

# ACID RAIN

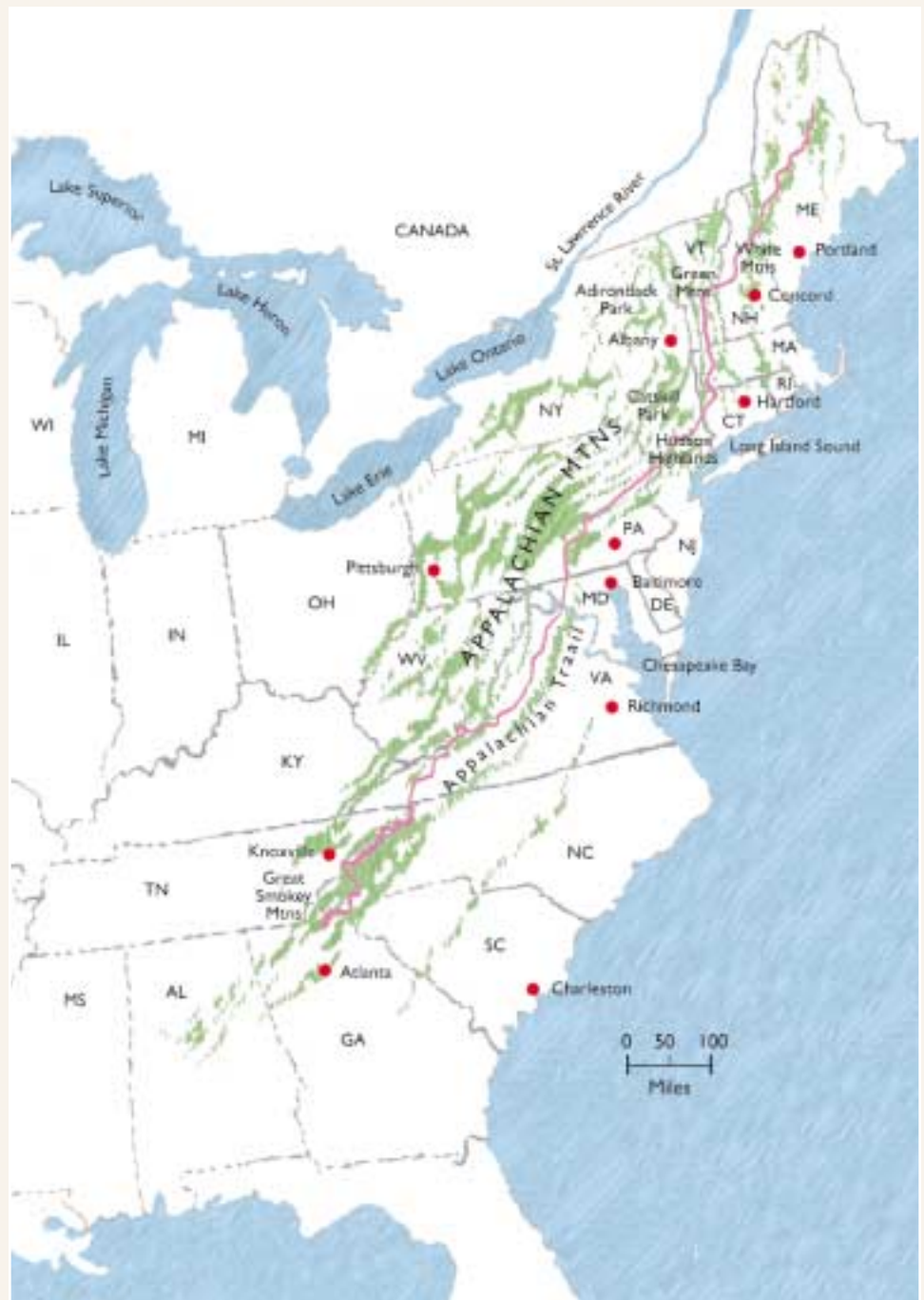


A Continuing National Tragedy

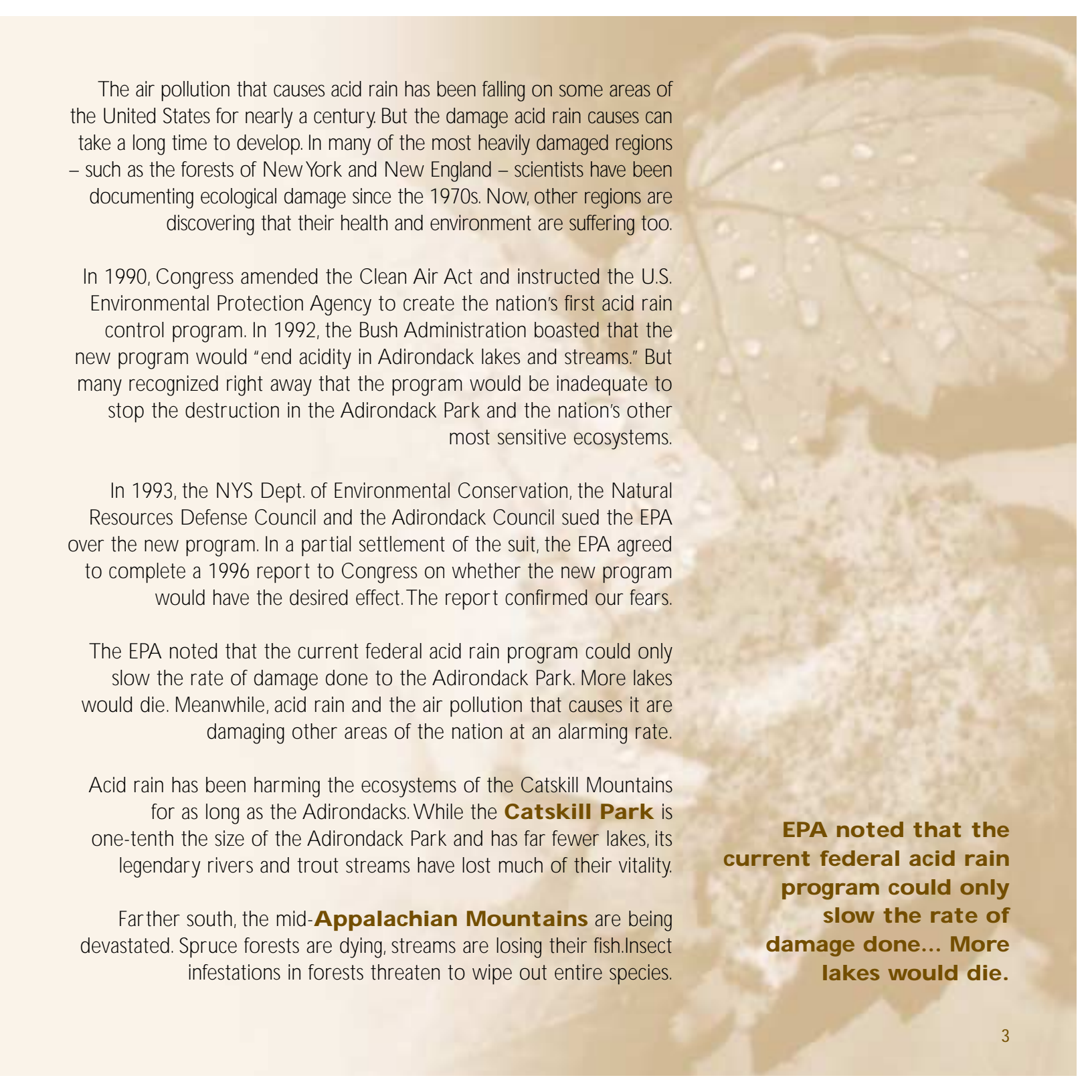
“ We still have a very major problem with acid rain. That is scientific fact. In that regard, the 1990 Clean Air Act Amendments have not worked very well.”

*Acid rain scientist Dr. Gene Likens, Boston Globe, February 8, 1998*

Despite the Clean Air Act Amendments of 1990, acid rain continues to degrade ecosystems in high-elevation forests and waters from New York's Adirondack Park, Taconic Ridge, Catskill Park and Hudson Highlands; through New England's Green and White Mountains and the mid-Appalachian range in the Carolinas and Tennessee. Associated nitrogen-based air pollution is ruining aquatic habitat in Long Island Sound and the Chesapeake Bay and even Colorado's Rocky Mountains are now showing air-pollution-related damage.



