

Provincial Framework for AIRSHED PLANNING



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Ministry of
Environment

C O N T E N T S

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P R E F A C E



This document describes a framework for preparing air quality management plans, or "airshed plans," in British Columbia. As such, it should be of interest to a broad range of local stakeholders in air quality, including local and regional governments, health professionals, industry, businesses, environmental and community interest groups, and private citizens.

The framework is designed to help those considering or undertaking a planning process to better understand what the Province of British Columbia (the Province) expects from an airshed plan in terms of approach and content. The intent is to encourage greater consistency and efficiency in planning efforts, towards implementation of the Canada-Wide Standards for particulate matter and ozone – key pollutants of concern due to their health and environmental impacts.

The *Draft Provincial Framework for Airshed Planning* represents the culmination of a development process that started in 2005 and included two rounds of stakeholder consultation (see Appendix 1). More than 60 participants contributed to these consultations, drawn from local and regional government, industry, academia, health authorities, and environmental and community organizations. Their input has been instrumental in shaping the provincial framework.

There is growing scientific evidence of a strong link between air pollution levels and impacts on human health. In the case of particulate matter (PM) and ground-level ozone, these impacts occur even at low concentrations, suggesting that no safe level may exist.

An important tool used by local and regional governments to combat air pollution is airshed planning – a stakeholder-driven process to coordinate the activities affecting air quality in a defined area or airshed. This planning approach recognizes that local air quality is influenced by a multitude of activities and emission sources, numerous stakeholders, and overlapping regulatory jurisdictions.

Airshed plans are currently in place in nine (9) communities and regional districts of British Columbia, with another three (3) plans under development and planning processes being considered in several more communities.

AIR QUALITY COMMITMENTS

The Province has committed to meet the Canada-wide Standards (CWS) for PM and ozone in all communities with air quality monitoring. The CWS set numerical targets for fine particulates (PM_{2.5}) and ozone to be achieved by 2010. The Province will also pursue widespread measures for "Continuous Improvement (CI)" and "Keeping Clean Areas Clean (KCAC)," since these pollutants have no identified safe levels and polluting up to the limit is unacceptable.

With a few exceptions (e.g., Prince George for PM_{2.5}, the Town of Hope for ozone), most areas of the province are currently below the CWS target levels. For the majority of monitored communities, therefore, the focus will be on continuous improvement and keeping clean areas clean.

THE PLANNING FRAMEWORK

Airshed planning provides a process for reducing PM and ozone-related emissions and, hence, supports the Province's commitments toward the CWS and CI/KCAC provisions. While the Minister of Environment can require the development of an airshed plan, a voluntary and community-led approach is preferred.

In this spirit, the Ministry will work with communities that are approaching or exceed the national standards to develop and implement a plan. Further support will be provided through the preparation of regulations, codes of practice, best management practices, and other tools.

This provincial framework is meant to guide future airshed planning initiatives in B.C. and to support implementation of the CWS for PM and ozone. Its purpose is to ensure greater consistency and resource efficiency in planning processes and to promote guiding principles from the provincial perspective: shared stewardship, sustainable development, integrated planning, CI/KCAC, flexibility, and adaptive and innovative management.

The framework will apply to areas outside of the Lower Fraser Valley that do not have delegated planning powers. However, the intention is to complement the existing airshed plans of the Greater Vancouver Regional District and Fraser Valley Regional District, with whom the Ministry will continue to work on addressing air quality issues.

Six major elements or "stages" have been identified for the airshed planning process (see diagram below). In practice, the process may not be so sequential and some stages may overlap, occur in a different order, or even be iterative. At all times, however, consultation and engagement of key stakeholders and the public will be critical to shape local goals and build support for action.

For each stage, the framework outlines a brief description, what is involved, how the Ministry can help, and examples of supporting resources:

THE AIRSHED PLANNING PROCESS



Evaluate the need for a plan

The community must decide whether air quality is a current or potential problem and, if so, whether an airshed plan is the right response. Air quality trends will be assessed using monitoring data or other information, such as health or visibility complaints. The need for an airshed plan will depend on factors including the severity of the problem, the number and kinds of emission sources, growth expectations, and community support and resources. Not every community will require a full-scale planning process.

Identify and engage stakeholders

One or more multi-stakeholder committees are typically formed to administer and guide airshed planning and make decisions along the way. A local "champion" who leads the process and galvanizes support is important to success. Key stakeholders should be engaged as much as possible, through either participation in a committee or the reporting of information. Consensus-based decisions are preferred but not necessary.

Investigate planning synergies

It may be possible to achieve air quality goals more efficiently by integrating with related planning processes, such as community energy plans and greenhouse gas action plans. The community will have to identify these processes and decide if integration is worthwhile. This will depend on the nature of the air quality problem, major emissions sources, community resources, and other factors.

Determine priority sources

The airshed planning committee must confirm the pollutants of concern and identify the corresponding emission sources that require action. For smaller

communities with easier-to-quantify sources, a basic emissions inventory may serve to set priorities. In more complex airsheds with multiple sources, further tools may be needed, for example additional air quality monitoring data, "micro" inventories, and dispersion models.

Develop the plan

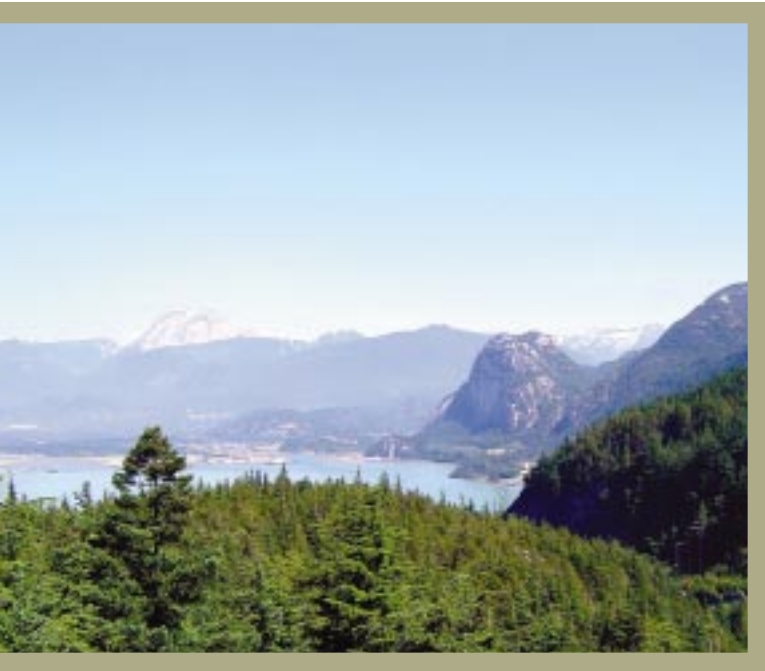
Plan development involves the determination of local air quality goals, indicators for measuring progress, and targets to be achieved. Potential strategies and actions to realize the targets are then evaluated based on decision-making criteria. Key local government actions could include the use of land use planning and zoning to direct development away from problem areas and best management practices to reduce existing emissions. Once these components have been developed, the plan must be drafted, with timelines and responsibilities for implementation, and signed off by the committee.

Implement, monitor, and report

The plan should document who will oversee and administer implementation and monitor and report on progress. A multi-stakeholder group drawn from the organizations accountable for implementing specific actions is likely best suited for this task. Regular progress reports should be made on actions and indicators, with a comprehensive plan review expected less frequently (e.g., every five years). This review should allow for modifications to the airshed plan in response to changing circumstances and emerging issues.

The Ministry will work closely with local and regional governments on the application and the further development of this framework.

I N T R O D U C T I O N



There is growing scientific evidence of a strong link between air pollution levels and impacts on human health.¹ Here in British Columbia, the Provincial Health Officer has estimated that 25 to 250 premature deaths, 900 to 2,700 emergency room visits, and 700 to 2,000 hospital admissions may result annually from air pollution.²

For common air contaminants such as particulate matter (PM) and ground-level ozone, health impacts have been found even at low concentrations, indicating that there may be no safe level. The elderly, the young, and those with existing heart and lung ailments are especially vulnerable.

Air pollution also affects the integrity of natural ecosystems and agricultural crops and degrades the visibility of scenic vistas. Together with the health costs, these impacts and their consequences for tourism and other industries have implications for economic activity throughout the province.

What is an airshed?

An airshed is an area where the movement of air (and related pollutants) tends to be limited by topography or meteorology. An example is a valley where surrounding mountains trap air pollution.

Airshed plans in place

Bulkley Valley-Lakes District (BVLD)
Fraser Valley Regional District (FVRD)
Greater Vancouver Regional District (GVRD)
Prince George
Quesnel
Regional District of North Okanagan (RDNO)
Regional District of Okanagan-Similkameen (RDOS)
Whistler
Williams Lake

AIRSHED PLANNING

Local and regional governments have developed and applied various approaches to combat air pollution. Among these, airshed planning has emerged as an important tool for dealing with multiple pollution sources that involve numerous stakeholders and, in some cases, cross political boundaries.

Airshed planning is a stakeholder-driven process to coordinate the activities affecting air quality in a defined area or airshed. It recognizes that local air quality is influenced by a myriad of activities and sources, including industry, transportation, commercial and residential development, wood smoke, road dust, and natural circumstances. Since no one jurisdiction controls all these sources, a collective approach to air quality protection is needed that can engage a variety of organizations and individuals and, where necessary, encourage partnerships with neighbouring communities.

¹ See Appendix 1 for some references on these health impacts.

