

# State of the Air

## *in British Columbia*

### 2005



The British Columbia Lung Association has produced this report, *The State of the Air in British Columbia:2005*, to help British Columbians better understand the quality of the air in our province. The scientific evidence is mounting about just how dangerous air pollution is even at air quality levels in BC. The report focuses on where pollutants come from, ambient levels in the atmosphere and how they affect human health. The focus is on three pollutants that many studies have linked to health impacts: fine particulate matter, ozone, and oxides of nitrogen. Government and community initiatives to protect the public health are outlined; also listed are some measures that you, as an individual, can do to help keep air clean. Future editions of this report will provide information about other pollutants, highlight more success stories of initiatives to protect public health, and keep you up to date on the most recent findings from all research being conducted here and around the world.

Understanding air quality and the impacts of the many contributors to its degradation is the only way we can begin to take the actions necessary to ensure clean air. There isn't a single magic solution to protecting the air we breathe, but rather a requirement that we all do our part.

We are very grateful to many individuals and agencies who contributed their enthusiasm, energy and resources to make this report possible. These include the BC Ministry of Environment, Environment Canada, Greater Vancouver Regional District, Fraser Valley Regional District, Health Canada and BC Centre for Disease Control.



*Scott McDonald*  
*Executive Director*  
*British Columbia Lung Association*



## Air Quality in BC — Is It a Problem?

British Columbians generally enjoy clean air and a healthy environment, and residents want to preserve air quality for generations to come. However, poor air quality can be a problem in BC, especially in Interior communities during certain times of the year when temperature inversions trap pollutants in mountain valleys.

Activities such as land development, burning fossil fuels for energy and transportation, industrial operations, residential wood burning, backyard burning and burning debris from forestry and agricultural operations contribute to air pollution. And as the population increases, so do many of these activities that cause problems with air quality.

**Health impacts** range from irritation, coughing and watery eyes, to reduced activity, missed school and work days, increased use of medications, increased visits to hospital emergency wards and hospitalizations, exacerbation of symptoms,

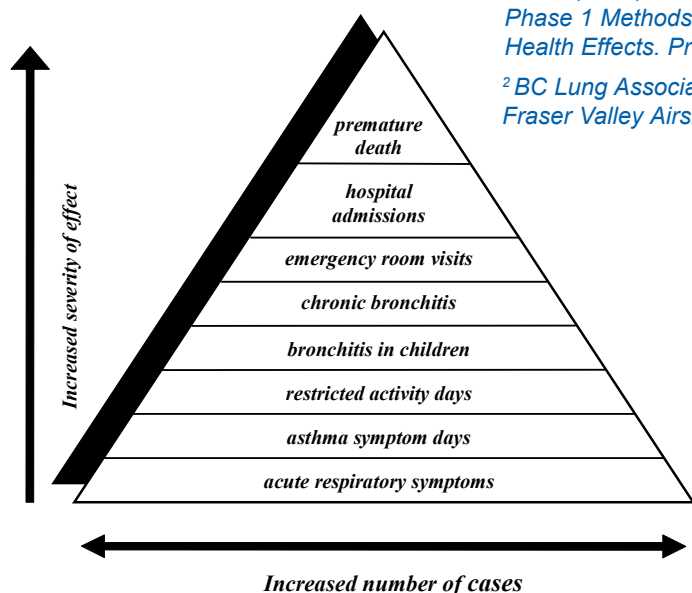
such as coughing, wheezing and tightness in the chest, worsening of existing heart and lung conditions and shortening of life expectancy of a year or more. This is sometimes referred to as a **health pyramid** (see diagram below) because the most severe health outcomes and illnesses affect fewer people while the less severe outcomes affect increasingly larger numbers of people. All these adverse health effects occur at the current low levels of air pollutants. Should we be concerned? The answer is yes. Despite all measures being done at present to reduce emissions and to maintain levels of air pollutants at current low levels, health effects are still observed and still pose a burden to the health care cost. In a report completed by an expert panel of air quality and health researchers for the Lung Association in 2003<sup>1</sup>, a threshold has not been demonstrated for particulate matter and ozone below which no negative health impacts could be expected.

Scientific evidence shows that further reduction in air pollution will lead to health benefits.

Another report by the BC Lung Association, “*Valuation of the Health Impacts from Air Pollution in the Lower Fraser Valley*”, concluded that improving air quality in the Lower Fraser Valley (LFV) will produce valued and socially desirable benefits including reduced illness and deaths. The potential benefit of a 10% improvement in ambient PM<sub>2.5</sub> in Western LFV alone could be in the order of \$1.19 billion.<sup>2</sup>

Air pollution costs money primarily through increased health care costs but also from the economic impact of lost productivity from missed work days. Poor air quality leads to crop damage and forestry production losses. In addition, BC’s beautiful scenery is valued by local residents and by tourists from around the world. Studies have shown that poor visibility caused by poor air quality can reduce tourism, causing losses to local economies.

Health Pyramid



<sup>1</sup>Bates, D.V., Koenig, J., Brauer, M., RWDI West Inc. *Health and Air Quality 2002—Phase 1 Methods for Estimating and Applying Relationships between Air Pollution and Health Effects*. Prepared for BC Lung Association, May 2003

<sup>2</sup>BC Lung Association 2005. “*Valuation of Health Impacts from Air Quality in the Lower Fraser Valley Airshed*.”

According to the 2003 annual report by the Provincial Health Officer<sup>3</sup>, air pollution in all its forms, both outdoor and indoor, likely causes between 140 and 400 deaths, 700 to 2,100 hospital admissions, and 940 to 2,800 emergency room visits per year in BC. Health Canada estimated that in the Greater Vancouver Regional District (GVRD), 5% ± 2% of deaths can be attributable to air pollution. Long-term exposure to air pollution was found to be of greater significance than acute (short-term) exposure in terms of contributions to premature deaths.