The Long-suffering High Country  
Map art by Tom Suzuki, Inc.



The air pollution that causes acid rain has been falling on some areas of the United States for nearly a century. But the damage acid rain causes can take a long time to develop. In many of the most heavily damaged regions – such as the forests of New York and New England – scientists have been documenting ecological damage since the 1970s. Now, other regions are discovering that their health and environment are suffering too.

In 1990, Congress amended the Clean Air Act and instructed the U.S. Environmental Protection Agency to create the nation's first acid rain control program. In 1992, the Bush Administration boasted that the new program would “end acidity in Adirondack lakes and streams.” But many recognized right away that the program would be inadequate to stop the destruction in the Adirondack Park and the nation's other most sensitive ecosystems.

In 1993, the NYS Dept. of Environmental Conservation, the Natural Resources Defense Council and the Adirondack Council sued the EPA over the new program. In a partial settlement of the suit, the EPA agreed to complete a 1996 report to Congress on whether the new program would have the desired effect. The report confirmed our fears.

The EPA noted that the current federal acid rain program could only slow the rate of damage done to the Adirondack Park. More lakes would die. Meanwhile, acid rain and the air pollution that causes it are damaging other areas of the nation at an alarming rate.

Acid rain has been harming the ecosystems of the Catskill Mountains for as long as the Adirondacks. While the **Catskill Park** is one-tenth the size of the Adirondack Park and has far fewer lakes, its legendary rivers and trout streams have lost much of their vitality.

Farther south, the mid-**Appalachian Mountains** are being devastated. Spruce forests are dying, streams are losing their fish. Insect infestations in forests threaten to wipe out entire species.

EPA noted that the current federal acid rain program could only slow the rate of damage done... More lakes would die.



Gary Randorf

In New England, studies by acid rain research scientist Dr. Gene Likens showed that the hardwood forest of **New Hampshire's** Hubbard Brook area has stopped growing. Sugar maples are at particular risk — bad news indeed for furniture and syrup makers.

Up north, the Canadian government estimates that by 2010, even with full implementation of the Canadian and American acid rain programs, an area the size of France and Britain in **southern Canada** will continue to receive harmful levels of acid rain. As many as 95,000 lakes will remain damaged, they stated in 1997.

Out west, scientists in the **Rocky Mountains** are finding that power plant emissions are saturating high-elevation watersheds in Colorado with acid-causing nitrogen. Evergreen forests are losing their needles and tree health is declining throughout the Front Range.

Acid rain damage is not limited to forests and aquatic ecosystems. In Pennsylvania, the monuments at the Civil War battlefield in **Gettysburg** are deteriorating far more quickly than similar structures in places not affected by acid rain. Throughout the Northeast, stone, brick and block buildings, as well as automobile finishes, show signs of more extensive and rapid weathering than counterparts in other regions of the country.

In the **Chesapeake Bay** and **Long Island Sound**, nitrogen-based pollution is overloading the water with nutrients. This contributes to an overabundance of algae, which when they die and decay, deplete the water of precious oxygen needed by all aquatic animals. The condition is known as hypoxia.

Closer to our homes, acidity in water supplies is leaching poisonous metals such as lead into the drinking water. Copper is killing the beneficial bacteria that make septic systems function. Airborne particles of sulfur — the chief component of acid rain — also cause and worsen lung diseases.

The few fish species that can survive in acidic waters are accumulating mercury in their body tissue. Now, mammals and birds that live on those fish are showing signs of mercury contamination. More than 500 lakes and ponds (out of 2,800) in the Adirondack Park are already too acidic to support the plants and aquatic wildlife that once existed in them. Each spring, an entire winter's acidic snowpack melts into the Park's waters, jolting them with a huge jump in acidity known as "acid shock." It could not happen at a worse time. Many of the Park's plants, animals and insects are at their most vulnerable at the beginning of the growing season.

