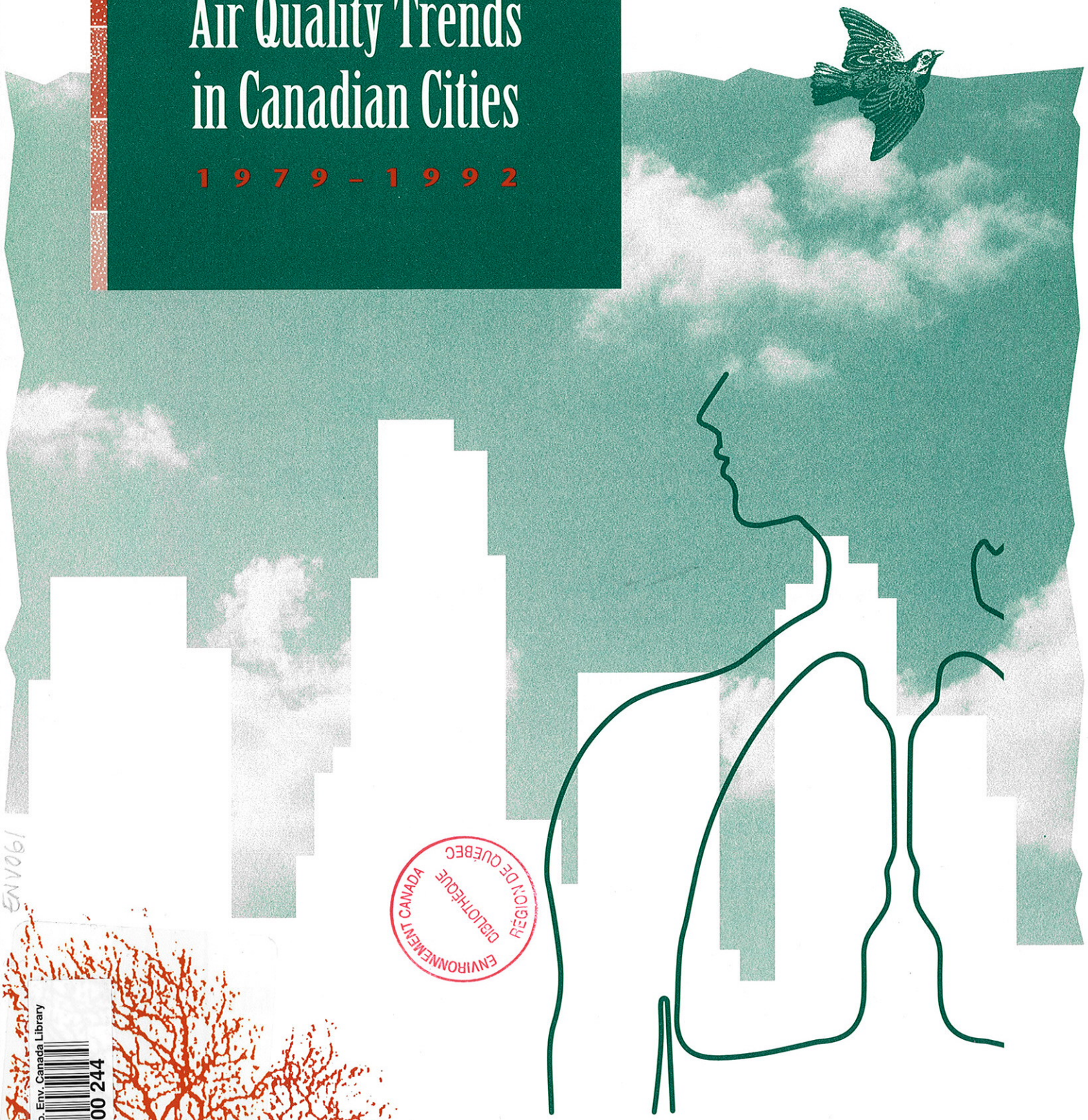
Air Quality Trends in Canadian Cities

1979 – 1992



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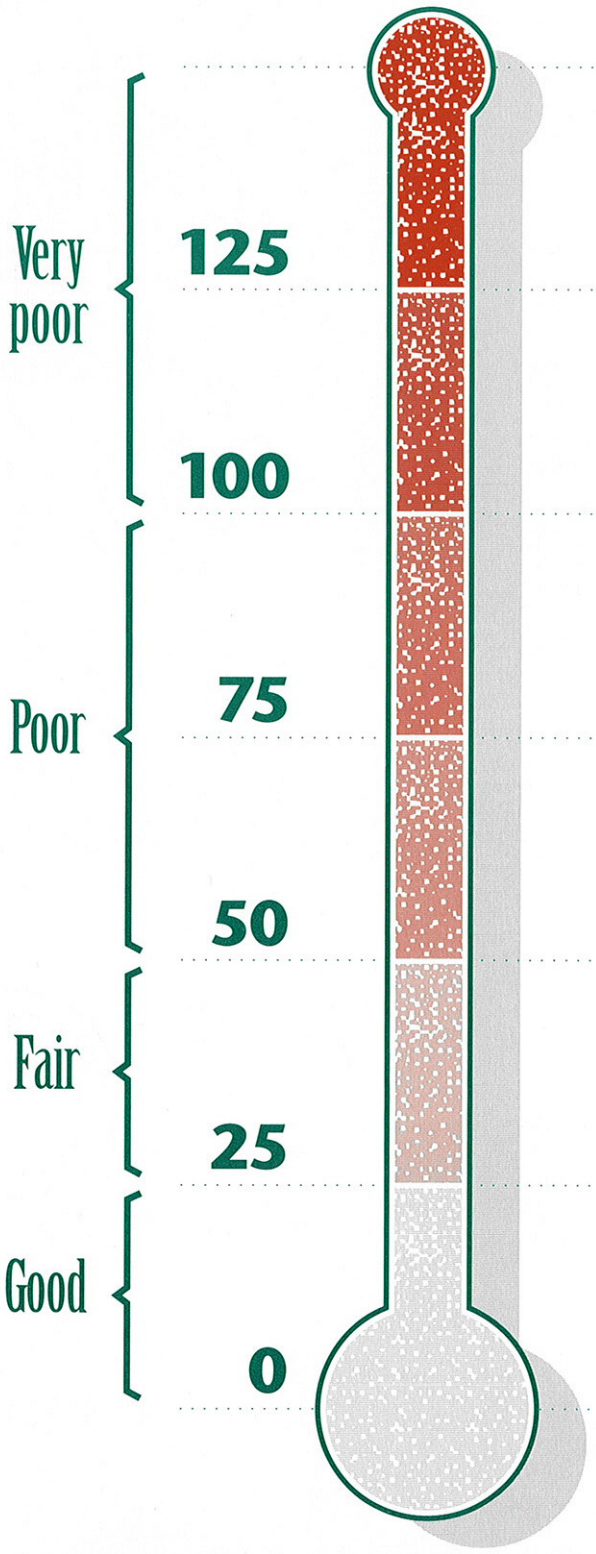
In 1969, the federal government introduced the **Clean Air Act** to address the problem of air pollution. And in fact, 1994 marks the 25th anniversary of a federal-provincial program that measures air pollution in **Canada, the National Air Pollution Surveillance (NAPS)** Network. The network provides important information on common pollutants to which Canadians may be exposed in the air they breathe.

National Ambient Air Quality Objectives (NAAQOs) were established by the federal government in the early 1970s. These objectives were established to protect human health and the environment by setting limits for the following common air pollutants: carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide and total suspended particulates. All of these substances are measured under the National Air Pollution Surveillance program and are described in detail under the heading *Trends in common air contaminants*.

Objectives are described for three ranges of pollutant concentration in the ambient air: *desirable, acceptable and tolerable*, and these correspond to degrees of environmental damage or potential health effects. Air pollution is then evaluated and stated as either good, fair, poor or very poor, by comparison with the objectives for each pollutant.

The **Index of the Quality of Air (IQUA)** collects and converts individual pollutant concentrations to a number on the IQUA scale. The following scale ranging from 0 to 125 illustrates how the various numbers correspond to air quality measurements (good, fair, poor or very poor). The IQUA helps communicate hourly measurements of common pollutants to the public in urban areas.

The Index of the Quality of Air (IQUA)



