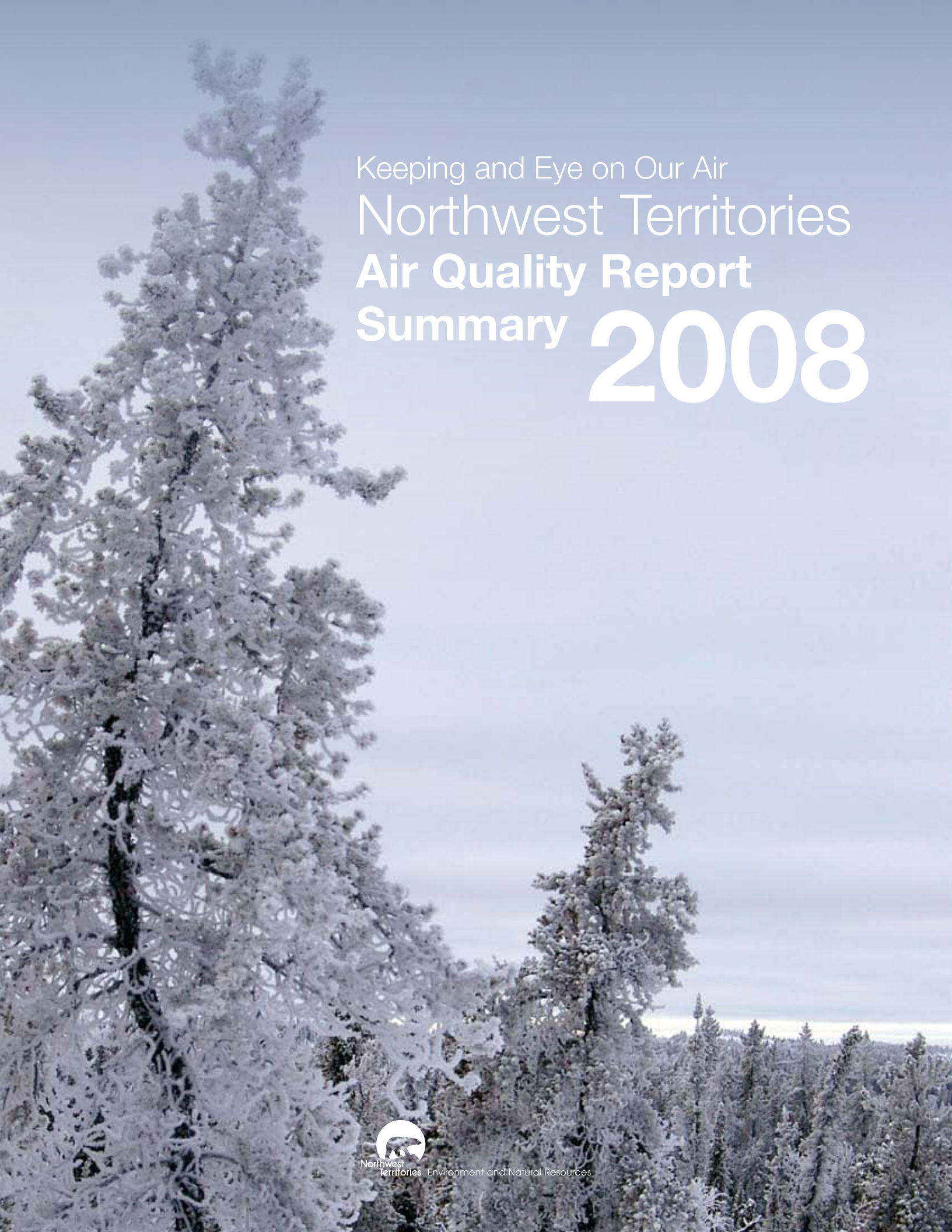

Keeping and Eye on Our Air

# Northwest Territories
# Air Quality Report Summary 2008

Northwest Territories Environment and Natural Resources

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# INTRODUCTION

The Department of Environment and Natural Resources (ENR) watches for changes in air quality. ENR monitoring stations located throughout the NWT have highly specialized instruments to collect and measure dust and gases that are in the air. This information is sent electronically to the ENR office in Yellowknife. The public, environmental consultants and other interested people can find this information at our web site on the Internet at http://lisin.rwed-hq.gov.nt.ca/NWTAQ/NetworkSummary.aspx.