² B.C. Provincial Health Officer (2003), *Every Breath You Take...Provincial Health Officer's Annual Report 2003*, p. 14.

Airshed planning processes have been used extensively in the US and are being applied increasingly in Alberta and other parts of Canada. To date, all such efforts in B.C. have been voluntary in nature, in keeping with a shared stewardship approach.

Airshed plans are currently in place in nine (9) communities and regional districts of the province.³ In addition, plans for the Sea-to-Sky airshed (along the eastern and western shores of Howe Sound), the Regional District of Central Okanagan, and the City of Merritt are under development and several more communities have expressed interest in airshed planning.

AUTHORITY FOR AIR PROTECTION

The responsibility for protecting air quality is shared among local, regional, provincial, and federal governments, as well as international jurisdictions. The Province has primary authority through the *Environmental Management Act* (EMA), which enables the Ministry of Environment (the Ministry) to develop air quality standards and guidelines, regulate point and area sources, and require the preparation of area-based management plans. Under the *Canadian*

Environmental Protection Act, the federal government can set national air quality objectives, guidelines, and standards. Local and regional governments derive authority from the Community Charter and can influence air quality through their powers over community planning and bylaw development.

Table 1 provides a summary of ways in which the different levels of government address air quality issues. Further background on regulatory responsibilities is provided in Appendix 1.

NATIONAL AND PROVINCIAL COMMITMENTS

B.C. was part of a national process to set Canada-wide Standards (CWS) for PM and ozone.⁴ Under the CWS agreement, provinces and territories committed to achieve by 2010 numerical targets for fine particulates (PM_{2.5}) and ozone in all communities with a population of 100,000 or greater.

Recognizing that no safe levels have been identified and that polluting up to the limit is unacceptable, the agreement also calls for measures to support "Continuous Improvement" (CI) and "Keeping Clean Areas Clean" (KCAC) in communities where air quality is better than the standards. Examples of the kinds of measures that should be considered to meet the national standards and the CI/KCAC provisions are shown in the sidebar on page 4.

The Province has committed to achieving the CWS in all monitored communities, regardless of size. Most areas of B.C. are currently below the national target levels, as shown in Figures 1 and 2. Exceptions are Prince George, which exceeded the PM_{2.5} standard between 2003 and 2005, and the Town of Hope, which exceeded the ozone standard

CANADA-WIDE STANDARDS FOR 2010

Target Level	Achievement Based on:*
PM _{2.5} – 30 µg/m ³ (24-hour average)	98 th percentile annual ambient measurement, averaged over 3 consecutive years
Ozone – 65 ppb (8-hour average daily maximum)	4 th highest annual ambient measurement, averaged over 3 consecutive years

* See CCME (2002), *Guidance Document on Achievement Determination*.

³ See Appendix 2 for weblinks to these plans.

⁴ Additional information on the CWS and their establishment by the Canadian Council of Ministers of the Environment (CCME) is contained in Appendix 1.

TABLE I. EXAMPLES OF GOVERNMENT APPROACHES TO AIR QUALITY PROTECTION

Air Issue	International	Federal	Provincial	Regional / Local
PM and OZONE	<ul style="list-style-type: none"> • Convention on Long-Range Transboundary Air Pollution • Canada/US Air Quality Agreement 	<ul style="list-style-type: none"> • Canada-wide Standards 	<ul style="list-style-type: none"> • Provincial PM₁₀ objectives • Development of jurisdictional plans for CWS implementation, including CI/KCAC provisions 	<ul style="list-style-type: none"> • Local bylaws (e.g., backyard burning, residential woodstoves) • Supporting provincial plans for CWS implementation
WOOD COMBUSTION		<ul style="list-style-type: none"> • Open burning on federal lands • Woodstove regulations (under development) 	<ul style="list-style-type: none"> • Wildfire Regulation and prescribed burning approval process • Open Burning Smoke Control Regulation • Woodstove emissions regulations 	<ul style="list-style-type: none"> • Local bylaws and public education (e.g., open burning of yard and garden waste, wood residue) • Approval of incinerators, including burn barrels • Inspection of woodstove installations for compliance with air quality and fire safety standards
TRANSPORTATION	<ul style="list-style-type: none"> • Marine PM emissions currently unregulated – need to be addressed in cooperation with the US and through the International Maritime Organization 	<ul style="list-style-type: none"> • Vehicle emissions standards • Fuel standards • Regulations pertaining to rail and aircraft emissions 	<ul style="list-style-type: none"> • Vehicle and fuel quality regulations • Roads, engineering, and traffic control best management practices • Construction specifications 	<ul style="list-style-type: none"> • Zoning and community planning • Transportation planning • Public transit and transportation demand management initiatives
INDUSTRIAL POINT SOURCES	<ul style="list-style-type: none"> • Notification requirements under Canada/US Air Quality Agreement 	<ul style="list-style-type: none"> • Regulations for specific industries • Environmental assessment 	<ul style="list-style-type: none"> • Regulations for specific industries • Environmental assessment • Permits 	<ul style="list-style-type: none"> • Zoning and community planning

Source: Adapted from Williams and Bhattacharyya (2004).

for the same period.⁵ For the vast majority of monitored communities, however, continuous improvement and keeping clean areas clean will be the primary focus.

IMPLEMENTING THE CWS IN B.C. COMMUNITIES

The Ministry of Environment will work with local and regional governments and stakeholders to ensure that the CWS and CI/KCAC provisions are implemented. This will be done through the development and application of a number of regulatory and other tools, including community-based processes and measures such as airshed planning.

In all areas of the province, regulations and approval processes (e.g., those governing woodstoves, prescribed burning, and specific industry sectors) will have an important role in helping to meet the national standards. So, too, will the application of "best available techniques," including pollution prevention measures, best available economically feasible technologies, and best management practices. The Ministry will continue to develop these techniques in consultation with stakeholders and other agencies.

Codes of practice are being prepared for various regulated sources under the EMA, to provide consistent management requirements for lower-risk emission sources.⁶ The Ministry is also evaluating the potential for a province-wide wood stove change-out program, to replace older stoves with cleaner-burning CSA/EPA emission-certified appliances. In addition, education and information programs continue to be supported – for example, "Burn-it-Smart," which instructs homeowners on the clean, efficient use of woodstoves.

Action in Support of the Canada-wide Standards

The national Guidance Document on Continuous Improvement and Keeping Clean Areas Clean gives examples of actions to meet the CWS and CI/KCAC provisions.⁷ KCAC actions represent both the minimal level applied everywhere in a jurisdiction and measures used in a specified area to avoid or minimize air quality degradation. As PM_{2.5} and ozone levels approach and exceed the CWS, the actions become more stringent.

In KCAC areas (those not significantly affected by emissions), actions include:

- ◆ Pollution prevention approaches
- ◆ Best management practices
- ◆ Best available economically feasible technology for key sources
- ◆ New source performance limits, guidelines, and codes of practice
- ◆ Economic instruments (e.g., emissions trading, tax incentives)
- ◆ Energy conservation and sustainable transportation programs

In CI areas (those outside KCAC and CWS areas), actions include:

- ◆ KCAC actions above
- ◆ Retrofit emission controls on key sources/sectors
- ◆ In-use vehicle emission reduction initiatives
- ◆ Local urban planning, transportation, and energy conservation initiatives

In areas where the CWS are exceeded, actions include:

- ◆ KCAC and CI actions above
- ◆ More stringent retrofit technologies on existing sources
- ◆ More intense urban planning, transportation, and energy conservation initiatives
- ◆ More vigorous negotiations with out-of-area sources to reduce their emissions (including transboundary contributions)

⁵ The Town of Golden also exceeded the PM_{2.5} standard, but the exceedance was attributed to the influence of forest fire smoke.

⁶ For more information, see http://www.env.gov.bc.ca/epdiv/ema_codes_of_practice.

⁷ CCME (2005), *Guidance Document on Continuous Improvement (CI) and Keeping-Clean-Areas-Clean (KCAC)* [Draft].

For areas approaching or already exceeding the CWS for PM_{2.5} or ozone (and potentially other ambient air quality objectives), the Ministry will consider a range of actions to improve air quality for the community involved, including:

- ◆ More frequent air permit reviews and compliance inspections;
- ◆ Best available economically feasible technology on new and retrofitted emission sources;
- ◆ More stringent requirements for regulated sources (e.g., those that would otherwise fall under the conditions of a regulation or code of practice); and
- ◆ Detailed scientific studies to better characterize and quantify the impact of sources and other influences on air quality.

Various policy options are being evaluated for how to address new emissions in already degraded airsheds without further affecting air quality. Within this context, the Ministry will work with individual proponents to minimize potential air quality impacts using best available technology and other measures.

In areas well below the CWS, the Ministry will consider proactive measures for keeping clean areas clean. For example, major new facilities may be expected to implement pollution prevention measures and best management practices, as well as to submit regular reports documenting their emission reduction activities. In those areas that expect further development, additional measures may be needed to minimize the impacts of future growth.