<sup>3</sup>BC Ministry of Health Services 2004. *Every Breath You Take: Provincial Health Officer’s Annual Report 2003*. <http://www.healthservices.gov.bc.ca/pho/pdf/phoannual2003.pdf>

## What Do I Need to Know About Air Quality in BC?

Air pollution consists of a very complex mixture of gases and particles. Some air pollutants are directly released into the air (**primary pollutants**), and some are formed by chemical and physical reactions that take place in the air (**secondary pollutants**). Whether the reactions happen, and how quickly, depends upon a number of conditions, such as temperature, humidity, and the presence of other gases.

The level of air pollutants in the air is referred to as **ambient air quality**. The ambient air quality is an important measure when considering health impacts. A number of air pollutants in the mixture are measured, or **monitored** in many communities in BC. These are typically the gases or particles for which ambient standards or objectives exist to compare levels with.

*The amount and types of air pollutants present in a community are the result of:*

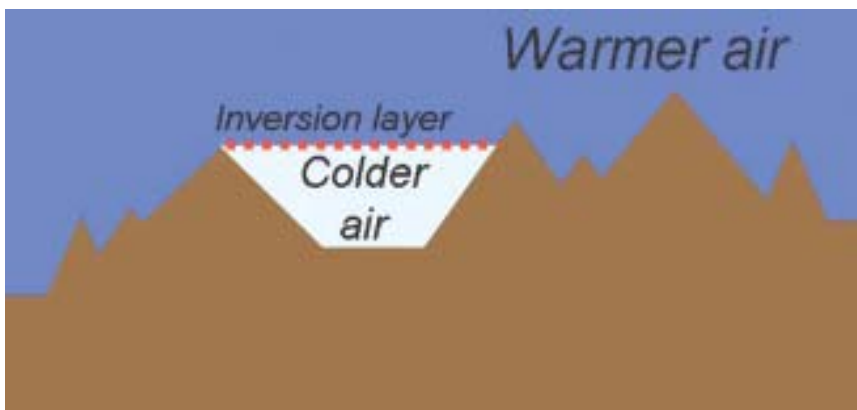
- ◆ *local sources, such as cars, industry, buildings, ships, woodstoves;*
- ◆ *seasonal and daily changes in activity levels (for example, morning rush hour traffic, weekend backyard burning), and*
- ◆ *seasonal and daily weather conditions and influence of topography.*



*Diesel Exhaust*



*Freeway Traffic*



*A Temperature Inversion*

**Temperature inversions** occur when a layer of warm air sits on top of cooler air near the ground—the opposite of what normally takes place. The warm air acts like a lid, keeping air pollutants trapped in the cooler layer of air near the ground and causing levels of pollution to increase for up to a few days. This type of weather condition often takes place during the winter in communities located in mountain valleys in BC's Interior where the valley walls further limit the movement of pollutants out of the area.

## Fine Particulate Matter: PM<sub>2.5</sub>

**Particulate Matter, or PM**, is the general term used to describe a wide variety of small solid or liquid particles in the air. PM includes both **fine particles**, less than 2.5 microns in diameter, and **coarse particles**, between 2.5 and 10 microns in diameter. When inhaled by people, particles larger than 2.5 microns are mostly removed in the upper and middle airways by a cleaning device called cilia that moves the larger particles upward to the throat to be swallowed. The **fine particles**, referred to as **PM<sub>2.5</sub>**, are the biggest concern to our health because they can be inhaled deeply into the lungs. These particles are about 1/30 the size of human hair. Fine particles are also efficient at scattering light leading to reduction in visibility. Studies have shown that poor visibility caused by air pollution can reduce tourism causing losses to the economy.

Exposure to PM<sub>2.5</sub> can result in reduced lung function and increases in symptoms such as coughing, wheezing, and chest pain. Increases in PM<sub>2.5</sub> levels in the air have been associated with increased use of medication for people with asthma and COPD, increased hospitalization and increased risk of premature deaths from heart and lung diseases. Long-term exposure could lead to reduction of life expectancy of a year or more. People who are most susceptible to the health effects of PM<sub>2.5</sub> include children, the elderly and those with heart and lung conditions, and diabetes.

Although there are many types of PM<sub>2.5</sub> in the air, **wood smoke and diesel engine exhaust** are of particular concern. Like cigarette smoke, wood smoke contains many toxic products of combustion, and several studies have related exposure to wood smoke to respiratory (lung) symptoms such as coughing, asthma, congestion, and wheezing. Diesel exhaust particles contain a mixture of chemicals including elemental carbon, toxic organic compounds, absorbed gases and trace metals. Studies have indicated that diesel exhaust may cause cancer in humans.



*A “beehive” burner in central BC*

## Where does PM<sub>2.5</sub> come from?

Sources of primary PM<sub>2.5</sub> include:

- transportation: fuel combustion in cars, trucks, trains, planes, and marine vessels
- industrial manufacturing
- wood smoke from residential wood stoves, backyard burning, and prescribed burning in agriculture and forestry
- forest fires

Precursor gases react to form secondary PM<sub>2.5</sub> and these include oxides of nitrogen (**NO<sub>x</sub>**), sulphur oxides (**SO<sub>x</sub>**), ammonia (**NH<sub>3</sub>**), and volatile organic compounds (**VOC**). Combustion of fossil fuels for transportation is a major source of NO<sub>x</sub>, SO<sub>x</sub>, and VOC.

Agricultural manure is the main source of NH<sub>3</sub>.

The key sources of PM<sub>2.5</sub> vary among regions in BC, with wood smoke being a larger contributor in most Interior communities, and transportation sources being more significant in the more heavily populated LFV. Many Interior communities also have contributions from one or a small number of unique industrial sources such as a pulp mill or beehive burners.

## How much PM<sub>2.5</sub> is in the air?

Ambient PM<sub>2.5</sub> levels and precursors are monitored in many communities in BC at stations operated by the BC Ministry of Environment, the GVRD, and the Fraser Valley Regional District (FVRD) and through partnerships with other agencies such as Environment Canada and the regional districts.

Even though human health impacts cannot be completely eliminated, ambient air quality **standards** or objectives are established by government agencies to minimize health impacts and protect the environment. For PM<sub>2.5</sub>, a Canada-wide Standard (CWS) has been agreed to by federal, provincial and

territorial governments. As part of this agreement, jurisdictions must meet the standard by 2010 and also show efforts to reduce and maintain PM<sub>2.5</sub> and ozone levels below the standard, i.e. demonstrate continuous improvement and keeping clean areas clean.

