mature burn programs, and their extensive experience has helped them to develop strategies that minimize smoke impacts to populated areas. Small forest licensees often operate in woodlots which tend to be located closer to communities, so although these stakeholders burn substantially less than large licensees, they can have significant impacts on air quality due to their location. In some cases, risks due to the location of burns are amplified by challenges with respect to knowledge of regulatory requirements and lack of experience and/or availability of equipment. These risks can be similar or even greater with agricultural operators, land developers, and even rural residents who do not burn very often and have had burns go awry in the past. Community wildfire prevention burns are a relatively new activity, but they have the potential to also cause significant impacts to air quality due to the location of the burns being so close to communities and rural neighbourhoods.

The Micro-Emissions Inventory for the year 2002 estimated that open burning sources in the BVLD accounted for 33% of annual PM_{10} loadings and 47% of annual $PM_{2.5}$ loadings. Because the nature of various emission sources in the airshed have changed over the past 10 years, these estimates are no longer valid and need to be recalculated. It is likely that these percentages are now larger.

4.5 Accomplishments to Date

Emission reduction and control efforts to date have occurred to manage the impact of smoke on local population centers by:

- reducing the amount of material burned
- reducing emissions of PM when burning occurs
- optimizing when burning can occur i.e. burning timing windows taking into account custom venting forecasting, fire hazard indices, time of season, and time of day for ignition. Guidance for implementing these practices is provided in the Bulkley Valley SMP.

Reducing the amount of material burned: Historically, broadcast burning was considered the most effective method for creating plantable terrain and opening ground to planters for reforestation, as well as for controlling vegetation and creating warm soil for optimum growth of planted trees. Changes in regulatory environment, among other factors, have lead to a shift away from broadcast burning to other site preparation treatments that do not involve the complete burning of an area, and therefore much less biomass is burned.

Retention of debris through a site specific approval process (such as the site plan) to meet biodiversity or wildlife objectives has allowed some licensees to retain a portion of their debris piles, or to not pile certain areas. Additionally, new management objectives for retaining coarse woody debris (CWD) on-site has resulted in less debris needing to be burned.

Reducing emissions of PM (cleaner burning): Harvest methods have changed from landing to roadside based operations, with many smaller piles becoming concentrated along roadsides, as opposed to fewer large piles at the landing. Landing piles generally burned poorly because they contained dirt, stumps roots, pushed by a bull dozer, with the fuel generally arranged horizontally and not in the tee-pee / pyramid shape. Roadside piles are constructed in a way to maximize fuel size, arrangement and air flow, which, along with other practices such as curing time, allow roadside piles to burn cleaner. With other factors being equal, such as utilization standards, the actual amount of debris burned would be similar with either system.

There has been a growing trend toward better piling and burning practices by operators in forest harvesting, agriculture, and land development. The experience level of operators and their awareness of both improved techniques and the benefits of lower smoke emissions are rapidly increasing. There is still however a need for further improvement to reduce or eliminate impacts that continue to occur from these sources.

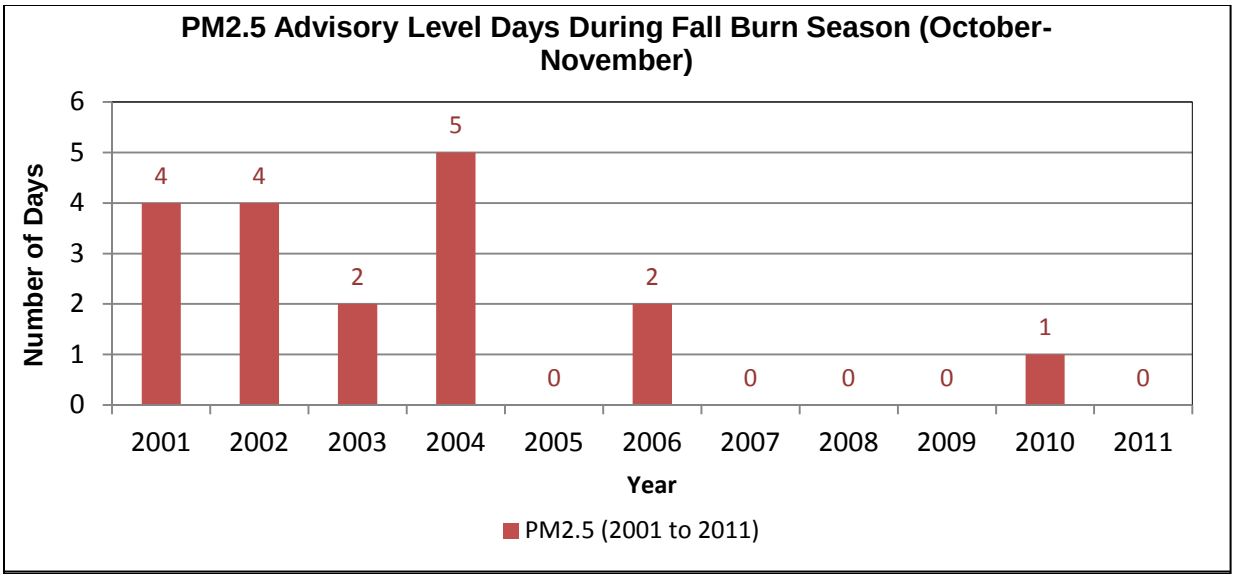


Figure 4-1 – Advisory-Level Days During Fall Open Burning Season

This figure shows the number of days during the fall open burning season (defined as October and November) when the daily 24-hour average concentration of $PM_{2.5}$ exceeded 25 µg/m in at least one community in the airshed (Burns Lake, Houston, Telkwa or Smithers). There appears to be improvements in results for $PM_{2.5}$ likely as a result of actions described below.

The following is a brief summary of accomplishments for open burning sources in the BVLD Airshed up to May 2012

- Burns Operators Forum held annually since 2006 where operators meet to share ideas and review burning plans for upcoming season
- Smoke Management Plans (some called Burn Plans for Smoke Management) signed off for Bulkley TSA and Nadina Forest District since 2005
- Woody Debris Inventory completed in 2009
- Bulkley Valley Smoke Management Plan pilot signed in 2011 which resembles the type of plans used in the new OBSCR.

More detailed discussions about these accomplishments are described in the Clean Air Plan Addendums that were produced in 2009.

4.6 Planning for the Future

Provincial government offices of MOE and MFLNRO together with representatives from large industry, woodlots and charter flight operators participated in meetings to comment on the material included in this chapter. On February 29th, 2012, a workshop was held with Burn Operator Stakeholders for consultation on the plan revision.

Table 4-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Open Burning

Chapter 4: Open Burning			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with all kinds of open burning	Continue Annual Burn Operators Forum and promotion of BMPs to all stakeholders.	All stakeholders	Number of Advisory Level Days in fall burn season (Oct-Dec) Average $PM_{2.5}$ over 3-month burning season
	Annual sector stakeholder reports to the AMS via Burn Operators Forum	All stakeholders	
	Conduct OBSCR compliance activities	MOE	Number of OBSCR tickets issued to forest sector

Table 4-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Open Burning (Continued)

Chapter 4: Open Burning (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1a. Reduce emissions and associated impacts from open burning in forestry sector	Develop and implement Smoke Management Plans (primarily for use by large licensees). Include requirements to use the following Best Management Practices (Custom Venting Forecasts, Piling techniques and seasoning, Smoke release periods, and communication/reporting)	MOE, Large Licensees, BCTS, Woodlots	Number of SMPs developed and signed off by MOE; Number of signatories to the plans (including small operators)
	Promote small operator participation in Smoke Management Planning by conducting outreach seminar	BCTS, Woodlot Associations, AMS	Number of attendees at SMP outreach seminar
	Prepare, publish and distribute an Information Brochure on the OBSCR and BMPs, tailored to small operators	MOE, AMS, BCTS, Cattlemen's and Dairymen's Associations	Number of small licensees receiving brochure
1b. Reduce emissions and associated impacts from open burning related to Community Wildfire Protection burning	Develop, publish and distribute information about BMPs for reducing debris burning associated with Wildfire Protection activities, and for minimizing impacts from burning that must occur.	AMS, FLNRO, Local/Regional Governments	Number of communities receiving BMP information
	Review and comment on Draft Community Wildfire Protection Plans	AMS	Number of plans in place and number and % of plans commented on

Table 4-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Open Burning (Continued)

Chapter 4: Open Burning (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1c. Reduce impacts from agriculture and land development debris burning	Prepare, publish and distribute an Information Brochure on the OBSCR and BMPs, tailored to agriculture and land development	AMS	Brochure posted online and provided to agriculture associations
	Deliver educational presentation at Cattlemen's/Dairymen's meeting	AMS	Number of educational presentations given
2. Provide a proactive response when air quality is deteriorating by stopping open burning	Use Pollution Prevention Notices (PPNs) as a tool to initiate a burn ban that stops open burning before air quality deteriorates to advisory threshold	MOE	Number of PPN's vs Number of Episodes where advisories were issued during fall open burning season
3. Maintain visibility in BVLD during burn season	Improve two-way communication between burn operators and aircraft operators by inviting aircraft operators to participate in Smoke Management Planning and Burn Operator Forums.	Large licensees, Aircraft Operators	Attendance of aircraft operators at burn operators forum.
	Issue daily burn notifications via email	Licensees	Percent of licensees emailing burn notification.
4. Promote and explore alternatives to all types of open burning	Include alternatives exploration as a reporting item on this sector's "AMS annual report form" Maintain Woody Debris Inventory on AMS website	AMS, Large licensees and small operators AMS	Number and % of stakeholders reporting that they seriously considered alternatives

4.7 Tools and Resources

Tools include custom three-day venting index forecasts; co-operation / co-ordination of burning activities; evaluation of wildfire / insect hazard abatement requirements vs. possibilities for debris burning variances; education—including spreading the word about good practice and rules; inclusion and improvement of existing smoke management plans. For more information contact Ben Weinstein at the B.C. Ministry of Environment. 250.847.7224 or ben.weinstein@gov.bc.ca

Smoke management plans should include all necessary contacts, such as fire danger class rating links and phone numbers to obtain MFLNRO burn reference numbers, MOE burn ban information, and venting index forecasts.

Skeena Region Air Quality Information Line 1-888-281-2992 (Environment Canada Public Venting Index forecasts for Smithers and Burns Lake and to find out information on mandatory (i.e. burn ban) and voluntary emission reduction strategies are in place, MOE regulatory requirements for open burning and daily air quality conditions.

Ministry of Forests, Lands and Natural Resources Operations Burn Reference Numbers 1-888-797-1717

Ministry of Environment-Skeena Region (Smithers) (250) 847-7260

Venting Index Forecast http://MOEwww.gov.bc.ca/epd/epdpa/venting/venting.html

Skeena Region Guide to the OBSCR:

http://MOEwww.gov.bc.ca/ske/skeair/reports/OBSCRguide2002.pdf

MOE Guide to the OBSCR: http://MOEwww.gov.bc.ca/air/particulates/agttobsc.html

OBSCR Checklist

http://www.bvldamp.ca/html/documents/MicrosoftWord-Checklist_000.pdf

Nadina Forest District Burn Management Plan

http://MOEwww.gov.bc.ca/ske/skeair/reports/nadinaplan.pdf

Bulkley Timber Supply Area Burn Plan for Smoke Management
http://MOEwww.gov.bc.ca/ske/skeair/reports/BTSABurnPlan2002.pdf

The Environmental Farm Planning project, is a voluntary, confidential process to perform an environmental risk assessment of the farming operation and to develop a plan to reduce or avoid these risks. Best Management Practices will also be promoted through a Reference Guide and Planning Workbook.
http://www.agr.gc.ca/cb/index_e.php?s1=n&s2=2004&page=n40226a

For a description of the Environmental Farm Program see:

http://bcac.bc.ca/efp_programs.htm

Burning Unwanted Crop Residue Fact Sheet http://www.lung.ca/cando/content/FS-stubble.pdf

CHAPTER 5

Industrial Sources

5.1 Background

Due to the abundant supply of timber in the region, the economy of central British Columbia is heavily reliant on the forest industry. Indeed, most communities in the BVLD Airshed are home to one or more forestry-based industrial operation. The most common operations are sawmills which are considered to be a primary wood processing facilities insofar as they take timber and manufacture it into lumber and lumber products.

Photo 6: Emissions from the Industrial Area in Houston, Feb 13, 2012. Visible in this plate are emissions from Houston Pellet (centre), Canfor sawmill (centre-left), and Houston Forest Products sawmill (far left in background).

Primary wood processing generates a considerable amount of wood residue which must be managed. Not that long ago it was quite common for sawmills to burn this residue in beehive burners, however this residue is a valuable resource in itself for secondary

wood processing facilities. Secondary wood processing facilities are those involved in manufacturing other wood or millwork products such as plywood, particle board, medium density fiberboard, wood pellets, furniture or even prefabricated buildings out of wood residue such as sawdust or shavings. In the BVLD, secondary wood processing facilities include pellet plants and a panel board plant.

Both primary and secondary wood processing facilities create emissions through combustion and non-combustion processes. Examples of combustion-related emissions are:

- $PM_{2.5}$ discharged through stacks from wood burning and drying,
- NO_x discharged through stacks from wood burning or emitted from kilns, and
- VOCs discharged through stacks from wood burning and from kilns from wood drying.

Examples of non-combustion emissions are PM_{10} discharged from cyclones and baghouses related to pneumatic conveyor systems, along with fugitive dust from logyards.

Photo 7: Dryer Emissions at Pinnacle Pellet During a Bypass of the Venturi-Scrubber Pollution Control Works, March 16th, 2012

There are many other types of industrial sources in British Columbia including smelters, pulp mills, oil and gas refineries and manufacturing plants, however, the only non-forestry based sources that currently operate in the BVLD airshed are asphalt plants. These facilities mix gravel and bitumen to create asphalt concrete for road paving and their emissions include $PM_{2.5}$, VOCs and some odorous compounds. There have been a number of mineral exploration activities occurring (mostly) in the more remote areas of the airshed in recent years, so it is possible that the airshed may be home to a mine site sometime in the future.

In the previous version of the BVLD Airshed Management Plan there were two chapters dedicated to permitted industrial emission sources: the Beehive Burner chapter and the Industrial Sources chapter. As all the beehive burners in the BVLD have been decommissioned and/or replaced with other sources, these chapters have been combined. Figure 5-1 depicts industrial facility locations relative to BVLD communities and B.C. air quality monitoring locations.