Outside air, surrounding us on the land and in our communities, is called “ambient” air. It contains nitrogen, oxygen, a small amount of carbon dioxide and water vapour. It also has traces of dust and other chemicals. There are standards that describe the maximum amount of dust and chemicals that can be in ambient air. The naturally occurring levels of dust and chemicals in the air are called “background levels”. Human activities and unusual natural events such as forest fires can raise these background levels and cause pollution.

By monitoring the levels of dust and chemicals in the air, we can report pollution when it happens. In 2004 and 2005, we saw a spike in our charts during forest fire season. Smoke from fires burning in Alberta, Alaska, Yukon and the NWT caused fine dust pollution at all of the NWT stations. This year, as in 2007, there was hardly any pollution from forest fires.

We also watch for trends over the years. One change we have seen has been in Yellowknife. When the local gold mines were operating, arsenic and sulphur dioxide polluted Yellowknife’s air, but since the mines have closed that air pollution has largely disappeared.

# OUR NETWORK

Environment and Natural Resources' permanent monitoring stations are located in:

- Yellowknife
- Inuvik
- Norman Wells
- Fort Liard

They are small trailers that hold equipment that is always collecting and measuring dust and chemicals in the air. In these four communities we watch for the following substances:

- Fine particle 'dust' ($PM_{2.5}$)
- Sulphur dioxide ($SO_2$)
- Nitrogen oxides ($NO_x$)
- Ground level ozone ($O_3$)

Also, testing is done for the following substances at selected stations:

- Hydrogen sulphide ($H_2S$)
- Carbon monoxide (CO)
- Coarse particle 'dust' ($PM_{10}$)
- Total Suspended Particulate (TSP – 'dust')
- $PM_{2.5}$ at Daring Lake (in the summer)
- Acidic deposition at Snare Rapids

We determine the significance of measured levels by comparing them to the *NWT Ambient Air Quality Standards* adopted under the NWT *Environmental Protection Act*. In some cases, standards have not been developed for the NWT and so we use limits set by the federal and provincial governments.

We also work with Canada-wide air quality networks:

- The Yellowknife and Inuvik stations are part of the National Air Pollution Surveillance (NAPS) Network. NAPS tests air quality in cities throughout Canada.
- Rainwater and snow sampled at Snare Rapids is part of the Canadian Air and Precipitation Monitoring Network (CAPMoN).

# HIGHLIGHTS IN 2008

Throughout the NWT we continue to enjoy clean air with very little pollution. The dust and chemicals we find in the air are usually well below the amounts allowed by our standards.

The main causes of pollution are forest fires and springtime/summer dust. Fine 'dust' ($PM_{2.5}$) levels in 2008 were low because there were few major forest fire events. There were only seven $PM_{2.5}$ readings above our standards, most due to smoke from NWT-based forest fires. Coarse 'dust' ($PM_{10}$) affected air quality in Yellowknife in the spring and in Inuvik throughout the summer. Other readings show us the effects on air quality from burning petroleum for heating and in our vehicles during the cold days of winter.

## Yellowknife

Yellowknife air quality remained good for the most part, although the effects of springtime dust and forest fires were noticeable on occasion.

- In 2008, the annual average for TSP or 'dust' in Yellowknife rose slightly from 2007 and there were only two daily TSP readings above our standard.
- Forest fire smoke, measured as fine 'dust' ($PM_{2.5}$), polluted the air in Yellowknife on occasion in July and August.
- The coarse particle 'dust' ($PM_{10}$) monitor showed some very high readings in April, prompting the City to begin road sweeping ahead of the normal spring cleanup schedule.