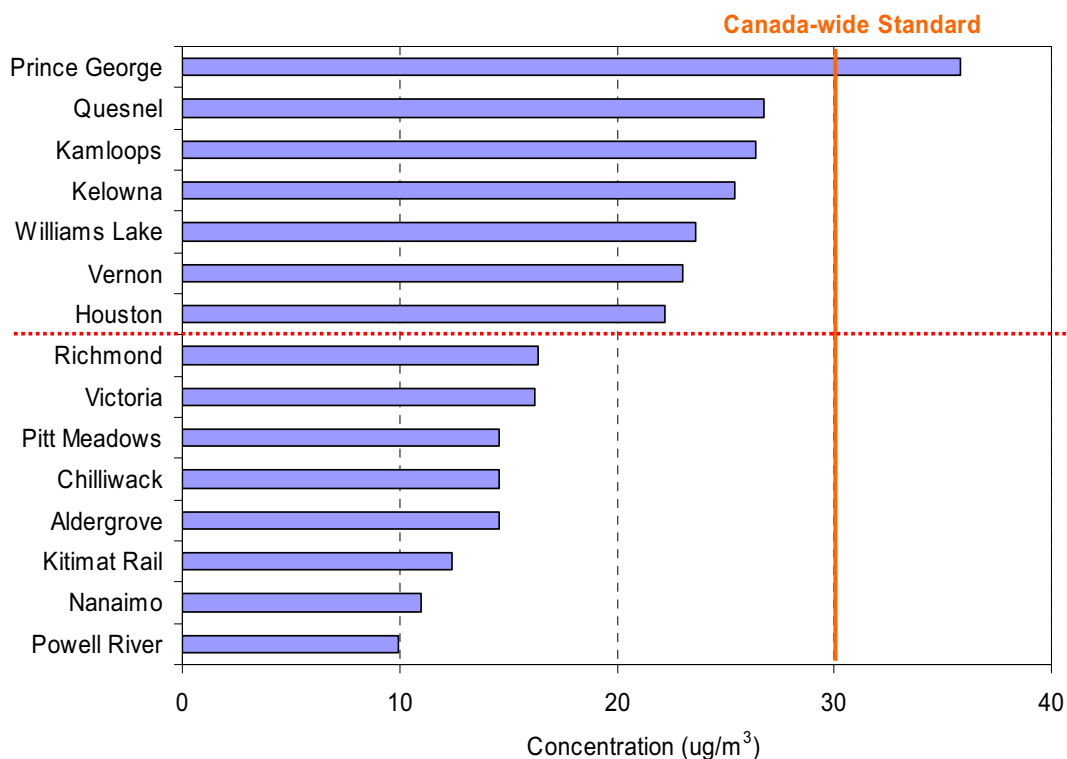
Almost all BC communities where PM<sub>2.5</sub> monitoring is available meet the Canada-wide Standard. As shown in Figure 1, higher levels of PM<sub>2.5</sub> typically occur in Interior communities, with Prince George recording the highest levels for the last three consecutive years. Lower levels were recorded in coastal communities as shown below the red dotted line in Figure 1.

This situation is thought to be a function of local sources, especially wood burning and industrial sources, combined with topography and weather conditions that can lead to a build up of air contaminants during certain times of the year.



*Industrial Stack*

**Figure 1: Ambient Levels\* of PM<sub>2.5</sub> across BC, based on 2002-2004 data**



*\* Levels are reported as the required calculation for Canada-wide Standard for PM<sub>2.5</sub>: 24-hour average concentration, annual 98<sup>th</sup> percentile, averaged over 3 consecutive years from continuous TEOM sites only.*

*\* Canada-wide Standard for PM<sub>2.5</sub> is 30 ug/m<sup>3</sup> (24-hour average)*

## Ozone

Although the protective ozone layer, located in the earth's stratosphere, is important to prevent the sun's harmful ultraviolet rays from reaching the earth's surface, **ground-level ozone (O<sub>3</sub>)** is a serious air pollutant. Ground-level ozone is not directly emitted from sources but rather is one of the "secondary" pollutants formed in the air through complex chemical reactions involving precursor gases NO<sub>x</sub> and VOCs in the presence of sunlight.

These reactions happen more rapidly at warm temperatures so ozone is a key component of **summer smog**.



*Haze—Lower Fraser Valley—Urban Smog*

High levels of ozone can cause inflammation in the lungs. Short-term exposure to ozone at concentrations found in some BC communities has been shown to produce decreased lung function and increases in respiratory symptoms

in healthy adults and susceptible subgroups of the population. People with asthma may also have more trouble breathing and need to use their medication more frequently.

## Where does ozone come from?

To understand the sources of ozone, it is important to understand the sources of its precursor gases. In the LFV, transportation sources including light-duty vehicles, marine vessels, heavy-duty diesel trucks and non-road engines are key sources of NO<sub>x</sub> contributing more than 85% of total NO<sub>x</sub> emissions. Man-made sources of VOCs include light-duty vehicles and solvent evaporation from industrial, commercial, and consumer products like paints, stains, varnishes, solvents, and thinners.

Natural sources, such as trees and other vegetation are major sources of VOCs contributing almost one third of total VOC emissions in the LFV.

