

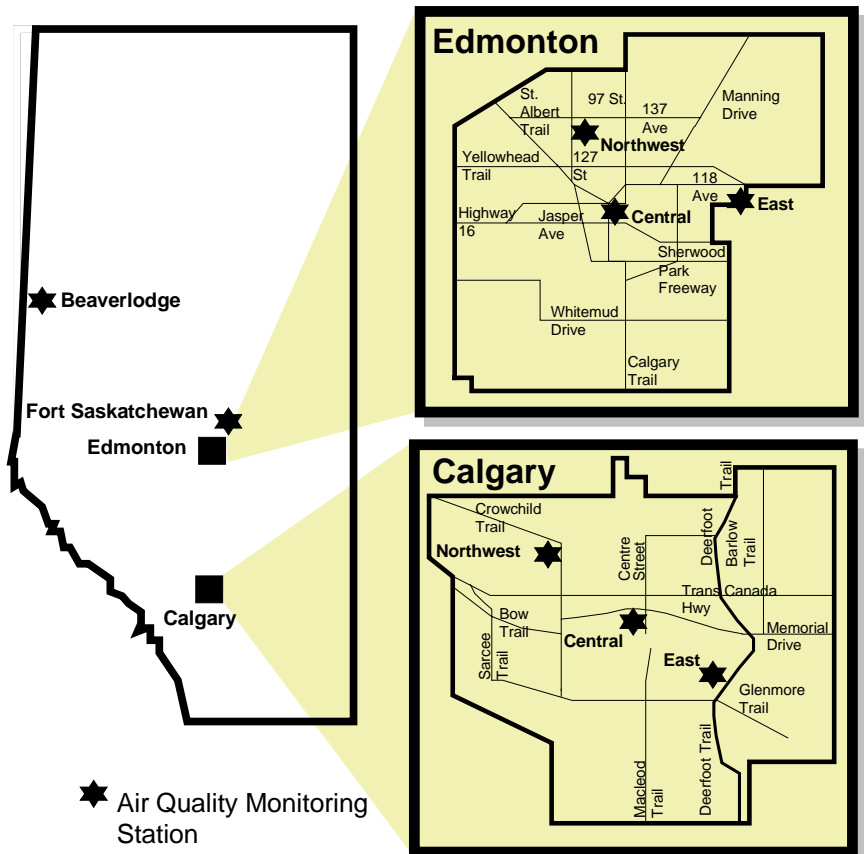
Air Quality in Alberta October to December, 1998

Alberta Environment continuously monitors air quality in Edmonton (three stations), Calgary (three stations), Fort Saskatchewan and Beaverlodge (35 km west-northwest of Grande Prairie). Air quality parameters monitored at Alberta Environment stations include carbon monoxide, dust and smoke (the coefficient of haze), oxides of nitrogen, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, carbon dioxide, ammonia and particulates (PM₁₀ and PM_{2.5}). The Index of the Quality of the Air (IQUA) is calculated at the Edmonton, Calgary and Fort Saskatchewan stations. The IQUA converts air parameter concentrations into *Good*, *Fair*, *Poor* and *Very Poor* air quality ratings.

☞ *Pollutants associated with vehicle exhaust emissions and traffic movement were lower in the fourth quarter of 1998 than the average for the previous ten years.* Dust and smoke levels were 26 to 34% lower at Edmonton stations than the ten-year average (1988 to 1997). Average nitrogen dioxide values from October to December were 6 to 11% lower than the ten-year average at Calgary monitoring stations. Carbon monoxide concentrations were 10 to 32% lower at Edmonton and Calgary monitoring stations. Lower levels of carbon monoxide, dust and smoke, and nitrogen dioxide at urban locations were due to decreased emissions from more efficient automobiles. Also, warmer weather conditions in southern Alberta may have accounted for better air quality in Calgary.

Highlights

- ☞ **Good air quality was reported over 98% of the time at Edmonton, Calgary and Fort Saskatchewan monitoring stations in the fourth quarter of 1998.** Good air quality occurred 100% of the time at the Calgary Central, Calgary Northwest and Fort Saskatchewan stations. The frequency of Good air quality was very close (within 1%) of the ten-year average (1988 to 1997) at all monitoring stations in the fourth quarter of 1998.
- ☞ **Poor and Very Poor air quality were not reported at any monitoring stations from October to December 1998.**
- ☞ **The one-hour guideline for carbon monoxide was exceeded once at the Edmonton Central station at 9 p.m. on October 22.** The eight-hour guideline was also exceeded at the Edmonton Central station on the evenings of October 22 and 23. Elevated carbon monoxide concentrations at these times were caused by vehicle exhaust emissions during stagnant weather conditions (strong temperature inversion with light winds).



For current air quality conditions call **427-7273** in Edmonton and **250-2099** in Calgary.