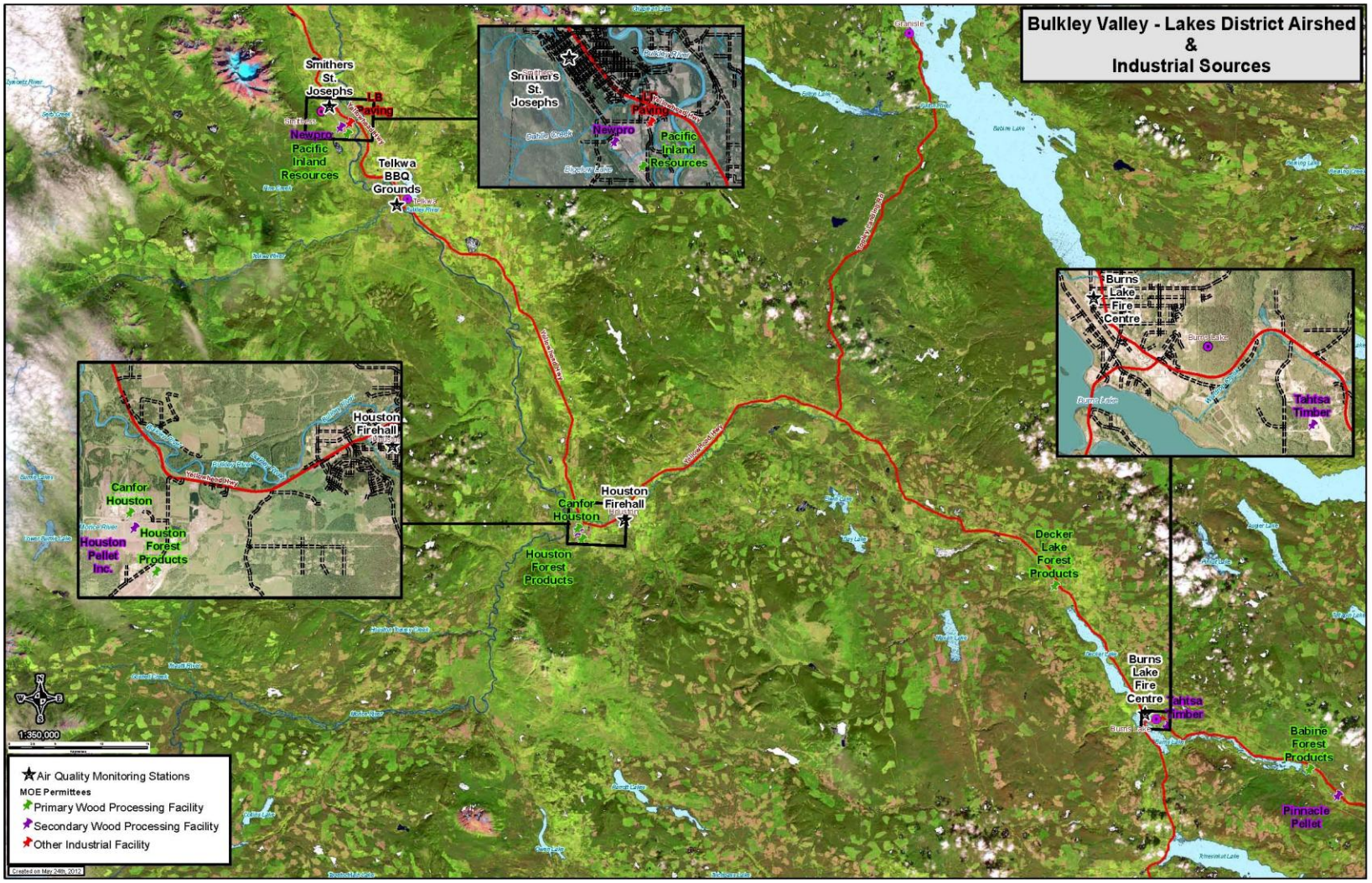


Figure 5-1: Industrial Sources in the BVLD and Ambient Air Quality Monitoring Stations

5.2 Key Stakeholders

The key stakeholders in this chapter are the various industrial companies that hold discharge authorizations (permits or approvals) with the Ministry of Environment. The Environmental Protection Division is responsible for administering these authorizations. Other stakeholders include municipal and regional governments which play a role in zoning and bylaw development and enforcement, and CHOKED, an air quality advocacy group that has acted as a "watchdog" for industrial facilities in the BVLD and elsewhere.

Table 5-1: Air Pollution Permit Holders

Primary Wood Processing Facilities:

Facility Name	Parent Company	Facility Type	Permit Number	Production	Annual Total Permitted Particulate Emissions	Main Emission Sources Authorized under Permit	Does Emission Source Meet BAT?
Pacific Inland Resources	West Fraser	Sawmill	PA 01691	275,000 mfbm / year	437 tonnes	Energy recovery system Dry kilns Sawmill and planer cyclones	Yes n/a No
Canfor Houston	Canadian Forest Products	Sawmill	PA 01543	530,000 mfbm / year	839 tonnes	Energy recovery system Kilns Cyclones	Yes n/a some yes
Houston Forest Products	West Fraser	Sawmill	PA 05339	260,000 mbfm / year	620 tonnes	Volcano energy recovery system Hot oil heated lumber kilns Natural gas heated kilns Shavings cyclones Chip blowing dust system	No Yes Yes No Yes
Decker Lake Forest Products	Hampton Affiliates	Sawmill	PA 03019	307,000 mbfm / year	55 tonnes	Kilns Planer shavings cyclones Chip blowing dust system	n/a No Yes
Babine Forest Products*	Hampton Affiliates	Sawmill	PA 04122	47,000 mbfm / year	208 tonnes	Volcano energy recovery system Kilns Cyclones	No Yes No

*In December 2011 there was a fire at Babine Forest Products and the sawmill was destroyed. The decision to rebuild the sawmill has not yet been made

Secondary Wood Processing Facilities:

Facility Name	Parent Company	Facility Type	Permit Number	Production	Annual Total Permitted Particulate Emissions	Main Emission Sources Authorized under Permit	Does Emission Source Meet BAT?
Newpro		Panel Board Plant	PA 06099	50 million square feet of 5/8" particleboard / year	323 tonnes	Cyclones associates with processing Cyclones associated with outside dryer Cyclones associated with inside dryer	No No No
Houston Pellet	Pinnacle Pellet / Canfor	Pellet Plant	PA 01543	500 tonnes per day	724 tonnes	Cyclones associated with dust collection systems and hammermill Cyclones associated with pellet dryers	Yes No
Tahtsa Timber**		Pellet Plant	103778		5 tonnes	Baghouses Wood dryer stack	Yes Yes
Pinnacle Pellet, Burns Lake	Pinnacle Pellet	Pellet Plant	104133	800 tonnes per day	374 tonnes	Cyclones associated with hammermill Wood dryer bypass stack Mico-mist venture scrubber stacks	Yes No Yes

**The Tahtsa Timber authorization expired in January 2012 and the facility is no longer in production

Other Permitted Industrial Sources

Facility Name	Parent Company	Facility Type	Permit Number	Annual Production	Annual Total Permitted Particulate Emissions	Main Emission Sources Authorized under Permit	Does Emission Source Meet BAT?
LB Paving		Asphalt Plant	RA 03732	-data to be inserted when available	-data to be inserted when available-	-data to be inserted when available-	-data to be inserted when available-
LB Paving		Mobile Asphalt Plant	RA 07685	-data to be inserted when available-	-data to be inserted when available-	-data to be inserted when available-	-data to be inserted when available-

5.3 Relevant Legislation & Plans

There are three levels of government which have some influence over how industrial sources are managed to protect air quality, with the provincial government playing the lead role in regulating these sources.

Federal: The *Canadian Environmental Protection Act* requires all large industrial facilities to report their emissions to the National Pollutant Release Inventory, NPRI. More information on the NPRI can be found at: http://www.ec.gc.ca/inrp-npri/. Almost all the industrial sources in the BVLD report their emissions to this database.

Provincial: The Environmental Protection Division (EPD) of B.C. Environment is mandated through the *Environmental Management Act* to manage the discharge of wastes into the environment in a manner that ensures the protection of human health and the environment. For industries, trades, business and activities prescribed in the Waste Discharge Regulation, management of waste discharges occurs primarily through waste discharge regulations or site specific authorizations such as permits, approvals or operational certificates. The facilities in this chapter all fall into a category in the Waste Discharge Regulation which requires them to obtain a site specific authorization (in this case it is a permit). Permits include a description of each emission source within a facility, and authorize a set flow rate (typically m^3/min) for each source along with a discharge concentration (typically mg/m^3). In the case of point sources that are stacks (usually a combustion source), a permit will usually include some requirement for stack emissions testing on a quarterly, semi-annual or annual basis to ensure that the discharge limits in the permit are being adhered to. Stack test results are available upon request from the B.C. Ministry of Environment.

Regional/Municipal: Regional and municipal governments are responsible for making land use decisions though Official Community Planning and zoning. Industrial facilities can only be located on lands that zoned for this particular use, and the facilities must also adhere to any and all applicable bylaws within the government jurisdiction. Typical bylaws of relevance include: zoning, noise, building and dust bylaws, (and any applicable Development Permit Areas as designated by the Official Community Plan).

5.4 Significance to Air Quality

Most permitted industrial sources are located in valley bottoms and along or near the Highway 16 corridor. Furthermore, most permit clauses authorize sources to operate 24/7, irrespective of meteorological conditions. Because of their continuous operations, industrial sources can negatively impact air quality in communities, especially during the fall and winter months when atmospheric dispersion is poor.

he Micro-Emissions Inventory for the year 2002 estimated that permitted sources and beehive burners *together* accounted for 35% of annual PM_{10} loadings and 31% of annual $PM_{2.5}$ loadings. Because the nature of emission sources has changed over the past 10 years, these estimates are no longer valid and need to be recalculated. Because beehive burners have been phased out, it is likely that these percentages are now less than they used to be. The 2012 Micro Emissions Inventory will confirm this.

5.5 Accomplishments to Date

The following is a brief summary of accomplishments for permitted sources in the BVLD Airshed up to May 2012:

- July 2005, Pacific Inland Resources decommissions beehive burner, installs energy recovery system to heat buildings and kilns
- March 2007, Newpro Emissions Characterization Report submitted to B.C. MOE and distributed to AMS Board of Directors
- September 2006 Houston Pellet begins operation, utilizing wood waste that previously was burned in the Canfor Houston beehive burner.
- April 2007, Canfor Houston decommissions beehive burner
- November 2007, Houston Forest Products decommissions beehive burner
- September 2010, Babine Forest Products decommissions beehive burner
- November 2010, Decker Lake Forest Products decommissions beehive burner
- December, 2010, Tahtsa Timber obtains approval for small pellet plant to utilize wood waste from logging debris piles
- January 2011, Pinnacle Pellet in Burns Lake obtains permit, utilizing wood waste that previously was burned in the Babine and Decker Lake Forest Products beehive burners

More detailed discussions about some of these accomplishments are described in the Clean Air Plan Addendums that were produced in 2009.

5.6 Planning for the Future

At a workshop on March 1st, 2012, industrial stakeholders met to review and renew goals for this second edition of the Clean Air Plan. The general goals presented in Table A were endorsed and in addition there are some specific sector goals, indicators and strategies that were agreed to at that meeting. They are presented below in Table 5-2.

Table 5-2: Summary of Goals, Strategies, Key Stakeholders and Indicators for Industrial Sources

Chapter 5: Industrial Sources (Stack Emissions)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce air quality impacts from industrial sources	Develop & implement Episode Management Plans (EMP) to reduce impacts during periods of poor air quality	Permittees, MOE	Number of EMPs developed and signed off by MOE; Percentage of episodes where EMPs were implemented
	Maintain compliance with permits by optimizing effectiveness and efficiency of pollution control works (e.g.: control of input temperature to ensure best combustion)	Permittees	Number of relevant non-compliances (reported to MOE or resulting from inspection)
	Conduct compliance assessment activities (e.g.: inspections)	MOE	Percent of compliance assessment activities identifying no non-compliance with air permits[19]
	Upgrade existing facilities towards Best Achievable Technology (BAT) as opportunities arise or as necessitated by environmental impact assessments.	Permittees, MOE	Number or % of BAT upgrades
	Hold annual forum to share ideas and promote continuous improvement Annual sector stakeholder reports to the AMS.	AMS, MOE, Permittees	Participation (%) in Annual Industrial Emissions forums

[19] Looking at non-compliance that directly relates to air quality protection

Chapter 5: Industrial Sources (Stack Emissions) (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
2. Minimize the potential for impact from future growth in this sector	Consider air quality in land use and community planning initiatives	Local / Regional Governments	Number or % of OCP's that recognize air quality Number of zoning referrals and proposed projects responded to by AMS
	Carefully review proposed new projects to identify opportunities to protect air quality	MOE, Local / Regional Governments, AMS	Indicator to be developed for this with different stakeholders
	Consider AQ when reviewing options for locating potential new facilities	Permittees, Local/Regional Governments	Indicator to be developed for this with different stakeholders
	Require BAT for all new facilities	MOE	% of new facilities meeting BAT

For each strategy, it is recommended that those stakeholders involved in implementing the strategy develop an implementation plan identifying the specific work needed to implement the strategy, a timeline for implementation, and roles and responsibilities for those involved.

With the large supply of fiber in central BC forests (as a result of the mountain pine beetle infestation), it is possible that the number of pellet plants in the BVLD airshed will continue to increase. As this happens, it will be important to ensure that this emission source does not compromise air quality or cause poor air quality through the cumulative effects of their emissions combined with the other existing emissions in the airshed. The Ministry of Environment has best achievable emission technology standards for pellet plant dryer emissions and the AMS intends to promote implementation of these standards. Furthermore, the AMS believes all new industry (not just pellet plants) should meet Best Achievable Technology standards for emission controls, and existing facilities should be encouraged to move toward this. In addition, the AMS intends to generally promote processes and projects which aim to minimize emissions and efficiently use waste products including woody debris.

If proposed mining projects complete the Environmental Assessment Process and move into development and permitting, goals and strategies for this source should also be identified and the companies should be encouraged to participate in AMS activities.

Finally, where appropriate in the Official Community Planning process, the AMS commits to submitting comments related to zoning or rezoning land for industrial development.

