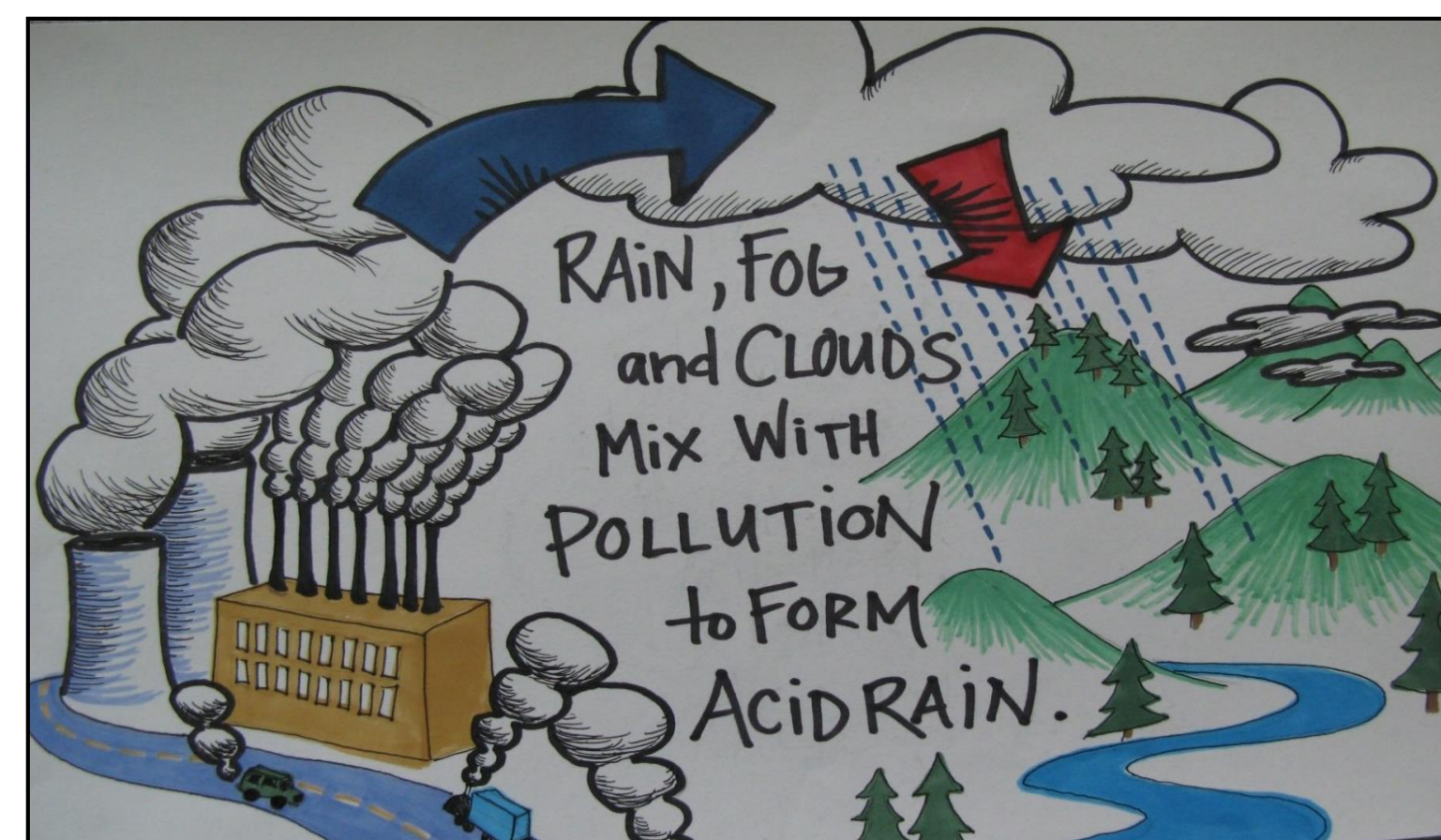


Cleaner Air and Healthier Forests: A Science and Policy Success Story

History of Acid Rain

When rain, fog, or clouds mix with pollutants released by automobile exhaust and coal-fired power plants (nitrogen oxides and sulfur dioxide), acid rain is formed. At high levels, acid rain can damage the leaves of plants that live in acid-sensitive ecosystems and decrease their overall health by reducing their capacity to convert energy from the sun into food they need to survive, known as photosynthesis.