Figure 1 AVERAGE PM_{2.5} CONCENTRATION LEVELS

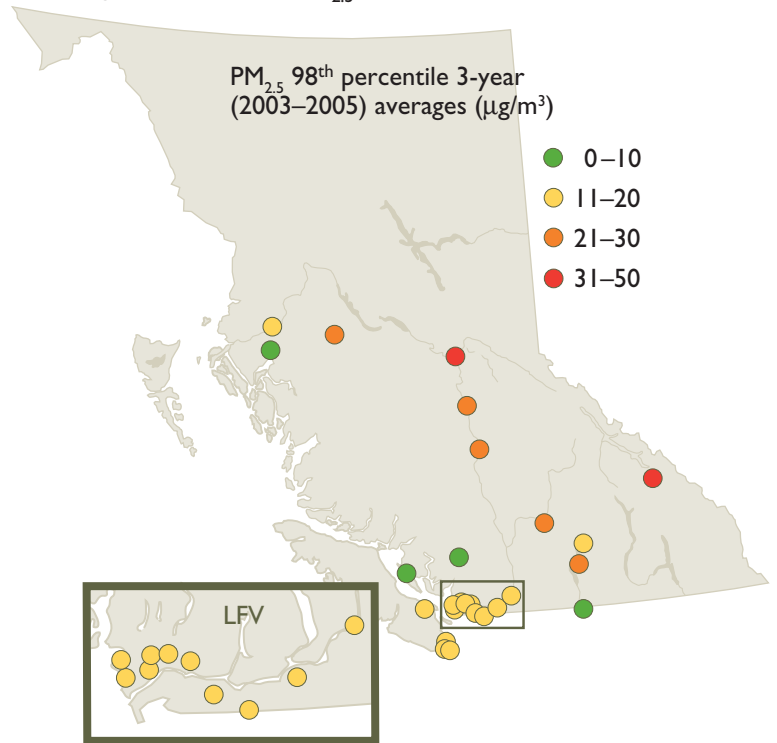
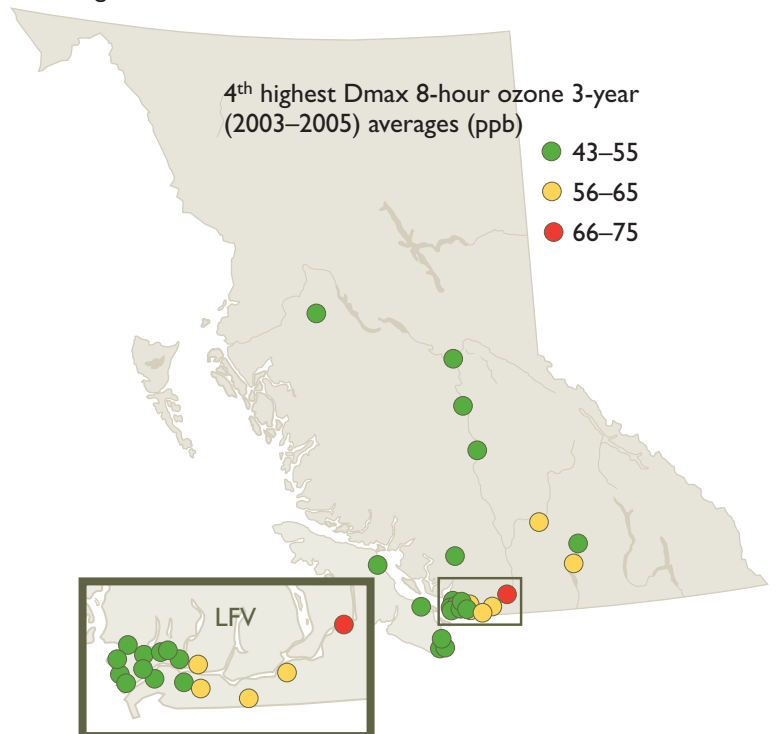


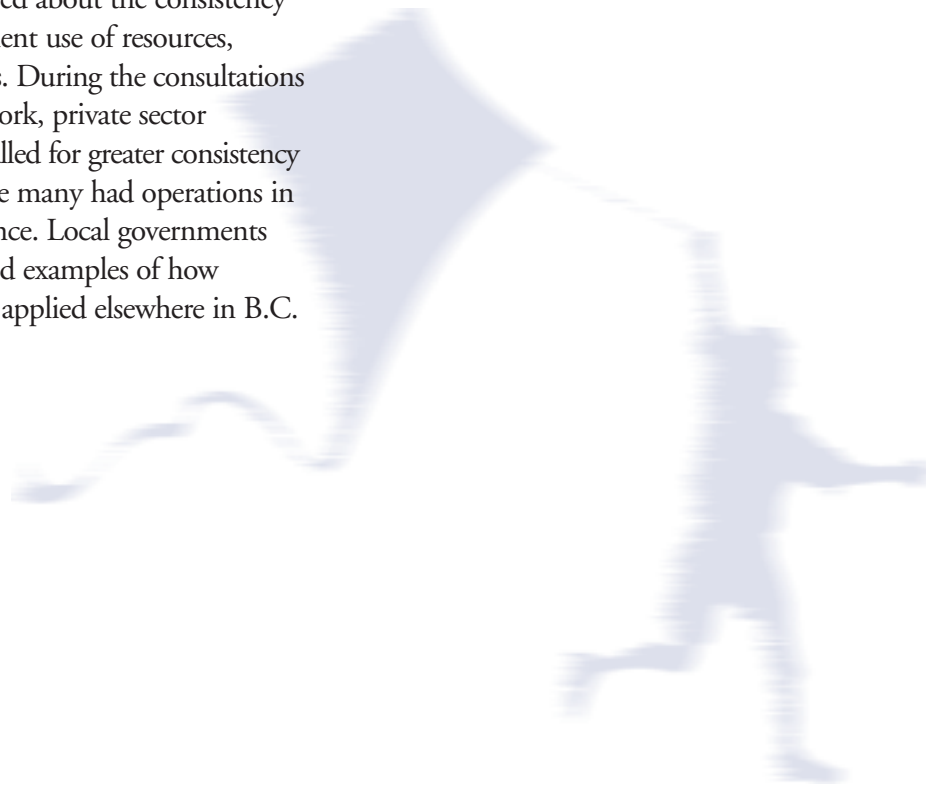
Figure 2 AVERAGE OZONE CONCENTRATION LEVELS



THE NEED FOR AN AIRSHED PLANNING FRAMEWORK

Airshed planning provides a process for reducing PM and ozone-related emissions and, as such, supports provincial commitments toward meeting the CWS and CI/KCAC provisions. While the Minister of Environment can require that an area-based management plan be developed, the preferred approach is voluntary and community-led in nature. In this spirit, the Ministry will work with communities that are approaching or exceed the national standards to develop and implement an airshed plan.

With the growing interest in airshed planning, concerns have been expressed about the consistency of its practice and the efficient use of resources, including people and funds. During the consultations for developing this framework, private sector stakeholders in particular called for greater consistency among airshed efforts, since many had operations in different parts of the province. Local governments asked for clear guidance and examples of how airshed planning had been applied elsewhere in B.C.



THE PLANNING FRAMEWORK

The framework described below is meant to guide future airshed planning initiatives in B.C. and to support implementation of the Province's commitments to the CWS for PM and ozone. Once in place, it will also serve to ensure greater consistency in the planning approach across communities and regional districts, encourage better use of resources and less duplication of effort, and promote key planning principles from the provincial perspective, including shared stewardship, sustainable development, and integrated planning.

The remainder of this document aims to clarify provincial expectations for airshed plans by setting out some guiding principles and outlining common elements, tools, and measures to incorporate in the planning process.

SCOPE OF APPLICATION

The framework is intended to apply to areas outside of the Lower Fraser Valley that do not have designated planning powers (i.e., besides the GVRD and FVRD).⁸ At the same time, it aims to complement and build on the current GVRD and FVRD airshed plans. Indeed, the Ministry of Environment will continue to assist these regional districts in reaching their air quality goals.

Application of the framework is currently focused on PM_{2.5} and ozone as pollutants of concern, with the CWS being a primary driver for action. However, it could be extended in the future to manage these and other pollutants using updated national or provincial ambient air quality objectives.

GUIDING PRINCIPLES

When developing community-based airshed plans, the following principles should be considered:

- ◆ *Shared stewardship* – All British Columbians have a responsibility to help protect the environment and human health.
- ◆ *Sustainable development* – Environmental protection and economic growth must be balanced for the wellbeing of current and future generations.
- ◆ *Integrated planning* – Airshed planning should be coordinated with other local and regional planning processes to achieve the most benefits with the least resources.
- ◆ *Continuous improvement and KCAC* – In keeping with the CWS, polluting up to a limit is unacceptable and the best way to avoid future problems is to keep clean areas clean.
- ◆ *Flexibility* – Within a provincial approach to airshed planning, communities should be free to develop their own solutions to local air quality concerns.
- ◆ *Adaptive and innovative management* – Plans should incorporate learning from experience, new approaches to emerging challenges, and application of the most appropriate level of science to decision-making.

THE PLANNING PROCESS

Six major elements, or "stages," have been identified for the airshed planning process (see Figure 3):

Evaluate the need for a plan

Assess whether air quality is a current or potential problem and if an airshed plan is needed and feasible.

Identify and engage stakeholders

Determine the key stakeholders in air quality and a decision-making structure and process for the plan

⁸ See Appendix 1 on the Province's delegation of planning authority to these two regional districts.

Investigate planning synergies

Identify and take advantage of opportunities to integrate with other local and regional planning initiatives (e.g., transportation plans, regional growth strategies, community energy plans, greenhouse gas action plans).

Determine priority sources

Confirm the key pollutants of concern and determine their major emission sources.

Develop the plan

Establish air quality goals and targets, evaluate and select actions to achieve them, and draft and sign off on the plan.

Implement, monitor, and report

Put the plan into action, track and report on progress, and undertake regular reviews and updates.