5.7 Resources

More information about the *Environmental Management Act*:

http://www.env.gov.bc.ca/epd/main/ema.htm

More information on zoning, bylaws, and community plans:

www.burnslake.ca www.houston.ca

www.telkwa.com/ www.smithers.ca/

CHAPTER 6

Wood Burning Appliances

6.1 Background

When used properly, wood can be an economical and comfortable heating strategy for a home or business. Unfortunately, many people fail to maximize their wood burning appliance's potential efficiency due to poor burning practices and having an older inefficient model (i.e. non-EPA emission certified appliance)[20]. This often results in unnecessarily degraded air quality outside and inside the home. Low temperature, smoldering, smoky fires that produce a plume of blue-grey smoke from the chimney are the main cause of wood heat-related air pollution. However, there are ways to control the amount of smoke generated from wood heating and these are promoted through Burn It Smart workshops, educational videos and brochures - all of which are available through the www.cleanairplan.ca website.

Although the number of homes heated with wood declined dramatically in the middle of the

1900s, many homeowners returned to wood heating in the 1970s when there were concerns about the price and availability of alternate fuel options such as natural gas. Now more than 400,000, or six percent, of all single family dwellings in Canada use wood as the primary fuel for heating. In addition, over 950,000, or 14 percent, use it as a supplementary heating fuel.

Of 13,621 homes in the plan area, approximately 5,400 were estimated to be heating with wood based on a telephone survey conducted in 2003[21]. It is estimated that of these 5,400, there are approximately 3,500 conventional technology (i.e. non-EPA emission certified) wood burning appliances (65%) and 1,300 (24%) high efficiency (EPA emission certified) appliances. Although the current numbers of appliances are not known, the number of conventional woodstoves has been reduced by the exchange of over 630 units through the Woodstove Exchange Program since 2006.

[20] High-efficiency wood stoves, fireplaces or inserts that are certified as CSA B-415 or US Environmental Protection Agency (EPA) certified, when properly installed and operated, can cut emissions by up to 90 percent and burn up to a third less wood while delivering the same amount of heat.

[21] http://www.bcairquality.ca/reports/pdfs/woodstove_emissions_0706.pdf

Photo 8: Smoke from an Old Woodstove in Smithers. March 18, 2011.

6.2 Key Stakeholders

Key stakeholders in related to the regulation, sale, operation and use of woodstoves include the following:

- Ministry of Environment
- Regional and Municipal Governments in the BVLD including:
  - The Regional District of Bulkley Nechako
  - The Regional District of Kitimat Stikine
  - The Village of Burns Lake
  - The District of Houston
  - The Village of Telkwa
  - The Town of Smithers
  - The District of New Hazelton
  - The Village of Hazelton
- Fire Chiefs in all of the above municipalities
- Woodstove Retailers
  - Flying Dutchman Services
  - Starland Home Building Centre
  - Burns Lake Home Hardware
  - Emberson Plumbing and Heating
  - North Central Plumbing and Heating
  - Quality Appliances
  - Smithers Home Hardware
  - Beertema's Plumbing and Heating
- Firewood suppliers
- Research Agencies
  - UBC
  - SFU

6.3 Relevant Legislation & Plans

Both provincial and municipal governments have a role in regulating woodstoves in general, with provincial government regulating the sale of wood burning appliances and municipal governments regulating their use.

Provincial: The Environmental Protection Division (EPD) of B.C. Environment is mandated through the *Environmental Management Act* to manage the discharge of wastes into the environment in a manner that ensures the protection of human health and the environment. Specifically relevant to this chapter is a regulation within *EMA* called the Solid Fuel Burning Domestic Appliance Regulation which was enacted in 1994 and regulates the sale of wood burning appliances. Specifically, the regulation requires that any wood burning appliance sold after 1994 by an authorized dealer be a low-emitting appliance with emissions certification from either the Canadian Standards Association (CSA) or the U.S. Environmental Protection Agency (EPA). These rules apply to new wood stoves, fireplace inserts and factory built fireplaces manufactured in BC, or sold or imported for use in BC. This regulation is currently being revised to include more stringent emission standards as well as a broader range of appliances (e.g.: furnaces are currently not regulated but soon will be).[22]

Regional/Municipal: Regional and Municipal governments have the ability to develop bylaws to regulate woodstove use. This has been accomplished in many BVLD communities. These bylaws include clauses which typically do some or all of the following: require mandatory or voluntary changeover from non-certified to certified stoves by a certain date; require that non-certified stoves be changed out before the sale of a house; require that only dry wood be burned in a woodstove; require that woodstoves not be operated during periods of poor air quality unless they are the only source of heart in the home; prohibit the installation and use of outdoor wood boilers; require specific maximum opacity of emissions, and allow an officer to enter a house to inspect woodstoves.

6.4 Significance of Source to Ambient Air Quality

Any poorly operated appliance burning uncured wood can produce a dense smoke plume (even an EPA emission certified one). In calm clear weather, such as during temperature inversions typical in the BVLD in winter, the atmosphere's capacity to disperse emissions is at a minimum. As a result, smoke plumes from woodstoves and fireplaces build up in the area causing local air pollution. To make matters worse, people often try to make their final load of fuel for the day last all night by damping the air supply as much as

[22] http://www.env.gov.bc.ca/epd/codes/solid-fuel/index.htm

possible. The result is a smouldering fire and a great deal of smoke with all its pollutants. This harmful smoke tends to linger near its source, rather than dispersing outwards or upwards. It has the greatest impact near or even inside the homes that produce it.

The Micro-Emissions Inventory for the year 2002 estimated that open burning sources in the BVLD accounted for 7% of annual PM_{10} loadings and 12% of annual $PM_{2.5}$ loadings. While, on an annual basis, woodstove emissions are low when compared to other sources (e.g.: open burning), because they are emitted low to the ground and very close to where people live, their emissions can have a disproportionately large impact on the health of people in the BVLD. Because the nature of various emission sources in the airshed have changed over the past 10 years, these estimates are no longer valid and need to be recalculated.

In March 2012 the Ministry of Environment repeated the provincial woodstove use survey done in June 2003. Results from this new survey, when compiled, will inform whether there has been significant change in woodstove use in the BVLD over the past 10 years. Anecdotally it is suspected that there are many new wood burning appliances in the BVLD as compared to 10 years ago, primarily because people perceive wood-burning to be a secure form of heat. It is likely that the percentages above are now larger both because beehive burners have been eliminated and also because it is suspected that the incidence of woodstoves has increased over the past decade.

As mentioned in Chapter 3, spatial mapping of woodsmoke in BVLD communities has been completed as part of the Woodstove Exchange Study, WEST. Refer to Figures 3-5 through 3-8 for the maps and, for more information on this research and other work carried out by a team of universities, visit www.woodstove.spph.ubc.ca.

6.5 Accomplishments to Date

The original airshed plan identified four strategies which were intended to target woodstoves. Below is each strategy along with the accomplishments to date.

1. Woodstove Change-out Program:

- In 2004 a woodstove exchange program changed out 35 woodstoves.
- Piloted a provincial Ministry of Environment woodstove exchange program based on social marketing techniques beginning in October, 2006.
- Changed out of over 630 smoky woodstoves to EPA emissions certified units. This is equivalent to a reduction of approximately 58 tonnes of $PM_{2.5}$ annually, and a savings of over 1000 cords of firewood .
- Issued 630, $250 rebates for a total of $157,500 in rebates from the AMS, plus $58,500 worth of matching rebates given by local governments:

- Program expansion in 2009 to encompass other adjacent areas outside BVLD airshed (entire RDBN and RDKS)

2. Community Education Program:

- An extensive community education program has been developed and implemented by the WSEP coordinator.
- Annual outreach and advertising campaigns have included radio and newspaper ads, maintenance of a website, demonstrations at community events and trade shows (average 6-8 per year) door-to-door campaigns in Smithers, Telkwa and Houston, and 3-4 Burn-it-Smart workshops per year.
- Other educational programs and materials have been developed to target children (colouring books, school presentations, etc.).
- Beginning in 2010, ran dry firewood prompts in local classifieds and regional magazine in late spring/early summer to remind residents that firewood must be prepared and seasoned minimum 6-8 months.

3. Local Government Toolkit:

- The BVLD AMS website contains a media toolkit with press releases and a number of fact sheets including: Bylaw Basics, Woodstove Wisdom, Talking to Neighbours Tip Sheet, and Indoor Air Quality.
- Links are provided to various local government bylaws and other reference materials including a model bylaw (with supporting documentation) are posted on the AMS website.
- In May 2006, a local government workshop was hosted in Smithers. The Town of Smithers hired Footprint Environmental Strategies to design and deliver the workshop, develop a draft wood burning appliance bylaw, and produce an education program.

4. Lobby for local regulations and stronger provincial regulations:

- AMS representatives have partnered with Ministry of Environment staff to make numerous presentations at local government councils. These presentations were instrumental in getting local governments to adopt wood burning appliance bylaws.
- Local bylaws are now in place in Burns Lake, Smithers and Houston; the bylaws restrict the use of wood burning appliances during advisory level days, and contain voluntary (Smithers and Burns Lake) and mandatory (Houston) removal dates for non-certified appliances. In addition, outdoor wood boilers are now banned in Granisle, Smithers, Houston and Burns Lake.

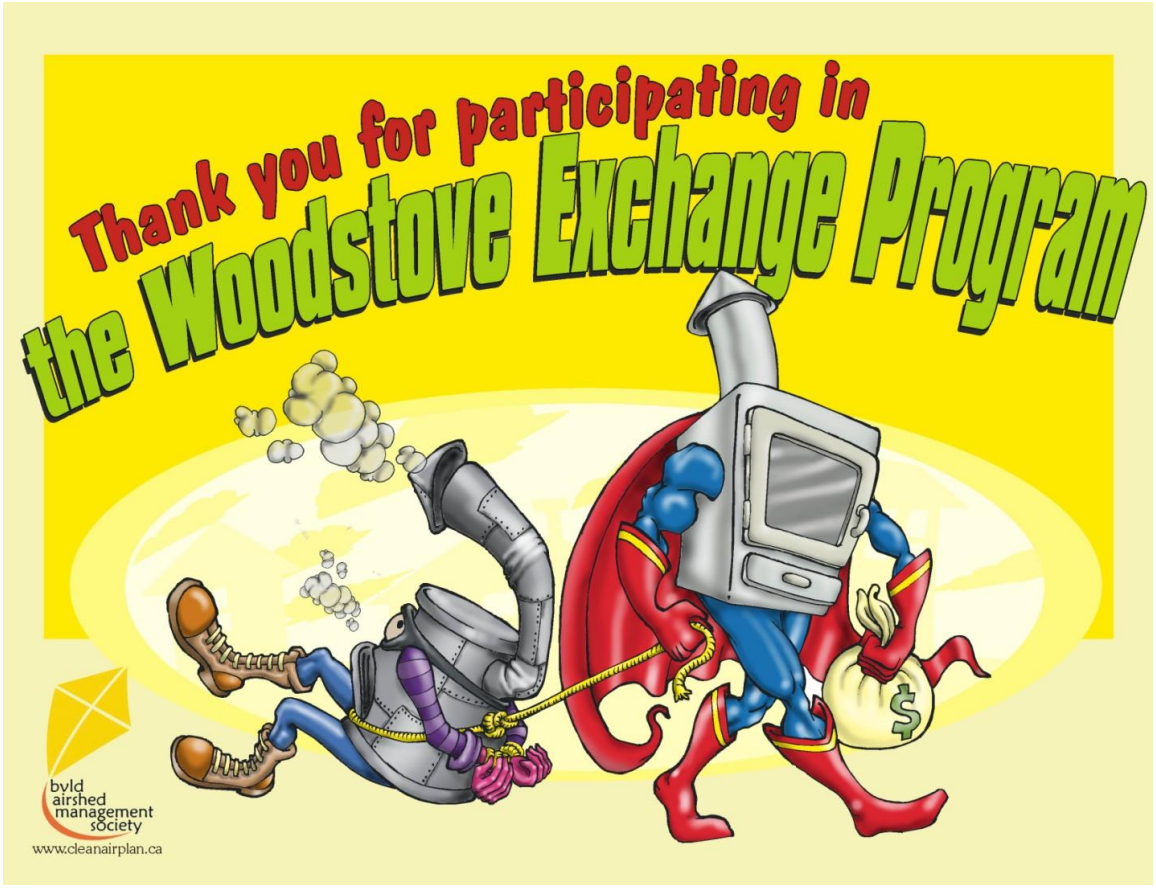


Photo 9: A Poster Thanking Participants for their Involvement in the Woodstove Exchange Program from April, 2007.

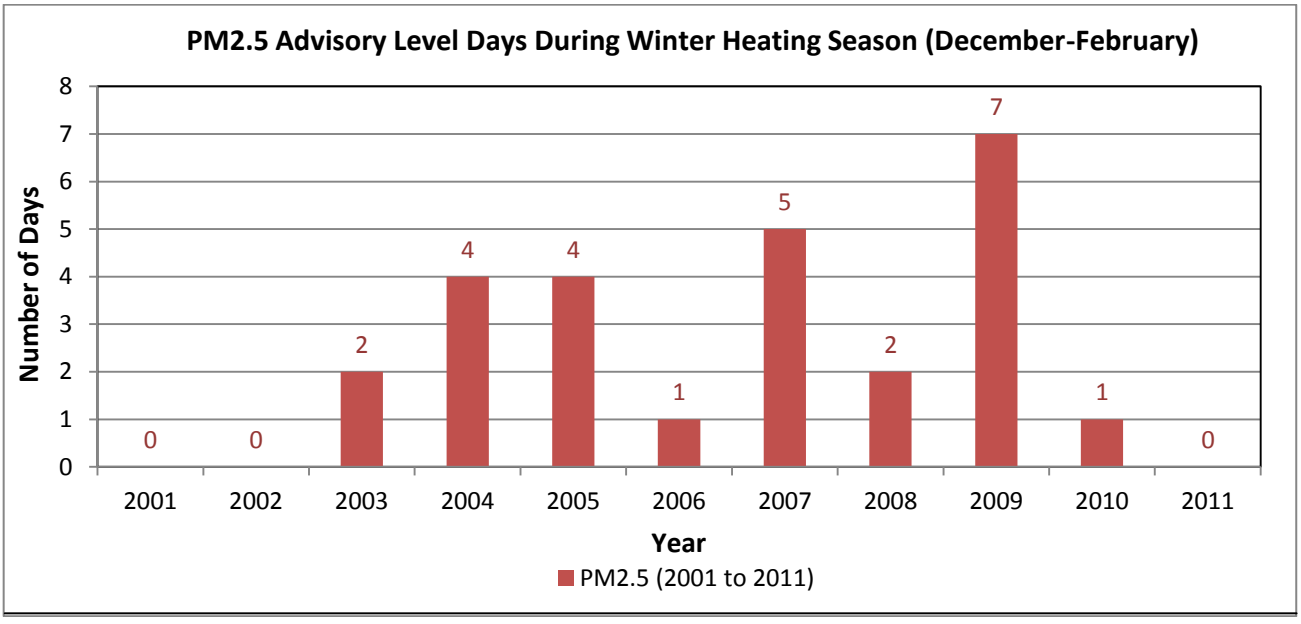


Figure 6-1: Advisory-Level Days During Winter Heating Season

The above figure shows the number of days during the winter heating season (defined as December to February) when the 24-hour average concentration of $PM_{2.5}$ exceeded 25 ug/m^3 in at least one community in the airshed (Burns Lake, Houston, Telkwa or Smithers). At this point is it is unclear if these data are trending up or down, and more years of data will help with this interpretation.

