

## Appendix 2B.1. Chronology of the Acid Rain Issue

(*Italic font denotes action entry; roman font denotes knowledge entry.*)

**1872** Smith (United Kingdom) publishes *Air and Rain: The Beginning of a Chemical Climatology* and for the first time uses the term *acid rain*.

**1919** Rusnov links soil acidification in Austria to sulfur-dioxide air pollution.

**1939** Erichsen-Jones (Sweden) demonstrates the relationship between acidity and the toxicity of aluminum to fish.

**mid-1940s** Egnér (Sweden) initiates first large-scale precipitation chemistry network in Europe.

**1955** Gorham (Canada and United Kingdom) connects acid rain with industrial emissions.

**1955** Rossby and Eriksson (Sweden) suggest atmospheric processes are an important mechanism for long distance transport and transformation of chemical substances.

**1964** Hubbard Brook experiments are begun in the United States.

**1967** Odén (Sweden) demonstrates that acid precipitation in Scandinavia is due largely to sulfur emissions in the United Kingdom and central Europe.

**1969** Government researchers in Canada link sulfur emissions from smelters to lake acidification and fish loss.

**1972** Bolin (Sweden) drafts Sweden's case study on *Air Pollution across National Boundaries: The Impact of Sulfur in Air and Precipitation* for the Stockholm Conference on the Human Environment.

**1972** OECD establishes the Cooperative Technical Program to Measure Long-Range Transport of Air Pollutants.

**1972** Norway begins the eight-year SNSF project, the Norwegian Interdisciplinary Research Program on Acid Precipitation: Effects on Forests and Fish.

**1972** Harvey and Beamish (Canada) document aquatic impacts of acidification in Killarney Lakes region.

**1972** Likens (United States) discusses regional distribution of acid precipitation and its effects in North America.

**1975** *Helsinki Conference on Security and Cooperation in Europe results in an agreement concerned about reduction of air pollution as supranational effort.*

**1976** The conference on Effects of Acid Precipitation is held in Telemark, Norway.

**1976** Schofield (United States) reports the first lake acidification in the United States.

**1976** Schindler (Canada) and others begin acid additions at Experimental Lakes Area in Ontario.

**1977** *The United Nations' Economic Commission for Europe begins negotiations.*

**1978** U.S. and U.K. power producers sponsor the International Symposium on Ecological Effects of Acid Precipitation.

**1979** *The Convention on Long-Range Transboundary Air Pollution (LRTAP) is concluded.*

**1979** Cronan and Schofield show an increase in free aluminum toxic to fish in lakes subject to acid deposition.

**1980** Ulrich and others in Germany postulate the association of forest decline with acid deposition.

**1980** The U.S. National Acid Precipitation Assessment Program begins.

**1980** *The U.S.-Canadian Memorandum of Intent to negotiate an agreement on transboundary pollution is signed.*

**1982** *The Conference on Acidification of the Environment is held in Stockholm.*

**1982** *West Germany reverses its position on LRTAP in response to the forest dieback (Waldsterben) issue.*

**1983** *ECE LRTAP signatories meet to debate two proposals for sulfur reduction.*

**1983** *The LRTAP Convention enters into force.*

**1983** In negotiations with the United States, Canada proposes the use of critical loads for sensitive lake waters.

**1984** *The Thirty Percent Club is formed in Ottawa to reduce sulfur emissions by 30 percent.*

**1984** *The Protocol to LRTAP on Financing Cooperative Program for Monitoring and Evaluation (EMEP) is adopted.*

**1985** *The Protocol to LRTAP on Reduction of Sulfur Emissions by 30 percent is concluded at Helsinki.*

**1986** The nitrate saturation of forest soils is reported by Grennfelt and Hultberg.

**1987** *The Helsinki Protocol to LRTAP on Sulfur Oxides enters into force.*

**1988** *The Protocol to LRTAP on Reduction of Nitrogen Oxides concluded at Sofia.*

**1991** *The Protocol to LRTAP on Reduction of Volatile Organic Compounds is concluded in Geneva.*

**1991** The Sofia Protocol to LRTAP on Nitrogen Oxides enters into force.

**1991** The U.S. National Acid Precipitation Assessment Program report is released.

**1994** The decline of base cations in atmospheric deposition is observed to retard expected decline in acidity from sulfur controls.

**1994** *The Revised Protocol to LRTAP on the Reduction of Sulfur Emissions is concluded in Oslo.*

**1995** The importance of alkaline emissions in the over-all acidification picture is recognized.

**1996** Reports are published on how acid deposition, ozone depletion, and climate warming interact to enhance ultraviolet-B penetration in lakes.

**1996** Negotiations begin on further LRTAP Protocols and revisions to control emissions of nitrogen oxides, ammonia, and volatile organic compounds.