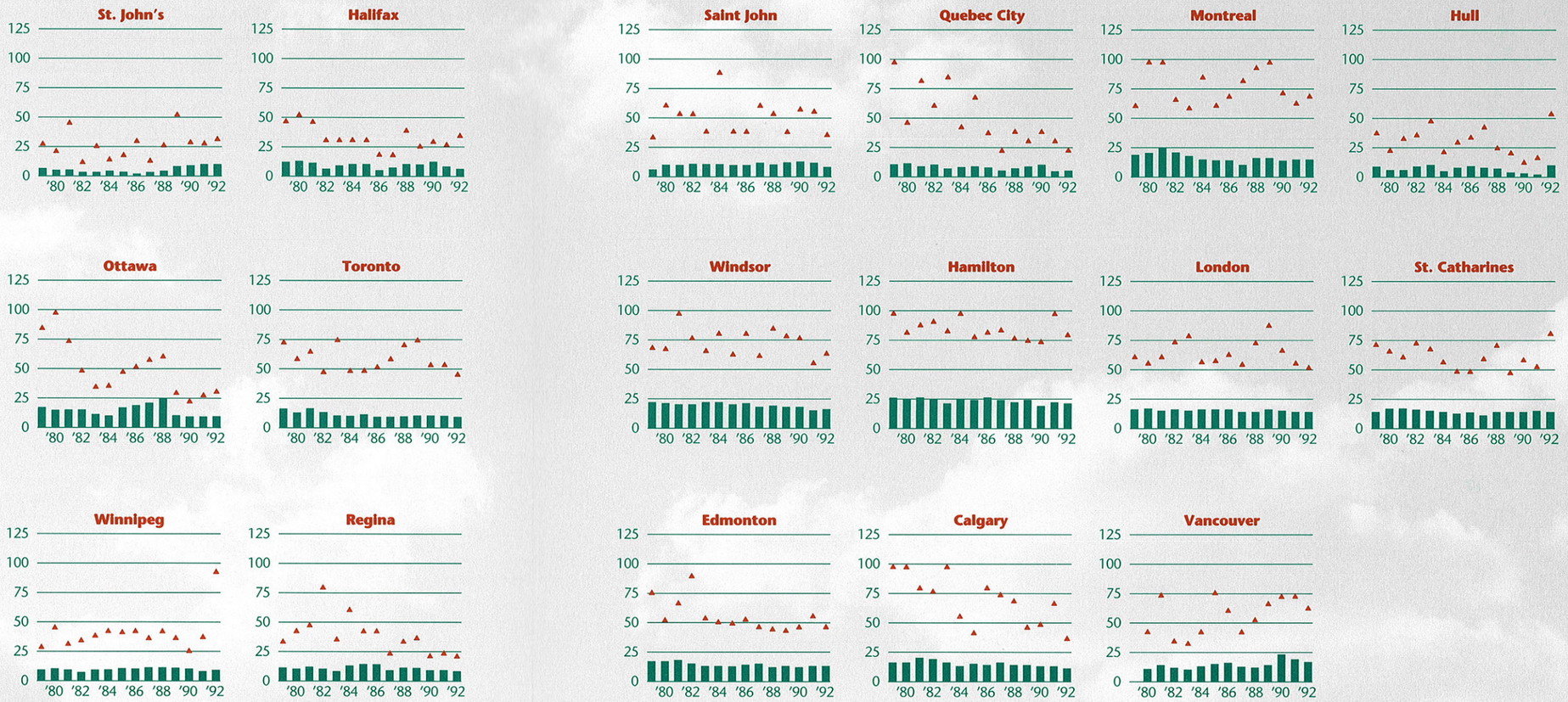
Air Quality in Canadian Cities

The following graphs provide a summary of air quality trends in 17 major cities across Canada from 1979 to 1992. Both the average and peak levels for air pollutants are shown for each year, to indicate the range of air quality in the downtown areas of selected Canadian cities.

▲ **Peak**

■ **Average**

Source: Air Quality Indicators Database; Pollution Data Branch.



Trends in common air contaminants

Suspended particulate includes dust, smoke and pollen and other substances emitted by natural sources and human activities. Transportation, mining operations, thermal power generation plants and waste incinerators are major sources of suspended particulate. Despite a 54 per cent decline in particulate levels in the 1974-1992 period, total suspended particulate (TSP) remain a dominant factor in determining local air quality.

Ground level ozone monitored by NAPS should not be confused with stratospheric ozone. Ground level ozone is the major component of photochemical smog, and is not emitted into the atmosphere. Rather, it is created from chemical reactions in the air between volatile organic compounds (VOCs) and nitrogen oxides (NOx). High ozone concentrations tend to occur under conditions of bright sunlight, high temperature and a stationary air mass. The highest smog concentrations are normally found in the Windsor-Quebec City corridor, the Saint John area of the Southern Atlantic region and the Lower Fraser Valley in British Columbia. Ground level ozone concentrations are strongly influenced by meteorology and thus are highly variable from year to year.

Sulphur dioxide is a colourless gas with a strong odour. Oil and gas processing, ore smelting and the burning of coal and heavy oil are the major generators of sulphur dioxide. From 1974 to 1992, the annual mean sulphur dioxide concentration decreased 61 per cent. As a result, sulphur dioxide levels rarely exceed maximum acceptable levels.

Carbon monoxide is a toxic, colourless and odourless gas generated from burning material containing carbon. Most carbon monoxide is created by motor vehicles, heating of dwellings and industrial pollution. The annual average concentration of carbon monoxide decreased by 70 per cent from 1974 to 1992. As a result, carbon monoxide levels very rarely exceed maximum acceptable levels.

Nitrogen dioxide is generated through high-temperature combustion processes including transportation and industrial fuel combustion. There was a steady decrease in annual average nitrogen dioxide levels nationwide from 1977 to 1992, a reduction of 38 per cent. As a result, maximum acceptable levels are rarely exceeded.

Air pollution has long been recognized for its potential to harm both the environment and human health. It comes from many sources, including motor vehicles, industrial activities and the burning of fossil fuels and wood that heat our homes and schools. Urban air quality in Canada continues to show improvement, with average pollutant concentrations in the atmosphere showing decreases. The federal government is continuing to work with provinces, territories and municipalities to meet Canada's air quality goals and to combat serious air quality issues such as smog, acid rain and climate change.

In Conclusion:

When we combine the information on each pollutant nationally, an overall improvement in air quality in major cities across Canada over the past decade is observable. Decreases in annual means from 1974-1992 were as follows:

Suspended particulate, 54%

Sulphur dioxide, 61%

Carbon monoxide, 70%

Nitrogen dioxide, 38%

The federal government will continue to measure air quality trends throughout the country, and an updated version of this fact sheet that incorporates new data will be produced by Environment Canada in 1995.

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