6.6 Planning for the Future

At a workshop on March 2nd, 2012, key stakeholders met to review and renew goals for this second edition of the Clean Air Plan. The General Goals presented in Table A were endorsed and in addition there are some specific sector Goals, Indicators and Strategies that were agreed to at that meeting. They are presented below in Table 6-1.

Table 6-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Wood Burning Appliances

Chapter 6: Wood Burning Appliances			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with all wood burning appliances	Continued operation of woodstove subcommittee	AMS	Number of wintertime AQ advisory level days Wintertime average $PM_{2.5}$
	Woodstove change out program.	All stakeholders	Number of woodstoves exchanged
	Develop innovative strategy/rebate program for burning dry wood	AMS, firewood suppliers	Strategy developed, rebates issued
	Public Education campaigns (stove operation and seasoned wood)	MOE, AMS, Local Governments	Number of education campaigns undertaken, brochures, burn it smart, etc (articles, promotions) Number of participants at education campaigns
	Bylaw Development and enforcement	AMS, Local Governments, Fire Chiefs	Number of bylaws in effect Number of violation tickets issued

Chapter 6: Wood Burning Appliances (continued)			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
2. Promote more sustainable home heating systems	Require new subdivisions to have district heating potential	Local Governments, AMS	Number of new subdivisions with district heating potential
3. Improve our understanding of the health effects of wood burning to use as leverage for achieving Goal 1	Support the Woodstove Exchange Study through in-kind work	Universities, MOE, AMS, Local Governments	Studies / publications written connecting health effects of wood burning.

6.7 Tools and Resources

BVLDAMS website: www.cleanairplan.ca

Burn it Smart http://www.burnitsmart.org/english/index.html

City of Prince George Clean Air Bylaw
http://www.city.pg.bc.ca/cityhall/bylaws/bylaw7232.pdf1

Woodheat.org, a responsible wood home heating educational website: www.woodheat.org

Residential Wood Burning Emissions in British Columbia (Revised May 17, 2005)

http://www.env.gov.bc.ca/air/airquality/pdfs/wood_emissions.pdf

A Guide to Residential Wood Heating, Natural Resources Canada (2002)

http://www.canren.gc.ca/prod_serv/index.asp?CaId=103&PgId=576

CHAPTER 7

Backyard Burning

7.1 Background

Backyard biomass burning ("backyard burning") is widely practised in B.C. as a means of disposal for lawn and garden waste, such as branches and leaves. These burns usually have high PM emissions per unit of fuel consumed as the fuel often has a high moisture content which leads to incomplete combustion. These burns often happen in residential areas, so the potential for human exposure to the emissions is high. While burning of garbage is illegal in B.C., it is not unheard of for garbage to be included in backyard burns. Backyard burning was for many years an acceptable practice. The level of acceptance has diminished since the late 1960's, first with increased town populations and a higher likelihood of having to inhale the smoke, and more recently with the realization that the smoke is in fact a serious environmental and health concern. The airshed plan recognizes that emissions from burning garbage and other materials are much more harmful than those generated from the burning of clean wood and other organic yard wastes (leaves, branches, etc.), though the strategies proposed in the plan attempt to reduce emissions from all types of backyard burning.

Photo 10: Backyard Burning Near the Smithers Golf Course, April 19, 2008

7.2 Key Stakeholders

Stakeholders responsible for the management of backyard burning primarily include regional and municipal governments (and their respective fire departments) with some support from the MOE and in some cases FLNRO. A full list is presented below:

- Regional and Municipal Governments in the BVLD including:
  - The Regional District of Bulkley Nechako
  - The Regional District of Kitimat Stikine
  - The Village of Burns Lake
  - The District of Houston
  - The Village of Telkwa
  - The Town of Smithers
  - The District of New Hazelton
  - The Village of Hazelton
- Fire Chiefs in all of the above municipalities
- The Ministry of Environment
- The Ministry of Forests, Lands and Natural Resources Operations

7.3 Relevant Legislation & Plans

Regional and municipal governments have the primary role in regulating backyard burning, though some relevant legislation exists in the *Environmental Management Act (EMA)*, which essentially makes garbage burning illegal. More detail on how each municipality regulates backyard burning is presented below.

Ministry of Environment: The Environmental Protection Division (EPD) of B.C. Environment is mandated through the *EMA* to manage the discharge of wastes into the environment in a manner that ensures the protection of human health and the environment. Backyard burning of woody debris is typically exempted by the Open Burning Smoke Control Regulation (OBSCR), however burning of garbage or other waste does not fall into the purview of the OBSCR as it is listed within the Waste Discharge Regulation as an activity that requires a permit or approval (it falls in the category of Municipal Solid Waste Management). Thus, if someone is burning garbage without a permit or approval it is a violation of the *EMA*.

Ministry of Forests, Lands and Natural Resources Operations (FLNRO): Through the *Wildfire Act*, FLNRO legislates requirements related to reduction of fuels which could otherwise pose a hazard in the event of a wildfire. Where municipal burning bylaws exist, these take precedence over the *Wildfire Act*. Where no bylaw exists (for example, in many regional districts), the *Wildfire Act* is the backstop. This act does not stipulate materials

which can and cannot be burned (because that is governed through *EMA*), however it does require people to register their burns with the FLNRO Open Fire Tacking System and to have adequate fire suppression onsite where a burn is being conducted.

Burns Lake: The Village of Burns Lake requires residents to have a burning permit for backyard burning between April 15th and October 15th. Bylaw 570, Permit for Burning, includes an extract from the Fire Code that states "The Fire Chief may have a special permit for open air burning of brush, grass, weeds and other materials"..."No person to whom a special permit has been issued under Section 27 shall, on or in any fire burn any rubber tires, oil, tar, asphalt shingles, battery boxes, plastic materials, or any similar materials which may produce heavy black smoke".

The Village of Burns Lake encourages residents to take grass clippings to the composting site at 5th and Carroll Street.

Houston: The Open Burning and Air Quality Bylaw 947 stipulates that open burning can only occur on properties greater 1 hectare. People are not allowed to burn garbage and are not allowed to use a garbage incinerator. A permit is required to open burn all vegetative material and the burn must comply with the OBSCR.

The District of Houston municipal composting site is in the Industrial Site. See Table 7.1 for an update on Houston's burning bylaws.

Smithers and Telkwa: Town of Smithers Open Burning Bylaw No. 1155, 1996. This bylaw prohibits the "open burning of domestic waste materials, garden refuse, garbage or noxious material". The bylaw also prohibits the "open burning of land clearing waste" unless the party conducting the burning holds a permit issued pursuant to Section 3 of the Bylaw.

The Town of Smithers has a grass clippings composting site at 2888 - 19th Avenue.

Smithers Recycling Centre at 2889 Tatlow Rd in Smithers for processing of paper products, cardboard, and number 2 plastics including milk jugs.

The Smithers/Telkwa Transfer Station on Donaldson Road accepts much of the material that may be destined for the backyard burn barrel. Materials must be sorted into categories including compost, brush and prunings, clean wood, painted or treated wood, metal, appliances, tires, and mixed garbage for transfer to the landfill site.

7.4 Significance of Source to Ambient Air Quality

Backyard burning has an undetermined and variable influence to overall air quality in the

BVLD. It is a problem during poor dispersion conditions at, or close to, ground level in populated areas - resulting in high concentrations of PM in residential areas. It also is a problem when garbage and other non clean-wood products are burned.

In addition to the production of PM, the burning of garbage or other materials such as demolition waste, painted wood, and manufactured wood products can produce significant amounts of dioxins. Potential health effects of dioxins include effects on reproduction and fetal development, immune system suppression, hormone system disruption, and cancer.

Photo 11: An illegal burn of woodwaste, drywall and insulation in the BVLD

Despite bylaws existing within most municipalities, fringe areas in regional districts can be a problem because municipal bylaws do not extend to regional district land yet population density can be as high there as within municipalities.

The Micro-Emissions Inventory for the year 2002 estimated that backyard burning accounted for 0.2% of annual PM_{10} loadings and 0.3% of annual $PM_{2.5}$ loadings. Because these emissions are sporadic and fall outside of provincial government tracking systems these emissions are extremely difficult to quantify.

7.5 Accomplishments to Date

Aside from assisting in the development of some of the bylaws listed above, in April 2006, AMS developed a brochure for the District of Hazelton on backyard burning. This was mailed out to each household with utility bills. The brochure was reviewed by the Ministry of Forests, Lands and Natural Resources Operations and Ministry of Environment. In the future this brochure can easily be adapted for other communities.

7.6 Planning for the Future

Most communities in the BVLD airshed have mechanisms (bylaws) to deal with back yard burning. For those that don't, the AMS is always willing to support communities that wish to pursue bylaws or other measures which address this emission source. Because very few complaints are brought to the AMS or MOE related to this source, it is unlikely that any other future action will occur unless either the AMS is requested or emissions from back yard burning becomes a higher profile issue. Given that AMS has adopted a community-based social marketing approach and that there are variations in literacy levels for English and learning and communication styles for residents in the airshed and adjacent jurisdictions, where requested, a special effort will be made to team up with complementary project leaders to integrate education on backyard burning and alternatives.

Table 7-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Backyard Burning

Chapter 7: Backyard Burning			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce air quality impacts attributable to backyard burning	Implement public communications strategy to promote local alternatives to open burning http://www.bcairquality.ca/topics/rcbc-alternatives.html	AMS	Number of new or updated bylaws with provisions relating to air quality protection
	Implement backyard burning bylaws in fringe areas. For references, see: http://www.bcairquality.ca/reports/pdfs/bylaws-2011.pdf http://www.bcairquality.ca/reports/pdfs/aq_bylaws_bc.pdf http://www.bcairquality.ca/reports/model-bylaw-backyard-burning.html	Local/Regional Governments, AMS	Public complaints to local government and/or LOE (especially in fringe areas)

7.7 Tools and Resources

Model Municipal Bylaw for Regulating Residential Backyard Burning
http://MOEwww.gov.bc.ca/air/particulates/pdfs/bylaw.pdf

MOE has published a *compendium of clean air bylaws* (including open burning) that municipalities can use as a tool for designing their own bylaws. The compendium is available online at *http://www.bcairquality.ca/reports/aq_bylaws_bc.html*.

The B.C. Ministry of Community, Sport, and Cultural Development's *Improvement District Manual, available online at: www.cscd.gov.bc.ca/lgd/gov_structure/improvement_districts/improvement_district_manual.htm* includes sample bylaws for improvement districts including a fire prevention bylaw that contains some provisions that target reducing pollution from open fires.

An *inventory* of facilities in each region that accept vegetation debris for disposal is available online at: *at www.bcairquality.ca/topics/rcbc-alternatives.html*.

Recycling Council of BC: www.rcbc.bc.ca

Composting Council of Canada: www.compost.org

CHAPTER 8

Transportation - Road Dust

8.1 Background

Transportation sector emissions include road dust from paved as well as unpaved roads,[23] trucking and railways, excessive idling of vehicles, and maintenance of motor vehicle engines and tires.

To ensure that paved roads are safe in the winter, maintenance crews apply traction materials. During the spring melt this material is exposed to traffic and the fine particulates associated with it can become airborne. These fine particulates from traction material applied to paved roads are referred to in this plan as simply "road dust". This affects air quality in populated areas adjacent to these paved roads. Road maintenance operators would like to remove as much traction material as soon as possible but, due to safety concerns, must wait until winter conditions have ended before commencing roadside sweeping. An alternative is to sweep early however the risk is that if there is more snow & ice they may have to reapply the traction material and then sweep again, resulting in considerably higher cost.

Particles from road dust and smoke sources fall into both PM_{10} and $PM_{2.5}$ categories. However, road dust is comprised mostly of larger (PM_{10}) particles. Since these larger particles tend to quickly settle out of the air, road dust emissions are a public health concern largely within town limits where road density and vehicle traffic are higher. The tendency for road dust effects to be an issue in late winter and early spring is suggested quantitatively by monitoring data (high levels of PM_{10} and very low levels of $PM_{2.5}$). Qualitative evidence of the localized effects of road dust on air quality can be witnessed quite frequently during freeze – thaw cycles in the spring, where there is very noticeable dust along roads as vehicles pass by, while just a short distance away this dust is not as visible.

Road dust emission levels are influenced by the quantity and size of winter traction materials applied, the duration of the winter/spring seasonal transition, the ability of works crews to remove as much material as soon as possible, and the levels of traffic driving on unswept roads. Highway corridors running through communities have been identified as key areas of concern. These emissions tend to be localized and seasonal in nature, but they continue to contribute to spring advisory level days in the BVLD Airshed. The Plan recognizes that implementing best management practices (BMPs) is

[23] Unpaved roads are primarily of concern in proximity to municipalities

likely the best approach for reducing impacts from road dust, and the 2006 update described a number of techniques and practices already employed by some local road maintenance operators.

The Ministry of Transportation and Infrastructure (MOTI) is developing BMPs for highways maintenance that will include air quality as a consideration. It is important the municipalities also participate in addressing road dust issues.