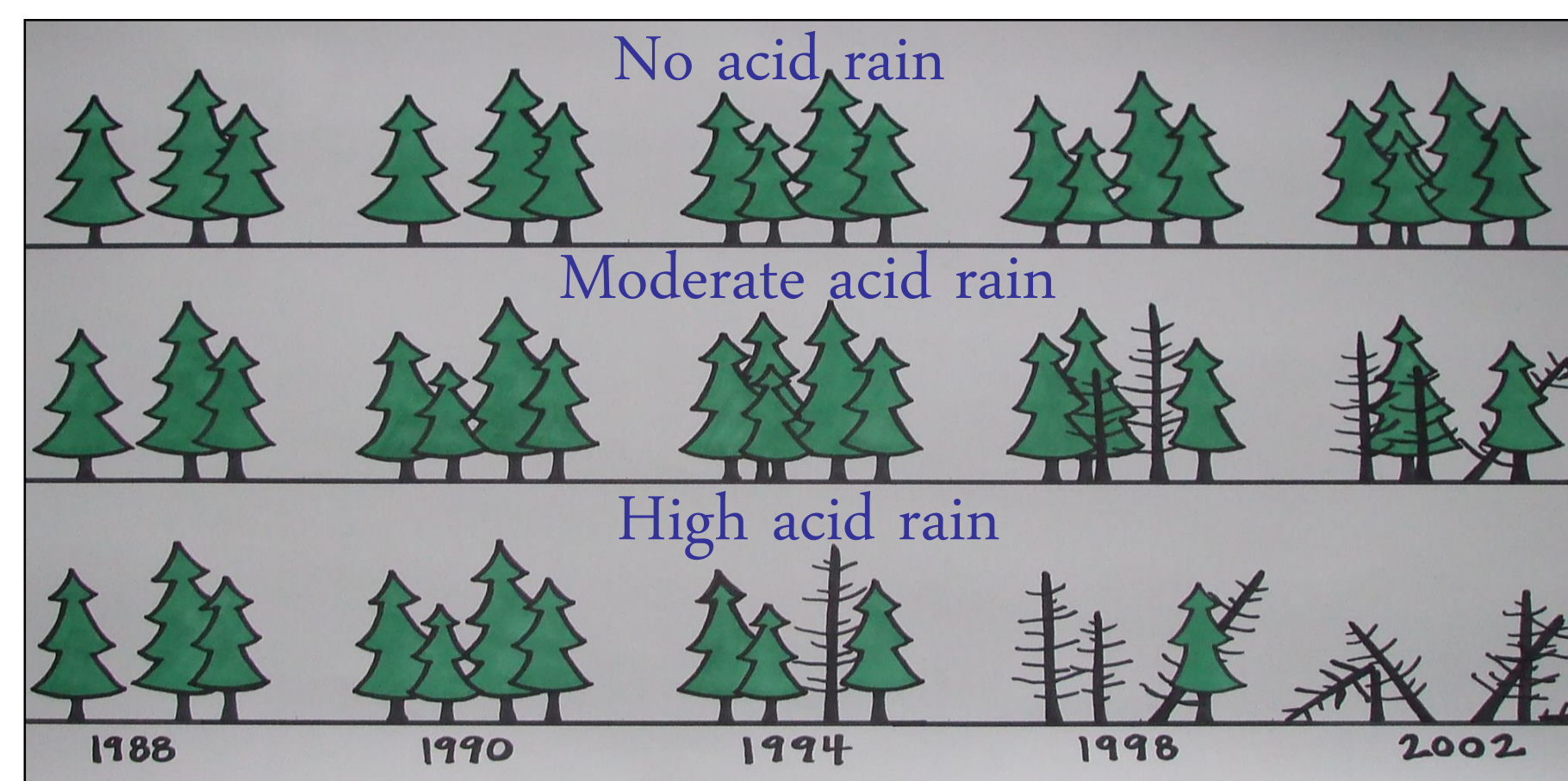
Acid rain became a major environmental problem in the 1970's and 1980's. In 1980, Congress took action to study this issue further by establishing the National Acid Precipitation Assessment Program (NAPAP)/Acid Rain Program. NAPAP monitors air quality trends and their effects on freshwater and forest ecosystems, and reports these results to Congress.



Mount Ascutney Research Project on Acid Rain

By the late 1980's, scientists understood only some of the effects of acid rain on forests. In 1988, U.S. Forest Service scientists began a research project on Mount Ascutney to better understand the association between forest damage and acid rain. They fertilized acid-sensitive red spruce forests each year to simulate the effects of rapid increases of air pollution from automobiles and coal-fired power plants. In addition to fertilizing the spruce forests, the scientists collected soil samples and data about the trees to determine the extent of forest damage and the rate of change. Trees started to die in 1994.

