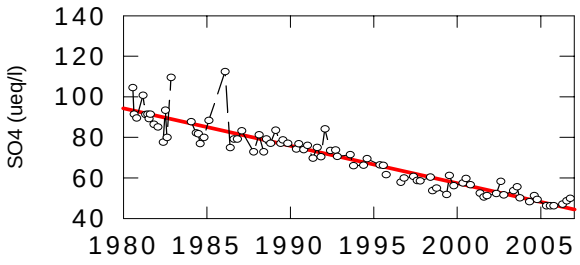
Acid Rain in the 21st century

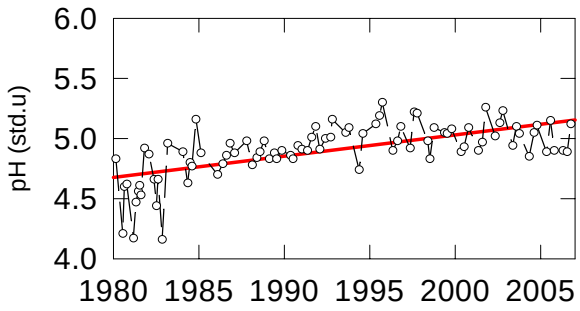
Is Acid Rain Really Still a Problem?

Many people think that acid rain was a problem solved in the 1980s. Indeed, the United States Congress pass Acid Rain Amendments to the Clean Air Act in 1990 and as a result, our air was cleaned up, right? Not exactly.

The Clean Air Act had a huge impact on reducing the amount of acid forming particles released into the air. Stationary "point" sources of pollution were targeted in the legislation, such as coal burning power plants, metal ore smelters and waste incinerators. As a result, there was a 40% reduction in the amount of nationwide sulfur emissions from 1980-2006.

Acid lakes in Vermont have responded with reduced sulfate concentrations and increasing pH levels as shown on Haystack Pond (Wilmington, VT) from 1981-2006. (Figure 1: sulfate concentration and Figure 2: pH.





However, while this was a great start, Vermont's precipitation continues to be unnaturally acidic and some of our lakes do not support healthy biological communities due to the acidic conditions.

Why are our Lakes and Rainfall still acidic?

Rain and snow tend to be naturally acidic and unpolluted rain has a pH of 5.6, below the neutral pH of 7.0 (Refer to the pH scale on page 2).

However, the rain and snow that falls on Vermont today is much more acidic than what is attributable to natural causes. In Vermont, the average pH of rain is between 4.2 and 4.4 with extremes ranging from 2.4 to 7.4. Rain that has a pH of 4.6 is 10 times more acidic than natural rainfall.

Our lakes and rainfall are still acidic because Vermont continues to receive polluted air from the mid-western industrialized parts of the country.

Electric power plants account for ⅔ of the sulfur dioxide and ¼ of the nitrogen oxide emissions in the United States. Some coal burning power plants were originally grandfathered in the Clean Air Act Amendments as they anticipated closing in the near future. Yet, these power plants continued to operate and burn high sulfur coal, releasing emissions four times the legal limit. As a result of a 1999 lawsuit brought by the New England states' attorney generals and some environmental groups, these power plants agreed in the fall of 2007 to abide by the Clean Air Act. Marked reductions in the pollution load being deposited on Vermont are anticipated.

Vermont's leading local source of air pollution is the automobile. As industries have reduced their emissions, vehicles play an increasing role in air pollution,

For More Information contact:
Vermont Water Quality Division
802-241-3777

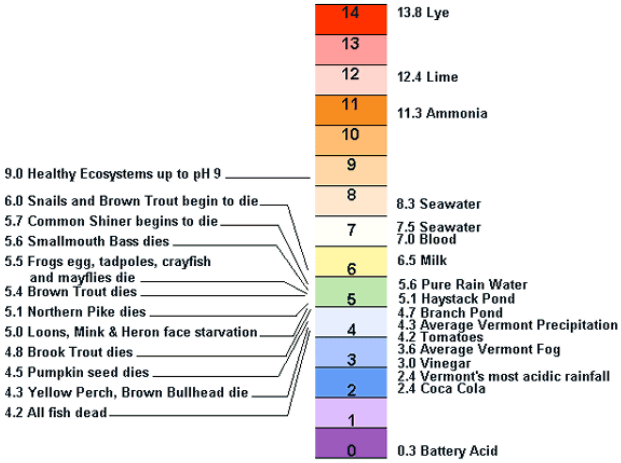
VERMONT
AGENCY OF NATURAL RESOURCES

Are Vermont's Lakes Dead?

While some of Vermont's acid lakes are fishless, they do support acid-tolerant insects such as whirligig beetles, water boatmen, dragon flies and backswimmers. Acidified lakes lack fish and populations of snails, crayfish and other acid-sensitive species dependent on calcium for their exoskeletons and reproduction.

Aquatic life can be harmed by acid rain directly through low pH and also through high aluminum levels. Aluminum is mobilized from the soil by acid leaching and has a toxic effect on fish and other aquatic organisms.

See the pH Scale with reference to Vermont Aquatic Ecosystems below.



What is Vermont Doing?

Vermont has studied the chemical and biological effects of acid rain since the early 1980s.

Vermont is fortunate to have dedicated group of volunteer acid rain monitors who have stations located on the summit of Mt. Mansfield, our highest peak, in Underhill, Morrisville as well as St. Johnsbury. These monitors track the acidity of precipitation seasonally, annually and over a range of elevations. Their data has documented that the western slopes of the Green Mountains receive more acidic precipitation than the eastern slopes, while Vermont's highest peak receives the most acidic. Their work has demonstrated that while the pH of Vermont's precipitation has slowly begun to increase, it remains unquestionably acidic.

Vermont Agency of Natural Resources monitors twelve acid lakes seasonally: Beaver (Holland), Big Mud (Mt. Tabor), Bourn (Sunderland), Branch (Sunderland), Forester (Jamaica) Grout (Stratton), Hardwood (Elmore), Haystack (Wilmington), Howe (Readsboro), Little (Woodford), Stamford (Stamford) Sunset (Marlboro).

Monitoring these lakes has revealed reductions in their acid concentrations in addition to reductions in the buffering agents such as calcium and magnesium in the waters. What does this mean? It means that while less acids are going into the waterbodies, there are also less buffers available to counteract the influence of these acids. As a result, we have seen no improvement in the biological condition of these lakes.

What Can I Do?

The less energy you use, the better our air and water quality will be. Consider your lifestyle. Do you drive a car? Do you carpool? Is your electricity produced by burning fossil fuels? Are there changes you can make to conserve energy or to use different energy sources?

Walk when you can. Reduce the miles you drive. Buy a more fuel efficient vehicle. Carpool: Contact Vermont Ride Share: 800-685-7433.

Ask your local electric company to buy electricity from renewable resources; many in Vermont offer this option.

Make your home energy efficient. Buy Energy Star appliances.

Turn down your thermostat when you are not home. Improve insulation. Check out the Vermont Energy Star Homes' web site to save money and improve the efficiency of your home.

Follow the suggestions on the Vermont Agency of Natural Resources EcoLogical Solutions: Global Warming web site. It provides guidance on how to make your daily lifestyle more earth-friendly.

Reduce your ecological foot print. Pollution that contributes to Global Warming and Acid Rain have similar origins. For more information on Global Warming go to EPA's Global Warming website www.epa.gov/climatechange/.