Red spruce forests on the western-facing slopes of the Park's High Peaks region are stunted and dying at a rapid pace. Those forests receive extremely high levels of polluted precipitation that blows in from the coal-fired smokestacks of the Ohio Valley and beyond. Day after day, even when it doesn't rain or snow, the pollution hangs in acid clouds that shroud the mountains in a caustic fog.

Adding insult to a long list of injuries, Canadian studies show that the larvae of black flies — the bane of spring outdoor activities in the Northeast and southern Canada — seem to thrive in acidic waters. Consequently, their populations are exploding as pollution changes the chemistry of the waters from which they hatch.

The Adirondack Park is suffering the worst damage in the nation from acid rain. And because nearly all of the utility plant pollution that causes acid rain in the Adirondacks comes from outside the state, New Yorkers alone can do little to prevent the onslaught.

The good news is that the current acid rain program is costing utility companies far less than they predicted when Congress was contemplating the Clean Air Act Amendments of 1990. As a result, the total costs of finishing the job Congress intended to do in 1990 would still be less than original estimates.

Tightening sulfur emissions further — combined with strict, new controls on nitrogen emissions — would help restore the health of our forests, lakes and streams; help prevent certain lung diseases; increase long-range visibility, and help coastal estuaries maintain healthy levels of dissolved oxygen.

This problem can be solved before the symptoms get any worse. The solution is affordable. All that remains is for Congress to act.

***See Specific Recommendations  
on Page 22***

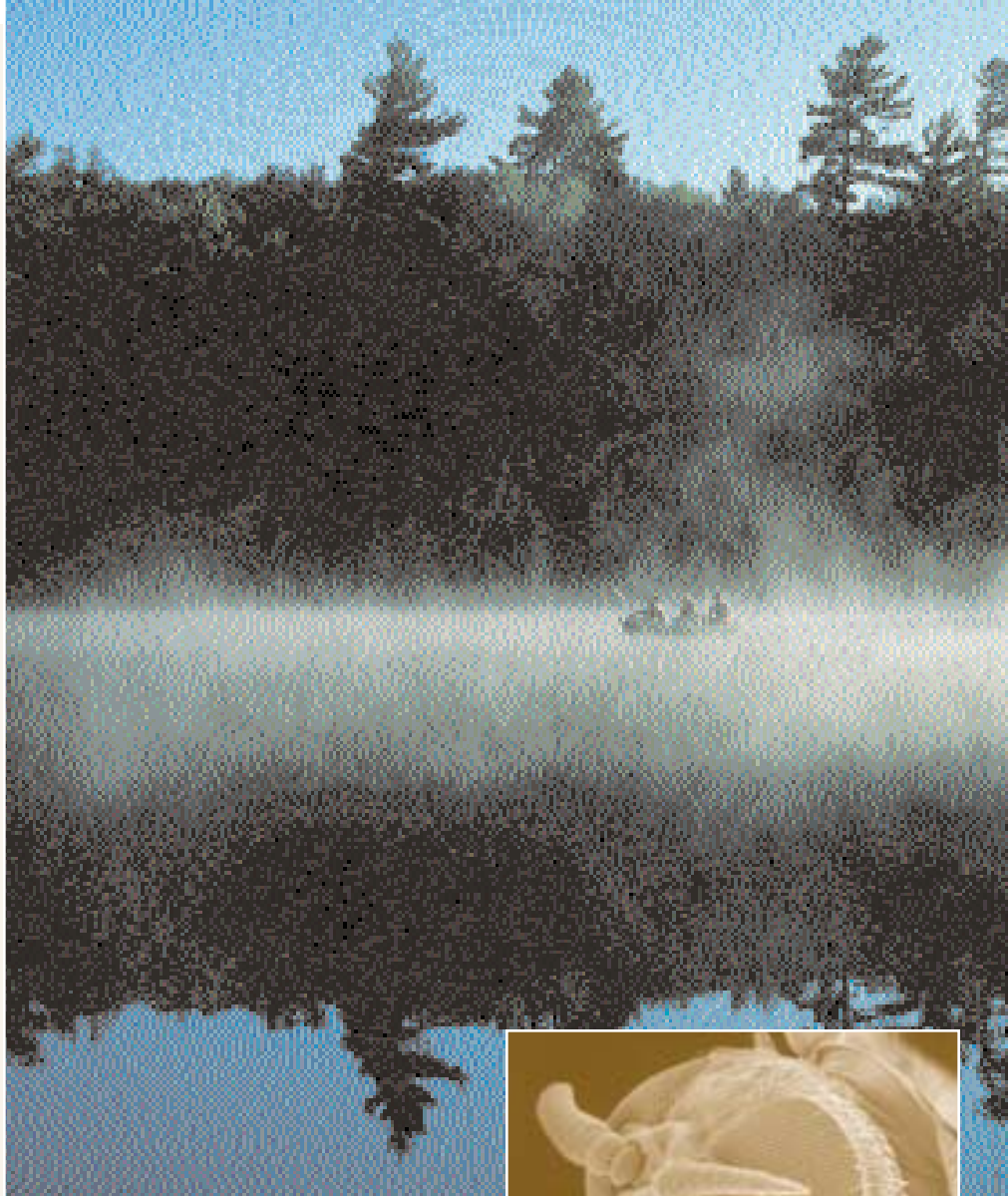
**Low pH and species loss.** The pH of Bear Pond hovers around the critical level of 5.0, at which most fish and other native aquatic life cannot survive.

