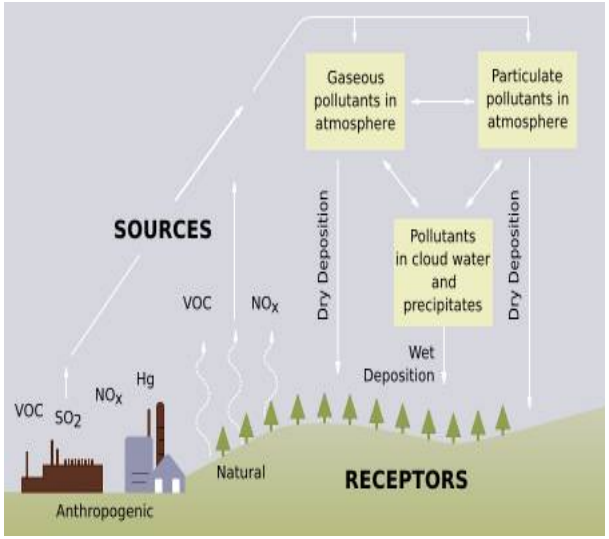

Nitrates and sulfates are harmful to many invertebrates, including snails.

Salamanders are particularly sensitive to changes in pH, and high acidity can kill them.

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- http://www.nrs.fs.fed.us/disturbance/pollution/
- http://www.epa.gov/acidrain/
- http://www.nps.gov/grsm/naturescience

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The Effects of Acid Deposition on the Great Smoky Mountains

What is acid deposition?

Acid deposition, also known as acid rain, is an environmental phenomenon caused by air pollutants, mainly nitrates (NOX) and sulfates (SOX), that is characterized by extremely high acidity which is particularly harmful to sensitive ecosystems.

What is the cause of acid deposition?

The main source of pollutants is the burning of fossil fuels. Vehicle emissions account for most of the nitrates in the air, and coal-fired power plants contribute most of the sulfates.

Why does acid deposition affect the Smoky Mountains?

The effects of acid deposition are particularly severe in the Smoky Mountains because of the large amounts of precipitation that fall there. The pollutants collect in the air outside of the park, and then are brought into the park by prevailing winds. Nitrates and sulfates then accumulate in the abundant clouds in the area, returning to the ground in the form of acid precipitation.

Where does acid deposition have the greatest effect?

The effects of acid deposition are the most severe at higher elevations over 4,000 feet where most precipitation occurs.

What are the harmful effects of acid deposition?

Acid deposition has many harmful effects in the Smoky Mountains ranging from damage to waterways, plants, and animals.

What harm does acid deposition do to waterways?

Acid deposition significantly lowers the pH of high-altitude streams, so much so that many aquatic plants and animals can no longer survive in them. During heavy storms, the pH of streams can dip to as low as pH 4.0 from a normal of around pH 6.5. This means the stream is over 200 times more acidified than normal. If this acidification of streams continues, in the future it is possible that many of these streams will become unlivable for many native species.

What harm does acid deposition do to animals in the Smoky Mountains?

Acid deposition has the greatest effect on high-elevation streams. Thus, brook trout populations have been in severe decline because they cannot survive in the acidified water. Acid deposition has also been the leading cause for the decline in the populations of many salamander species who cannot stand the change in pH.

What harm does acid deposition do to plants in the Smoky Mountains?

Acid deposition has had a profound negative impact on high-elevation red spruce tree populations. It is thought that acid deposition interferes with the spruce's ability to weather through winter. Regardless, much of the red spruce forests have been decimated. The destruction of these forests has significant impact, because without them aluminum in the ground is free to erode. This erosion further damages the soil and waterways as aluminum is highly toxic to most living things.