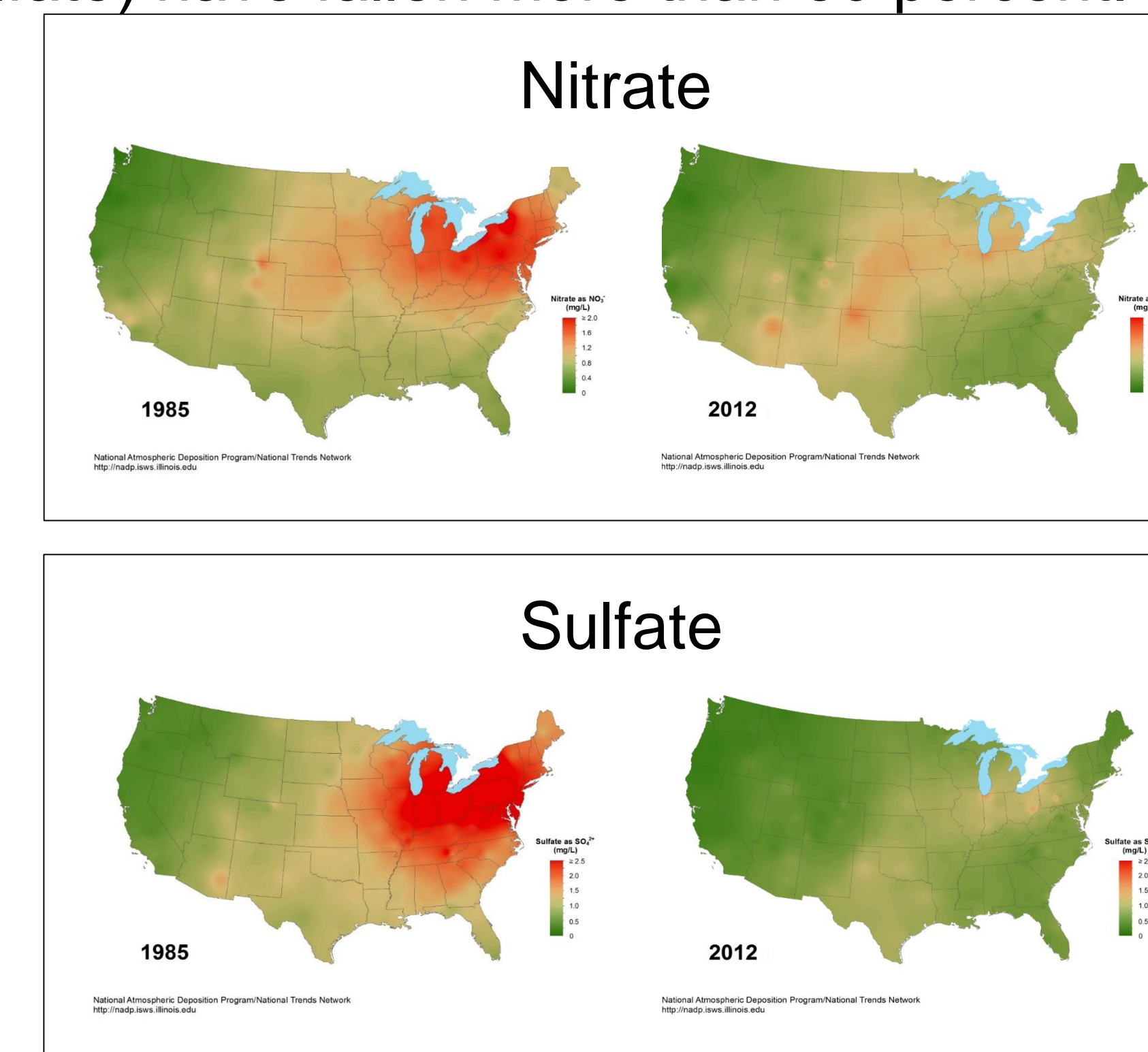
Policy makers used results from the Mount Ascutney research project, NAPAP, and many other experimental studies to estimate the amount of nitrogen and sulfur emission that would likely damage acid-sensitive forests.



Science Influences Congressional Policy

Early in the acid rain program, some opponents resisted regulations or caps on emissions of nitrogen and sulfur. They thought there was too much uncertainty or not enough data to take decisive actions, and that the problem was too expensive to fix. These and similar ideas are stated today to suggest why policy makers should not take assertive actions against climate change.

The power plant industry, vehicle manufacturers, and Congress ultimately worked out a market-based system to limit nitrogen and sulfur emissions as a measure to reduce the creation of acid rain. This system was part of the Clean Air Act, and, as predicted by scientists, the resulting regulations lead to lower emissions of nitrogen and sulfur from power plants and automobiles and a reduction in pollutant levels in the atmosphere. Since the 1980's, nitrogen oxides (nitrate) have dropped more than 50 percent and sulfur dioxide levels (sulfate) have fallen more than 80 percent.



Additional Research on Mount Ascutney

Although science and congressional policy successfully reduced acid rain levels in the atmosphere from the 1970's to 2000's, scientists are still studying the effects of changes in acid rain on forestlands. Ongoing research on Mount Ascutney will help scientists better understand how improvements in air quality will benefit red spruce trees and prevent further acidification of the forests.