Rainfall, snow, sleet, fog and mist falling on the Adirondack Park can be more than 200 times more acidic than untainted rain, with a pH of 3.3 or less.

Studies of Adirondack waters by the Adirondack Lakes Survey Corp. show that up to 27 percent of all 2,800 lakes and ponds remain at a pH of less than 5.0 all year. Each spring, as the previous winter's acidic snowpack melts all at once, the resulting "acid shock" causes the pH in up to 58 percent of the Park's waters to drop below 5.0 for weeks at a time.

Each year, as pollutants and acidity accumulate, a few more lakes become too acidic to support their natural life forms. EPA now estimates that 43 percent of the Park's lakes and ponds will reach the critical point by the year 2040 without further controls on air pollution. By then, EPA predicts that nearly all of the Park's streams will fall into the critical zone during the spring and most will stay that way all year.

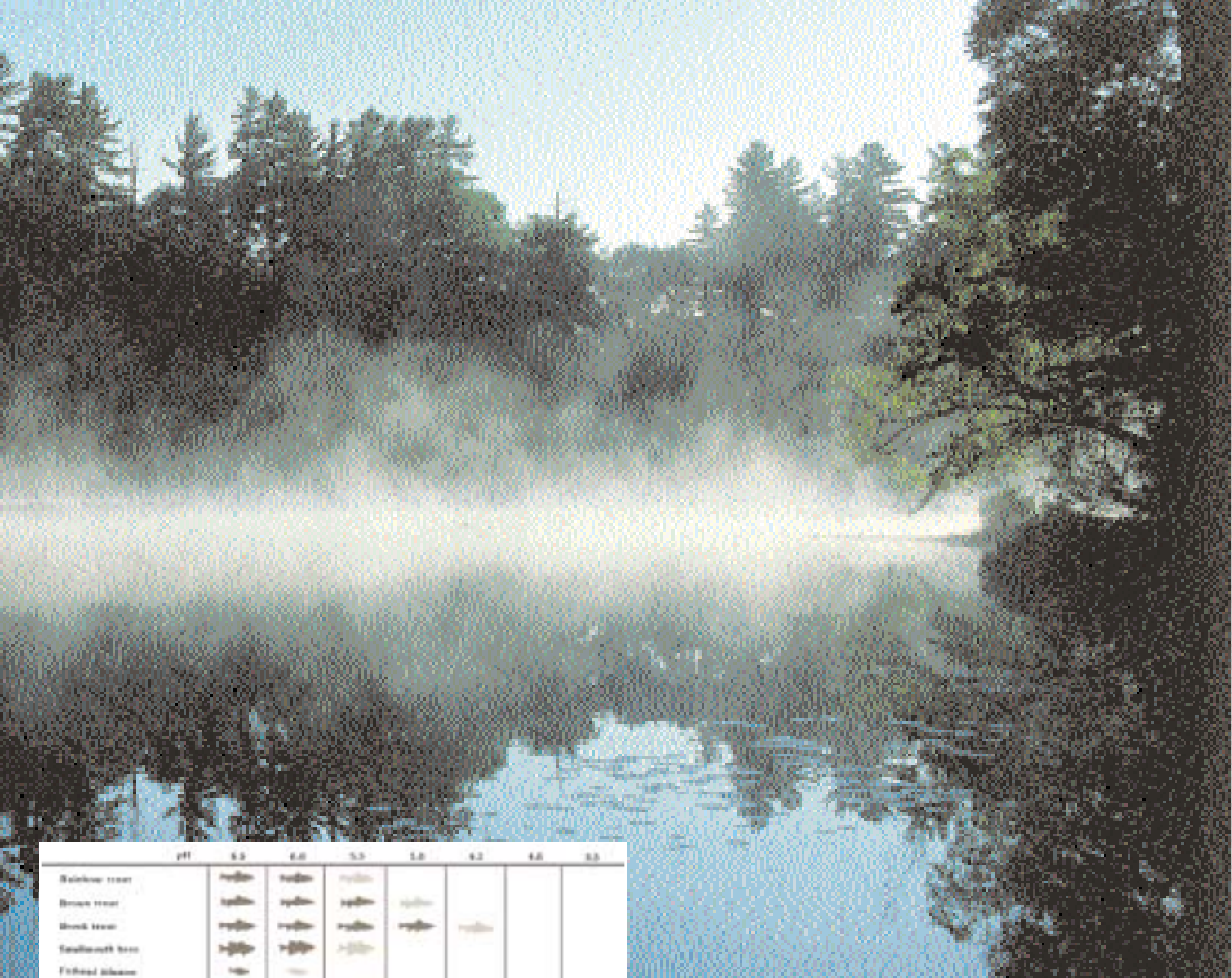
