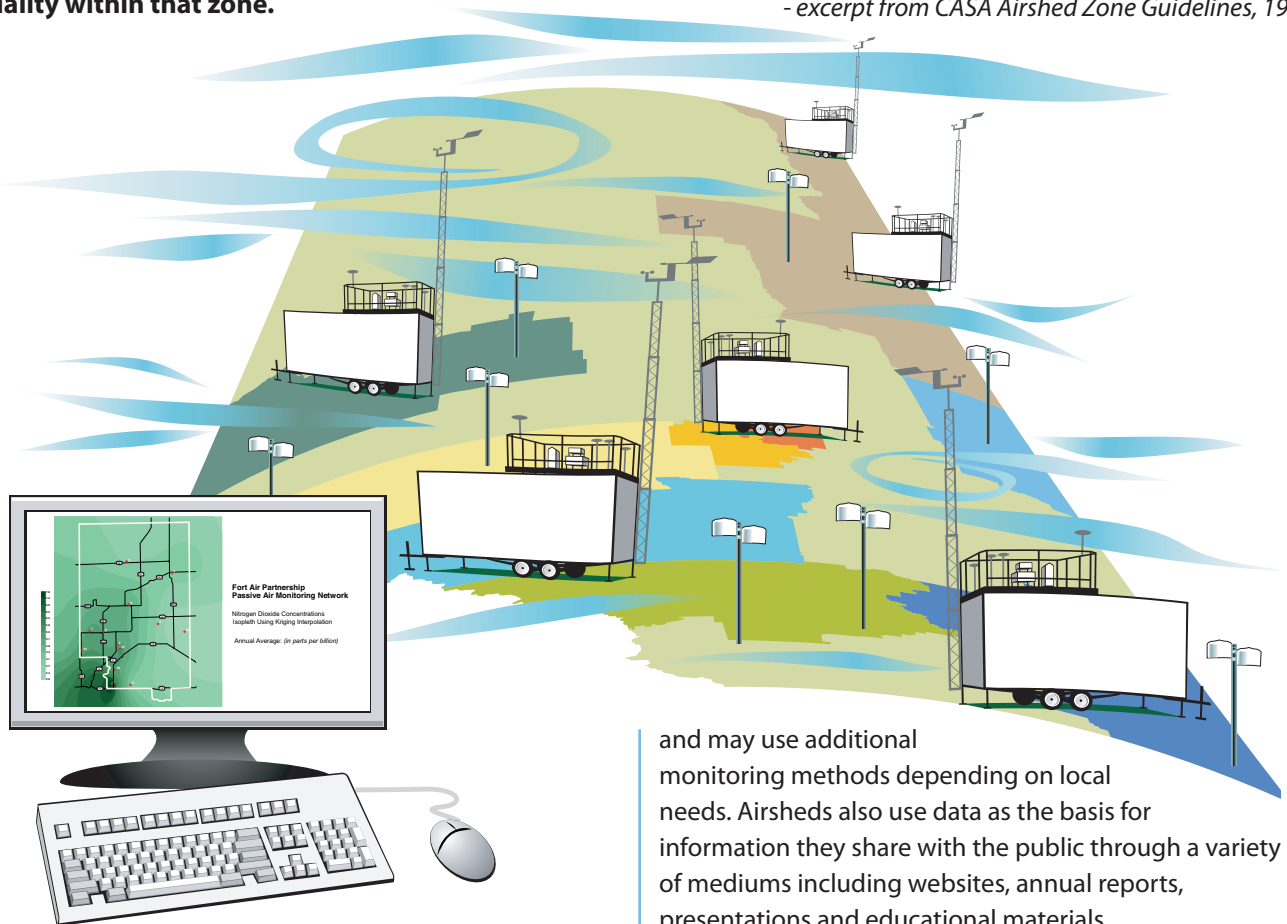


REGIONAL AIRSHED MONITORING IN ALBERTA



Airshed zones are guided by local or regional multi-stakeholder non-profit societies who use the Clean Air Strategic Alliance (CASA) consensus model to make decisions. These societies work within a designated area to monitor, analyze, and report on air quality and they recommend and implement actions to improve air quality within that zone.

- excerpt from CASA Airshed Zone Guidelines, 1994



The Role of Airsheds in Alberta

Many of Alberta's air quality issues are local, both in their cause and the solutions required. In these cases, province-wide approaches may not adequately address the localized situation. Instead, an airshed zone can enable local stakeholders to design local solutions to address local air quality issues.

