
ENVIRONMENTAL Fact Sheet



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Acid Rain

Acid rain, also known as acid deposition, is any form of precipitation with acidic components. It includes rain, snow, sleet, hail, fog, and even dust that fall from the sky.

What Causes Acid Rain?

Uncontaminated precipitation is naturally acidic. Water contains atmospheric gases as well as carbon dioxide, and when the carbon dioxide dissolves it forms carbonic acid, which makes the pH of normal rain about a 5.6 on the pH scale.

Acid rain is caused by the release of sulfur dioxide and nitrogen oxides into the atmosphere, where they react with water, oxygen, and other chemicals to become sulfuric and nitric acid respectively. The pH of acid-impacted rain is generally below 4.5 on the pH scale. Acid rain can be formed by natural causes, such as volcanic eruptions. More commonly, however, acid rain is due to human activities. Burning fossil fuels, manufacturing, oil refineries, electricity generation, and vehicles all release sulfur and nitrogen oxides into the atmosphere. In the United States, about two-thirds of all sulfur dioxide and one-quarter of all nitrogen oxide comes from electric power generation that relies on burning fossil fuels like coal.

What is the Effect of Acid Rain on New Hampshire Lakes?

Acid rain increases the acidity of lake water. This causes changes in the assemblages of plant and animals that occur naturally in the lake. An acid-stressed lake is typically very clear, with filamentous algae along the bottom and reduced fish population. Acid rain can leach copper, aluminum, and other heavy metals out of the soil and into runoff and drinking water. This process in turn puts more harmful materials in the water and soil, thus reducing the populations of organisms in the waterbody or soil. Some lakes in New Hampshire have reached the point where fish are unable to survive due to the acidity of the water.

New Hampshire's surface water is particularly vulnerable to acid rain. Due to natural geology such as our granite, our surface water has naturally low buffering capacity. Elements like calcium or magnesium can "buffer" against acidic inputs, which can counteract or neutralize acid rain. These elements tend to be in low concentration in our surface waters.

NHDES has three programs that monitor acid rain: the Rooftop Rain Program, the Remote Pond Program, and the Acid Outlet Program. The Rooftop Rain Program, initiated in 1972, monitors the pH of precipitation events by collecting rain and snow on the rooftop of the NHDES building. The Remote Pond Program, initiated in 1981, is a collaboration between NHDES and NH Fish & Game, where water is collected from 10 remote ponds during fish stocking activities. Lastly, the Acid Outlet Program, initiated in 1983, monitors 20 lakes twice a year for pH and acidifying compounds. Since these programs were initiated, the Rooftop Rain Program has documented a significant improvement in pH levels, and the

Remote Pond and Acid Outlet Programs have documented significant reductions in sulfuric and nitric acids in our water.

How Can We Reduce Acid Rain?

The impact of acid rain has lessened in recent years, largely due to legislation such as the Clean Air Act which limited the amount of pollutants, such as sulfur dioxide, that could be emitted. This has prompted a slow, partial recovery of New Hampshire's surface waters from the impacts of acid rain.

While some improvements have been documented, the influence of acid rain is far from over. Conserving energy to reduce the need for fossil fuel burning will go a long way toward reducing acid disposition. Here are some tips for reducing your energy needs:

- Turn off lights, computers and other appliances when not in use.
- Use energy-efficient lighting, air conditioners, heaters, refrigerators, washing machines, etc.
- Only use electric appliances when you need them.
- Keep your thermostat at 68 F in the winter and 72 F in the summer. Conserve more energy at night and when you're away from home.
- Insulate your home.
- Carpool, use public transportation, or better yet, walk or bicycle whenever possible.
- Buy vehicles with low nitrogen oxide emissions, and keep vehicles well maintained.
- New Hampshire residents have options when it comes to choosing an electricity provider. Consider switching to an energy provider or program that utilizes renewable resources.

Other Resources

[NHDES Acid Rain Status and Trends Report](#)

[NHDES Acid Rain Status and Trends Summary Sheet](#)

Trend in pH values of precipitation collected at NHDES through the Rooftop Rain Program, 1972 – 2013.