**Black flies** are the scourge of springtime outdoor activity in the Northeast and southern Canada. Their bites are painful, bloody and often leave welts on the skin. While many aquatic species decline and die-off in acidic water, black fly larvae remain unaffected by acidity or the heavy metals acidity leaches into the water. As a result, the black fly has less competition for habitat and fewer predators. In short, black flies do best where acid rain is worst.



**Bear Pond, NY**  
*Gary Randolph*

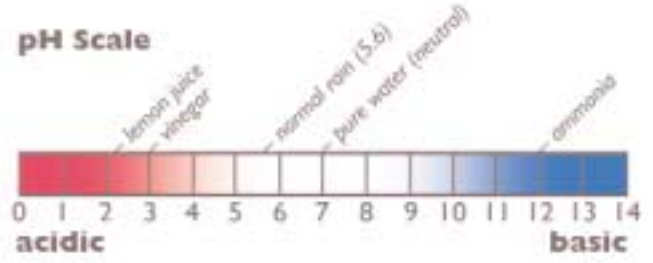


**Black flies love acid rain.**  
*NYS Department of Education / NYS Museum*



pH	5.5	6.0	5.5	5.0	4.5	4.0	3.5
Rainbow trout	✓	✓	✓	✓	✓	✓	✓
Brown trout	✓	✓	✓	✓	✓	✓	✓
Brook trout	✓	✓	✓	✓	✓	✓	✓
Smallmouth bass	✓	✓	✓	✓	✓	✓	✓
Fishhead salmon	✓	✓	✓	✓	✓	✓	✓
Pumpkinseed sunfish	✓	✓	✓	✓	✓	✓	✓
Yellow perch	✓	✓	✓	✓	✓	✓	✓
Wood frog**	✓	✓	✓	✓	✓	✓	✓
American eel**	✓	✓	✓	✓	✓	✓	✓
Spotted salamander*	✓	✓	✓	✓	✓	✓	✓
Clam**	✓	✓	✓	✓	✓	✓	✓
Snail**	✓	✓	✓	✓	✓	✓	✓
Worm**	✓	✓	✓	✓	✓	✓	✓

\*endemic life stage  
 \*\*injected species  
 Adapted from U.S. Department of the Interior - Fish and Wildlife Service



As pH decreases, more species die.