Airsheds in Alberta

There are nine airshed societies in Alberta responsible for monitoring air quality in a specified region (see back page). Each airshed has its own mandate, but they all monitor and report **ambient air quality** to Alberta Environment and other stakeholders. Most airsheds use a combination of **continuous monitoring stations** and **passive monitors**,

and may use additional monitoring methods depending on local needs. Airsheds also use data as the basis for information they share with the public through a variety of mediums including websites, annual reports, presentations and educational materials.

Monitoring Networks in Alberta

In Alberta, air quality is monitored by a network of stations operated by Alberta Environment, airsheds (air quality management zones), Environment Canada and industry. Every monitoring network is different, influenced by a unique mix of local and provincial issues, emissions sources and information needs.

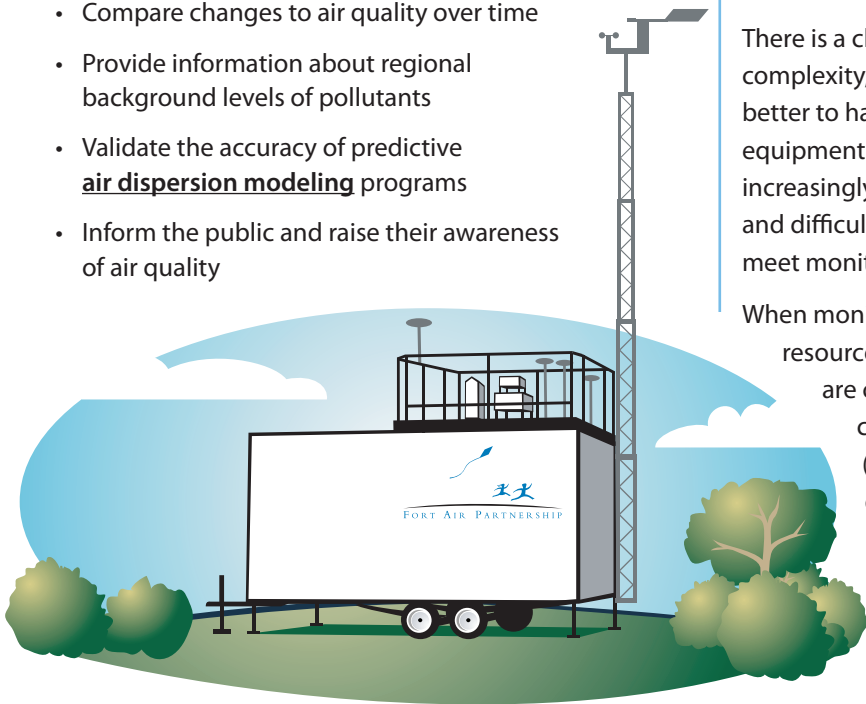
STATION OBJECTIVES

The first step in designing or implementing any monitoring network is defining its overall objectives. Having a clear monitoring objective helps answer the questions: Which air quality indicators should be measured? Where should the monitoring sites be located? How precise do the measurements need to be? Are we interested in following

trends over a long period of time, or is it important to understand what changes in air quality occur within an hour?

One or more of the following activities may be conducted to fulfill airshed monitoring objectives:

- Measure the highest possible pollutant concentrations
- Measure the air quality where people live
- Measure compliance with provincial or national standards
- Measure the impact on air quality of major sources such as a busy roadway or a large industrial facility
- Compare changes to air quality over time
- Provide information about regional background levels of pollutants
- Validate the accuracy of predictive **air dispersion modeling** programs
- Inform the public and raise their awareness of air quality



Ultimately, the purpose for monitoring air quality is not simply to collect data, but to provide information required by scientists, policy makers and planners to enable them to make informed decisions on managing the effects to the environment.

SITE SELECTION

Both the type of pollutants measured and location of monitors are selected based on monitoring objectives. If the objective is to characterize air quality where people live, ozone and fine particulate matter might be monitored in communities because of their potential health effects. If the objective is to understand the impact resulting from the emissions of specific emitted compounds on local air quality, these pollutants might be measured at the fence line of an identified industrial facility.

When selecting a monitoring site, the nature of nearby sources and pollutants are considered. Some pollutants are likely to be found near an industrial source such as emissions not captured from tanks or process facilities, or they can be natural emissions released from wetlands.

Other monitoring site considerations are transportation of pollutants by prevailing winds, formation of pollutants by chemical reactions in the atmosphere, and topography. Some practical factors such as access to electricity and communications, all-season access to the site, and appropriate security are also considered.

