

2015 Acid Rain Status and Trends



New Hampshire Precipitation, Lakes, and Ponds

For over three decades, NHDES has monitored precipitation as well as water in lakes and ponds to better understand the long-term impacts of acid rain. Previous research has found that the accumulation of acidifying compounds has, over time, diminished the ability of some ecosystems to neutralize acids, especially in acid sensitive locations like New Hampshire. Despite significant improvements in air quality at the national and local level which has reduced acid rain, the recovery of the state's waterbodies has been slow. However, NHDES monitoring has shown that New Hampshire's waterbodies are exhibiting signs of recovery. Continued monitoring will allow NHDES to document additional water quality improvements and recovery while preserving the robustness of the long-term data sets.

Measured Parameters

pH: measures the acidity or the basicity of aqueous solutions on a scale of 0 to 14, with values less than 7 being acidic, values greater than 7 being basic, and 7 being neutral.

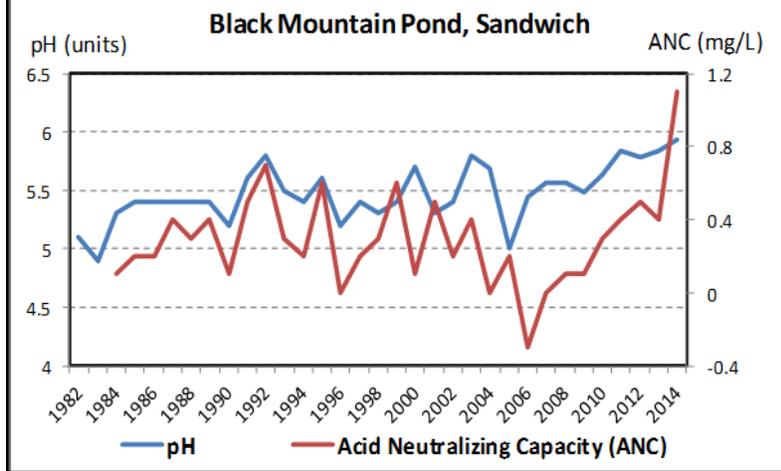
Acid Neutralizing Capacity (ANC): measures the ability of water to neutralize the acidic input to the lake.

Specific conductance: measures how well water can conduct an electric current. Conductivity increases as the number of charged molecules in the water increases.

Nitrate (NO_3^-): acidifying compound

Sulfate (SO_4^{2-}): acidifying compound

Example of pH and ANC trends of an individual waterbody in the Remote Pond Program



NHDES Acid Rain Monitoring Programs

Rooftop Rain Program

- Initiated in 1972
- Samples collected following precipitation events
- Collected on the rooftop of NHDES in Concord, NH

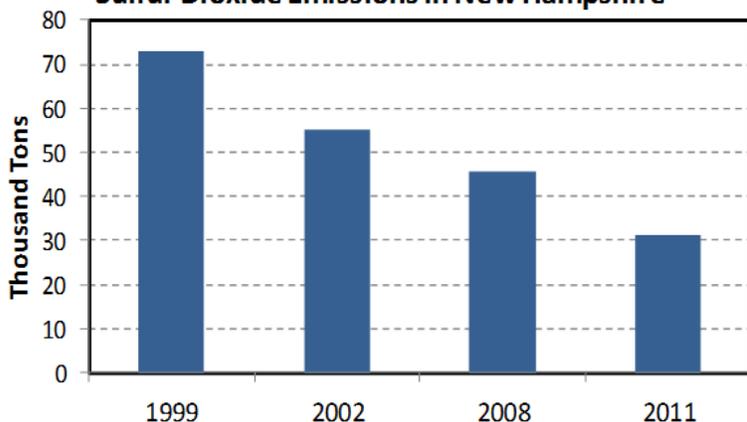
Remote Pond Program

- Initiated in 1981
- Annual spring sampling of 10 waterbodies
 - High elevation
- Sampled in collaboration with NH Fish & Game

Acid Outlet Program

- Initiated in 1983
- Biannual sampling of 20 waterbodies
 - Low elevation
- Headwater ponds with small watersheds
- Sampling is conducted in the spring and fall

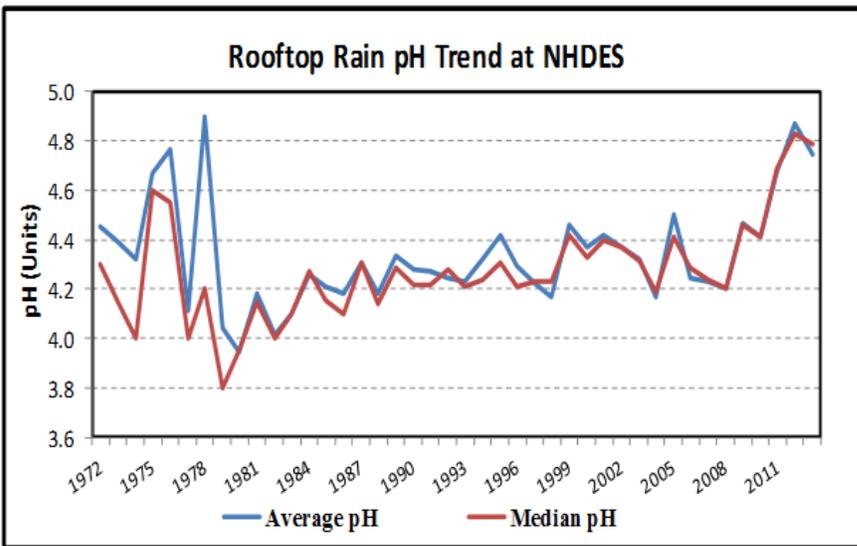
Sulfur Dioxide Emissions in New Hampshire