8.2 Key Stakeholders

The Ministry of Environment

The Ministry of Transportation and Infrastructure

Highways maintenance contractors

Parking lot contractors

Public works and roads maintenance officials from BVLD communities

8.3 Relevant Legislation & Plans

Municipal public works staff and highways road maintenance contractors are responsible for road safety and maintenance. Each jurisdiction is managing as best as they can within their limited budgetary constraints. While there are no regulations specifically concerning road dust, regulations covering air quality in general do include this source of fine particulate. Furthermore, MOTI is developing best management practices that will guide services provided under maintenance contracts.

8.4 Significance of Sources to Ambient Air Quality

While road dust emissions tend to be localized and seasonal in nature, they do contribute to spring advisory level days in BVLD communities. Of the seven emission source categories targeted in this plan, road dust is the least significant in terms of health and environmental effects (due to the larger size of the fine particulates and local scale), but can be a significant contributor to seasonal advisory level days.

The Micro-Emissions Inventory for the year 2002 estimated that road dust accounted for 25% of annual PM_{10} loadings and 10% of annual $PM_{2.5}$ loadings. These emissions are very difficult to quantify, but because they are all emitted in a short period (the road dust season) these emissions are known to have an impact on air quality.

Figure 8-1 shows the number of days during the spring road dust season (defined as February to April) when the 24-hour average concentration of PM_{10} exceeded 50 $\mu g/m^3$ in at least one community in the airshed (Burns Lake, Houston, Telkwa or Smithers). Over

the past 10 years there has been no improvement in the number of PM_{10} Advisory Level Days. Results are strongly influenced by meteorological patterns and the arrival of spring (spring comes sooner in some years and later in other years).

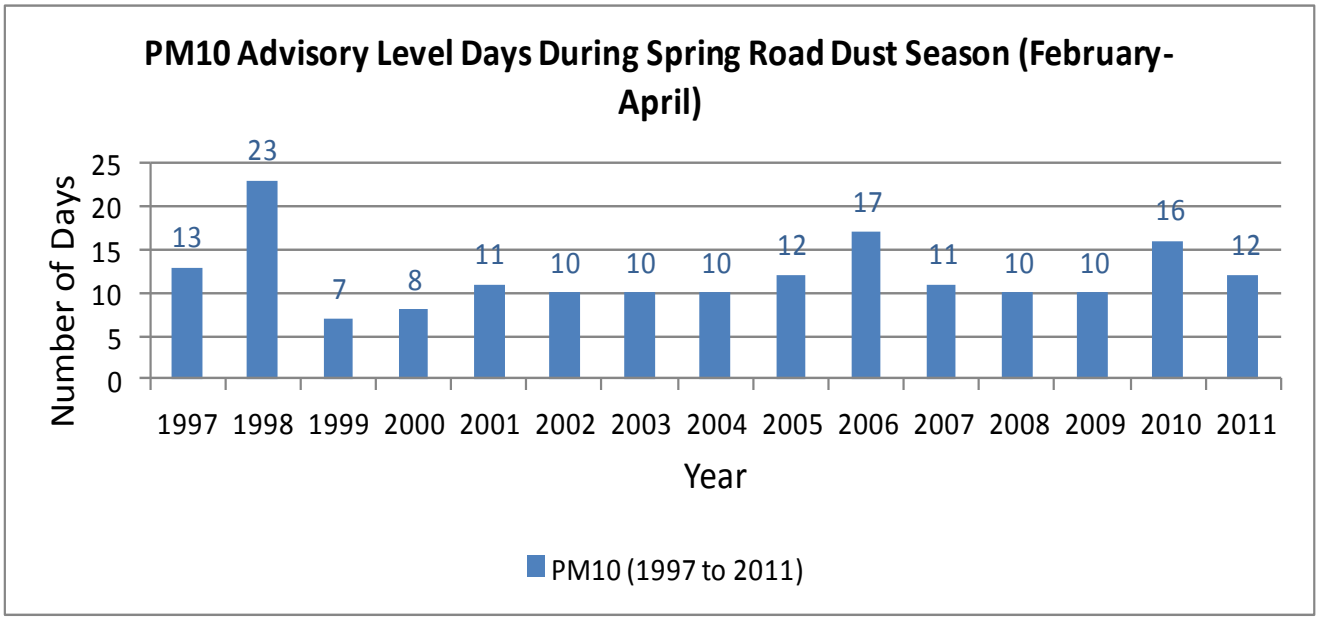


Figure 8-1 – Advisory Level Days During the Spring Road Dust Season

Despite road dust being less of a health concern than smoke or other combustion sources because of its larger particle size range, road dust is a nuisance which can affect the health and well being of BVLD residents. During the road dust season MOE does occasionally receive air quality complaints. Furthermore, a prolonged road dust season can skew annual air quality statistics.

8.5 Accomplishments to Date

In 2004 The AMS hosted a Road Dust Forum where maintenance crews, MOE and MOTI representatives gathered to discuss how improvements road dust could be better managed to reduce emissions from this source. Unfortunately that was the one and only meeting of its kind. One of the strategies presented in Section 8.6 is to reinitiate this working group as agreed to at the Transportation stakeholder workshop held on March 1st in Houston as part of the plan revision process.

Throughout the BVLD airshed, numerous techniques are used by road maintenance operators to ensure that roads are safe for travel, and that the potential for health and environmental impacts from road dust are minimized. All jurisdictions support improving road maintenance efficiencies and standards while looking for the most cost-effective methods to achieve them. Air quality and associated health and environmental improvements often result from improvements in efficiency.

A number of strategies and techniques employed by local road maintenance operators is presented here, even though these are not strictly speaking related to work of the AMS:

- Use of traction material made from breaking up larger rocks. This creates more angular particles that provide better traction than the more rounded material typically available from gravel pits, and tend to stay longer on the road surface where they are needed most
- Screen for particle size and/or use washed traction material to prevent very large and very fine particles from being applied to roads
- On unpaved roads, dust control application of calcium chloride (CaCl2), magnesium chloride (MgCl2) or lignosulphonates (all three in liquid form). These materials bind to fine particulate on roads thereby decreasing the amount of dust.
- Anti-icing application of CaCl2 or MgCl2 prior to roads becoming icy. These salts help to lower the temperature at which water freezes (i.e. below 0°C instead of at 0°C) and reduce the amount of traction material needing to be applied later if snow and ice accumulates.
- De-icing application of $CaCl_2$ or $MgCl_2$ on already icy/snowy roads. Sweeping and/or vacuuming. This reduces the amount of dust on the roads.
- Prior to sweeping or vacuuming roads, apply water (or coordinate with rainfall event).

8.6 Planning for the Future

At the Transportation workshop on March 1st, 2012, key stakeholders met to review and renew goals for this second edition of the Clean Air Plan. The general goals presented in Table A were endorsed and in addition there are some specific sector goals, indicators and strategies that were agreed to at that meeting. They are presented on the following page in Table 8-1.

Table 8-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Transportation - Road Dust

Chapter 8: Transportation - Road Dust			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce emissions and impacts associated with road dust from paved surfaces	Sweep city streets as early as safely possible in the springtime	Local government maintenance crew	Number of PM_{10} Advisory Level Days in spring road dust season (Feb-April)
	Hold annual Road Dust Operators forums and (see next page)	AMS, Local/Regional Governments & Hwy maint. crews	Date of commencement of sweeping operations in each community
1. Reduce emissions and impacts associated with road dust from paved surfaces	Transportation stakeholders workshops to share successes and challenges as well as report on activities toward implementation of the airshed plan	AMS, Local/Regional Governments & Hwy maintenance crews	Number of attendees at Road dust forum
	Investigate opportunity for a pilot program to sweep streets twice during the spring (perhaps green bonus can factor in)	Local government maintenance crews	Pilot program investigated and commenced.

8.7 Tools and Resources

Best Management Practices for Highway Maintenance Activities - July, 2004
http://www.th.gov.bc.ca/publications/eng_publications/environment/MoT_Hwy_Maint_BMP.pdf

Best Management Practices to Mitigate Road Dust from Winter Traction Materials **(**March 2005)

Winter traction materials are applied to snow-covered and icy roadways to make them safe for travelling. But while protecting road safety, these materials can contribute to air pollution by stirring up road dust — including fine particulate matter, which is a significant health threat. The ministry has developed this "best management practices" document to help local governments, planners and road- maintenance crews.

http://www.env.gov.bc.ca/air/airquality/pdfs/roaddustbmp_june05.pdf.

Road dust minutes and handouts from MOE/BVLDAMP workshop held January 12, 2003 to develop this chapter are posted at www.cleanairplan.ca. Handouts included:

Ten of the Best Street Sweeping Practices, reprinted from *Better Roads Magazine* April 2003

Corralling Road Dust on Gravel Roads, Erosion Control, Joseph Tilton
http://www.forester.net/ecm_0207_dust.html

Road Management and Engineering Journal

http://www.usroads.com/journals/rmej.htm

Fugitive Dust Control Techniques and Businesses:

http://www.nmenv.state.nm.us/aqb/dust_control.html#Salts

CHAPTER 9

Transportation – Vehicle Emissions

9.1 Background

When the Plan was written in 2004, it focused on fine particulate pollution from smoke and road dust since these were deemed to have the largest impacts on local air quality. Since 2004, the AMS has expanded the scope of its work to include activities focused on other pollutants which also impact human health. In particular, the AMS has capitalized on community interest and funding opportunities for projects relating to transportation emissions from motor vehicles and the CN Rail Line.

9.2 Key Stakeholders

Ministry of Environment
Ministry of Transportation and Infrastructure
Municipal Governments
CN Rail
Trucking Associations
School Districts
Business Associations

9.3 Relevant Legislation & Plans

The Provincial Government has many regulations (and some legislation) governing fuels and fuel emissions:

Cleaner Gasoline Regulation — (December 1995) The Cleaner Gasoline Regulation establishes standards for gasoline that will significantly reduce emissions of harmful pollutants, such as volatile organics, nitrogen oxides, sulphur oxides and toxics.

Gasoline Vapour Control Regulation — (May 1995) This regulation requires the installation and use of gasoline vapour control systems at service stations, bulk gasoline storage plants, gasoline terminals and on truck cargo tankers. These systems are designed to prevent the escape of gasoline vapours into the atmosphere during the transfer of gasoline between fuel storage tanks and cargo tankers.

Motor Vehicle Emissions Control Warranty Regulation — (April 1996) This prohibits the sale or the making available for sale, of a motor vehicle in British Columbia unless the manufacturer promises to fix the vehicle free of charge if there are defects in materials or workmanship that cause the vehicle to fail emission standards, or the vehicle fails AirCare.

The *Greenhouse Gas Reduction (Vehicle Emissions Standards) Act* – (May 2008) This enables implementation of a government commitment made in the 2008 Throne Speech to set vehicle greenhouse gas emission standards equivalent to those laid out in California's 2004 Low-Emission Vehicle II regulations. The Act will be brought into force by regulation (currently under development). Vehicle emission standards will cut GHG emissions by 30 per cent relative to current vehicle models — a reduction of 600,000 tonnes of GHG emissions annually by 2016. This will also help to increase the fuel efficiency of the vehicle fleet in B.C., creating financial savings for British Columbians who will pay less at the pump. The Act also enables the regulation of zero emission vehicles.

The Federal Government also has many regulations (and some legislation) governing fuels and fuel emissions. More information is available online at http://www.env.gov.bc.ca/epd/bcairquality/topics/federal-vehicle-programs.html

9.4 Significance to Air Quality

An operating vehicle emits a range of gases from its tailpipe into the atmosphere. Some emissions, principally carbon dioxide (CO_2), are classified as greenhouse gases (GHGs) because they increase the earth's natural "greenhouse effect" and in doing so, are contributing to the changing of the world's climate. Other emissions, such as volatile organic compounds (VOCs), carbon monoxide (CO) and oxides of nitrogen (NO_X), are criteria air contaminants (CACs) and these emissions are known to contribute towards air pollution and smog.

While smog is a pollution problem more commonly associated with large urban centres, smaller centres with sensitive airsheds are also impacted on a neighbourhood level by any addition of emissions to the atmosphere and growing awareness of health issues have also contributed to a growing public intolerance of behaviours that do not consider these impacts. The links to climate change combined with rising fuel costs and a slowing economy have also raised awareness of the negative impacts of unnecessary idling and vehicle operations in general.

While a quantitative analysis of the significance of transportation emissions for the BVLD airshed is not available, it is presumed that this source follows a seasonal pattern related to the interaction of climate, topography, and the characteristics of the emission source (i.e. health impacts and volume). Certainly the health impacts of the specific gases from tailpipes are well-known and AMS is general supports the precautionary principle when it comes to protecting public health while also advocating for a sensible balance between environmental protection and a health economy. The proposed updating of the MEI may provide further information towards quantifying vehicle emissions. When this information becomes available this chapter will be revised.

Photo 12: CN emissions, October 4, 2009

9.5 Accomplishments to Date

The primary focus of the airshed plan in this area has been anti-idling campaigns. AMS participated in a province-wide Anti-Idling campaign in 2008 and sponsored a summer student Ambassador under a provincial grant. This led to a partnership with Smithers Senior Secondary School to sponsor a work study student during that same summer. Further partnership building success followed with the School District and the Department of Fisheries and Oceans for the delivery of education and policy initiatives. A final partnership was also struck with One Sky, a non-profit society in Smithers, to follow up on work started with local governments and businesses with respect to adopting policies and educating staff and customers. One Sky received an Eco-Action grant to carry out this work while at the same time, AMS funding to continue this work was depleted.

Links to larger economic development and community planning issues surfaced very clearly during Community Open Houses and AMS Board meetings and the AGM in 2008. For example, emissions from increased CN Rail traffic related to the Prince Rupert container port and from trucking operations related to a proposed molybdenum mine on Hudson Bay Mountain were identified as key concerns.

9.6 Planning for the Future

The anti-idling, trucking and rail emission strategies proposed for the future here are based on the ability of partners to continue initiatives started in 2008 and the feasibility of receiving new funding for AMS to contract out and/or sponsor further research and education programs. New goals and strategies for vehicle emissions are suggested in Table 9-1. These will need to be developed further during implementation of the airshed plan, as well as the development of appropriate indicators.