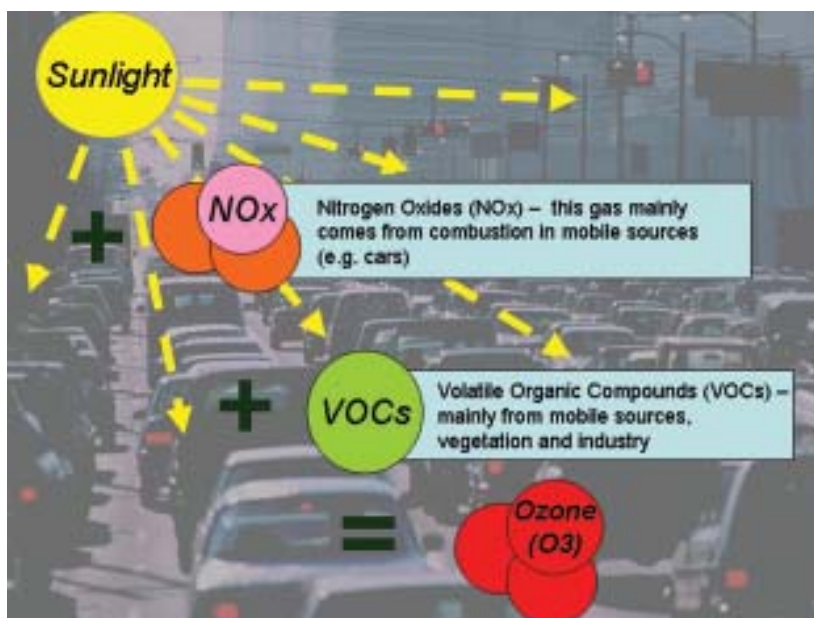
In other parts of BC, transportation sources along with industrial sources of NO<sub>x</sub>, such as the pulp and paper industry and the upstream oil and gas industry, contribute approximately 75% to total NO<sub>x</sub> emissions. Almost 95% of the VOCs outside of the LFV are from natural sources.

*Man-made sources of VOCs include light-duty vehicles and solvent evaporation from industrial, commercial, and consumer products like paints, stains, varnishes, solvents, and thinners. Natural sources, such as trees and other vegetation, also produce VOCs that contribute to ozone formation.*

## How much ozone is in the air?

A Canada-wide Standard also exists for ozone. Based on the most recent information on the health effects of ozone, long-term exposure to “average” day-to-day concentrations may contribute to a greater burden on public health than less frequent, very high concentrations. Even areas that meet the standard may require action to maintain or improve air quality.

Figure 2 shows recently observed ozone levels for 2002-2004 in BC communities compared to the Canada-wide Standard. Higher ozone levels are typically located downwind of major urban centres away from high NO<sub>x</sub> levels that tend to remove ozone. For example, ozone levels in the urban areas

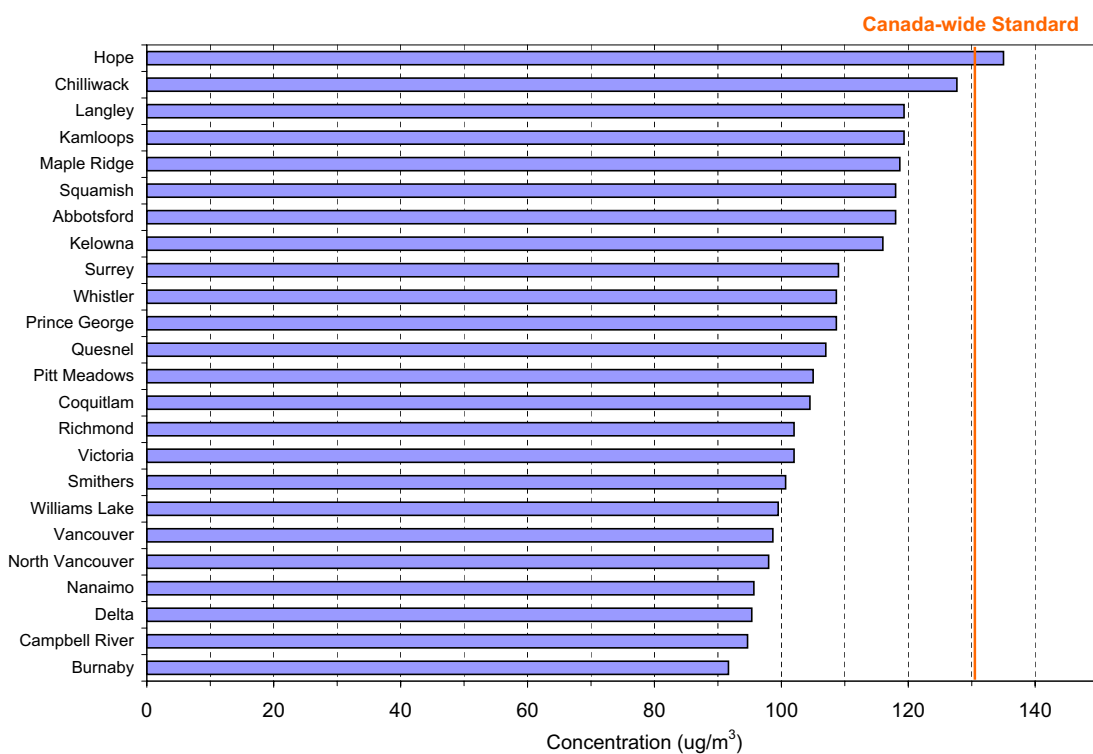


*Ozone formation*

of Vancouver and Burnaby were lower than communities in Howe Sound and the eastern Fraser Valley, such as Hope, Chilliwack, Squamish (2002 and 2004 data

only) and Langley during 2002-2004. In parts of BC outside the LFV, the highest levels of ozone were observed in Kamloops and Kelowna.

## Figure 2: Ambient Levels\* of Ozone across BC, based on 2002-2004 data



\* Levels are reported as the required calculation for Canada-wide Standard for ozone: 8-hour average concentration, 4<sup>th</sup> highest annual measurement, averaged over 3 consecutive years.

\* Canada-wide Standard for ozone is 65 ppb which is equivalent to about 130 ug/m<sup>3</sup> as shown in Figure 2.

