Environment Canada
Environnement Canada

ACID RAIN

The Facts

What is acid rain?

Acid rain is caused by emissions of sulphur dioxide (SO_2) and nitrogen oxides (NO_x). Once released into the atmosphere, these substances can be carried long distances by prevailing winds and return to earth as acidic rain, snow, fog or dust. When the environment cannot neutralize the acid being deposited, damage occurs.

The main sources of SO_2 emissions in North America are coal-fired power generating stations and non-ferrous ore smelters. The main sources of NO_x emissions are vehicles and fuel combustion.

Why are Canadians concerned about acid rain?

Acid rain is one of the most serious environmental problems facing North America. Public and political support for measures to control the problem is consistent and wide-spread, even in regions where acid rain is not a large-scale problem.

Acid rain is causing serious economic, social and environmental problems in eastern Canada. It is increasing the acidity of lakes and streams to the point where aquatic life is depleted and waterfowl populations may be threatened. It is increasing the acidity of soil, water and shallow groundwater. Acid rain is also suspected of being one of the causes of forest decline. But the effects of acid rain are not limited to the natural environment. Acid rain pollution also erodes buildings and monuments and is suspected of contributing to respiratory problems in people.

Economically, acid rain is endangering resources — fishery, tourism, agriculture, and forestry — in an area of eastern Canada that measures 2.6 million square kilometres (one million square miles). The resource base at risk sustains approximately eight per cent of Canada's gross national product. It is estimated that acid rain causes $1 billion worth of damage in Canada every year.

For more information on acid rain, contact:

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The Facts

More than 300,000 lakes are vulnerable, approximately 150,000 are being damaged, and more than 14,000 are acidified. In addition, 19 salmon rivers no longer support the species.

84 per cent of the most productive agricultural lands in eastern Canada annually receive more than the acceptable levels of acid deposition.

About 55 per cent of eastern Canada's forests, which generate $14 billion worth of forest products, are in areas where rainfall is acidic. Acid rain is suspected of being an important contributing factor in forest decline experienced in eastern North America and Europe.

Throughout eastern Canada, extensive damage to materials, historic buildings and monuments, attributable to acid rain, has been widely documented.

More than 80 per cent of all Canadians live in areas with high acid rain-related pollution levels. Canadian and U.S. studies indicate that there is a link between this pollution and respiratory problems in sensitive populations such as children and asthmatics. Acid deposition can increase the levels of toxic metals such as aluminum, copper and mercury in untreated drinking water supplies.

What must be done to stop acid rain in Canada?

Canada cannot win the fight against acid rain alone. Only reducing acidic emissions in both Canada and the United States will stop acid rain.

More than half of the acid deposition in eastern Canada originates from emissions in the United States. Areas such as Muskoka-Haliburton and Quebec City receive about three quarters of their acid deposition from the United States.

Canadian emissions also contribute to acid deposition in the United States. Between 10 and 25 per cent of the deposition in areas of the northeastern United States is of Canadian origin.

In order to protect the environment in eastern Canada, acid deposition (measured in the form of wet sulphate) must be reduced to less than 20 kilograms per hectare (18 pounds per acre) per year in all vulnerable areas. Scientific information from Canada, the United States and other countries supports this objective.

To achieve this objective:

Total Canadian sulphur dioxide emissions from the Saskatchewan-Manitoba border eastward must be reduced to 2.3 million tonnes (2.6 million tons) per year — about 50 per cent of the 1980 level.

The transboundary flow of sulphur dioxide from the United States to eastern Canada must be reduced to about 2 million tonnes (2.2 million tons) per year — about 50 per cent of the 1980 level.

What is Canada doing?

In February 1985, Canada launched a major acid rain control program. The federal government and the seven provinces east of Saskatchewan agreed to reduce total Canadian sulphur dioxide emissions to 2.3 million tonnes per year. They also agreed to a series of limits to provincial emissions to achieve this objective. Each province further agreed to enforce these limits through legislation and to achieve them by 1994, at the latest. The current provincial emission limits are as follows:

Sulphur Dioxide Emissions

	1980 Levels (tonnes)	1994 Objectives (tonnes)
Manitoba	738,000	550,000
Ontario	2,194,000	885,000
Quebec	1,085,000	600,000
New Brunswick	215,000	185,000
Prince Edward Island	6,000	5,000
Nova Scotia	219,000	204,000
Newfoundland	59,000	45,000
Total	4,516,000	2,474,000

Regulatory and program measures to achieve more than 90 per cent of the emission reductions required under the Canadian Acid Rain Control Program are now in place. The governments are committed to allocating the remaining 174,000 tonnes in reduction in emissions to meet the overall goal of 2.3 million tonnes per year by 1994. Sulphur dioxide emissions in eastern Canada have already been reduced to about 2.8 million tonnes (35 per cent below the 1980 level).

Quebec, Ontario and Manitoba have issued regulations, including targets and schedules to achieve their reductions. Newfoundland and Prince Edward Island have already achieved their emission reductions. New Brunswick and Nova Scotia are developing additional regulatory measures.

Even the Western provinces that are least affected by acid rain are taking preventive measures. For example, all new power plants in Alberta and Saskatchewan are meeting stringent emission limits.

Canada's 10-year Acid Rain Control Program contains specific emission reduction requirements for pollutors, but allows industry time to develop and test new technologies.

To reduce nitrogen oxide (NO_x) emissions from cars and trucks, the federal government has adopted tougher emission standards requiring the use of state-of-the-art control technology. These standards reduced allowable emissions from cars and light duty trucks by 67 per cent effective September 1, 1987 and from heavy trucks and buses by 50 per cent beginning December 1, 1988. The regulations will keep total national NO_x emissions at their current level until the mid 1990s.