### Camels Hump, VT 1963

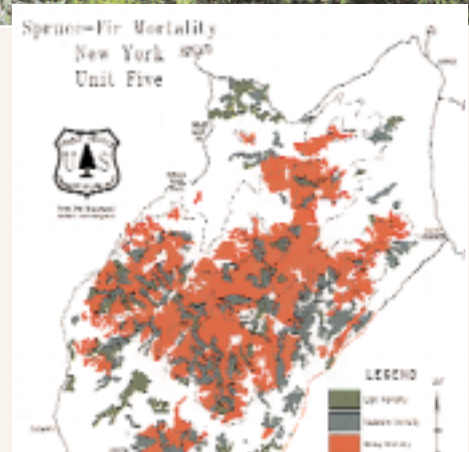
*Vermont Forest Ecosystem Monitoring Program*

**Mount Marcy.** Red spruce trees on the upper slopes of mile-high Mount Marcy, New York's highest peak, have suffered severe die-back from the effects of acid rain and a harsh climate.

**Adirondack High Peaks.** U.S. Forest Service map showing a large kill zone (colored red) in the spruce/fir forests of New York's highest mountains. Mount Marcy is just below center.



Mount Marcy, NY  
*Mike Storey*



Adirondack High Peaks  
*US Forest Service*



Camels Hump, VT 1983  
*Vermont Forest Ecosystem Monitoring Program*

**Camels Hump.** Camels Hump, in Vermont's Green Mountains, at left, in 1963. Above, the same location 20 years later. Photos reveal what botanical studies have confirmed: the decline in red spruce forests has been rapid and unmistakable over the past three decades. Acidity leaches aluminum out of rock and soil and depletes the soil of vital minerals. Aluminum destroys the root hairs of trees, preventing them from absorbing the water and nutrients needed for survival.



### Mount Mitchell, NC

*Gary Randorf*

**Mount Mitchell.** Aside from the Adirondacks and Catskills, the one area of the country suffering the most acid rain damage is the mid-Appalachian region. These spruce trees are dead and dying on the slopes of Mount Mitchell in North Carolina.

They have succumbed to aluminum damage affecting their roots.

**Appalachian damage.** Often, a tree weakened over time by acid rain will die from what — on the surface — appears to be an unrelated disease or other stress factor. Species such as spruce and fir, for example, can succumb to severe cold, drought, insect infestations or diseases that may have caused little damage to a tree located where acid rain is less severe.

Reports by the U.S. Forest Service indicate that death rates for many tree species have doubled or tripled in parts of the greater Appalachian range since the 1960s and 70s. The greatest proportion of dead trees are located in areas that receive the highest doses of sulfur- and nitrogen-based air pollution.