## Oxides of Nitrogen

Nitrogen dioxide (NO<sub>2</sub>) and nitric oxide (NO) are often referred to together as “NO<sub>x</sub>”, or oxides of nitrogen. NO<sub>x</sub> is formed when fuel is burned, and so is a very common air contaminant, particularly in urban areas. Key sources include combustion of fossil fuel for heat, transportation, and industrial uses, residential and industrial wood burning, as well as other biomass combustion sources such as agricultural burning and forest fires. From a health perspective, NO<sub>2</sub> is of concern because it can irritate lung tissue and cause other respiratory problems. NO<sub>x</sub> is also of concern because of its

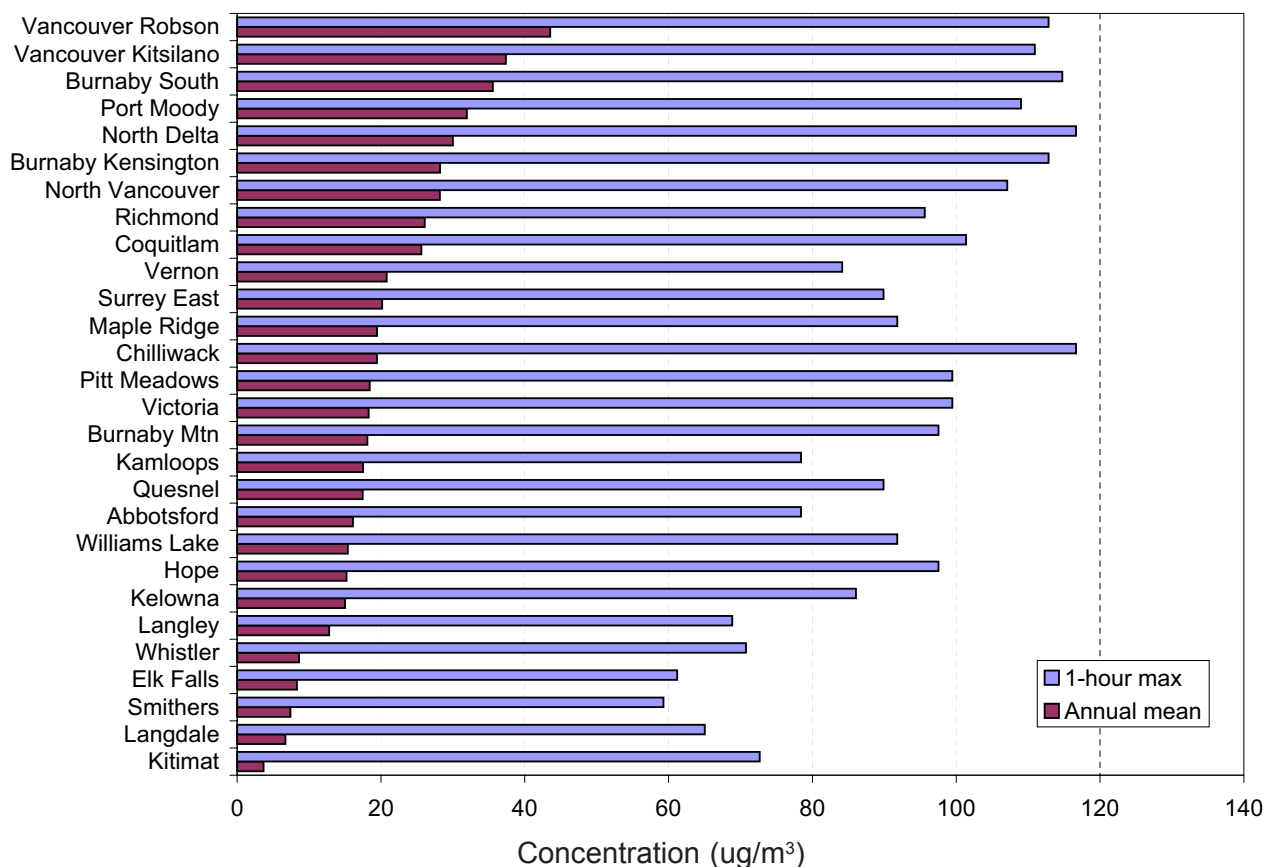
involvement in photochemical reactions in the air to form the harmful pollutants in smog.

The vast majority of NO<sub>x</sub> emissions in both the LFV and the rest of the province come from transportation. Light duty cars, marine vessels, diesel trucks, and non-road engines are the main contributors, particularly in the LFV. Elsewhere, energy-intensive industries and the upstream oil and gas industry are sources of NO<sub>x</sub>. The combustion of natural gas to heat homes, businesses and other buildings also produces NO<sub>x</sub> emissions.

*Levels of NO<sub>2</sub> in the air are measured in many communities in British Columbia, as shown in Figure 3 below. NO<sub>2</sub> tends to be an important pollutant in urban communities where traffic density is high.*

*In 2004, the highest one-hour average levels were observed in Vancouver and Burnaby, consistent with the high levels of vehicle emissions and marine sources in these urban areas. The lowest levels were observed in the less densely populated communities of Smithers, Langdale and Kitimat.*

**Figure 3: Ambient Concentrations of NO<sub>2</sub> across BC in 2004**



*All values found in Figure 3 are well below the national objective for NO<sub>2</sub>*



## What Is Being Done to Improve Air Quality?

*The responsibility to manage air emissions from these activities is spread across federal, provincial, and local levels of government. Many actions have been taken to reduce emissions of air pollutants, with the goal of improving ambient air quality levels. This section provides some examples.*

### Transportation Sources and Engines

The Canadian government has a Federal Agenda on Cleaner Vehicles, Engines and Fuels. This program works with provincial agencies and industry to establish standards for both engines and fuels that are consistent with US standards and improve emissions in a number of ways. For example:

- New heavy diesel emission standards for off-road vehicles and fuels, including a reduction in sulphur content of the fuel sold for off-road, rail and marine diesel starting in 2007 and an even more significant reduction by 2010
- Federal regulations requiring sulphur levels in gasoline for on-road vehicles to be lowered to an average concentration of less than 30 parts per million, effective January 1, 2005
- Continuing improvements to federal emissions standards for light-duty cars and trucks. For example, NO<sub>x</sub> emissions were reduced about 93% between 1993 and 2004, and a reduction of 95% is expected by 2010
- New federal standards for small “spark ignition” engines (lawn and garden equipment, snow blowers, etc.), starting with the 2005 model year
- Regulations being developed to reduce emissions from construction, mining and forestry equipment, recreational vehicles and boats, and larger spark ignition engines (such as forklifts)

*Environment Canada worked with school districts in Abbotsford and Chilliwack to install emission-reducing devices on 29 diesel school buses. The results of this pilot project will be evaluated, and the program may be expanded in future to other school districts. Environment Canada is also working with the GVRD and municipal fleet managers to install similar devices on 70 municipal diesel trucks and maintenance vehicles such as garbage trucks, fire trucks and street sweepers.*