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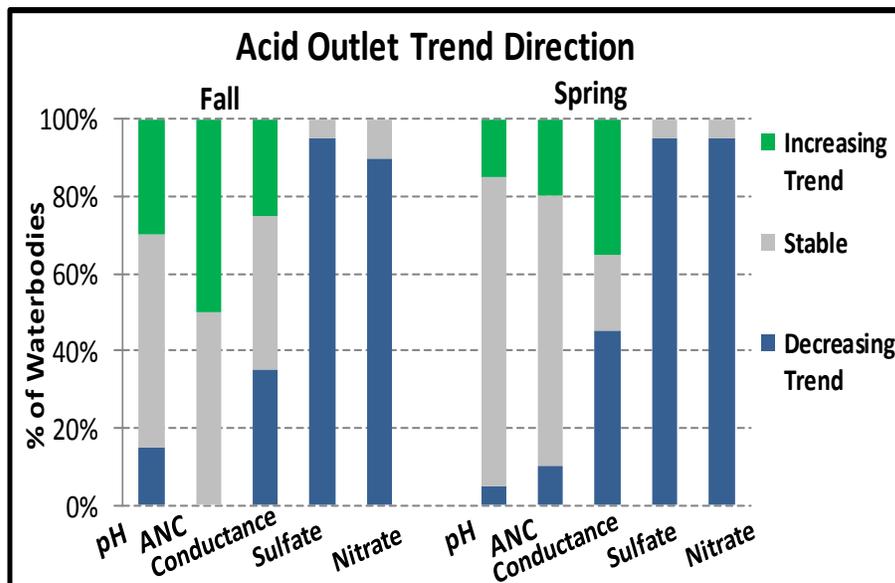
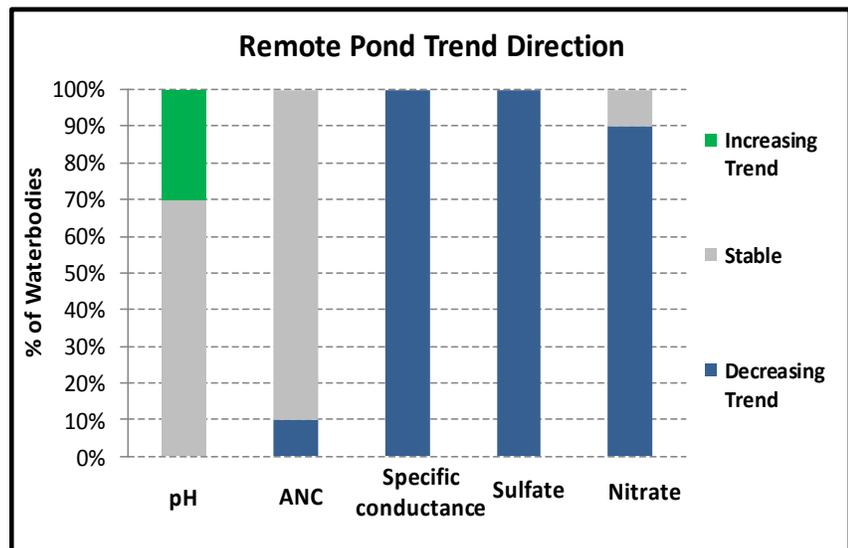


Rooftop Rain Program

Rainfall pH has significantly increased (become less acidic) since NHDES began testing precipitation in 1972. Sulfate and nitrate concentrations have also significantly decreased over time.

Remote Pond Program

Out of 10 waterbodies, 30% have undergone a significant increase in pH since monitoring began in 1981. ANC decreased in 10% of the waterbodies but remained stable in the other 90%. 100% of the waterbodies had a significant decrease in specific conductance and sulfate concentration, as well as a 90% reduction in nitrate concentrations.



Acid Outlet Program

ANC and pH have increased or remained stable in a majority of the 20 monitored waterbodies. Specific conductance was variable. Sulfate and nitrate concentrations significantly decreased in $\geq 90\%$ of waterbodies. In general, spring sampling trends show less recovery than fall sampling trends due to a 'shock' of acidifying compounds that accumulated in the snow and are rapidly released during melt.