Online Planning Tool

An online tool developed for the Ministry of Environment by The Sheltair Group walks communities through the steps of an airshed planning process.⁹ The tool outlines a full-scale planning process as well as suggestions for a "planning lite" version to be used by communities with less complex air quality issues, fewer resources, and/or limited local support for airshed planning.

Figure 3
SCHEMATIC OF THE AIRSHED PLANNING PROCESS



In practice, the planning process may not be so sequential. Several of the stages may overlap, occur in a different order, or even be iterative. Nonetheless, these six elements are common to the airshed plans developed to date in B.C. and elsewhere.

Also critical are strategies to consult with and engage key stakeholders and the public throughout the planning process. Proactive consultation and engagement are necessary to properly shape local goals and priorities and build support for action.

DESCRIBING THE PROCESS

The sections which follow outline each of the six stages in turn, providing a brief description of the stage, what it involves, how the Ministry of Environment can help, and examples of supporting resources that are available. Additional step-by-step details on the preparation of an airshed plan may be found in the Ministry's online Air Quality Planning Tool (www.airqualityplanning.ca).

⁹The Sheltair Group (2005), *Air Quality Planning Tool – A Step by Step Process for B.C. Communities*.

Stage 1 Evaluate the need for a plan



DESCRIPTION

Before embarking on an airshed planning process, a community needs to determine: whether local air quality is a current problem, or is likely to become one in the foreseeable future; and, if so, whether the development of an airshed plan is the appropriate response. This initial stage includes an air quality assessment, consideration of the future pressures on the airshed, and an evaluation of the relative benefits of an airshed planning process.

Airshed planning is a valuable tool for protecting current air quality and preventing future degradation in the face of growth. However, it is not intended that every community develop an airshed plan. In practice, the planning process takes time, resources, and commitment. Each community must determine where such a process is practical given its particular circumstances.

On the other hand, communities approaching or exceeding the CWS (and potentially other air quality objectives) will be expected to prepare an airshed plan, with support from the Ministry.

WHAT IS INVOLVED

Assessing air quality

For communities with access to local air quality monitoring data, this assessment will typically involve comparing the data to established national and provincial air quality criteria (i.e., objectives, guidelines, or standards). Where monitoring data are not available, the assessment may be based on other information, such as visibility problems or health complaints. In some cases, a particular issue (e.g., smoke) may already have been identified for the airshed.

While a lack of air quality monitoring should not preclude action, the measures selected should be appropriate for the current level of understanding and their costs of implementation. The intent is to make the best-informed decisions using an appropriate level of science.

Monitoring allows the community to establish an air quality baseline, determine whether local conditions are improving or worsening with time, and identify the pollutants of most concern. In complex airsheds involving many different sources, it may be difficult to prioritize major sources without further scientific investigation, including additional monitoring. The decision to undertake further scientific study may be part of the planning process. In airsheds with a few well-characterized sources, information may be sufficient to proceed with plan development without more study.

Aside from looking at air quality trends, the assessment should also consider how economic and social pressures, such as urban or industrial expansion, could affect air quality.

Determining the need for a plan

If a current or potential air quality problem has been identified, the community will have to review a number of considerations in determining the need for, and extent of, an airshed plan. Factors that the community should consider include:

- ◆ *How severe are the air quality issues?*
Communities that have minor or no immediate air quality concerns may choose other options, such as pursuing complementary planning processes (see Stage 3) or public education as a means to maintain good air quality. At the very least, they can build air quality considerations into local decision-making and use best management practices. For these communities, an airshed planning "lite" approach may be more suitable, as identified in the Ministry's online airshed planning tool.¹⁰

For areas approaching or exceeding the CWS (and potentially other air quality objectives), the Ministry will work with communities to ensure that a full-scale airshed plan is developed and implemented.

- ◆ *What are the number and kinds of emission sources?*
A comprehensive airshed plan is more appropriate where there is a significant air quality problem and a mix of contributing sources that may fall under different levels of government authority. In the case of only a few major emission sources, all of which are provincially regulated, a full-scale plan may not represent the most efficient use of resources. Airshed planning is effective for harnessing collective action if there are a diverse number of sources to manage.
- ◆ *What are the prospects for growth and future degradation of air quality?*
For communities experiencing air quality concerns and/or rapid growth, airshed planning offers a useful way to determine how to maintain or improve air quality while accommodating economic development. This could mean, for

Drivers for Airshed Planning: Examples

In Quesnel, airshed planning was initiated in response to concerns over high PM levels, a growing awareness of the impacts on human health, and the development of a negative reputation due to air quality.¹¹ Action in the Bulkley Valley-Lakes District was spurred by local physicians pointing to the high rates of PM-related illness. For the Sea-to-Sky Corridor, concerns about future development and the potential impacts on health, recreation, and tourism were the motivating factors.

instance, using modelling or other tools to identify areas that are better suited to future development from an air quality perspective.

- ◆ *Is there community support for airshed planning?*
Strong local support from a range of stakeholders is key to developing an effective airshed plan that reflects community goals, distributes responsibility for action, and can be properly implemented to achieve results. The engagement of major emitters in the planning process is an important feature for success, as demonstrated by the participation of industry in Quesnel's airshed plan.
- ◆ *What are the relative benefits of a planning process and what resources are available to conduct it?*
If a community has limited financial resources and air quality is not a major concern, then a full-scale airshed plan may not be desirable. Where there are clear benefits to comprehensive planning, communities can draw on a variety of government and other (e.g., industry) sources for funding and technical support.

¹⁰ *Ibid.*, p. 1.

¹¹ MacMillan (2005), "Quesnel Airshed Management Plan 2004–2014."

HOW THE MINISTRY CAN HELP

The Ministry of Environment operates a large air quality monitoring network throughout the province and can provide access to and help with interpretation of the data. This network is currently being reviewed to determine the most efficient way to characterize air quality in all B.C. communities.

Direct funding can also be provided, on a priority basis, for airshed activities. Factors such as current air quality, the potential for future degradation, local support for action, and opportunities for partnership funding will be taken into account. Given competing priorities, the Ministry is not in a position to provide full funding to individual airshed plans. However, additional funding can be accessed both within and outside of government (see examples).

SELECTED RESOURCES

Air quality data – Current monitoring data can be accessed at www.env.gov.bc.ca:8000/pls/aqiis/air.summary; see Appendix 2 for a listing of completed air quality assessments for various communities.

Online Airshed Planning Tool (www.airqualityplanning.ca) – See Step 1.

Clean Air Toolkit for local governments (www.cleanairkit.ca) – Provides an online listing of resources available to support air-related activities, including air quality projects and research.

Community Energy Association (CEA) Funding Guide¹² – describes programs and organizations offering funding and other resources to local governments for energy-related activities (www.communityenergy.bc.ca).

¹² CEA (2006), *Funding Your Community Energy Initiatives: A Guide to Funding and Resources for British Columbia Local Governments*.

Funding Partnerships: Examples

The airshed planning process in Williams Lake received funding from the Ministry of Environment, the City of Williams Lake, the Cariboo Regional District, the Interior Health Authority, and Human Resources Development Canada. In the Sea-to-Sky airshed, funding partners include the Ministry, Environment Canada, and a number of local or regional governments – the Resort Community of Whistler, the District of Squamish, Lions Bay, Bowen Island, Pemberton, Gibsons, and the Squamish-Lillooet Regional District. In addition, Howe Sound Pulp and Paper has contributed air monitoring equipment.

Stage 2 Identify and engage stakeholders



Committee Structure: Examples

For its airshed plan, Quesnel used a single roundtable of stakeholders drawn from local and provincial government, industry, health agencies, and environmental and other groups. Each participant had an equal voice at the table. In the Sea-to-Sky airshed, plan development is led by an Air Quality Coordinating Committee and assisted by a facilitator, technical support and implementation partners, and the Howe Sound Community Forum of local officials. The BVLVD required a more complex structure because of its large geographic coverage (more than 35,000 square kilometres) and the number of local and regional governments and First Nation/Tribal Council offices involved. One regional and four community working groups reported to a multi-stakeholder coordinating committee that was supported by an advisory committee of industry and local politicians.¹³

DESCRIPTION

Launching an effective airshed planning process requires the active engagement of key stakeholders and sound leadership and decision-making to drive the process.

Airshed planning relies on decision-making committees to provide the critical leadership and guidance. Typically, these groups are composed of representatives from government, industry, First Nations, and other community interests that have a stake in air quality. The structure, composition, and mandate of the committee(s) will depend on community size, available resources, the nature and complexity of air quality issues, and the level of local interest.

WHAT IS INVOLVED

Community structure and mandate

In terms of structure, a single committee may be sufficient for smaller communities. In larger, more

complex airsheds, additional sub-committees or working groups may be required to deal with technical and/or regulatory issues.

Typical functions of an airshed planning committee include overall administration, partnership building and securing of funding, direction setting, education and outreach, research, and reporting. Initial duties will be to establish a budget, finalize funding, and designate a planning timeline.

Leadership

An important feature of successful airshed planning is a local "champion" who leads the process, brings key stakeholders on board (including members of local government), and keeps the process on track. Local champions have included an environmental organization in Quesnel, a former mayor in Whistler, and a paid facilitator in the BVLVD. Whistler, in turn, served as an early champion of the Sea-to-Sky airshed planning process now underway.

¹³ Rigby (2003), "Bulkley Valley-Lakes District Airshed Management Plan."

Participation

At a minimum, agencies with a regulatory responsibility (e.g., provincial and local government), major emission sources, and organizations representing community interests should be involved in the planning process. Health agencies are a useful ally in communicating air quality health risks to local decision-makers and the public.