Once fully implemented, the Canadian Acid Rain Control Program will cost the private sector and provincial utilities about $500 million annually over a 20-year period. In the past 15 years, Canada has spent more than $15 billion on air pollution control.

What does Canada need from the United States?

Canada is asking the United States to do what Canada itself has done. By 1994, Canada will reduce its transboundary flow of sulphur dioxide to the United States by 50 per cent. Canada needs the United States to do the same; to reduce the export of sulphur dioxide to Canada to 2 million tonnes (2.2 million tons) per year — about 50 per cent of the 1980 level.

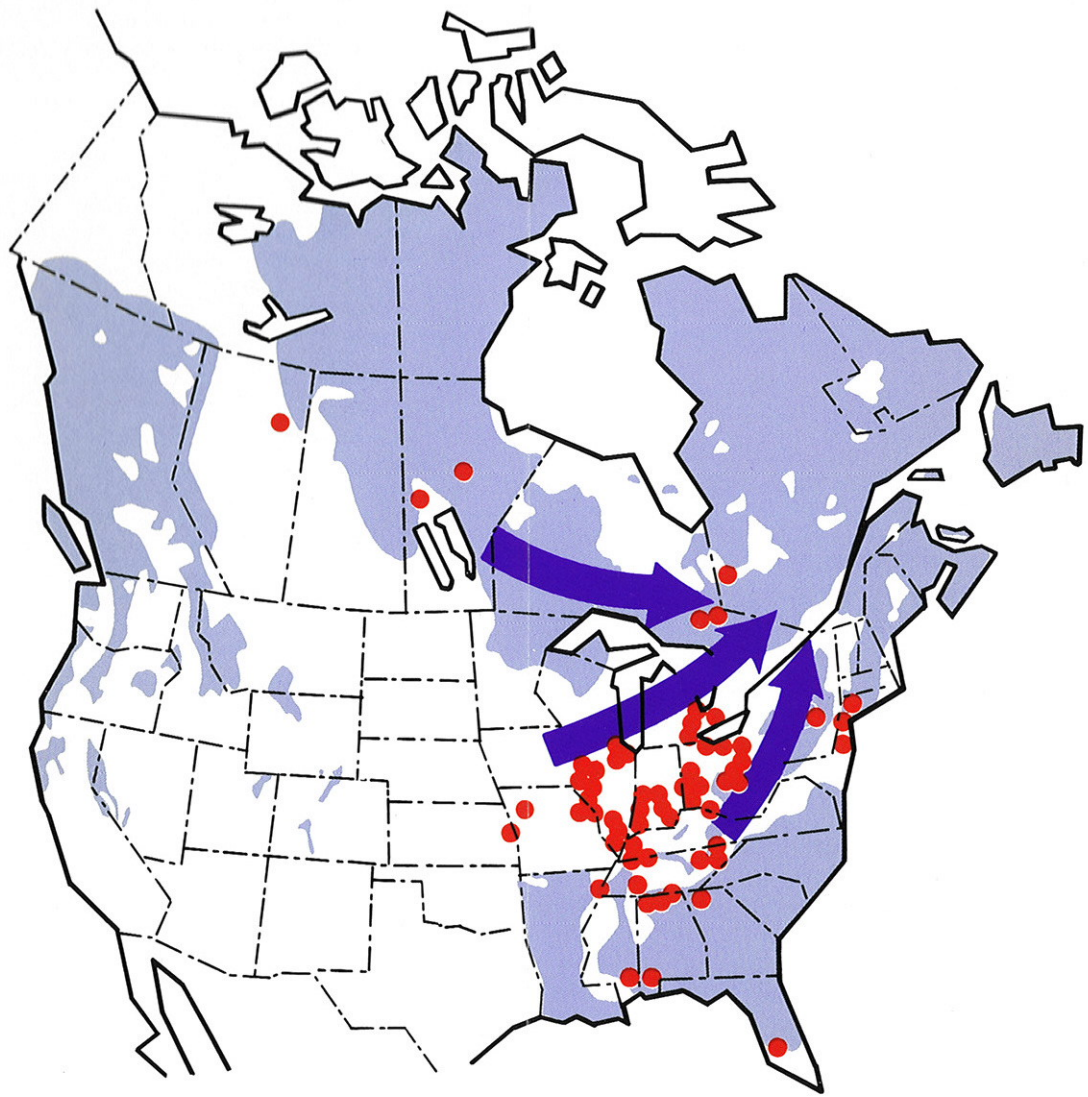
The Canadian Acid Rain Control Program will cost each Canadian about $20 per year. It is estimated that a similar program in the United States would cost each American $12-$18 ($10-$15 U.S.).

The transboundary flow of sulphur dioxide between Canada and the United States in millions of tonnes is estimated as follows:

	'70	'80	'86	'95
United States to Canada	5.1	3.8	3.2	3.5-4.2*
Canada to United States	2.1	1.5	1.0	0.7*

* based on forecasts

Location of Major Sources of SO_2 Emissions in North America and Prevailing Wind Patterns



Areas having SO_2 emissions greater than 100 kilotonnes per year.

Areas most sensitive to acid precipitation.

Important storm paths.

This map clearly illustrates why Canada's efforts to control acid rain are concentrated in the seven eastern provinces, from Manitoba east. Most major Canadian sources of SO_2 emissions are located within this area, which is quite sensitive to acid precipitation. In addition, prevailing winds transport the pollution from the U.S. into these eastern portions of Canada.