Internet: www.gov.ab.ca/env/air.html
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☞ **Air quality guidelines for sulphur dioxide were not exceeded in the fourth quarter of 1998.**

However, the one-hour guideline for hydrogen sulphide was exceeded at the Calgary East (11 times) and Edmonton East (one time) monitoring stations. These exceedances were recorded at the Calgary East station on November 13 (1 a.m., 9 a.m. and 10 a.m.), November 18 (4 p.m.), November 24 (7 a.m. and 2 p.m.), November 27 (4 a.m. and 5 a.m.), December 2 (11 a.m.), December 3 (9 a.m.) and December 13 (1 a.m.). The 24-hour guideline for hydrogen sulphide was also exceeded on November 27 and December 2 at the Calgary East monitoring station. Elevated hydrogen sulphide values at the Calgary East station were due to emissions from the near-by sewage treatment plant. The one-hour guideline was exceeded at the Edmonton East station at 10 p.m. on October 23. This exceedance was caused by fugitive emissions, or leakages, from

industrial activities in the vicinity of the monitoring station.

☞ **The one-hour guideline for ground-level ozone was not exceeded in the fourth quarter of 1998.**

However, because of natural ozone in the atmosphere, the 24-hour guideline for ozone was exceeded occasionally at most locations in Alberta. The highest number of exceedances of this guideline was recorded at the Beaverlodge station (38 days). In the winter, ozone is present naturally in the atmosphere primarily due to transport from the ozone rich upper atmosphere to the ground level through normal atmospheric mixing. Lower ozone concentrations are recorded in the city cores because of the destruction of naturally occurring ozone by nitric oxide from vehicle exhaust emissions. Because of high natural levels, the 24-hour guideline for ozone is currently under review by a federal-provincial committee.

Number of Times Air Quality Guidelines were Exceeded - October to December, 1998

Station	Carbon Monoxide		Dust and Smoke	Hydrogen Sulphide		Nitrogen Dioxide		Ozone		Sulphur Dioxide	
	1-hour	8-hour	monthly	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour
Edmonton Central	1	2	0	n/a	n/a	0	0	0	0	n/a	n/a
Edmonton Northwest	0	0	0	n/a	n/a	0	0	0	5	n/a	n/a
Edmonton East	0	0	0	1	0	0	0	0	11	0	0
Calgary Central	0	0	0	n/a	n/a	0	0	0	0	n/a	n/a
Calgary Northwest	0	0	0	n/a	n/a	0	0	0	9	n/a	n/a
Calgary East	0	0	0	11	2	0	0	0	0	0	0
Fort Saskatchewan	0	0	0	0	0	0	0	0	12	0	0
Beaverlodge	n/a	n/a	n/a	n/a	n/a	0	0	0	38	n/a	n/a
Guideline	13 ppm	5 ppm	90% of values < 1 COH unit	0.01 ppm	0.003 ppm	0.21 ppm	0.11 ppm	0.082 ppm	0.025 ppm	0.17 ppm	0.06 ppm