Inclusion of those with facilitation or communication skills is beneficial, as either committee members or paid contractors. For the BVLD and Whistler plans, contracted facilitators played a pivotal role in providing continuity to the planning process as well as secretariat-level support.

In some instances, key stakeholders may be unwilling or unable to participate. At the least, they should be included on a distribution list of planning-related materials.

Overall membership will need to be balanced with the committee's ability to make decisions in a timely manner, recognizing that, generally, the larger the committee the longer the decision-making process.

Decision-making process

Consensus-based decision-making (i.e., decisions that all participants can accept) is the preferred approach for an airshed plan. However, if no consensus can be reached within a predetermined timeline, majority decisions may be needed.

HOW THE MINISTRY CAN HELP

The Ministry of Environment can provide in-kind technical support to airshed planning committees. For example, regional staff have provided technical presentations to help committee members understand local air quality data and the planning process itself.

Further assistance is offered for building partnerships with other agencies or groups and for facilitating collaboration among government

Determining Airshed Boundaries

An essential early task for airshed planning is to delineate the airshed. While in theory an airshed is determined in relation to the dispersion of pollutants, in practice it is often defined instead by political boundaries, to reflect the area in which there is support and authority for action. This could be based on municipal boundaries or on regional ones – where there are common issues requiring solutions across a broader area. Planning exercises to date have defined their airsheds in terms of municipalities (Prince George, Whistler), regional districts (FVRD, GVRD, RDOS, RDNO), and multiple regional districts (BVLD, Sea-to-Sky Corridor).

The Importance of Allies

Key allies can make a valuable contribution to airshed planning. For example, the BVLD and Quesnel plans benefited from the participation of industry and health authorities. Health agencies can supply the impetus for a planning process and the public credibility to engage broad support. Securing industry allies can ensure early buy-in to the plan and the development of feasible actions that can be smoothly implemented.

agencies. Seed money can also be provided, on a limited basis, to support planning committees. As well, the Ministry can help with identifying airshed boundaries based on knowledge of major sources and meteorological and topographical influences.

SELECTED RESOURCE

Online Airshed Planning Tool
(www.airqualityplanning.ca) – see Step 2.

Stage 3 Investigate planning synergies



DESCRIPTION

Many activities within an airshed can affect air quality and are subject to different planning processes. These include transportation plans, regional growth strategies, greenhouse gas (GHG) action plans, and energy plans. As such, there may be opportunities to streamline the planning process by taking an integrated approach to meeting multiple objectives.

This stage requires the identification of related planning processes and a decision on whether integration is warranted and feasible. That decision will depend on factors such as the nature of the air quality problem, major emission sources, and the community's resources.

Whistler's Integrated Planning Process

The Integrated Energy, Air Quality and Greenhouse Gas Management Plan developed by Whistler represents the first planning document in Canada to integrate the three approaches.¹⁴ In Whistler, more than 90 per cent of air pollutants come from energy consumption, so that managing energy and GHG emissions can largely address air quality issues. The Whistler plan identifies a number of co-management opportunities as well as a streamlined approach to implementation.

WHAT IS INVOLVED

Identify related planning processes

Of particular interest is the overlap between three air-related planning processes that occur at the local level: airshed plans, GHG action plans, and community energy plans (CEPs). A study for the Ministry¹⁵ found that there were substantial similarities among these processes, especially where the main source of air emissions was fossil-fuel-based energy consumption.

Appendix 3 lists B.C. communities with a CEP and/or a GHG action plan.

Determine the merits of an integrated approach

The above study identified a number of potential benefits to integrated planning. These include a full consideration of synergies and tradeoffs between planning processes, more robust solutions when multiple objectives are considered, greater efficiency in the use of resources, and reduced consultation fatigue. At the same time, some challenges were noted, including the possible dilution of focus and support, technical difficulties in creating combined inventories, and the ability to secure required technical expertise. The community or region will have to weigh these relative benefits for its particular airshed.

¹⁴ Resort Community of Whistler (2004), *Integrated Energy, Air Quality and Greenhouse Gas Management Plan*.

¹⁵ Holland Barrs Planning Group and Marbek Resource Consultants (2004), *Integration of Air Quality-Related Planning Processes: Report*.

An integrated approach will be less effective from an air quality perspective where the critical air issues facing the community are not a central concern in other planning processes. For example, open burning is a large source of PM emissions and hence a health concern, but is not counted as a source of GHG emissions (assuming that the wood is from sustainable forests). The success of Whistler's integrated plan was due to the fact that most of the GHG and air quality issues flowed from energy consumption.

Planning integration may also not be feasible if the community considers that the process may be too broad or overwhelming. However, any plans developed should at least be complementary, in order to avoid conflicts among airshed, GHG, community energy, and other planning objectives.

HOW THE MINISTRY CAN HELP

The Ministry of Environment can assist with understanding current GHG and community energy planning processes as well as any related policies, regulations, and other pertinent requirements.

Local governments can also access provincial funding support for integrated energy, GHG, and air quality planning processes (from the Ministry) as well as for Integrated Community Sustainability Planning – through the Ministry of Community Services.¹⁶ It is anticipated that further support will be made available under one more upcoming provincial plans, including those for energy and climate change.

Local government, for its part, can enable integration by incorporating air quality considerations into decision-making, including Official Community Plans.

SELECTED RESOURCES

Holland Barrs study – describes current community-based planning processes and makes recommendations on how to integrate them (www.env.gov.bc.ca/air/airquality/pdfs/int_aq_rep_may04.pdf).

CEA Community Energy Plan Tool Kit – provides an introduction to CEP, energy solutions by planning scale, and case studies and points of interest for specific users (www.communityenergy.bc.ca/toolkit.htm).

Federation of Canadian Municipalities' Partners for Climate Protection (PCP) program – offers a Five-Milestone Framework for managing local GHG emissions (www.sustainablecommunities.fcm.ca/Capacity_Building/Energy/PCP).

Online Airshed Planning Tool (www.airqualityplanning.ca) – see Step 3.

¹⁶ This funding is part of the federal Gas Tax Agreement with the provinces and their member municipalities.

Stage 4 Determine priority sources



DESCRIPTION

A vital step in the planning process is to confirm the pollutants of concern from Stage 1 and identify the corresponding priority emission sources that require action. At this time, some understanding of the airshed goals will be helpful. For instance, one goal could be continuous improvement across all sectors as opposed to targeting the single largest source. Another consideration will be what is achievable in the short and long term – for example, realizing some "early wins" versus larger reductions that will take more time to implement.

There are a number of techniques for use in the identification of priority sources, depending on the complexity of the sources.

WHAT IS INVOLVED

Emissions inventory

The most basic identifying technique is an emissions inventory, which quantifies the emissions released in the air from various sources over a set time period, normally a year. For industrial point sources, facility-specific information is available. In the case of transportation, commercial, and residential sources (e.g., woodstoves), total emission estimates can be generated for a specific area using GIS-based tools. For smaller communities with sources that are easier to understand and quantify, these inventory estimates may be sufficient to identify priority sources.

Additional information on priority sources

In more complex airsheds containing multiple sources, further data are often needed to better understand the major sources and their impact on local air quality. These may include:

- ◆ Local air quality and meteorological monitoring data, to assess the conditions under which poor air quality is experienced;
- ◆ Detailed "micro" emissions inventories to more accurately characterize local sources and support dispersion modelling studies; and
- ◆ Dispersion and/or receptor models for estimating how much various sources affect air quality.

HOW THE MINISTRY CAN HELP

The Ministry of Environment maintains a provincial emissions inventory and GIS capability to make preliminary estimates of airshed-specific emissions. In addition, technical assistance can be provided with respect to emissions inventories, monitoring and modelling studies, and the identification of outside technical experts for further help.

SELECTED RESOURCES

Provincial emissions inventory – see for example the year 2000 methodology and results reports (www.env.gov.bc.ca/air/airquality/#inventories).¹⁷

Residential wood burning emissions in B.C. – provides estimates of the quantity of air emissions from residential wood heating (www.env.gov.bc.ca/air/airquality/#inventories).¹⁸

National Pollutant Release Inventory (NPRI) – database of annual air emissions in Canada (www.ec.gc.ca/pdb/npri/npri_home_e.cfm).

Quesnel and Williams Lake inventories – quantifying common air contaminants in each airshed for the year 2000 (http://wlapwww.gov.bc.ca/car/epd/air/aq_reports/quesnel.html and http://wlapwww.gov.bc.ca/car/epd/air/aq_reports/wml.html).¹⁹

Golden source apportionment work – documentation on a two-year study being conducted to identify the town's sources and their relative contributions to regional air pollution (www.env.gov.bc.ca/air/airquality/#source_app).

Online Airshed Planning Tool (www.airqualityplanning.ca) – see Step 4.

¹⁷ B.C. Ministry of Water, Land and Air Protection (2005a), *2000 British Columbia Emissions Inventory of Criteria Air Contaminants: Methods and Calculations*; and MWLAP (2005b), *2000 British Columbia Emissions Inventory of Criteria Air Contaminants: Result Highlights*.

¹⁸ MWLAP (2005c), *Residential Wood Burning Emissions in British Columbia*.

¹⁹ Plain (2002a), *Inventory of Common Air Contaminants Emitted in the Williams Lake Airshed for the Year 2000*, and Plain (2002b), *Inventory of Common Air Contaminants Emitted in the Quesnel Airshed (2000)*.

Stage 5 Develop the plan



DESCRIPTION

Central to any airshed plan is the development and documentation of efforts that are needed to maintain or improve local air quality.