Table 9-1: Summary of Goals, Strategies, Key Stakeholders and Indicators for Transportation - Vehicle Emissions

Chapter 9: Transportation – Vehicle Emissions			
GOAL	**STRATEGIES**	**KEY STAKEHOLDERS**	**INDICATORS**
1. Reduce impacts from vehicle idling	Hold stakeholder workshop to further scope the issue and develop refined strategies for raising public awareness about idling impacts	School District, Local Governments, Business Associations	Incorporation of idling strategy and indicator in an update by June 2014
2. Reduce vehicle emissions	Hold stakeholder workshop to further scope the issue and develop refined strategies for promoting low emissions options (e.g.: biking, carpooling, public transportation, etc.)	All stakeholders	Incorporation of emissions reduction strategy and indicator in an update by June 2014
	Explore opportunities for holding vehicle emissions clinics in conjunction with other airsheds	All stakeholders	Number of vehicles participating
3. Reduce or eliminate air quality degradation attributable to rail traffic (primarily idling engines)	Engage CN Rail to identify issues and opportunities for improvement	AMS, CN Rail	Incorporation of rail traffic strategy and indicator in an update by June 2014
4. Reduce or eliminate air quality degradation attributable to trucking (primarily idling engines)	Engage Truckers Association to identify issues and opportunities for improvement	AMS, truckers	Incorporation of trucking traffic strategy and indicator in an update by June 2014

9.7 Tools and Resources

BC Idle Reduction Initiative

http://www.bcairquality.ca/topics/idling/index.html

Clean Transportation

http://www.bcairquality.ca/plans/clean-transportation.html

Carbon Offset Aggregation Cooperative for Northern BC

www.northerndevelopment.bc.ca

CHAPTER 10

Implementation

10.1 Promoting Economic Opportunities While Reducing Pollution

10.1.1 Building in Efficiencies and Incentives

A balance of public health and economic values in this Plan was put forward as an absolute need at the beginning of the Community Working Group (**CWG**) formation process in 2003. It is with this in mind that the plan has focused on the resolution of issues through cooperative means. The AMS believes that we do not have to choose between creating jobs and reducing air pollution. By focusing on value-added industry and implementing strategies as opportunities arise, both goals can be met.

Many emission source reduction goals and strategies should be able to be accomplished without major disruption to the associated industry, individual homes, business owners, or governments. The approach to forest harvest debris burning and residential and commercial space heating outlined below provide two examples of how this is possible. Some strategies may require larger capital expenditures, but these are suggested to be done as opportunities arise during the business cycle, which should lessen the impact.

It is understood that forest harvest debris open burning must take place on a seasonal basis to abate wildfire risk and insect hazards. By using **custom venting forecasting** (CVF) to better predict atmospheric **venting** conditions, reduced advisory level days have been possible with little additional costs to the burn operators.

With respect to woodstoves, a financial incentive and targeted education approach has been adopted, and applied since 2006. This has resulted in the exchange of over 630 smoky old stoves with clean burning, emissions certified units. It is recognized that many families and businesses rely on older wood heating appliances for most or all of their heating requirements and are unable to afford to upgrade to a newer technology (higher efficiency) appliance. Financial assistance through rebates and low interest loans have been used to rid the BVLD area of older woodstoves. Additional approaches such as municipal bylaws restricting or prohibiting inefficient stoves have been implemented as well.

10.1.2 Taking a Value Added Approach

In 2004 when the Plan was in development, Community Working Group members agreed on an approach that would support efforts to move forward with **value added** methods for utilizing wood waste, as opposed to burning it in beehive burners or in the bush. This included research and the hosting of forums.

As of November 2010, all beehive burners in the BVLD have been decommissioned. At some sawmills, beehive burners have been replaced with energy recovery systems with state-of-the-art pollution control systems (these systems provide heat to sawmill buildings and also are used in kilns to dry lumber). In other cases this wood waste is now used to make wood pellets or panel board. Piled woody debris is also making its way to facilities for use in making pellets, as opposed to being open burned.

The BVLD Airshed Management Society is prepared to provide continued support for value added alternatives research and development for emissions reduction issues, until they are resolved satisfactorily.

10.1.3 Looking for Economic Opportunities

The most valuable approach to making economic gains through airshed planning is to improve the quality of life for all residents. Looking for and exploiting ways to reduce emissions of PM that may cause health effects in BVLD communities will have a direct benefit by making the area more livable, thus attracting new economic growth and diversification opportunities. Reducing emissions may also allow the airshed to accommodate additional sources, making room for new industries.

Being proactive in identifying locations for new development that would minimize pollution of populated areas would assist in promoting sustainable economic growth. This can be accomplished by analyzing weather patterns and geography so that new sources of PM emissions can be accommodated in areas where there is a lesser likelihood that the emissions will impact people. This type of analysis uses dispersion modeling scenarios to identify suitable areas for development. Once identified, this information can be relayed to local governments and suitable areas for development can be designated through the use of official community plans. This will help to reduce approvals needed to develop in those designated areas, promoting new industry.

The BVLD Airshed Management Society can also work with local government in an advisory or referral role for the review of official community plans and for locating developments with airborne emissions. Developments may include industries such as manufactured wood products including fiberboard or wood stove pellet manufacturing.

For information on Official Community Plans (OCPs), see:
http://www.toolkit.bc.ca/tool/official-community-plan

10.2 Integration with Other Initiatives

Integration of social, economic and environmental objectives at a range of scales is desirable in community planning. Airshed management planning objectives and strategies are very compatible with energy management planning, climate change and greenhouse gas emission reduction strategies, land use planning, waste management planning, and growth management strategies. Coordination between planning processes can lead to impressive results in a shorter period of time, and at a lower cost.

Reducing fine particulates, greenhouse gases, waste production and energy consumption can be achieved in numerous ways in all sectors and by every individual. Climate change and energy planning are two important issues, and examples of how air quality improvement crosses over into these areas are provided below.

10.2.1 Climate Change

Some expected impacts of climate change include:

- Increased pest damage (such as the Mountain Pine beetle infestation in Western North America)
- More frequent and severe storms and wildfires (as observed in the Kelowna firestorm of 2003, and locally in our airshed in 2010).
- More droughts in semi arid regions (especially damaging in Third world countries that have the fewest resources to cope)
- Rising ocean levels and coastal flooding
- Changes in vegetation communities forcing the migration of species, and extinction for those that cannot migrate quickly enough
- Melted glaciers and polar ice/permafrost, resulting in an amplified heating effect with less light reflected
- Acidification of the ocean, affecting hundreds of marine species and causing some species extinctions

The largest influences on climate result from choices made to meet transportation and energy needs. Reducing vehicle emissions is possible by reducing total kilometers driven and by reducing the amount of emissions per kilometer. For example, walking or biking shorter distances instead of driving, and carpooling or taking public transit for longer distances are among these choices. Such actions will reduce emissions of greenhouse gases from the tailpipe of your vehicle, as well as lower emissions of fine particulates due to tailpipe emissions, tire wear and road dust.

Ensuring that homes and businesses are well-insulated will mean less energy is needed

for heat. Depending on how these buildings are heated, this can mean reduced greenhouse gas and fine particulate emissions, as well as reduced drain on pocketbooks

There are many other ways to reduce emissions of fine particulates that also result in lower greenhouse gas emissions and lowered energy use and less waste production. For more information refer to the BC Climate Exchange website at:

http://www.bcclimateexchange.ca/index.php?p=home

10.2.2 Energy Planning and Efficiency

Understanding the energy needs of a community and the many ways of meeting these needs will ensure a healthy, sustainable future. Cogeneration is one example of a value added process. Perhaps more wood waste could be used to provide a renewable source of energy in the form of electricity and could reduce the need for other non-renewable sources of electricity.

Alternative sources of energy can also be used to power industries, businesses, and homes in remote locations. Examples include wind and solar energy, both of which have no emissions of greenhouse gases or fine particulates, and both of which are available in as great a supply as Mother Nature can produce. Other possibilities include biomass and biogas fuels, micro-hydro and geothermal energy.

No matter how a home or business is heated, be it with wood, gas, pellets or other fuel, operating the heating appliance efficiently will reduce the amount of fuel needed, thus reducing emissions of fine particulates and potentially greenhouse gases. If heating with wood, using a newer emissions certified appliance whenever possible will further reduce emissions of fine particulates.

AMS is committed to working with local groups to promote energy efficiency and improved air quality. For more information on alternative energy and applications for the BVLD, see:

Nadina Community Futures Development Corporation at www.cfdcnadina.ca/.

BC Community Energy Association at www.energyaware.bc.ca

Natural Resources Canada - RETScreen International www.retscreen.net

BC Sustainable Energy Association www.bcsea.org

Advanced Buildings Technologies and Practices www.advancedbuildings.org

AMS will continue to look for opportunities to integrate with other airshed planning and

compatible planning processes through the ongoing development of this plan. We have already participated in a province-wide study on the Integration of Air Quality-Related Planning Initiatives. The intent of this study was to evaluate the performance of various planning processes available to local governments that address air quality-related objectives, namely greenhouse gas and community energy plans. BVLDAMS is profiled in this report, which is available at

http://www.bcairquality.ca/reports/pdfs/int_aq_rep_may04.pdf

As well, other airshed planning processes are happening around the province and MOE staff and BVLDAMS members continue to exchange ideas with these groups. Links to websites and reports resulting from plans developed for Prince George, Williams Lake and Quesnel are located at www.cleanairplan.ca

10.3 Role of the AMS

Since August 2005, the implementation of the Plan has been carried out under the structure of a non-profit society registered in BC. The BVLD Airshed Management Society has charitable status and is governed by a board of directors elected by the membership as per the constitution and bylaws. The airshed plan does not have legislative or legal authority, however is meant to provide advice and guidance to Provincial, Regional, and Municipal Governments; Industry, and the public.

This plan revision has clearly identified the need for a part time Airshed Plan Coordinator, and potential funding sources have been identified. The Coordinator's role would be to steer and oversee the implementation of the Clean Air Plan, including the development of an annual workplan, budget, and communications strategy. This role would also include fundraising as needed.

Grants in varying amounts have been provided in the past by the BC Lung Association (production of a quarterly newsletter and ongoing support for the Woodstove Exchange Program), the Bulkley Valley Credit Union (development and implementation of a neighbourhood air quality education program, support for website development), the Fraser Basin Council (participation in the BC Clean Air Forum), and BC Transit (Clean Air Day). Additional sources of funding and commitment to multi-year funding are needed to determine activities to be carried out in the workplan.

Contributions of time and energy by volunteers also drive the AMS capacity to deliver specific projects and coordination of these efforts should be done by the facilitator. Lastly, and perhaps most importantly, partnerships with key organizations such as the Northern Health Authority, local governments, the BC Lung Association, and other airshed

management groups around the province will add to the overall effectiveness and capacity of the BVLD Airshed Management Society.

The following proposed workplan for the AMS follows an annual cycle and includes core activities as outlined in Table 10-1.

Table 10-1: Summary of Core Activities

Task	Task Leader	Timeline
Annual Clean Air Plan Review	Coordinator with input from MOE and the AMS	June
Clean Air Day celebrations	Coordinator with input from MOE and the AMS Board	June
Annual Burn Operators Forum	Coordinator with input from MOE and the AMS	Late August, early September
Annual presentations to local governments, organize annual sector	Coordinator with input from MOE and the AMS Board	February
Booths at fall fairs	Coordinator with input from MOE and the AMS	Late August
Maintenance of website	Coordinator	Ongoing
Quarterly Board	Coordinator	April, June (AGM), July (for Plan

10.4 Committee Structure

The AMS is considering its' committee structure in light of the 2012 revisions to the airshed plan and will likely have board committees correspond to the sectors or chapters in the revised plan. Subcommittees can be struck for specific tasks and can be ad hoc, bringing in outside expertise and stakeholders as appropriate.

Further consideration of this is expected at the 2012 Annual General Meeting of the AMS.

10.5 MOE Role

The Ministry of Environment will continue to play a pivotal role in airshed management. Specific tasks include:

- Supporting the Ministry of Forests, Lands, and Resource Operations in the provision of Custom Venting Index Forecasting Service
- Enforcement of EMA and its regulations and issuance of waste discharge permits
- Completion of an annual Ambient Air Quality Assessment

- Maintenance of existing meteorology and air quality monitoring network to ensure adequate assessment of indicators
- Air quality dispersion modeling and/or other impact assessment techniques such as source apportionment
- Support of the BVLD Airshed Management Society operations through financial and in-kind contributions
- Sitting on the Board of Directors
- Representing BVLD airshed priorities at provincial workplan and budget development meetings
- Assist when possible with community outreach activities

10.6 Local Government Role

Local governments play a vital role in airshed plan implementation as they have jurisdiction in several key areas of the airshed plan: Official Community Plans (OCPs) and zoning provide a framework for decision-making about what activities can occur where; bylaws can be developed and implemented to regulate woodstoves and backyard burning, and road dust is created and then eliminated as a result of necessary municipal public works activities. This has been discussed in the various chapters of this plan and many of the strategies will require participation and leadership by local governments in order to be successful.

Local governments are now represented on the AMS board and it is anticipated that there will be continued participation on the part of municipalities, and Regional Districts, in AMS activities and annual workshops to share in implementation successes and challenges.

10.7 Reporting Out, Plan Review and Updating

At each of the sector workshops held during the revision of this plan, there was support for annual sector meetings and reporting out by stakeholders on activities toward the goals of the plan. This reporting would be at the sector workshops and ultimately to the board of the AMS and the communities.

It is anticipated that these reports would address three questions:

1. What activities have you undertaken in the last year toward the goals of the airshed plan?
2. What are your plans for next year?
3. What are your long term plans?

It is suggested that these reports are an opportunity for the stakeholders to highlight successes. The reports would address what participants have done to address airshed plan goals as well as what their future plans might be to help further the implementation of the airshed plan. Information from this portion of the implementation process will potentially provide information for plan updating at the AMS Annual General Meetings.

In this way, the airshed management plan can foster continuous improvement in air quality following an adaptive management framework i.e. an iterative process that uses scientific and other information in a cycle of continuous learning from experience and integrating that into refinement of the airshed plan.

Although airshed planning is an ongoing process, it is suggested that a major review of the plan would be appropriate about once every five years.

References

Bulkley Valley Lakes District Airshed Management Plan 2004 (as revised in 2006), and 2009 Addendums. www.cleanairplan.ca

Cariboo Environmental Quality Consulting Ltd., 2012. *BVLD Airshed Management Plan Revision Stakeholder Workshops.* Cariboo Environmental Quality Consulting Ltd. Williams Lake, BC.

Elliot, C. and R. Copes. 2011. *Burden of Mortality Due to Ambient Fine Particulate Air Pollution ($PM_{2.5}$) in Interior and Northern BC.* Revue Canadienne De Sante Publique 102(5): 390- 393. Cited by B.Oke, Healthy Community Environments Lead. Northern Health Authority, Prince George, BC. duringreview of this report.

