

EnviroWinBlog 01. Success of environmental action against the problem of acid rain.

Introduction

This EnviroWinBlog 01 is part of a set of three EnviroWinBlogs describing the success of large-scale environmental actions. EnviroWinBlog 01 describes the success against the problem of acid rain, whilst EnviroWinBlog 02 describes success against the problem of the hole in the ozone layer, and EnviroWinBlog 03 describes successful progress against the Crown-of-Thorns starfish. Promotion of the successes of these three environmental wins is detailed in EnviroWinBlog 04.

Citation references, Paragraph and Section references are those contained in the PhD Thesis “Values and science in contemporary education: The study and impact of student orientation”. The Thesis document is available in the University of Newcastle repository, here: <http://hdl.handle.net/1959.13/1501410> (and then by clicking on Attachment01).

3.1.1 Win No. 1. Success of environmental action against the problem of acid rain

Introduction to acid rain

The combustion of various fossil fuels can produce chemical pollutants in the atmosphere, such as sulphur dioxide (SO₂), nitrogen oxides (NO_x) and volatile organic compounds. These pollutants may be subject to long-range transport and precipitation, causing damage by acidification. This process has been labelled as “acid rain.” The phenomenon of acid rain was reported in Scotland as early as 1872 (Levy, 1995).

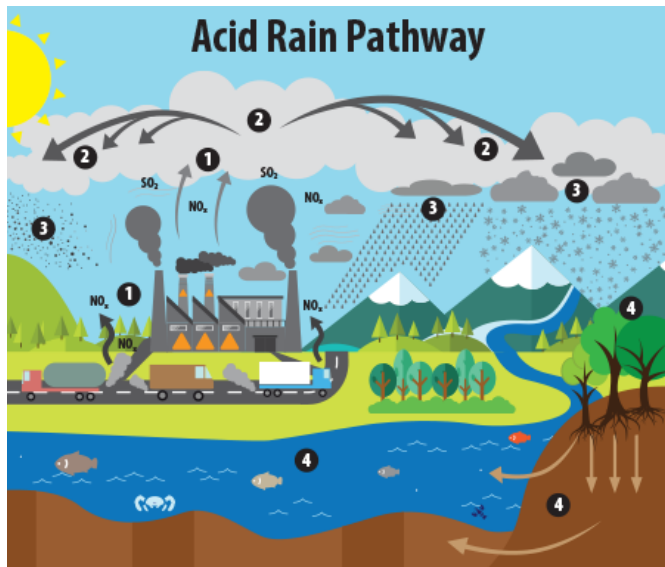
Acid rain history

In Australia, the town of Queenstown, Tasmania experienced severe acid rainfall with ravaged landscapes, commencing in the first decade of the 20th century, due to SO₂ emission from gold and copper mining operations (Driussi & Jansz, 2006). The landscape has not yet recovered from this damage, as evidenced by a contemporary image (refer Appendix 3.1). Fortunately, acid rain transitioned from being a pollution disaster in the 1980’s to an environmental success in the year 2000 (Swift, 2000). Ogden (2019) states that solutions to the acid rain problem were effective, in North America at least, because it became a non-partisan

issue. The nations of Europe and North America were able to recognise that they were experiencing a common problem of acid rain, which was a problem not constrained by national boundaries. Accordingly, these nations agreed on common actions, which proved effective in severely mitigating the problem of acid rain.

The acid rain mechanism.

The acid rain mechanism is described in the following Figure 3.1, which has been sourced from the web-site of the United States Environmental Protection Agency.



This image illustrates the pathway for acid rain in our environment: (1) Emissions of SO₂ and NO_x are released into the air, where (2) the pollutants are transformed into acid particles that may be transported long distances. (3) These acid particles then fall to the Earth as wet and dry deposition (dust, rain, snow, etc.) and (4) may cause harmful effects on soil, forests, streams, and lakes.

(EPA, 2020b, p. 1)

Figure 3. 1 Acid rain pathway

The acid rain chronology.

The chronology regarding the international acid rain narrative is contained in the following paragraphs.

1967. Increasing acidity in Swedish waterways was attributed to air pollution (SO₂, NO_x) from Britain and Europe. In the USA, sulphuric acid spewed from power plant smokestacks drifting into forests, streams and lakes. Trees and fish were killed and stone buildings corroded (Kerr, 1998).

1972. Sweden highlighted the acid rain issue at the 1972 Stockholm Conference on the Human Environment. Consequently, the OECD was motivated to research the problem

of acid rain. This action was supported by the Soviet Union in the mid-1970's, partly as a means of developing détente with the West (Levy, 1995).

- 1979. The Convention on Long Range Transboundary Air Pollution was signed by 33 states, committing the signatory countries to broad principles and joint research activities regarding the acid rain issue (Levy, 1995).
- 1985. European countries realised that acid rain was not restricted to Scandinavia, and that it was a European-wide problem. Accordingly, the Helsinki protocol was signed to reduce sulphur emissions (Levy, 1995).
- 1988. In Europe, following the 1985 Helsinki protocol to reduce sulphur emissions, the 1988 Sofia protocol was implemented to freeze nitrogen oxide (NO_x) emissions (Levy, 1995). Additionally, SO₂ emissions were halved in the period 1980-1993 by a combination of emissions trading and command-and-control regulations (Kerr, 1998).
- 1995. The Acid Rain Program was introduced in the USA, and Phase 1 of the program ran until 2000. This program consisted of an emissions cap regarding SO₂ emissions, combined with a SO₂ emissions trading program.
- 2000. The Acid Rain Program was seen to be successful (Swift, 2000).
- 2019. Acid rain went from being a pollution disaster to an environmental success. Ogden (2019) states that solutions to the acid rain problem were effective, in North America at least, because it became a non-partisan issue. Further, the lesson learned from the acid rain story was that dismantling of partisanship together with community-wide support are necessary for protecting the Earth's climate (Ogden, 2019).

Summary of the acid rain problem and conclusion

The nations of Europe and North America were able to recognise that they were experiencing a common problem of acid rain, which was a problem not constrained by national boundaries. Accordingly, these nations agreed on common actions, which proved effective in severely mitigating the problem of acid rain.

Additional successes are described in EnviroWinBlog 02 regarding the problem of the hole in the ozone layer, and in EnviroWinBlog 03 regarding progress against the Crown-of-Thorns starfish. Promotion of the successes of these three environmental wins is detailed in EnviroWinBlog 04.

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