This stage requires determining air quality goals, indicators, and targets and deciding on strategies and individual actions (i.e., emission reduction measures) to achieve the goals and targets. The plan is then drafted to describe these elements, along with timelines and responsibilities for implementation, and approved by the airshed planning committee.

In practice, the plan's development may be fairly iterative. Throughout the process, feedback should be obtained as much as possible from key community interests and the general public.

Airshed Plan Goals: Examples

Prince George's airshed plan has a goal to achieve and maintain acceptable air quality by reducing current emissions and preventing the development of future problems. In the BVLD, the overall goal to continuously improve air quality is supported by sector-specific goals (e.g., for forest and agricultural burning). Quesnel and Williams Lake have both specified numerical targets (lower than the CWS for $PM_{2.5}$) to be achieved over a ten-year timeline.

WHAT IS INVOLVED

Air quality goals

Goals represent the community's long-term vision for air quality. They should complement provincial air quality objectives and commitments on CWS, but would not replace existing regulatory tools.²⁰ When setting them, consideration should be given to goals from other related planning initiatives, in order to avoid conflicts.

Indicators and targets

Indicators are measurable parameters that are used to assess future progress towards achieving the air quality goals (e.g., number of exceedances of an objective per year). Targets are desired values for indicators (e.g., zero exceedances per year). Ideally, the indicators should be robust and easy to measure, but at the same time responsive to changes in the proposed actions.

Strategies and actions

The development of broad strategies and individual actions to protect air quality requires prioritizing sources and potential actions based on decision-making criteria – typically, what promises the most impact for the least cost, delivers multiple benefits, and/or can be implemented quickly. Potential actions include those that target specific sources (e.g., industry

²⁰ Through delegated authority, the GVRD may adopt requirements that "meet or beat" provincial requirements.

or land-clearing practices), result in changes to local zoning or land development practices, and influence public behaviour (e.g., public education programs on better wood-burning practices, incentives for building energy efficiency and alternative transportation).

Among the key actions for local government are land use planning and zoning decisions that direct development to areas of lower air quality risk and the use of best management practices to reduce existing emissions. In developing their airshed plans, communities should refer to the kinds of actions expected by the federal government and the Province for implementing the CWS and CI/KCAC provisions (see pages 2–5 of the Introduction).

Plan drafting and sign-off

The draft plan should summarize the goals, indicators, targets, strategies, and actions and identify timelines and responsibilities for phased implementation. As a commitment to local air quality, it is important that all members of the airshed planning committee, including local government and industrial stakeholders, be signatories to the final plan. Also critical is for the plan to be formally recognized in the Official Community Plan(s).

HOW THE MINISTRY CAN HELP

The Ministry of Environment can provide a variety of scientific, technical, and financial support for plan development. It can help with identifying, developing, and quantifying emission reduction actions, including pollution prevention measures, best management practices, and education and information.

The Ministry will also provide direction for air quality action through its development and implementation of regulations, approval processes, codes of practice, and provincial policies for key emitting sectors. Again, communities developing airshed plans should refer to the Introduction (under

Emission Reduction Actions: Examples

The BVLD airshed plan includes actions to eliminate certain beehive burners and reduce emissions from others (e.g., through shutdowns during air quality episodes). In Prince George, actions include bans on backyard burning on some properties and expanded use of winter abrasives, street sweeping, and other measures to control road dust. As part of its airshed plan, Quesnel adopted a bylaw requiring new woodstoves to be CSA/EPA emission-certified.

"Implementation of CWS in B.C. Communities") for guidance on the Province's expectations in areas approaching or exceeding the CWS, areas well below the standards, and all other areas.

Prince George, for example, is a complex airshed that currently exceeds the CWS for PM_{2.5}. In this case, the Ministry is providing financial support as well as technical expertise to identify emission reduction priorities using specialized monitoring and modelling studies.

SELECTED RESOURCES

Clean Air Toolkit (www.cleanairkit.ca) – lists actions that local governments can take to address various air quality issues.

Online Airshed Planning Tool (www.airqualityplanning.ca) – see Step 5.

Airshed plans developed by B.C. communities and regions – see Appendix 2.

Stage 6 Implement, monitor, and report



DESCRIPTION

Even before an airshed plan has been finalized, thought must be given to how it will be implemented. The airshed planning committee must ultimately decide who will oversee implementation, manage budgetary and resourcing requirements, and monitor and report on indicators. Other issues include to whom this reporting should occur and when (i.e., frequency), and how often a comprehensive review of progress should be undertaken.

WHAT IS INVOLVED

Implementation responsibilities

The responsibility for plan oversight should include the organizations that are accountable to implement specific actions. Ideally, a multi-stakeholder group drawn from the key interests in local air quality should oversee implementation.

Overseeing Plan Implementation: Examples

Oversight of Prince George's airshed plan is led by an Air Quality Implementation Committee comprised of representatives from the local and provincial governments, industry, business, health agencies, and public interest groups. In the BVLD, an Air Management Society is charged with overseeing plan implementation. This non-profit society is a similar coalition of local and provincial interests and also secures and manages funds to support implementation.

Reporting Progress: Example

The BVLD airshed plan is reviewed annually and the results are posted on the Air Management Society's website (see the 2006 review results at www.bvldamp.ca/cap.shtml#Review). The public can submit written comments, which will be considered at an annual plan review meeting. A progress report is made at the Society's Annual General Meeting. Quarterly reports are also posted in between plan reviews and updates covering administration, communications, and emission reduction strategies.

Progress reports

Progress reports on the status of local initiatives and associated indicators should be made regularly to track plan implementation. A comprehensive review is expected on a less frequent basis (e.g., every five years) to assess progress towards the goals and targets. This review also provides an opportunity to re-evaluate the content of the airshed plan to ensure that it is still relevant and to make modifications in light of emerging issues.

HOW THE MINISTRY CAN HELP

The Ministry of Environment will consider the recommendations contained in airshed plans in all future air approvals. It will also play an ongoing role in ambient air monitoring to track air quality progress.

To encourage the sharing of information and tools, the Ministry provides ongoing support for the annual Clean Air Forum, which brings together various organizations and individuals with an interest in airshed planning. The Ministry website will continue to include links to approved airshed plans and supporting documentation. In addition, an annual status report will be provided on local airshed planning efforts across the province.

SELECTED RESOURCES

Air quality monitoring – the Ministry’s monitoring reports are available at www.env.gov.bc.ca/air/airquality/reports_plans.

Clean Air Forum presentations – available from the Fraser Basin Council website www.fraserbasin.bc.ca/programs/basin_wide.html).

Online Airshed Planning Tool
(www.airqualityplanning.ca) – see Step 6.

C O N C L U S I O N



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This document has outlined a framework for community-based airshed planning across the province. The Ministry of Environment will work in close cooperation with local and regional governments to apply and improve the framework.

IMPLEMENTING THE FRAMEWORK

The Airshed Planning Framework will provide a foundation on which to develop provincial policies and guidelines for air quality protection (e.g., emission offsets, best management practices), as well as to conduct local and regional planning processes. Communities that are embarking on airshed planning will be encouraged to follow the framework.

As more experience is gained with airshed plans in B.C., it is expected that the planning process will evolve and new community needs will emerge. Therefore, the Ministry will periodically review individual planning processes and update the provincial framework as required.

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GLOSSARY OF TERMS AND ACRONYMS

Ambient air quality: describes the level of air pollutants in a particular area or airshed.

Ambient air quality objectives: air quality criteria for specific pollutants that are determined to be necessary for protecting human health and/or the environment; typically consist of a numeric concentration, averaging time, and rules or guidance on sampling methodology and how the objectives should be applied (may also be referred to as ambient air quality criteria or guidelines).

Area source: a term generally used in emission inventories for sources that are not classified as specific point, mobile, or natural sources; some agencies include mobile and/or natural sources in this category.

Best available economically feasible technology: emission control technology that is considered to represent a balance between lowest possible emissions and economic feasibility.

BVLD: Bulkley Valley Lakes District

Carbon monoxide: a colourless, odourless gas that is produced from the incomplete combustion of carbon-containing fuels.

CCME: Canadian Council of Ministers of the Environment

CEA: Community Energy Association

CEP: Community Energy Plan

CEPA: *Canadian Environmental Protection Act*

CI: Continuous Improvement

CSA: Canadian Standards Association

Canada-wide Standards (CWS): environmental standards developed under the Canada-wide Environmental Sub-agreement of the Canada-wide Accord on Environmental Harmonization.

Dispersion model: computer program that uses a series of mathematical equations to simulate the behaviour of pollutants in the atmosphere.

EMA: *Environmental Management Act*

Emission: the discharge of an air pollutant from a particular source or group of sources into the environment.

Emission offset: a measure that balances or "offsets" a new emission source in an area by a reduction in emissions from another source, which may include a source outside the area.

Emissions trading: a tool for reducing air emissions; refers to a market where, for specified pollutants, parties can buy or sell allowances or permits for emissions, or credits for reductions in emissions.

EPA: United States Environmental Protection Agency

FCM: Federation of Canadian Municipalities

FVRD: Fraser Valley Regional District

Fugitive dust: dust that is not emitted from a definable point source – e.g., comes from open fields, roads, and storage piles.

GHG: Greenhouse Gas

Ground-level ozone (O₃): a gas that is an oxidant, harmful to human health and vegetation, and a major component of urban smog.

GVRD: Greater Vancouver Regional District

KCAC: Keeping Clean Areas Clean

µg/m³: micrograms per cubic metre.

Microgram: one-millionth of a gram.