Henderson, S. 2012. Environmental Health Scientist, BC Centre for Disease Control. *$PM_{2.5}$ in the case of This vs. That.* Presentation to the Health Authorities Air Quality Council at the Vancouver Coastal Health Office in North Vancouver, BC.

Levelton. 2010. *Review of the Bulkley Valley – Lakes District Airshed Management Plan*. Levelton Consultants Ltd. Richmond, BC.

Oke, B. 2011. Healthy Community Environments Lead. Northern Health Authority, Prince George, BC. *Personal Communication.*

World Health Organization. 2005. *WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Global Update 2005.*

http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf

Zirnhelt, N.A. 2011. *Quesnel Airshed Management Plan Review – 2011*. Cariboo Environmental Quality Consulting Ltd. Williams Lake, BC.

Zirnhelt, N.A. 2012. *Bulkley Valley – Lakes District Airshed Management Plan 2012 Revision Options.* Cariboo Environmental Quality Consulting Ltd. Williams Lake, BC.

bulkley valley - lakes district
airshed management society

COMMUNITY ACTION PLAN *for* CLEAN AIR

APPENDICES

Appendices

Appendix A

Abbreviations and Glossary

AMP	Airshed Management Plan
BFP	Babine Forest Products
BMP	Best Management Practice
BVLD	Bulkley Valley-Lakes District
CANFOR.	Canadian Forest Products Ltd.
CFDC	Community Futures Development Corporation
CSA	Canadian Standards Association
CWD	Coarse Woody Debris
CWG	Community Working Group
DM	District Manager (Ministry of Forests, Lands and Natural Resources Operations)
DLFP	Decker Lake Forest Products
EPA	Environmental Protection Agency
HFP	Houston Forest Products (West Fraser Mills Ltd.)
MFLNRO	British Columbia Ministry of Forests, Lands and Natural Resources Operations
MOTH	British Columbia Ministry of Transportation and Highways
PIR	Pacific Inland Resources (West Fraser Mills Ltd.)
PLC	Programmable Logic Controller
RWG	Regional Working Group
TSA	Timber Supply Area
WETBC	Wood Energy Technicians of British Columbia

MOE	British Columbia Ministry of Environment
AIR QUALITY ADVISORY	An advisory issued by the Ministry of Water, Land and Air Protection alerting the public that air quality is degraded.
ADVISORY LEVEL DAY for	A day is considered an advisory level day if the daily (24-hour) concentration is greater than the provincial objective of: 50 ug/m^3 PM_{10} and 25 ug/m^3 for $PM_{2.5}$ (98 percentile 3 yr. rolling average)
AIR QUALITY of EPISODE	A period of degraded air quality (due to higher than normal levels pollution), due to a combination of emissions, topography and meteorology.
AIR QUALITY INCIDENT	See Advisory level day.
AIRSHED	A geographic area that, because of emissions, topography and meteorology typically experiences similar air quality.
AMBIENT	Environmental or surrounding conditions.
ASTHMA	A condition often of allergic origin that is marked by continuous or spastic laboured breathing accompanied by wheezing, by a sense of constriction in the chest, and often by attacks of coughing or gasping.
ASTHMATIC	A person who is sensitized to allergens and with hyper-responsive airways. There is genetic predisposition, but non-genetically related asthma occurs also in adults.
ATMOSPHERIC MIXING	Movement of air that results in mixing. Typically caused by atmospheric instability.
ATMOSPHERIC (temperature, PROFILE	A chart or graph which shows meteorological variables wind, etc.) from the surface up into the atmosphere at one location.
BEEHIVE BURNER wood	A beehive burner is a large conical steel structure used to burn residue. The beehive burner contains a series of dampers, air ducts, fans and various controls. Wood residue is fed into the structure near 2/3 from the base. These have all been phased out of the airshed as of 2012.

BENCHMARK	A standard by which something can be measured or judged.
BEST MANAGEMENT PRACTICES	A practice or combination of practices that are determined to be the most effective, practical means of reducing the amount of pollution generated by a source to a level compatible with environmental quality goals.
BIOMASS	Biomass refers strictly speaking to the total weight of all the living things in an ecosystem. However, it has come to refer to the amount of plant and crop material that could be produced in an ecosystem for making biofuels and other raw materials used in industry, for example.
BROADCAST BURNING	Debris is burned as is on the ground as opposed to being piled into distinct piles.
BRONCHITIS	Acute or chronic inflammation of the bronchial tubes.
BURN BAN	A suspension of the exemption under the Waste Management Act of the requirement to have a permit or approval to discharge waste (therefore, no burning under the Open Burning Smoke Control Regulation is allowed). This means that only operators with a valid permit or approval for open burning can do so during a burn ban.
BURN REFERENCE NUMBER	Ministry of Forests, Lands and Natural Resources Operations require residents planning a fire larger than a typical backyard burning pile to obtain a burn reference number by calling 1-888-797-1717. This number ensures that MFLNRO can track every person planning to burn debris.
CALPUFF	A computer model that uses modeled meteorology from CALMET along with inputted emission information from sources to produce an estimate of air quality at numerous locations throughout a defined area and period of time.
CALMET	A computer model that uses meteorological monitoring data, land use data and terrain data to develop a 3-dimensional estimate of meteorological conditions at numerous locations over a defined area and period of time.
CANADIAN STANDARDS ASSOCIATION	A not-for-profit, membership-based association serving business, industry, government and consumers in Canada and the global marketplace. It works in Canada and around the world to develop standards that address needs, such as enhancing public safety and health.
CATEGORY 1	An open fire that meets both of the following requirements:

CAMPFIRE	(a) burns material in one pile not exceeding 0.5 m in height and 0.5 m in width (b) the open fire is lit, fuelled or used (i) by any person for a recreational purpose, or; (ii) by a first nation for a ceremonial purpose.
CATEGORY 2 OPEN FIRE	An open fire, other than a campfire, that (a) burns material in one pile not exceeding 2 m in height and 3 m in width; (b) burns material concurrently in 2 piles each not exceeding 2 m in height and 3 m in width, or; (c) burns stubble or grass over an area that does not exceed 0.2 ha.
CATEGORY 3 OPEN FIRE	An open fire that burns (a) material in 3 or more piles each not exceeding 2 m in height and 3 m in width; (b) material in one or more piles each exceeding 2 m in height or 3 m in width; (c) one or more windrows, or; (d) stubble or grass over an area exceeding 0.2 ha.
CIRCULATORY DISEASE	Disease caused by the normal flow of blood through the body being restricted or blocked as a result of arterial plaque. This may cause damage to the heart, brain, kidneys or other organs and tissues.
CLOUD CEILING	The lowest broken or overcast layer of a cloud. Usually the term will only be used if clouds occupy more than %50 of the visible sky at a particular height. If a cloud ceiling is low, chances are the sky is drab and visibility for small aircraft may be reduced.
COARSE WOODY DEBRIS	Coarse woody debris is dead woody material, in various stages of decomposition, located above the soil, larger than 7.5 cm in diameter (or equivalent cross-section) at the crossing point, which is not self-supporting. Trees and stumps (intact in ground) are considered self-supporting.
COMBUSTIBLE MATERIAL	Material which have the potential to burn.
COGENERATION	Simultaneous production of heat energy and electrical or mechanical power from the same fuel in the same facility. The use of waste heat (as in steam) from an industrial process to produce electricity, or the use of steam from electric power generation as a

	heating source are examples of cogeneration.
COMMUNITY WORKING GROUP	Three groups (Lakes, Morice and Bulkley (with Kispiox)) of stakeholders developed for the BVLDAMP with a focus on local air quality issues.
DAMPING	The act of starving a fire of air, thereby lengthening the time it takes for wood to burn. This decreases the efficiency of the burn, causing incomplete combustion (burning) which results in smoke (smoke is wasted, unburned fuel).
DIABETES (TYPE II)	Mild form of diabetes mellitus that develops gradually in adults; can be precipitated (made to occur sooner or faster) by obesity, severe stress, menopause or other factors; can usually be controlled by diet and hypoglycemic agents without injections of insulin.
DIOXINS	Any in a family of over 200 chlorinated organic chemicals (all heterocyclic hydrocarbons). Dioxins are produced when chlorinated materials such as plastics are burned. Dioxins are known to cause skin diseases (chloracne), birth defects, miscarriages, and cancer.
EPA EMISSION standards CERTIFIED APPLIANCE	A wood-burning appliance which has met the low-emission set by the United States Environmental Protection Agency.
EMISSION INVENTORY	Involves qualifying and quantifying the emissions in an area which contribute to ambient air quality. Qualifying entails determining what sources exist that emit the pollutant of interest, and quantifying involves determining how much each source emits and when.
EMISSION	A substance discharged into the environment.
EPISODE	See advisory level day.
EPISODE SCENARIO	Modeled advisory level day.
GREENHOUSE GASES	Gases that trap heat close to the Earth's surface. There are around 30 greenhouse gases, of which C02 is the most important.
FALL AND BURN	Hand felling, hand piling, and burning individual trees or patches of trees for the purpose of bark beetle control.
FINE PARTICULATE(S)	Tiny solid or liquid particles that come in many shapes and sizes and from many sources, both natural and human-caused. Fine particulates 10 micrometer or less in diameter are called PM_{10}, and those 2.5 micrometers or less in diameter are called $PM_{2.5}$ (PM stands for particulate matter),

FORECAST LOOPS	An animated prediction model which plays repeatedly.
FORECAST VENTING	See Venting Index Forecast.
HAND BUCKING	Trimming tops and branches from harvested trees, and cutting that tree to ideal lengths. This can be done using a chainsaw or handsaw.
HOG SYSTEM	Industrial and commercial facilities incinerate 'Hog' to power their facilities. Hog is the unusable waste generated by saw-milling logs and consists of bark and sawdust. A hog system grinds and chops this material from larger material and collects/prepares it for transport from the sawmill to the end user.
HORMONAL SYSTEM	The system of glands that secrete (produce) hormones.
IMMUNE SYSTEM	A collection of cells and proteins that work to protect the body from potentially harmful, infectious microorganisms (microscopic life-forms), such as bacteria, viruses and fungi.
INSECT HAZARD ABATEMENT	Efforts that reduce the risk of insect damage spreading. Fall and Burn is one example of this.

LANDING	An area of concentrated skidding activity, where logs are dropped to be 'Hand Bucked' or 'Machine Processed'. Skidding is where machines drag logs to a centralized point (landing) or roadside.
LICENSEE	Refers to a holder of a Major License under the Forest Act.
METEOGRAMS	A numerical weather forecast in which the output displays temperature (surface and at 850 hPa), mean-sea level pressure, wind and precipitation.
METEOROLOGY	The study of the weather, as well as the atmosphere and atmospheric phenomena including the atmosphere's interaction with the earth's surface, oceans, and life in general.
MODEL	A computer program used to estimate or simulate a real world situation.
PARTICULATE MATTER	A criteria air pollutant. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including the burning of wood, diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves among others. Fine particulate are a subset of particulate matter "Particulate matter," also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.
PHENOMENA	The plural of phenomenon, an occurrence, circumstance, or fact that is perceptible by the senses.
PILING	Placing logging debris into specific vertical piles for the purpose of burning the debris more efficiently or to reduce the area of ground affected by the debris.
$PM_{2.5}$	Particulate matter with a diameter of less than 2.5 micrometers (µm). One micrometer is one millionth of a metre. $PM_{2.5}$ is included in fine particulate, and is a subset of PM_{10} (when measuring PM_{10}, it includes $PM_{2.5}$). $PM_{2.5}$ is typically associated with combustion sources (smoke) and is more closely related to adverse health effects than larger particles.