MONITORING EQUIPMENT SELECTION

There is a clear trade-off between equipment cost, complexity, reliability and performance. It is not always better to have the most complex, expensive monitoring equipment. While very advanced systems can provide increasingly refined data, they are usually more complex and difficult to maintain. A monitoring program should meet monitoring objectives as simply as possible.

When monitoring methods are selected, both the resources and required measurement precision are carefully considered. A full complement of continuous monitoring equipment in a station (able to report very precise, minute-by-minute data almost instantaneously) might cost \$250,000 to construct and \$50,000 a year to operate. By comparison, a passive monitor capable of reporting monthly average concentrations of one to four pollutants (suitable for identifying long-term trends) is inexpensive and costs between \$50-250 per month to operate.

DATA QUALITY

Whatever the reasons for monitoring, the measurements need to be accurate and reliable. The **Alberta Air Monitoring Directive** is a provincial guiding document that prescribes monitoring methods to be used across Alberta. Annual station audits performed by Alberta Environment ensure that all ambient monitoring performed complies with this Directive.

Data quality assurance and data quality control is an important component of a monitoring program. Quality Assurance *policies* and Quality Control *procedures* ensure consistent high quality data.



A quality assurance program is a series of activities that ensure the measurements meet defined and appropriate standards of quality. Some of these activities are:

- Frequent site visits
- Automatic daily **calibration** that checks a zero point and a high point on each analyzer against known gas concentrations
- Daily data validation and screening
- Monthly multi-point calibration that checks several readings from each analyzer against known gas concentrations
- Use of certified calibration gases
- Monthly data inspection
- Annual audits by an external auditor



Benefits of Regional Airshed Monitoring

Apart from the transparency of an airshed monitoring program, there are advantages to having monitoring networks operated on a regional basis by an airshed monitoring group.

Airsheds operate most of the Alberta air monitoring stations on behalf of Alberta Environment, Environment Canada, industry and other stakeholders. By sharing resources and optimizing the monitoring networks, cost and resource efficiencies occur. Monitoring is more easily performed to consistent high standards when operated within a network. Airsheds make ambient air monitoring data easily available to the public. Given that airsheds facilitate regional air monitoring, air quality can be evaluated on a regional basis, not just by individual station.

Airsheds also provide an important public service. They provide an avenue for local residents and industries to request and receive information specific to their region. Airsheds can provide a forum for public engagement on air quality issues. Through their own websites and that of Alberta Environment, airsheds provide public access to monitoring data. They also provide information and educational materials such as annual reports, media releases, fact sheets and education kits.



Airshed Websites

Alberta Capital Airshed Alliance
www.capitalairshed.ca

Calgary Regional Airshed Zone
www.craz.ca

Fort Air Partnership
www.fortair.org

Lakeland Industry and Community Association
www.lica.ca

Palliser Airshed Society
www.palliserairshed.com

Parkland Airshed Management Zone
www.pamz.org

Peace Air Shed Zone
www.pasza.ca

West Central Airshed Society
www.wcas.com

Wood Buffalo Environmental Association
www.wbea.org

Definitions

Air dispersion modeling - a set of scientific equations used to describe and simulate the dispersion, transformation and deposition of pollutants emitted into the air.

Alberta Air Monitoring Directive (AMD) - The AMD (1989) and its amendments (AMD 2006) represent Part 1 of the Monitoring and Reporting Directive series, which specifies environmental monitoring and reporting requirements and guidelines in Alberta.

Ambient air quality - the quality of air that is found outside buildings or structures.

Calibration - a process in which measured gas concentration values are compared to a reference gas of a known concentration.

Clean Air Strategic Alliance (CASA) - CASA was established in 1994 as a new way to manage air quality issues in Alberta. It is a non-profit organization composed of diverse stakeholders from government, industry and non-governmental organizations such as health and environment groups. CASA is responsible for strategic planning related to air quality issues in Alberta and has endorsed a Comprehensive Air Quality Management System for the province. This system promotes the establishment of airshed zones to address regional air quality issues.

Continuous monitoring stations - facilities that provide almost instantaneous measurement of ambient concentrations for several pollutants. Continuous monitoring is used when pollutant concentrations may vary significantly in a short time.

Passive monitors - monitoring method often used in rural and remote areas, which requires no power to operate. Passive monitors usually sample for an entire month.

Making it Clear is a series of fact sheets on air quality in Alberta developed for Fort Air Partnership with support provided by Alberta Environment. To obtain the series visit www.fortair.org or call 1-800-718-0471