Micrometre: one-millionth of a metre.

NAAQOs: National Ambient Air Quality Objectives

Nitrogen dioxide (NO₂): a reddish-brown gas that is harmful to human health and contributes to ozone and particulate formation as well as to acid rain.

Nitrogen oxides (NO_x): the generic term for a group of highly reactive gases that contain nitrogen and oxygen in varying amounts, including nitrogen oxide (NO) and nitrogen dioxide; produced during high-temperature fuel combustion.

NPRI: National Pollutant Release Inventory

Particulate matter (PM): microscopic liquid and solid particles (other than pure water).

PCP: Partners for Climate Protection

PM_{2.5}: microscopic particles 2.5 micrometres or smaller in diameter.

PM₁₀: microscopic particles 10 micrometres or smaller in diameter.

Point source: a commonly used term in emission inventories for a single stationary source of pollution, such as a stack or vent.

Pollutant: a substance that causes harm to the environment.

Pollution prevention: avoiding, eliminating, or reducing pollution at the source.

ppb: parts per billion

RDCO: Regional District of Central Okanagan

RDNO: Regional District of North Okanagan

RDOS: Regional District of Okanagan-Similkameen

Receptor model: a computer program that utilizes chemical measurements at an individual monitoring site (the receptor) to calculate the relative contributions from major sources to the pollution at that site.

Sulphur dioxide (SO₂): a colourless gas that is produced when sulphur-containing fuels, such as coal or diesel fuel, are burned, or during production processes that use sulphur-containing raw materials.

Total suspended particulate: ambient particles up to approximately 100 micrometres in diameter.

Transportation demand management: a range of measures to make transportation systems more efficient by managing traffic within existing infrastructure.

Volatile organic compound (VOCs): a variety of compounds containing carbon and hydrogen that have a boiling point in the range of 50–250° C; some are photochemically reactive and contribute to the formation of ozone and/or particulate matter.

This appendix provides some brief background on the development process for the airshed planning framework, references on the human health impacts of air pollution, and a description of regulatory responsibilities for air quality protection in B.C.

FRAMEWORK DEVELOPMENT

Information on the consultations and other preparatory work undertaken to develop this airshed planning framework can be found at www.env.gov.bc.ca/air/airquality/#airplanaqconsult. The development process included:

- ◆ Preliminary consultations with key stakeholders in Vancouver (February 2006) and Prince George (March 2006) on the goals of a province-wide framework, structure and resourcing of the planning process, and other matters;
- ◆ A report summarizing the results of these consultations;²¹
- ◆ A discussion paper on a provincial airshed planning framework describing the role of the Province, guiding principles, and key elements of an airshed plan;²² and
- ◆ Further consultations with stakeholders in Vancouver, Penticton, and Prince George (all in June 2006) focused on the requirements for a planning framework in B.C., who should be involved, and how the Province and others can best support the process.²³

AIR POLLUTION AND HUMAN HEALTH

The growing evidence on the impacts of air pollution on human health draws on extensive research, including more than 200 international studies funded by the US-based Health Effects Institute (<http://www.healtheffects.org>). This independent research organization is supported by the US Environmental Protection Agency (EPA) and the motor vehicle industry.

General information on health-related impacts and research can be found at:

- ◆ Health Canada (www.hc-sc.gc.ca/ewh-semt/air/out-ext/index_e.html);
- ◆ Canadian Lung Association (www.lung.ca/protect-protegez/pollution-pollution/outdoor-exterior/index_e.php);
- ◆ British Columbia Lung Association (www.bc.lung.ca/airquality/outdoor_airquality.html); and
- ◆ California Air Resources Board (www.arb.ca.gov/research/health/health.htm);

The B.C. Lung Association has published several recent reports related to provincial research on air pollution and health, including:

- ◆ Bates et al. (2003), *Health and Air Quality 2002 – Phase 1: Methods for Estimating and Applying Relationships between Air Pollution and Health Effects*;

²¹ The Sheltair Group and Elevate Consulting (2006), *Consultations on Proposed Options for Provincial Air Quality Objectives and an Airshed Planning Framework: Summary Notes*.

²² Elevate Consulting and The Sheltair Group (2006b), *A Provincial Airshed Planning Framework: Consultation Discussion Paper*.

²³ Elevate Consulting and the Sheltair Group (2006a), *A Provincial Airshed Planning Framework: Summary of Findings from Stakeholder Consultations*.

- ◆ RWDI AIR et al. (2005), *Health and Air Quality 2005 – Phase 2: Valuation of Health Impacts from Air Quality in the Lower Fraser Valley Airshed: Final Report*; and
- ◆ B.C. Lung Association (2006), *State of the Air 2006 in British Columbia*.

AIR QUALITY REGULATORY REQUIREMENTS

Responsibility for air quality protection is shared among the federal, provincial, and local/regional governments, and with neighbouring jurisdictions.

FEDERAL AUTHORITY

Federal authority over air quality comes primarily from the *Canadian Environmental Protection Act* (CEPA), whose goal is pollution prevention and protection of the environment and human health.²⁴ CEPA enables the federal government to regulate and control substances through national quality objectives, guidelines, and standards. This is achieved by the setting of National Ambient Air Quality Objectives (NAAQOs)²⁵ and Canada-wide Standards (CWS).

CWS were developed under the Canadian Council of Ministers of the Environment (CCME) Canada-wide Accord on Environmental Harmonization and its Canada-wide Environmental Standards Sub-Agreement. The CWS Agreement

establishes numerical ambient concentration targets and requires jurisdictions to develop implementation plans for achieving them through monitoring networks and reporting on progress.

CWS for PM and ozone were endorsed by the CCME in June 2000. It was recognized that while the standards would reduce the health impacts of these pollutants, they could not be fully protective. The Agreement clearly states that polluting up to a limit is unacceptable, and that the CWS are "only a first step to subsequent reductions towards the lowest observable effects levels."²⁶ As a result, the standards also require jurisdictions to implement programs of continuous improvement (CI) and keeping clean areas clean (KCAC) in all areas with air quality better than the target.

To provide guidance on the development of CI/KCAC programs, a national multi-stakeholder working group was convened.²⁷ CI was interpreted as "taking remedial and preventative actions to reduce emissions from anthropogenic sources towards the long-term goal of reducing overall ambient concentrations of PM and ozone." KCAC was clarified as applying to "areas not significantly affected by local sources of emissions"²⁸ and as "taking preventative steps to avoid or minimize degradation in overall ambient concentrations of PM and ozone." In other words, KCAC actions are not meant to preclude future development, but rather to result in smaller air quality impacts than had no action been taken at all.

²⁴ *Canadian Environmental Protection Act*, 1999, c. 33. See <http://laws.justice.gc.ca/en/showtdm/cs/C-15.31>.

²⁵ NAAQOs are currently in place for sulphur dioxide, total suspended particulate, carbon monoxide, nitrogen dioxide, and ozone. These objectives identify benchmark levels of protection for people and the environment.

²⁶ CCME (2000), *Canada-wide Standards for Particulate Matter (PM) and Ozone*, p. 2.

²⁷ See CCME (2005), *Guidance Document on Continuous Improvement (CI) and Keeping-Clean-Areas-Clean (KCAC)* [Draft].

²⁸ As practical guidance, KCAC applies to areas with a population density of less than 0.5 persons per square kilometre (see www.bcstats.gov.bc.ca/data/cen01/PopDens2001.pdf for the 2001 Census Data) and no permitted point sources nearby (i.e., within 15 km).

PROVINCIAL AUTHORITY

The *Environmental Management Act* (EMA) authorizes the Ministry of Environment to to:²⁹

- ◆ develop standards, objectives, and guidelines for the protection of air quality;
- ◆ regulate industrial point sources through site-specific permits, regulations, and codes of practice; and
- ◆ control area sources, such as open burning and woodstove emissions, through regulations.

The Act enables the use of administrative penalties, orders, and economic instruments to assist in achieving compliance. It also empowers the Minister of Environment to require the development of area-based management plans, such as airshed plans, for the protection of human health and the environment.

EMA further provides the GVRD with delegated authority to manage air emissions within its regional boundaries. This includes powers to develop emissions standards, issue permits, and conduct airshed planning. Such delegated authority is unique within the province. By Order-in-Council, the FVRD has been delegated authority for airshed planning, but not so for air quality management.

The Ministry also uses a number of non-regulatory tools to manage air quality. It operates an extensive air quality monitoring network in cooperation with federal, regional, and local agencies and maintains a provincial data management system. Other tools to support local action include technical studies for informing air management decisions, a GIS-based provincial emissions inventory, best management practices (see Appendix 4 for examples), and public outreach materials. In some sectors, tax incentives have been created to encourage the use of less polluting technologies, such as hybrid vehicles and alternative fuels.

LOCAL AND REGIONAL AUTHORITY

B.C.'s Community Charter identifies five areas of concurrent municipal/provincial regulatory authority, of which three have implications for air quality: public health, protection of the natural environment, and buildings and structures. While municipalities can develop and apply bylaws in these areas, some level of provincial involvement is also required. Similarly, regional districts can develop and apply bylaws concerning public health, buildings, and structures. Under concurrent authority, bylaws must comply with a minister's regulation or an agreement between a minister and a municipality/regional district, or must be approved by the minister responsible.