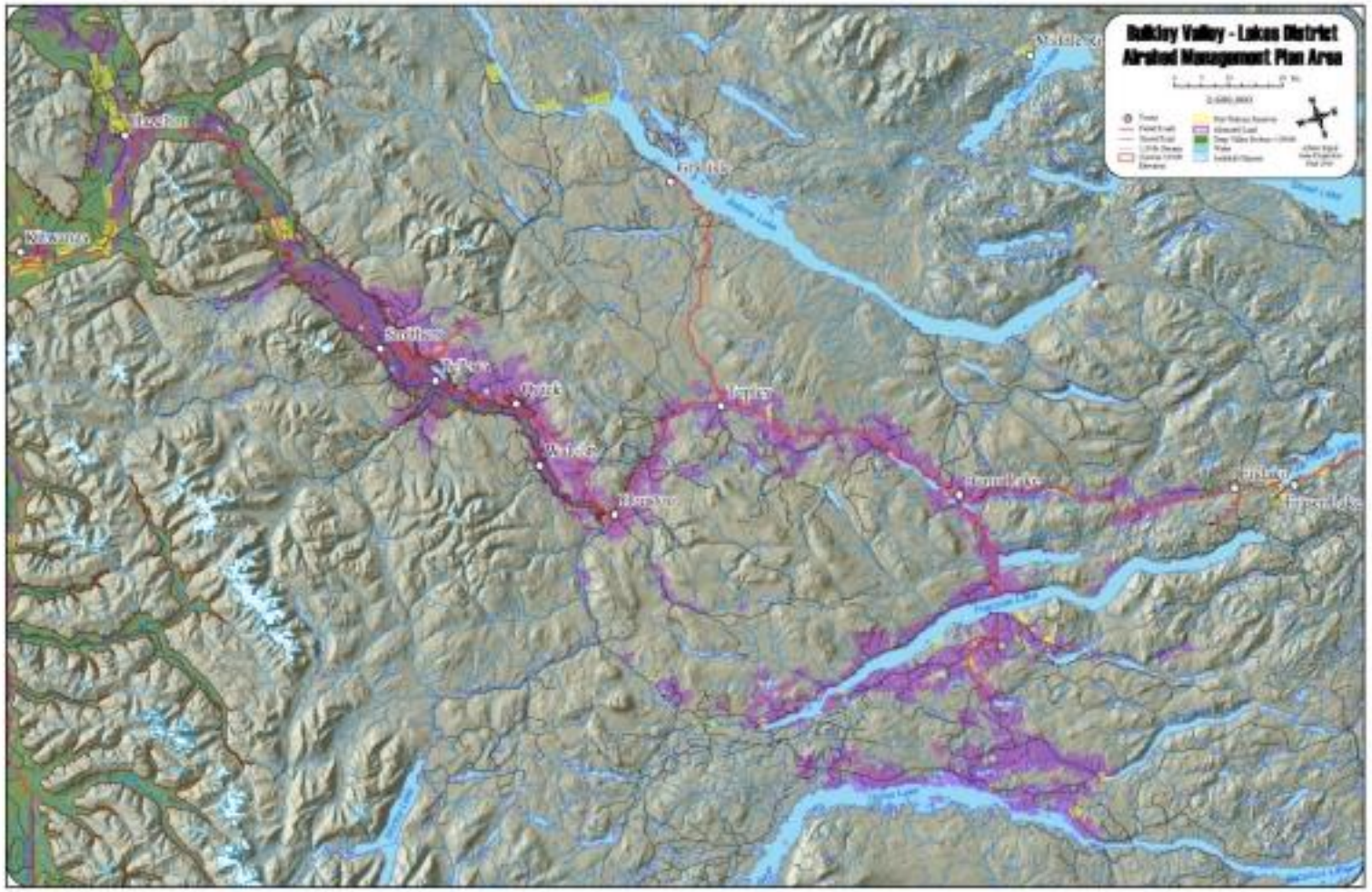
PM_{10}	Particulate matter with a diameter of less than 10 micrometers (μm). One micrometer is one millionth of a metre. PM_{10} is included in fine particulate and includes $PM_{2.5}$ (when measuring PM_{10}, it includes $PM_{2.5}$). The larger particles in PM_{10} are typically associated with crustal (ie. dust) sources.
POTENTIAL EPISODE DAY	A day where, based on meteorological variables (still air, poor venting) the potential for an advisory level day exists, dependent on emissions.
PROGRAMMABLE LOGIC CONTROLLER (PLC)	A solid-state control system that has a user-programmable memory for storage of instructions to implement specific functions such as I/O control, logic, timing, counting, report generation, communication, arithmetic, and data file manipulation. A controller consists of a central processor, input/output interface, and memory. A controller is designed as an industrial control system.
REFORESTATION	Replanting of trees on land that has recently been harvested for trees (logged).
REGIONAL WORKING GROUP	Made up of representatives from Community Working Groups and others, developed for the BVLDAMP with a focus on airshed-wide air quality issues.
RESIDUAL DEBRIS	Tree limbs and tops, rotten wood, etc.
RESPIRATORY DISEASE	Describes a number of problems that affect the organs of the respiratory system. The respiratory system is made up of the organs that are involved in breathing. These include the nose, throat, larynx, trachea, and lungs, which are made up of the bronchi, and arterioles.
ROADSIDE BASED	Refers to forest harvest debris piles based located near or on a roadside. Roadside based debris piles are smaller but greater in number than piles concentrated at a landing.
SILVICULTURE PRESCRIPTION	A pre-harvest paper document that outlines factors to consider during and after logging that will achieve a new plantation when complete.
SITE PREPARATION TREATMENTS	Sometimes post-harvest ground is not plantable. Either the ground has too much debris, is too wet, or the soils are too compact. A Site Preparation treatment will target the problem to create a more favorable planting and growing environment for the seedling.

SMOKE DISPERSION	The ability of the atmosphere to dilute smoke through mixing and transport.
SMOKE HAZARD ABATEMENT	Reduction of hazard due to smoke.
STACK EMISSIONS	Substances coming out of a stack.
TIMBER SUPPLY AREA	An integrated resource management unit established in accordance with the Forest Act.
TIER 1 (BEEHIVE) BURNER	A Tier 1 burner is one that is 5 km or less from a populated area of 500 or more people.
TIER 2 (BEEHIVE) BURNER	A Tier 2 burner is defined as other than a Tier 1 burner.
TOPOGRAPHY	The terrain of an area including position and elevation information for surface features
VALUE ADDED ALTERNATIVE	A solution or alternative to any situation which has direct or indirect 'value' of any kind. Value could be in the form of alternate cash generation (ie. use of waste as or to create a useable product), waste reduction or pollution prevention.
VENTING	An atmospheric phenomenon (resulting from a combination of wind and the atmosphere's ability to lift air), which allows for smoke dispersion.
VENTING INDEX FORECAST	A numerical weather forecast in which the result is a scale from 0-99, consisting of three categories (good, fair and poor), which describes venting conditions. Poor venting exists when the venting index forecast is from 0-33, fair venting exist when the venting index forecast is from 34-54 and good venting conditions exist when the venting index forecast is from 55-99.
VISUAL BLIGHT	Something which Impairs or destroys vision.
WELL BEHAVED	In this plan, refers to a realistic outcome produced by a numerical weather forecast or weather variables in general.
WINDGRAMS	A numerical weather forecast in which the output is a forecast of wind conditions (speed and direction) up into the atmosphere and foreword into time at one given location.

WOOD STOVE CHANGE OUT PROGRAM	A program in which education and incentives are available to people wanting to trade in a non-EPA emission certified appliance in exchange for a new lower emission (fine particulate) appliance.

Appendix B

Map of the Airshed Planning Area



Appendix C

Summary of Air Quality and Meteorology Monitoring Stations in the BVLD (as of March 2012)

Continuous Monitoring	Burns Lake Fire Centre	Houston Firehall	Telkwa	Smithers St. Joseph's
Location	8 – 4th Ave.	3382 – 11th St.	1304 Birch St.	4020 Broadway Ave.
Meteorology[1]	March 97 – current	Nov 94 – current	Jan 98 – current[2]	Nov 94 – current
PM_{10} - TEOM	March 97 – current	Feb 97 – current	Feb 98 – Oct 05	Feb 97 – current
$PM_{2.5}$ - TEOM	Oct 06 – current	Mar 01 – current	Oct 06 – current	July 04 – current
$PM_{2.5}$ – Federal Equivalency Method	Planned Summer 2012	Planned Summer 2012	Planned Summer 2012	July 10 – current
Dual Wavelength Aethelometer (UV + BC)				June 11 – current
Carbon Monoxide (CO)				June 97 – April 2012
Nitrogen Dioxide (NO_2)				June 97 – current
Nitrogen Oxide (NO)				June 97 – current
Ozone (O_3)				June 97 – current

[1] Note: Standard meteorological monitoring equipment includes: temperature, relative humidity, wind speed and wind direction.

[2] Note: Telkwa meteorological monitoring station includes precipitation and snow depth.

Non-Continuous PM Monitoring[3]	Telkwa	Smithers	Hazelton	Kitwanga
Location	1304 Birch St.	4020 Broadway Ave.	3275 Bowser St.	Kitwanga Elementary
Meteorology	March 97 – current	Nov 94 – current	Feb 05 – current	Sept 05 – current
PM_{10}		Feb 08 – current	April 04 – Feb 09	April 04 – Dec 07
$PM_{2.5}$	Sept 09 - current	Feb 08 – current	*See table below*	Jan 08 – April 09

[3] Note: non-continuous $PM_{2.5}$ monitoring programs are planned for Burns Lake and Houston beginning

fall 2012 for 6 – 12 months.

Hazelton $PM_{2.5}$ Monitoring Study	Northwest Community College	New Hazelton School	Gitxsan Education Centre
Location	4815 Swannell Drive	3275 Bowser St.	4125 River Rd.
$PM_{2.5}$	Sept 09 – Dec 12	Jan 09 – March 10 & Jan 12 – Dec 12	March 10 – March 12

Appendix D

Sample Road Dust Advisory

MEDIA RELEASE

For Immediate Release - Attention Editor

ROAD DUST ADVISORY IN EFFECT FOR [COMMUNITY]

[Date, Year] – Smithers. The Ministry of Environment in cooperation with Northern Health has issued a Road Dust Advisory for [Community] because of high concentrations of dust that are expected to persist until [time or weekday].

Avoid strenuous outdoor activities and stay indoors with windows and doors closed.

If you are experiencing symptoms such as continuing eye or throat irritation, chest discomfort, shortness of breath, cough or wheeze, follow the advice of your health care provider, particularly if you are elderly, have asthma, hay fever, breathing or lung conditions or if you react strongly to road dust.

Tips to reduce your personal health risk:

- Avoid roads with heavy vehicle traffic.
- If you stay indoors, keep windows and doors closed and reduce indoor sources of pollution, such as smoking, vacuuming and use of wood stoves.
- Continue to control medical conditions such as asthma, hay fever and chronic respiratory disease. If symptoms continue to be bothersome, seek medical attention.
- Maintaining good overall health is a good way to prevent health effects resulting from short-term exposure to air pollution.

Additional Information:

- This advisory has been triggered by high concentrations of road dust, measured as coarse particles, PM_{10}, which have diameters 10 micrometres or smaller.
- The provincial air quality objective for coarse particles, PM_{10}, is 50 micrograms per cubic metre, averaged over 24 hours. 24-Hour average PM_{10} concentrations are summarized below for communities in Skeena Region and are current as of [Hour, Day, Date, Year]:

Appendix D (continued)

Community	Burns Lake	Houston	Smithers	Terrace	Kitimat
24-Hour PM_{10} Concentrations					

- The current dusty conditions are caused by road traffic stirring up winter traction materials that have accumulated on roadways over the past winter.
- Real-time air quality information for B.C. communities can be found at: www.bcairquality.ca.

Contacts:
Ben Weinstein
Phone: (250) 847-7224
Air Quality Meteorologist
BC Ministry of Environment

Appendix D (continued)

Sample Air Quality Advisory and Opening Burning Restrictions Notice

MEDIA RELEASE
For Immediate Release - Attention Editor

AIR QUALITY ADVISORY AND OPEN BURNING RESTRICTIONS IN EFFECT FOR [COMMUNITY]

[Date, Year] – Smithers. The Ministry of Environment in collaboration with the Northern Health Authority has issued an Air Quality Advisory for [communities] because of high concentrations of fine particulates which are expected to persist [timeline].

Persons with chronic underlying medical conditions should postpone strenuous exercise until the advisory is lifted. Staying indoors and in air conditioned spaces helps to reduce fine particulate exposure. Exposure is particularly a concern for infants, the elderly and those who have diabetes, and lung or heart disease.

Open burning restrictions are now in effect for the [xxx TSA of the xxx Forest District] for a period of [*specify duration up to 7 days*]. No new fires may be initiated and no additional material may be added to existing fires. For more information on burning restrictions, see the section below entitled 'Mandatory Emission Reduction Actions.'

In [community] the use of wood burning stoves is prohibited unless this is your only source of heat. Other residents of [community or area] are requested to not use woodstoves unless it is the sole source of heat in your home.

For more information on current air quality, see: www.bcairquality.ca.

Tips to reduce your personal health risk:

- Avoid roads with heavy vehicle traffic and areas with wood smoke.
- Stay inside, keep windows and doors closed and reduce indoor sources of pollution such as smoking, vacuuming and use of woodstoves.

Appendix D (continued)

- Run an air cleaner. Some room air cleaners, such as HEPA filters, can help reduce smoke indoors provided they are the right size for your home and filters are kept clean.
- Take shelter in air-conditioned buildings which have large indoor volumes and limited entry of outdoor air.
- Use symptom management medications, such as inhalers, if you need them.

While health effects are often more apparent during air quality advisories, the majority of adverse health effects are due to long term exposure of fine particulates at levels well below those that trigger air quality advisories. Avoiding unhealthy exposure where possible and maintaining a healthy lifestyle by eating healthy and exercising regularly can prevent health effects resulting from both, long and short-term exposure of air pollution.

Mandatory Emission Reduction Actions:

Pursuant to sections 2(i) and 4(2) of the Open Burning Smoke Control Regulation (OBSCR), as pollution may occur from open burning:

- The Director has suspended the exemption in the OBSCR that allows for open burning of debris to occur in [xxx TSA of the xxx Forest District] without a permit or approval from the Ministry of Environment. For a period of [*specify duration up to 7 days*], no new fires may be initiated.
- The Director requires that no additional material be added to existing fires.

Contravention of the above provisions may be subject to a fine under the Regulation.

Date issued:	[Statutory Decision Maker]
	for Director, *Environmental Management Act*
Date amended:	[Skeena] Region

The following woodstove-use restrictions are in effect until this air quality advisory is cancelled:

- [City]'s Clean Air Bylaw prohibits the use of wood-burning appliances, except for Sole Wood Burning Heat Users, when an Air Quality Advisory is in effect.

Appendix D (continued)

Voluntary Emission Reduction Actions for [community/area]:

- Avoid the use of woodstoves and fireplaces unless used as the sole source of residential heat.
- Where woodstoves or fireplaces are the sole source of residential heat, use only CSA/EPA emissions approved wood burning appliances and dry wood, and ensure an adequate supply of combustion air.
- Avoid backyard burning.
- Reduce the use and idling of vehicles.

Additional Information:

- The provincial air quality objective for fine particles, $PM_{2.5}$, is 25 micrograms per cubic metre, averaged over 24 hours. 24-Hour average $PM_{2.5}$ concentrations are summarized below for communities in Skeena Region and are current as of [Hour, Day, Date, Year]:

Community	Burns Lake	Houston	Telkwa	Smithers	Terrace	Kitimat
24-Hour $PM_{2.5}$ Concentrations						

- Sources of fine particulates contributing to this air quality episode include wood smoke ([suspected sources]) as well as emissions from industry and transportation sources such as automobiles, trucks and rail traffic.
- This episode is expected to continue until there is a change in the current weather system, and may expand to other communities along the Hwy 16 corridor tomorrow.
- Real-time air quality information for B.C. communities can be found at: www.bcairquality.ca.

Contacts:

Ben Weinstein
Phone: (250) 847-7224
Air Quality Meteorologist
BC Ministry of Environment

Dr. William Osei
Phone: (250) 565-2150
Medical Health Officer
Northern Health Authority

How to Contact Us

This Plan is reviewed annually to measure progress towards goals and the effectiveness of the indicators and strategies for reaching those goals. The Plan contents may be
revised through a consensus-based process at the Annual General Meeting and Clean Air
Plan Review, or through the Board of Directors with input from the community.

All proposed changes and their rationale should be submitted to the Airshed Coordinator or MOE for review at the annual plan review meeting. Submissions will be available for review at any time, and will be circulated in advance and added to the agenda of each yearly plan review meeting.

Individuals or organization wishing to join the BVLDAMS, assist in implementation of specific initiatives listed in the airshed plan, or submit amendments, should direct their inquiries to:

E-mail: info@cleanairplan.ca Website: www.cleanairplan.ca