*In March 2005, the Province of BC announced plans to add up to 356 gasoline-electric hybrid vehicles to the government fleet. Many other municipal and regional fleets are also adding hybrid and alternative-fuelled vehicles.*

*In the LFV, the AirCare vehicle emission testing program helps to decrease the production of secondary PM<sub>2.5</sub> and ozone by cutting down on the amount of the precursors—especially NO<sub>x</sub> and VOCs—emitted from vehicle tailpipes.*

*The Province of BC offers incentives to people for the purchase of alternative fuels, alternative-fuel vehicles and hybrid cars by reducing or eliminating the amount of provincial tax charged.*

## Biodiesel Exhaust: Demonstrating the benefits of alternative fuel

One option to reduce PM<sub>2.5</sub> is to use biodiesel in heavy duty vehicles such as trucks, buses, and maintenance equipment. **Biodiesel is a cleaner burning, non-toxic, biodegradable fuel made from vegetable fats such as canola oil or waste animal fats.** Biodiesel can be blended with conventional petroleum diesel fuel to reduce emissions of many air pollutants. Natural Resources Canada found that a 20% biodiesel blend reduces tailpipe emissions of PM by 15%–18%. Emissions of NO<sub>x</sub> increased by 2% which indicates the complexity and trade-offs involved in managing air quality.

Managers of large corporate or government vehicle fleets in several locations in Canada have reported favorable results from using biodiesel. In addition to environmental benefits, users reported that biodiesel was clean to handle and easy to blend. It was well-received by drivers and operators who observed that there was no visible “black cloud” of emissions with biodiesel, engines were less noisy, and the ride was smoother with less vibration. Workers inside a transit garage noticed improved air quality and less black soot within the building.



*Biodiesel pump in Burnaby*

The biodiesel market is rapidly developing and construction of local production facilities will start soon. The following demonstration projects have been completed or are underway:

- Beginning December 2004, 17 vehicles from nine public and private-sector vehicle fleets in the Capital Region used a biodiesel blend for a six-month trial.
- The City of Victoria, Canada Post, Sooke School District 62, Columbia Fuels, the District of Saanich, BC Mail Plus, BC Transit, and Vancouver Island Powerline were involved.
- Starting April 1, 2005, hundreds of municipal vehicles from Burnaby, Delta, North Vancouver, Richmond, Vancouver, and Whistler began using biodiesel in a five-year project.

The latter project is being coordinated through the Fraser Basin Council and Fleet Challenge BC with funding assistance from the Government of Canada, Vancity Credit Union, the Province of BC, the City of Vancouver and West Coast Reduction Ltd.

There are currently biodiesel pumps selling biodiesel in Port Alberni and Burnaby and more stations will be opening soon.

*For more information visit <http://www.bcbiofleet.com>.*

## Wood Smoke Sources

- Outdoor burning is regulated by the BC Open Burning Smoke Control Regulation which encourages the reduction and re-use of land clearing waste rather than burning this material. Where re-use options are not available, the Regulation sets restrictions on burning. Fires must not take place within 100 metres of a neighbouring resident and must be at least 500 metres from a school or hospital. The amount of debris that can be burned at a site and the number of days burning can continue are also limited. People who want to start a land clearing fire must check that local air ventilation conditions are suitable for burning by calling regional burning hotlines (see <http://www.gov.bc.ca/air/particulates/burning.html> for contact numbers).

- Several municipalities in BC have passed bylaws that ban backyard burning outright, or have strict rules or permitting requirements for burning dry garden waste.

People who want to burn waste should check with their local municipality first, and should also ensure they know how to manage their outdoor fire.

*Information is available from BCLA at <http://www.bc.lung.ca/services/openburning.pdf>.*

- To address wood burning emissions from residential wood stoves and fireplaces, the BC Solid Fuel Burning Domestic Appliance Regulation specifies particulate emission limits and labelling requirements for all new wood stoves, fireplace inserts and factory built fireplaces manufactured, sold, or imported for use in BC.



*Open burning emits harmful chemicals*

- Most regions of BC have undertaken wood stove change-out programs whereby people can trade in their old wood stoves and purchase new, cleaner burning stoves at a reduced cost. The Province is also looking at the feasibility of a province-wide change-out program.
- The Town of Golden has passed an innovative new bylaw to prohibit the installation of all solid fuel burning appliances in new homes constructed in the area.

*People who want to start a land clearing fire must check that local air ventilation conditions are suitable for burning by calling regional burning hotlines (see <http://www.gov.bc.ca/air/particulates/burning.html> for contact numbers).*

*Several municipalities in BC have passed bylaws that ban backyard burning outright, or have strict rules or permitting requirements for burning dry garden waste.*

## Working Together: Airshed Planning in BC

Air quality is impacted by a wide range of industrial, residential, commercial, and transportation activities. Many communities, particularly in the Interior of BC, have one or more major industrial sources that have historically been thought to be the main problem. Over the past 20 years, improvements have been made to pollution controls through permit requirements and technology upgrades. Increasingly, choices regarding transportation and energy use are needed to keep BC's air quality clean. This requires **cooperation** among government agencies, health authorities, industry and the community and a mix of regulation, community planning, economic incentives, education, and voluntary action. For these reasons, many communities are turning to **airshed planning** as a way to coordinate air quality planning activities across

an area to ensure that issues are addressed, and to achieve the common objective of healthy air quality.

There are many examples of airsheds in BC, and a growing list of communities that have become involved in airshed planning. Communities that have developed an airshed plan, or are in the process of doing so, include Prince George, Bulkley Valley/Lakes District, Quesnel, Williams Lake, Whistler, and the Regional District of North Okanagan. These plans are joint efforts of government, industry, health officials and community representatives to address local issues of concern. The FVRD has also had an air quality management plan in place since 1998 which identifies and commits to the need for partnership approaches to manage air quality in this growing region.