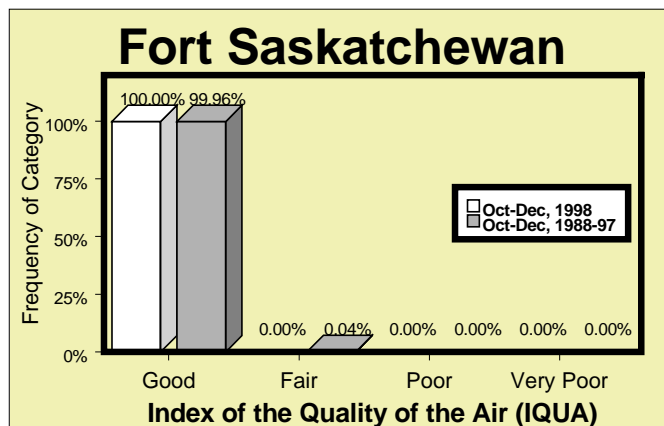
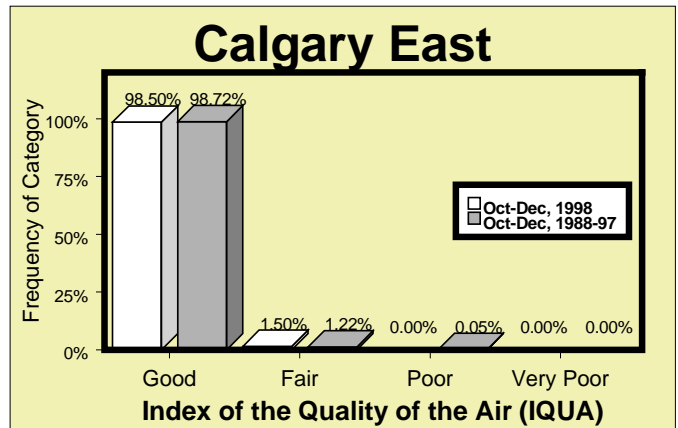
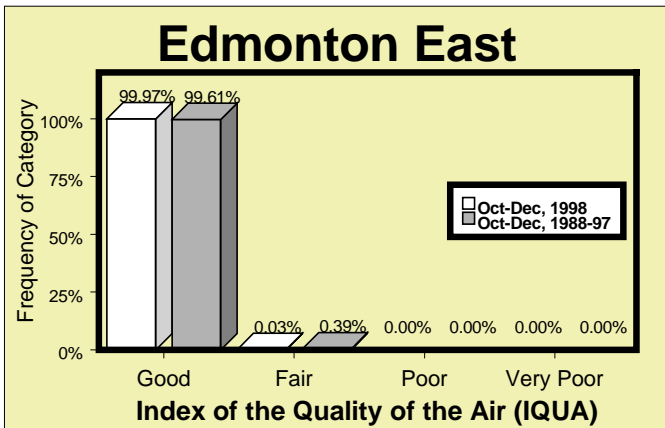
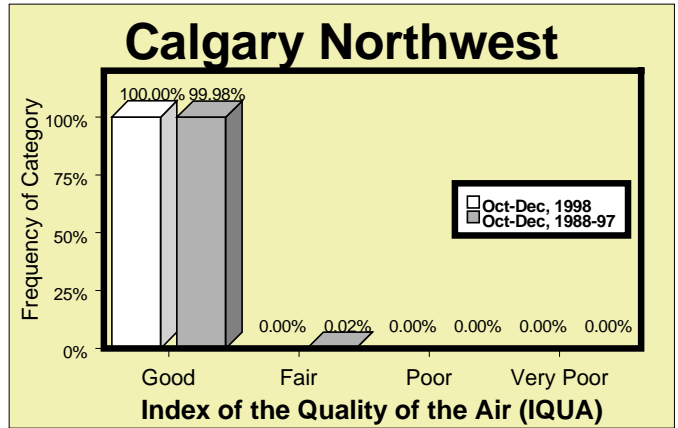
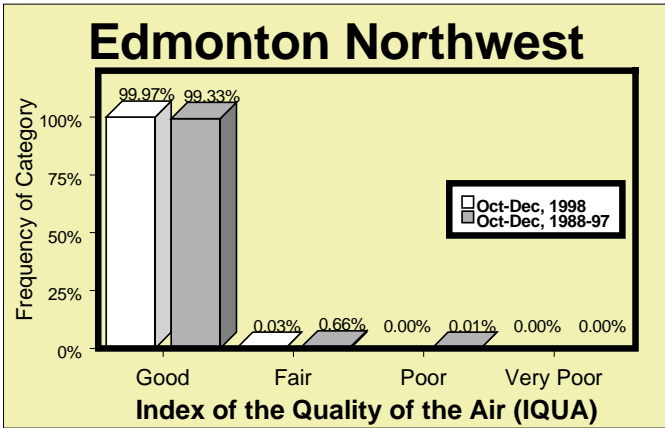
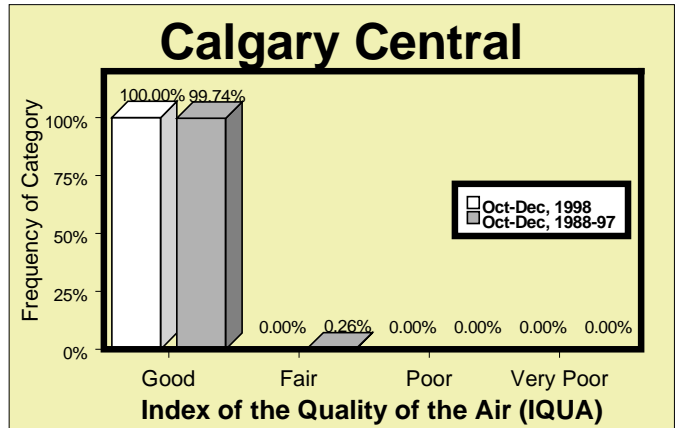
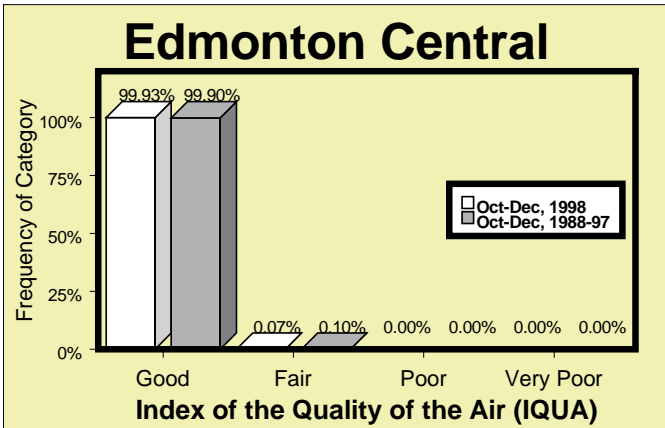
n/a Parameter not monitored or data not available.

