

How to Reduce Acid Deposition

The negative effects of acid deposition must be viewed as a public problem since the pollutants are created from the combustion of fossil fuels. The most important step is for you to write your congressional leaders demanding more stringent emission standards for coal-fired power plants and vehicle emission. Technology, such as emission scrubbers, can be used to remove sulfates from the air. Also, minimize your use of vehicles. Drive less or take public transportation whenever possible. Regular tune-ups will reduce your cars emissions, and driving fuel-efficient cars will further reduce the pollutants responsible for acid deposition. Making your home as energy efficient as possible will further reduce the pollution caused by power plants. Simple tips include weatherproofing your home, using fluorescent light bulbs, and minimizing the use of air conditioning. **Remember the little things matter and make a big difference!**



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- <http://www.epa.gov/acidrain/>
- <http://www.nps.gov/grsm/naturescience>

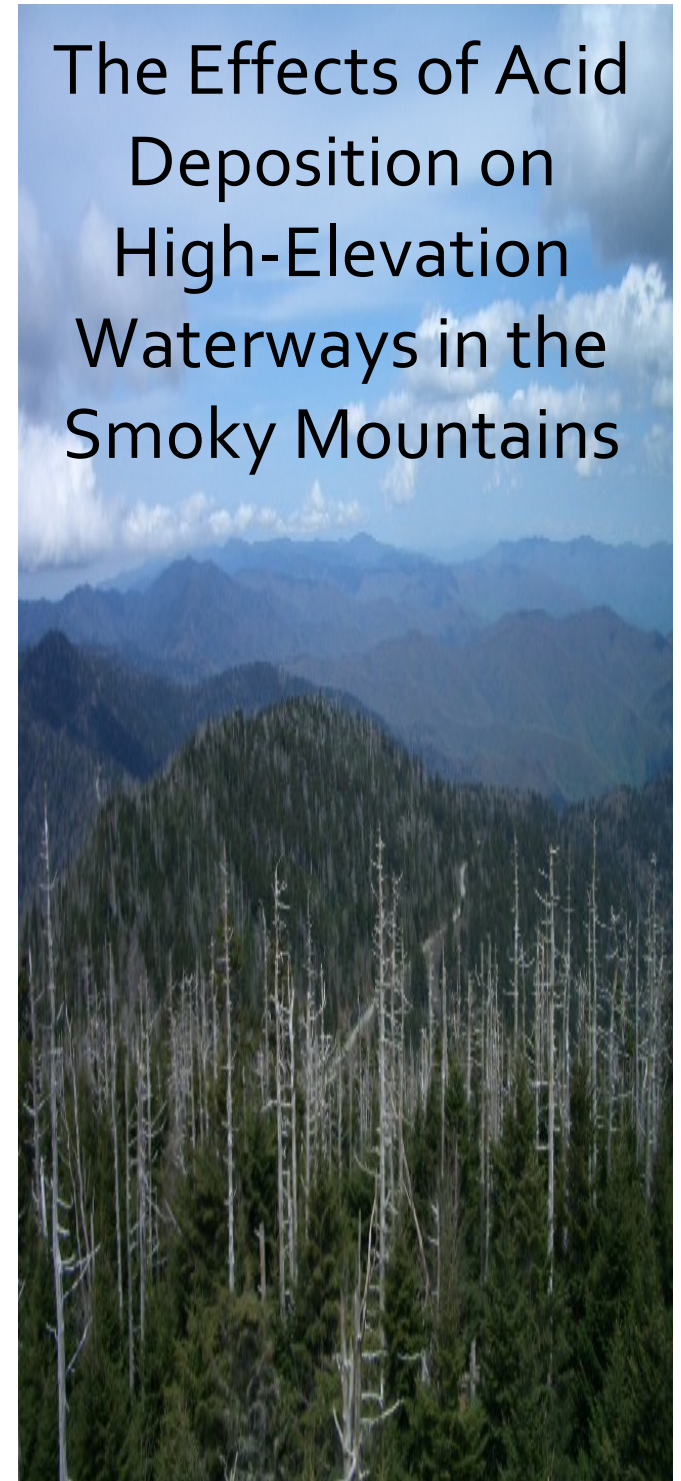
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The Effects of Acid Deposition on High-Elevation Waterways in the Smoky Mountains



Acid deposition is a pressing concern for the Great Smoky Mountains, especially affecting high- elevation (higher than 4,000 ft) waterways.

Nitrates and sulfates, two pollutants released from vehicle emissions and power plants respectively, are emitted into the air during the combustion of fossil fuels. In the air, these nitrates and sulfates combine with water vapor and are integrated into clouds. The clouds, which have become acidified from the pollutants, facilitate the transport of these pollutants towards the Smoky Mountains. These highly acidified clouds release nitrates and sulfates in the form of precipitation, which falls mainly in higher elevations where its effects are amplified as the water concentrates in streams. Clouds can also carry dry pollutant particles, which can fall directly into waterways.



General Effects of Acid Deposition on High-Elevation Waterways



Acid deposition has lowered the pH of almost 30% of high-elevation streams below the point where animals can safely live in them. During storms, when high volumes of acid rain deluge streams the pH of the water can dip as low as a pH of 3.5, about the same acidity as vinegar. The effects of acid deposition are magnified over time because as streams become more acidified they lose their ability to buffer future acid deposits. Already, almost 97% of high-elevation streams have little buffer capacity and are subject to the acidity of episodic rains. When streams lose their buffer capability, the acidity of the stream depends solely on the highly acidified acid deposition. It is predicted that in 50 years a majority of Smoky Mountain streams could have a pH of under 5.0, which is harmful to all forms of animal life.

Effects of Acid Deposition on Stream Biota

Acid deposition is particularly harmful to the native brook trout population. Brook trout have begun to disappear from many of the Smoky Mountain waterways, and if current trends continue it is predicted that in 50 years all streams in the Smoky Mountains will be too acidified for brook trout to live. Acid deposition affects the trout in two ways. The acidified compounds are inherently toxic to fish, but they also have a negative impact on the fish's gills causing the membranes to cease functioning properly. Acid deposition also mobilizes aluminum in the soil, which is also toxic to fish. Aluminum disrupts the membranes in fish's gills, causing severe physiological damage. Brook trout are not the only animals affected by acid rain. Many species of reptiles, salamanders, and snails have been harmed as well. Acid deposition hinders a snail's ability to uptake calcium to form its shell. This causes the snail's death since it has lost its main source of protection. Many diverse species of salamanders have also been threatened by acid deposition. Salamanders are very sensitive to changes in pH in the water they live in, and when the water becomes too acidified they die. This should be a pressing concern because many unique species of salamander are found only in the Smoky Mountains. Already some species of salamander have been pushed to the brink of extinction.