*As previously seen in Figure 1, Prince George exceeds the Canada-wide Standard for PM<sub>2.5</sub>. To respond to local concerns related to wood smoke and road dust, the community of Prince George developed an **airshed management plan**. Key management programs in Prince George include:*

- *Phasing out the use of beehive burners at local mills*
- *Selecting low dust winter road abrasives, sweeping city streets more often, and working with local stakeholders (rail yards, commercial developments, Ministry of Forests) to improve road paving and pavement requirements*
- *PM reductions from the two local pulp mills*
- *Open burning bans and outdoor burning education programs*
- *"No-burn" advisories banning residential wood burning during air quality advisories, and an education program to minimize residential wood burning in the community*

*For more information, visit [http://wlapwww.gov.bc.ca/nor/pollution/environmental/air\\_mgmtplan\\_final.html](http://wlapwww.gov.bc.ca/nor/pollution/environmental/air_mgmtplan_final.html)*

### *What is an airshed?*

*An airshed is a geographic area where the movement of air is limited by local geography and weather conditions. Because air pollution does not recognize political boundaries, many communities can share the same airshed (eg. the LFV or Bulkley Valley). However, airsheds are often defined based on community boundaries.*

In 1994, the GVRD was the first region in Canada to prepare a comprehensive air quality management plan. Since then, the objective of the plan, to reduce emissions by 38%, have been met through the cooperative efforts of the GVRD with all levels of government, industry and the community. The GVRD is currently reviewing and revising its plan within the context of sustainability to ensure clean air will be available for future generations. The GVRD shares the LFV airshed with the larger communities in the FVRD and Whatcom County in Washington State. This results in the need for cooperation among a number of jurisdictions to address common air quality concerns.

The **Georgia Basin/Puget Sound International Airshed Strategy** is a multi-agency, international effort by government agencies, along with First Nations/Tribal agencies and non-governmental organizations, working together to protect air quality for present and future generations. **For more information**, see <http://www.pyr.ec.gc.ca/airshed>.

## Lessons Learned: How Community Efforts Successfully Reduced Lead Exposure in Trail

Teck-Cominco has operated a lead and zinc smelter in Trail for over a hundred years. Air emissions from the smelter have caused high lead concentrations in soil and house dust, and blood lead levels in the community's children were found to be high compared to Canadian health standards. Lead is a toxic metal that can have negative health impacts, particularly in young children. The **Trail Community Lead Task Force** was formed in 1990 to find ways to reduce exposure of children to lead while enabling the smelter facility to continue operations.

The Task Force's efforts are an example of successful, cooperative problem-solving among concerned citizens, industry, school districts, and local and provincial governments. The BC Ministries of Health and Environment, Teck-Cominco, and the City of Trail funded the Task Force and provided technical support.

Community stakeholders, including union and school district representatives, participated in the Task Force to develop the strategy which consisted primarily of two key efforts:

- The Task Force developed and distributed information about dust abatement, exposure pathways, and implemented education programs to assist residents to reduce exposure to lead, and

- Improvements were made at the smelter to reduce the amount of lead released to the air.

In 1997, a new state of the art smelter started operations. Since then, lead emissions from the main stack have dropped by about 98% compared to the old smelter. Additional new control devices and improvements to procedures at the plant have resulted in cleaner operations at the site in general. These improvements are also seen in the ambient air quality levels measured at monitoring stations in the community where lead levels have dropped by over 80%.

When the Task Force was first formed, over 100 children had blood lead levels higher than the Task Force's own selected screen-



*Sod turning ceremony in Trail*

ing-level goal. By 2000, there were only about twelve. The Task Force, now renamed the **Trail Health and Environmental Committee**, continues to work toward further improvements in air quality and community health.

*For more information, see [mypage.direct.ca/t/tlp/](http://mypage.direct.ca/t/tlp/)*



*Public education to create awareness*

## ▶ ▶ ▶ What Can You Do? ◀ ◀ ◀

*Cleaning up the air is everyone's responsibility. Over the years, many improvements have been made to reduce emissions from industrial smokestacks and from motor vehicles, through emission standards and fuel quality improvements. Now the challenge is to reduce emissions from individual activities and choices regarding transportation and residential fuel use as population growth and development continues.*

### Here are 10 things you can do to make every day a Clean Air Day:

#### ▶ **Leave the car at home or reduce the amount you drive:**

For shorter trips, consider walking or biking—these clean transportation choices give you an added fitness benefit and save money! For longer trips, consider ridesharing or taking transit. If you do use your car, think about combining your errands to reduce the number and distance of trips. Check if a car co-op exists in your community. Members of a co-op can use cleaner transportation alternatives (walk, cycle, transit) most of the time, but have the ability to “sign-out” a vehicle for occasions when they need a car.



*Public transit  
in the Lower Mainland*

#### ▶ **Reduce unnecessary vehicle idling:**

Today's vehicles do not require a long “warm-up” period, and idling can actually be harmful to electronically controlled engines. Under most driving conditions, a vehicle can be driven within 30 seconds of starting. Unless you are in the middle of heavy traffic, you can turn off the engine if the vehicle will be stopped for more than 10 seconds. Idling a vehicle for longer than 10 seconds requires more fuel than stopping and restarting the engine. **For more information, go to** <http://www.oee.nrcan.gc.ca/communities-government/transportation.cfm?attr=28>.

#### ▶ **Keep your vehicle's emission control system well-maintained:**

When it comes time to purchase a vehicle, choose a fuel-efficient, low-emissions vehicle if you can. Keep up the routine vehicle maintenance schedule as recommended in your owner's manual—catching a potential problem early can reduce vehicle emissions and lead to longer engine life. If you drive a 1996 or newer vehicle, pay attention to the “Check Engine” or “Service Engine Soon” light on the dashboard. If the light remains on while driving, this could be an indication from the On-Board Diagnostic (OBD) system that there are problems with the emission control system. Have the vehicle checked by a qualified service technician as soon as possible, to determine if repairs are needed. **For more information on your vehicle OBD system, go to** [www.epa.gov/obd/](http://www.epa.gov/obd/).