The Index of the Quality of the Air

The index of the quality of the air (IQUA) provides the public with a meaningful measure of outdoor air quality. The IQUA is calculated every hour at all Edmonton, Calgary and Fort Saskatchewan monitoring stations. From this index, we know whether the air quality is Good, Fair, Poor or Very Poor. The air pollutants used to calculate the IQUA are carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide. Good, Fair, Poor and Very Poor air quality categories are directly related to guidelines under Alberta's Environmental Protection and Enhancement Act, and National Air Quality Objectives.

IQUA rating	Description
Good	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor	Tolerable range: not all aspects of the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor	Intolerable range: in this range, continued high readings could pose a risk to public health.

Source: Environment Canada. 1980. Guideline for a short-term air quality index. A report by the Federal-Provincial Committee on Air Pollution.



Average Concentrations - October to December, 1998 ^a

Parameter	Monitoring Period	Edmonton Stations			Calgary Stations			Fort Saskatchewan	Beaverlodge
		Central	Northwest	East	Central	Northwest	East		
Carbon Monoxide (ppm)	Oct-Dec 1998	1.10	1.02	0.53	1.00	0.69	0.97	0.61	n/a
	Oct-Dec 1988-97	1.38	1.28	0.59	1.47	0.81	1.36	0.62	n/a
Coefficient of Haze (COH unit)	Oct-Dec 1998	0.16	0.23	0.19	0.24	0.13	0.38	0.13	n/a
	Oct-Dec 1988-97	0.24	0.32	0.28	0.26	0.12	0.37	0.16	n/a
Hydrogen Sulphide (ppm)	Oct-Dec 1998	n/a	n/a	0.001	n/a	n/a	0.001	0.000	n/a
	Oct-Dec 1988-97 ^b	n/a	n/a	0.001	n/a	n/a	0.001	0.001	n/a
Nitrogen Dioxide (ppm)	Oct-Dec 1998	0.030	0.028	0.022	0.031	0.021	0.028	0.017	0.006
	Oct-Dec 1988-97	0.029	0.027	0.022	0.035	0.022	0.030	0.017	n/a
Ozone (ppm)	Oct-Dec 1998	0.009	0.010	0.015	0.009	0.015	0.009	0.014	0.024
	Oct-Dec 1988-97	0.010	0.010	0.014	0.008	0.016	0.010	0.015	n/a
Sulphur Dioxide (ppm)	Oct-Dec 1998	n/a	n/a	0.003	n/a	n/a	0.004	0.002	n/a
	Oct-Dec 1988-97	n/a	n/a	0.003	n/a	n/a	0.004	0.003	n/a
Total Hydrocarbons (ppm)	Oct-Dec 1998	2.51	2.50	2.00	2.17	2.18	2.25	1.97	n/a
	Oct-Dec 1988-97	2.29	2.27	2.27	2.27	2.08	2.27	2.13	n/a
Carbon Dioxide (ppm)	Oct-Dec 1998	n/a	n/a	n/a	411	n/a	n/a	n/a	n/a
	Oct-Dec 1992-97	n/a	n/a	n/a	401	n/a	n/a	n/a	n/a
Particulate (PM ₁₀ in µg/m ³)	Oct-Dec 1998 ^c	n/a	20.5	19.5	23.1	n/a	n/a	n/a	n/a
	Oct-Dec 1994-97 ^d	n/a	f	n/a	f	n/a	n/a	n/a	n/a
Particulate (PM _{2.5} in µg/m ³)	Oct-Dec 1998 ^e	n/a	13.8	n/a	9.9	n/a	n/a	n/a	n/a
	Oct-Dec 1997	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ammonia (ppm)	Oct-Dec 1998	n/a	n/a	n/a	n/a	n/a	n/a	0.004	n/a
	Oct-Dec 1988-97	n/a	n/a	n/a	n/a	n/a	n/a	0.003	n/a

a All average values based on data collected from October to December.

b Average hydrogen sulphide at the Edmonton East station for Oct-Dec 1991-97

c PM₁₀ monitoring began in July 1998 at the Edmonton East station.

d Average PM₁₀ at the Calgary Central station for Oct-Dec 1995-97.

e PM_{2.5} monitoring began in November 1997 at the Calgary Central station and in July 1998 at the Edmonton Northwest station.

f Historical PM₁₀ value requires adjustment due to instrument error.

n/a Parameter not monitored.