## Fort Liard

Fort Liard air quality remained excellent, with only some small effects of forest fire smoke measured. The natural gas developments in the area are not presently affecting the air quality in the community.

## Norman Wells

Norman Wells air quality remained excellent, with only some small effects of forest fire smoke measured. Industry is not presently affecting the air quality in the community.

## Inuvik

Air quality in Inuvik remained excellent for the most part, although the effects of dust were noticeable throughout the summer.

- The coarse particle 'dust' ($PM_{10}$) monitor showed some high readings in the spring months.

# POLLUTANTS WE MONITOR, PROBLEMS THEY CAUSE

Our job is to watch for pollution and we do that by monitoring dust and gaseous substances.

Dust comes in different particle sizes. Dust of all sizes is called Total Suspended Particulate (TSP), and dust that is about 30 times smaller than the width of a human hair is called $PM_{2.5}$. High levels of $PM_{2.5}$ can cause health problems because the particles are so small that they get through our nose and throat defences and get deep into our lungs. $PM_{10}$ particles are slightly larger than $PM_{2.5}$ particles, but are still inhalable and, therefore, they also cause health concerns.

We monitor the following gaseous substances:

## Sulphur Dioxide

$SO_2$ can come from forest fires, building heating, power generating plants, gas plant flares and oil refineries. High levels can cause lung problems, especially for people with asthma. $SO_2$ can affect plants, especially lichens, and lead to the formation of other pollutants.

## Nitrogen Oxide

The sources of $NO_x$ are the same as $SO_2$ as well as vehicle emissions. High levels can cause serious breathing problems that can be ongoing. $NO_x$ can also lead to formation of other pollutants.

## Hydrogen Sulphide

$H_2S$ smells like rotten eggs and can come from oil and gas activities and sewage treatment plants as well as from natural sources such as swamps. High levels can cause eye irritation and stomach sickness.

## Ground Level Ozone

This is the same gas ($O_3$) that is found higher up in the atmosphere, where it is called stratospheric ozone. High in the atmosphere, $O_3$ is a good thing – it protects the planet from the sun's harmful ultraviolet rays. However, at ground level, $O_3$ can be harmful to humans and plants. High levels can be created in the lower atmosphere by sunlight and heat causing chemical reactions with other gases ($NO_x$ and substances called volatile organic compounds or VOCs). High levels can lead to chest tightness, coughing, wheezing and other heart and lung problems. The effect of $O_3$ on plants can be seen as discoloured leaves and general poor vegetation growth.

## Carbon Monoxide

CO comes from a number of sources, including home heating, vehicle exhaust and forest fires. Extremely high levels of CO in our air can be poisonous and can cause headaches, shortness of breath and stomach sickness.

# EQUIPMENT AND QUALITY CONTROL

Our Air Quality Monitoring Network uses a variety of monitoring equipment to collect information on pollutants. To test gaseous substances in the air, analyzers are constantly vacuuming air in, measuring chemical content and providing “real-time” data.

There are two methods of testing for dust. To test for TSP, a vacuum pump sucks the air in and filters catch the dust. Samples are collected by a machine called a High Volume Air Sampler (Hi-Vol) and sent to a laboratory for testing.

To test $PM_{2.5}$ and even smaller particles, samples are taken continuously by a machine called the Beta Attenuation Mass Monitor (BAM).

ENR uses a number of methods to ensure they have correct, scientifically valid information. ENR follows Environment Canada guidelines and installs and operates equipment according to manufacturers’ recommendations and maintenance plans. Analyzers are self-calibrating and our technologists also check measurements on a daily basis.

ENR stations also track wind speed, wind direction and temperature.

*Analyzers*

*Hi-Vol*

*Bam Head*

# NEED MORE INFORMATION?

After reading this summary, if you would like to find out more about air quality, you can find the NWT Air Quality Report for 2008 on the Internet at www.enr.gov.nt.ca/eps/environ.htm or check out ENR's air quality web site at http://lisin.rwed-hq.gov.nt.ca/NWTAQ/NetworkSummary.aspx.

You can also contact our Environment Division:
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