#### ▶ **Take care while refuelling and ensure your gas cap seals properly:**

During the summer, reduce emissions of VOCs that contribute to smog by refuelling your car in the evening when temperatures are cooler. Take care to avoid fuel spillage and don't over-fill your vehicle gas tank. Gasoline vapours in the fuel tank will be forced out by the liquid fuel.

► **Become a “non-smoker” at home:**

Like cigarette smoke, chimney smoke contains cancer causing and toxic compounds. Upgrade an old wood stove with a certified wood stove or switch to a cleaner alternative such as electricity or natural gas. Uncertified wood stoves can produce up to 10 times more smoke and require about 30% more wood to produce the same amount of heat as from a certified model that is operated correctly.

► **Paint Smart!**

Use latex-based paints and solvent alternatives to reduce emissions of volatile organic compounds. Latex paints are also less toxic and easier to clean up! Close paint cans tightly between uses and during breaks.

► **Garden Smart!**

Use manual or electric lawn mowers, leaf blowers, and weed trimmers, instead of gas-powered models. The small engines in yard equipment, particularly older 2-stroke models, are typically not clean-burning and emit high levels of contaminants per litre of fuel burned. Since 1997, equipment manufacturers have had to meet tougher standards of the US Environmental Protection Agency, which have also been adopted by the Government of Canada. Between 2003 and 2007, a 70% reduction in NO<sub>x</sub> and VOC emissions will be phased in. If you are in the market for new lawn and garden equipment, look for information on emissions controls to ensure you are buying the cleanest technology.

► **Burn Smart!**

If you heat your home with wood, reduce smoke emissions by learning to burn more efficiently and cleanly. You will also save money and reduce the build-up of creosote in the chimney which can be a safety issue. *For more information on how to burn wood more cleanly and safely, check the website [www.burnitsmart.org](http://www.burnitsmart.org) or contact the BC Lung Association at <http://www.bc.lung.ca/services/woodstoves.pdf>.*

► **Stop smoking out your neighbours:**

Reduce the amount of backyard burning you do by recycling or composting yard debris instead of burning. Larger prunings and woody materials can be chipped and either composted or used as mulch. Many communities have yard waste curbside pick-up services, or centralized drop-off depots. If your community does not offer this service, talk to your local government about the health impacts of smoke, and encourage yard waste management services. If you need to burn yard debris, always check to ensure that local bylaws permit such burning, and that an air quality advisory is not in place for your community. And never burn anything but clean, dry vegetative material. *More information is available at <http://www.bc.lung.ca/services/openburning.pdf>.*

► **Get involved to promote airshed management plans in your community:**

Many communities across the province have joined forces with local industry and public interest groups to work together and improve the health of their air. *For more information, go to [wlapwww.gov.bc.ca/air/airquality/index.html](http://wlapwww.gov.bc.ca/air/airquality/index.html); [www.gvrd.bc.ca/air/planning\\_plans.htm](http://www.gvrd.bc.ca/air/planning_plans.htm)*



*A push reel mower (no air pollution and a little exercise...)*

## For more information about your air quality, visit or contact the following agencies:

### British Columbia Lung Association

www.bc.lung.ca  
2675 Oak Street  
Vancouver, BC V6H 2K2  
(604) 731-5864  
or toll-free at 1-800-665-5864 (in BC  
but outside the Lower Mainland)

### Ministry of Environment

#### Vancouver Island Region

wlapwww.gov.bc.ca/vir/  
2080-A Labieux Road  
Nanaimo, BC V9T 6J9  
(250) 751-3100

#### Lower Mainland Region

wlapwww.gov.bc.ca/sry/  
2<sup>nd</sup> floor, #10470 152<sup>nd</sup> Street  
Surrey, BC V3R 0Y3  
(604) 582-5200

#### Thompson and Cariboo Regions

wlapwww.gov.bc.ca/car/  
400 - 640 Borland Street  
Williams Lake, BC V2G 4T1  
(250) 398-4530

wlapwww.gov.bc.ca/sir  
1259 Dalhousie Dr.  
Kamloops, BC V2C 5Z5  
(250) 371-6200

### British Columbia Health Authorities

#### Northern Health Authority

www.northernhealth.ca  
300 - 299 Victoria Street  
Prince George, BC V2L 5B8  
(250) 565-2649

#### Interior Health Authority

www.interiorhealth.ca  
1340 Ellis Street  
Kelowna, BC V1Y 9N1  
(250) 868-7700

#### Vancouver Island Health Authority

www.viha.ca  
430 - 1900 Richmond Avenue  
Victoria, BC V8R 4R2  
(250) 592-0570

### Environment Canada, Pacific and Yukon Region

www.pyr.ec.gc.ca  
401 Burrard Street  
Vancouver, BC V6C 3S5  
(604) 664-9100

#### Kootenay and Okanagan Regions

wlapwww.gov.bc.ca/kor/  
#401 333 Victoria Street  
Nelson, BC V1L 4K3  
(250) 354-6333

#### Skeena Region

wlapwww.gov.bc.ca/ske/  
PO Box #5000, 3726 Alfred Avenue  
Smithers, BC V0J 2N0  
(250) 847-7260

#### Omineca and Peace Regions

wlapwww.gov.bc.ca/nor/  
3rd Floor, 1011 Fourth Avenue  
Prince George, BC V2L 3H9  
(250) 565-6135

#### Vancouver Coastal Health Authority

www.vch.ca  
Environmental Protection  
10th Floor, 601 West Broadway  
Vancouver, BC V5Z 4C2  
(604) 736-2866

#### Fraser Health Authority

www.fraserhealth.ca  
Environmental Services  
300, 10334 - 152A Street  
Surrey, BC V3R 7P8  
(604) 572-2600

### Health Canada Safe Environment Programme

www.hc-sc.gc.ca/hecs-ses/air\_quality  
400-4595 Canada Way  
Burnaby, BC V5G 1J9  
(604) 666-2671

### Greater Vancouver Regional District

www.gvrd.bc.ca  
4330 Kingsway  
Burnaby, BC V5H 4G8  
(604) 432-6200

### Fraser Valley Regional District

www.fvrd.bc.ca  
45950 Cheam Avenue  
Chilliwack, BC V2P 1N6  
(604) 702-5000  
1-800-528-0061

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