In addition, the Charter also identifies areas where local governments have broad regulatory powers not requiring provincial involvement in bylaw development. The area most applicable to air quality is "the protection and enhancement of the well-being of its community in relation to the matters referred to in section 64 [*nuisances, disturbances and other objectionable situations*]."³⁰ Nuisance bylaws relating to disperse sources of smoke (e.g., open burning, woodstoves) and fugitive dust have been developed in a number of communities around the province, as shown in the sample list in Appendix 4. However, none of these bylaws seeks to regulate emissions from individual industrial point sources, which fall under the jurisdiction of the Province and, through delegated authority, the GVRD.

Local governments also influence air quality through their powers to determine land use within municipal or regional district boundaries. For example, zoning bylaws can serve to restrict how a property may be used. Official Community Plans

²⁹ *Environmental Management Act*, SBC 2003, c. 54. See www.qp.gov.bc.ca/statreg/stat/E/03053_00.htm.

³⁰ *Community Charter*, SBC 2003, c. 26, s. 8(3).

provide a vision for directing local development and land use, while regional growth strategies help guide local planning and address regional issues, such as transportation and urban sprawl. Best management practices, as well, can be applied to demonstrate leadership in local air quality protection.

INTERNATIONAL COMMITMENTS

The Province is supporting the Georgia Basin/Puget Sound International Airshed Strategy, a multi-agency cooperative effort whose current focus is on sharing information with respect to transboundary air pollution issues.³¹ Air quality memoranda of understanding have also been signed with Washington State and Idaho.

³¹ See www.pyr.ec.gc.ca/airshed.

This appendix provides weblinks for airshed planning processes and community air quality information.

CURRENT PLANS AND PROCESSES

Airshed plans in place or currently under development can be obtained at:

Bulkley Valley-Lakes District Clean Air Plan (revised 2006)

www.bvldamp.ca/cap.shtml

Fraser Valley Regional District Air Quality Management Plan (1998)

www.fvrd.bc.ca/FVRD/Services/Air+Quality

Greater Vancouver Regional District Air Quality Management Plan (2005)

www.gvrd.bc.ca/air/planning_plans.htm

Prince George Air Quality Management Plan – Phase One (1998)

www.city.pg.bc.ca/city_services/utilities/airquality

Quesnel Airshed Management Plan (2004)

www.city.quesnel.bc.ca/LivingInQuesnel/AirshedMgmt/qairshedmngt.asp

Regional District of North Okanagan Air Quality Action Plan (2005)

<http://www.nord.ca/airquality.php>

Regional District of Okanagan-Similkameen Air Quality Management Plan (2006)

www.rdos.bc.ca/index.php?id=13

Sea-to-Sky Airshed Plan (draft)

www.seatoskyairquality.ca/what/index.html

Whistler Integrated Energy Plan (2004)

www.sustainablecommunities.fcm.ca/files/Office_Documents/Action_plan.pdf

Williams Lake Airshed Management Plan (2006)

www.cariboord.bc.ca/PublicInfo/PDF/wl%20airshed%20mgmt%20plan.pdf

COMMUNITY AIR QUALITY SUMMARIES

The following air quality summaries are posted online for B.C. communities:

Kootenay Region

- ◆ Cranbrook

http://wlapwww.gov.bc.ca/kor/epd/pdf/cranbrook_air_quality_report.pdf

- ◆ Golden

http://wlapwww.gov.bc.ca/kor/epd/golden_source_app/golden_source_app.pdf

- ◆ Kootenays (1993–1999)
http://wlapwww.gov.bc.ca/kor/epd/pdf/kootenay_air_quality_report.pdf
- ◆ Radium Hotsprings
http://wlapwww.gov.bc.ca/kor/epd/pdf/radium_final.pdf

Lower Mainland Region

- ◆ Sea-to-Sky Airshed
http://wlapwww.gov.bc.ca/sry/p2/air_quality/sea_sky_airshed_03.pdf
- ◆ Sechelt (2003 Update)
http://wlapwww.gov.bc.ca/sry/p2/air_quality/sechelt_2003.pdf
- ◆ Whistler
http://wlapwww.gov.bc.ca/sry/p2/air_quality/whistler_rep.pdf

Thompson Region

- ◆ Merritt
www.env.gov.bc.ca/air/airquality/pdfs/merritt_aq_report.pdf#search=%22merritt%20air%20quality%22

Cariboo Region

- ◆ Quesnel
http://wlapwww.gov.bc.ca/car/epd/air/aq_reports/quesnel.html
- ◆ Williams Lake
http://wlapwww.gov.bc.ca/car/epd/air/aq_reports/wml.html

Omineca-Peace Region

- ◆ Prince George
<http://wlapwww.gov.bc.ca/nor/pollution/environmental/air/index.html>

Skeena Region

- ◆ Bulkley Valley-Lakes District
http://wlapwww.gov.bc.ca/ske/epd/air/aq_reports/index.html

The following communities have developed community energy plans or have achieved one of five milestones as members of the Federation of Canadian Municipalities' Partners for Climate Protection program:³²

COMMUNITY ENERGY PLANS

Municipalities

Bowen Island
Capital Regional District
Kamloops
Kelowna
North Vancouver (City of)
Prince George
Quesnel
Revelstoke
Saltspring Island
Vancouver
Whistler

First Nations

Atlin/Taku River Tlingit
Douglas
Ehattesaht
Ginkolx
Gitga'at (Hartley Bay)
Haisla (Kitimaat Village)
Huu-ay-aht
Hupacasath
Kitasoo-Xaixais
Kluskus
Kwadacha
Kyuquot
Oweekeno/Wuikinuxv
Samahquam
Skatin
Tsay Key Dene
Tsawataineuk
Uchucklesaht
Xeni Gwet'in

PARTNERS FOR CLIMATE PROTECTION MEMBERS

Abbotsford
Anmore
Belcarra
Bowen Island
Burnaby
Central Kootenay
Central Okanagan Regional District
Coquitlam
Dawson Creek
GVRD
Invermere
Kamloops
Kelowna
Langley (City of)
Langley (Township of)
Lions Bay
Prince George
Maple Ridge
Mission (District of)
Nanaimo (District of)
New Westminster
North Vancouver (City of)
North Vancouver (District of)
Pitt Meadows
Port Alberni
Port Coquitlam
Port Moody
Quesnel
Revelstoke
Richmond
Saanich
Surrey
Vancouver
Victoria
West Vancouver (District of)
Whistler
White Rock

³² The five milestones are: create GHG emission inventory and forecast; set an emissions reduction plan; develop a local action plan; implement the local action plan or set of activities; and monitor progress and report results.

Examples of best practices and local bylaws

This appendix documents some provincial best management practices and local bylaws related to air quality protection.

BEST MANAGEMENT PRACTICES

The Ministry of Environment has published two sets of relevant practices:

Best Management Practices To Mitigate Road Dust from Winter Traction Materials – This guide is intended to help governments, planners, and road maintenance crews to manage road dust generated from winter traction material. www.env.gov.bc.ca/air/airquality/pdfs/roaddustbmp_june05.pdf.

Environmental Best Management Practices for Urban and Rural Land Development in British Columbia (Draft) – This document provides guidance on the siting of buildings relative to major thoroughfares, building design and construction, and other outdoor considerations from the air quality perspective. www.cher.ubc.ca/PDFs/BAQS_feb16_06.pdf.

LOCAL BYLAWS

Local bylaws related to air quality protection include:

- ◆ B.C. Ministry of Environment Model Bylaw for Backyard Burning
www.env.gov.bc.ca/air/particulates/pdfs/bylaw.pdf
- ◆ City of Quesnel Bylaw 1460 to adopt new Official Community Plan, with provisions for supporting its airshed plan and working with industry to reduce emissions
www.city.quesnel.bc.ca/Planning/Bylaws.asp
- ◆ City of Quesnel Bylaw 1569 (Solid Fuel Burning Appliance Bylaw) to effectively ban the installation of non-emissions-certified wood-burning appliances
www.city.quesnel.bc.ca/Planning/Bylaws.asp
- ◆ City of Vancouver Motor Vehicle Noise and Emission Abatement Bylaw No. 9344 to restrict idling of parked cars to three minutes
www.onedayvancouver.ca/take_action.php?itemId=40
- ◆ District of Houston Bylaw 947 to regulate open burning and enhance air quality (includes 2010 phase-out for non-certified woodstoves)
www.hpbcanada.org/947%20Burning%20%20Air%20Quality%20Bylaw.pdf
- ◆ Environment Canada Model Municipal Bylaw for Regulating Woodburning Appliances
www.ec.gc.ca/cleanair-airpur/caol/pollution_sources/woodburningbylaw/1toc_e.cfm
- ◆ GVRD Model Municipal Anti-Idling Bylaw
www.gvrd.bc.ca/air/consumer_reduction.htm

- ◆ North Okanagan Regional District Bylaw 1915 to regulate open burning
www.nord.ca/publications/bylaws.php
- ◆ Prince George Clean Air Bylaw No. 7721 to regulate burning
www.city.pg.bc.ca/cityhall/bylaws
- ◆ Regional District of Central Okanagan Smoke Control Regulatory Bylaw 773
www.nord.ca/publications/bylaws/1915_open_burning.pdf
- ◆ Town of Golden Solid Fuel Burning Appliance Bylaw 1150 prohibiting the installation of solid fuel burning appliances in new home construction
www.town.golden.bc.ca/upload/dcd20_1150_Solid_Fuel_Burning_Appliance_Bylaw.pdf
- ◆ Town of Smithers Regional District of Central Okanagan Smoke Control Regulatory Bylaw 773 (includes 2010 phase-out for non-certified woodstoves)
www.bvldamp.ca/documents/SmithersBL1520WOODBURNINGAPPLIANCESMOKECONTROL.pdf