CASE STUDY #1: ACID RAIN IN THE ADIRONDACKS

From http://classes.colgate.edu/aleventer/geol101/acidadir/acid.htm

Effects on mountain ranges

Acid rain causing pollution is carried on prevailing winds and can drift for hundreds of miles before it is deposited by precipitation. Adirondack, Catskill and Appalachian mountain regions are the hardest hit because prevailing winds carry the pollution from several other states onto those mountain ranges (which we will see in a few slides). As the winds rise over the mountains, the moisture they contain cools and condenses into the clouds, which reach the point of saturation. The resulting "rain" has high concentrations of sulfur and nitrogen pollution. The sulfur dioxide becomes sulfuric acid, and nitrogen becomes nitric acid. In the Adirondacks, only 20 percent of the acid rain has a natural source.

Clean Air Act and emissions

Under the Clean Air Act, the EPA sets limits on how much of a pollutant can be in the air anywhere in the United States. The law allows individual states to have stronger pollution controls, but states are not allowed to have weaker pollution controls than those set for the whole country.

Even though the Clean Air Act has helped reduce acid rain, it is still a prevalent problem. Emissions need to be reduced further in order to save our environment. The Northeastern states and mountain ranges are being damaged by mid-western pollutants because the typical wind pattern in the United States blows from west to east. In 1990, Congress amended the Clean Air Act and instructed the U.S. EPA to create the nation's first acid rain control program. But many recognized right away that the program would be inadequate to stop the destruction in the park. The EPA realized that the current federal acid rain program could only slow the rate of damage done to the Adirondack Park.

The current SO_2 allowance "trading system" has been effective in lowering the SO_2 levels in the atmosphere, but they are still too high. Tightening emissions further - combined with new controls on nitrogen emissions - would help restore the health of forests, lakes and streams.

As of now, there are not many restraints on nitrogen emissions, for they are much harder to define. Coal power plants are easier to set limits on than transportation. So, the acid rain in our environment has moved from being predominantly SO_2 based to NO_x based. Further restrictions need to be placed on both SO_2 and NO_x in order to save the environment.

Adirondack Park

Adirondack Park, located in upstate New York, suffered the worst damage in the nation from acid rain. Utility plant pollution from the highly industrial Midwest states of Ohio, Illinois, Indiana and Pennsylvania, is carried Northeast via wind patterns. As the winds rise over the Adirondack Mountains, the moisture they contain cools and condenses into clouds. The moisture, saturated with heavy amounts of nitric and sulfuric acid, precipitates onto the Adirondack Mountains, damaging the vegetation. Precipitation can be more than 200 times more acidic than natural rain, with a pH of 3.3 or less. Now, more than 500 lakes and ponds (out of 2,800) in the Adirondack Park are already too acidic to support the plants and aquatic wildlife that once existed in them.

A tree is weakened over time by acid rain, leaving it more susceptible to factors that would otherwise be harmless. Spruce and fir are so stressed by the acid pollution that they have succumbed to severe cold, drought, insect infestations or diseases. According to the U.S. Forest Service, death rates for many tree species have doubled or tripled in the last decade.

How do we solve this problem? One, make sure the existing program that sets a cap on the total amount of nationwide pollution and allows individual companies to buy and sell the rights to that pollution, runs smoothly and effectively. Two, create a new pollution-trading program for nitrogen oxides, a federal allowance-trading program similar to the sulfur-dioxide program. Three, keep monitoring the results-biological surveys and chemical tests should be performed on a regular basis. Four, give the EPA the authority to keep making cuts to protect human health and sensitive ecosystems without further Congressional action.