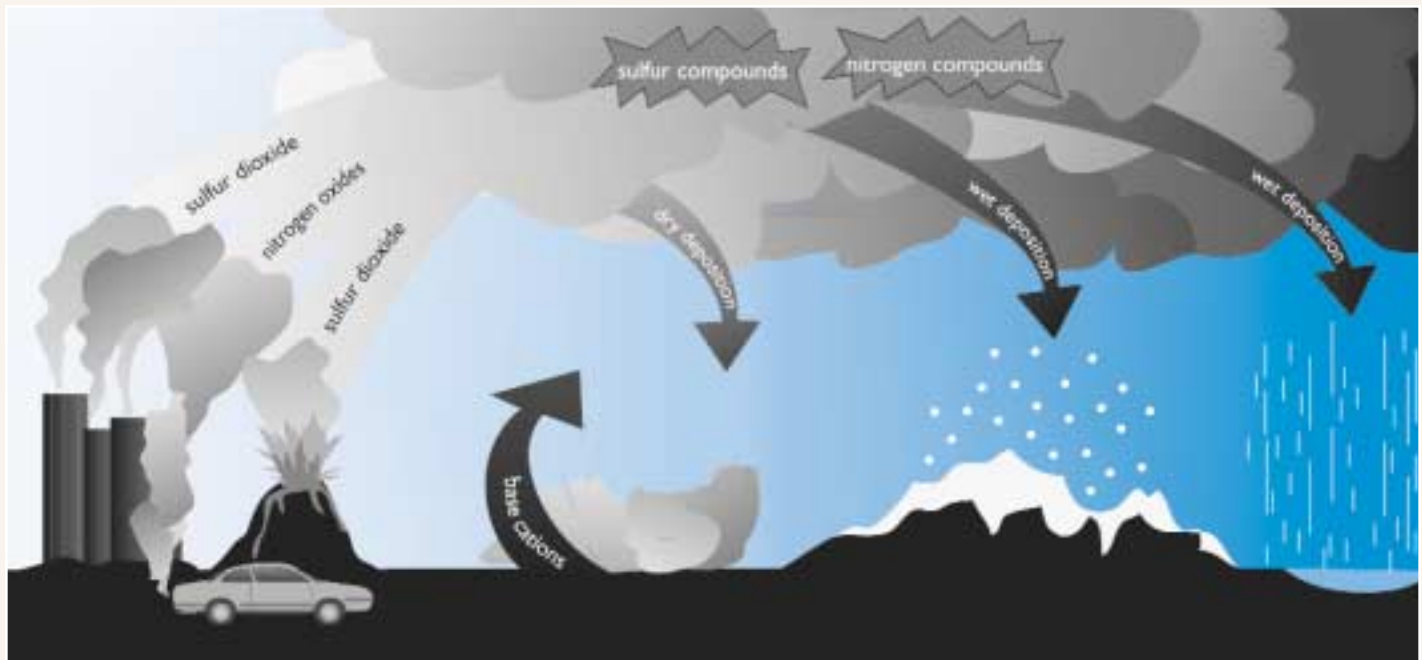
Winter Injury  
*Jenny Hager*

“Winter injury” on a red spruce tree in Vermont’s Green Mountains, caused by a combination of cold weather and acid rain.



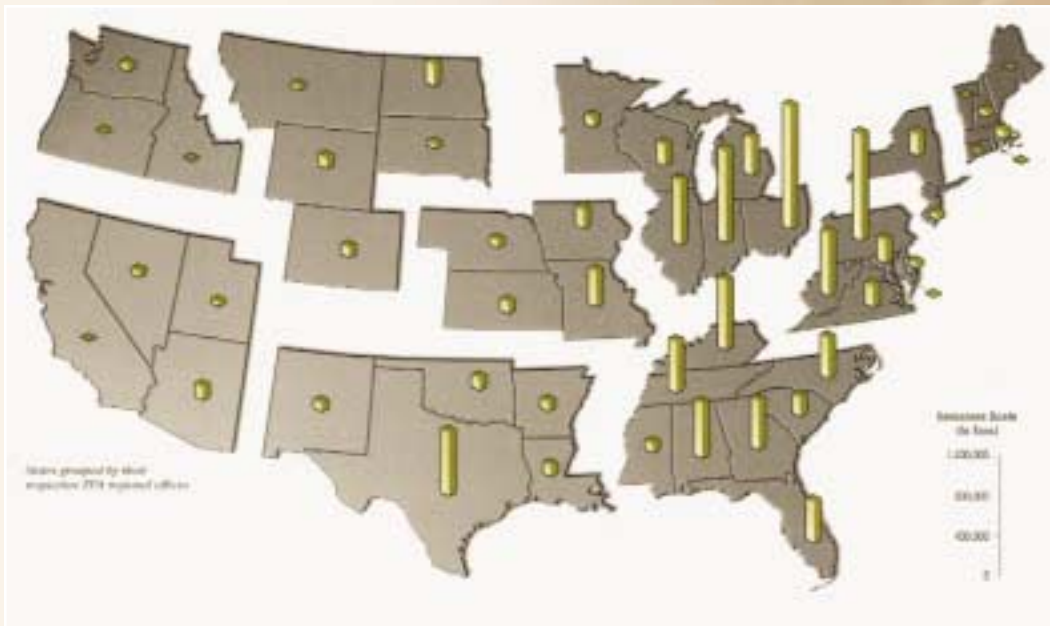
Insect Infestation  
*Quintin McClellan / Virginia Tech*

**Insect Infestation.** A hemlock branch in the mid-Appalachian Range infested by woolly adelgids. Adelgids love nitrogen and their populations explode in the presence of nitrogen-based air pollution. Mature trees can die from the infestation within four years.



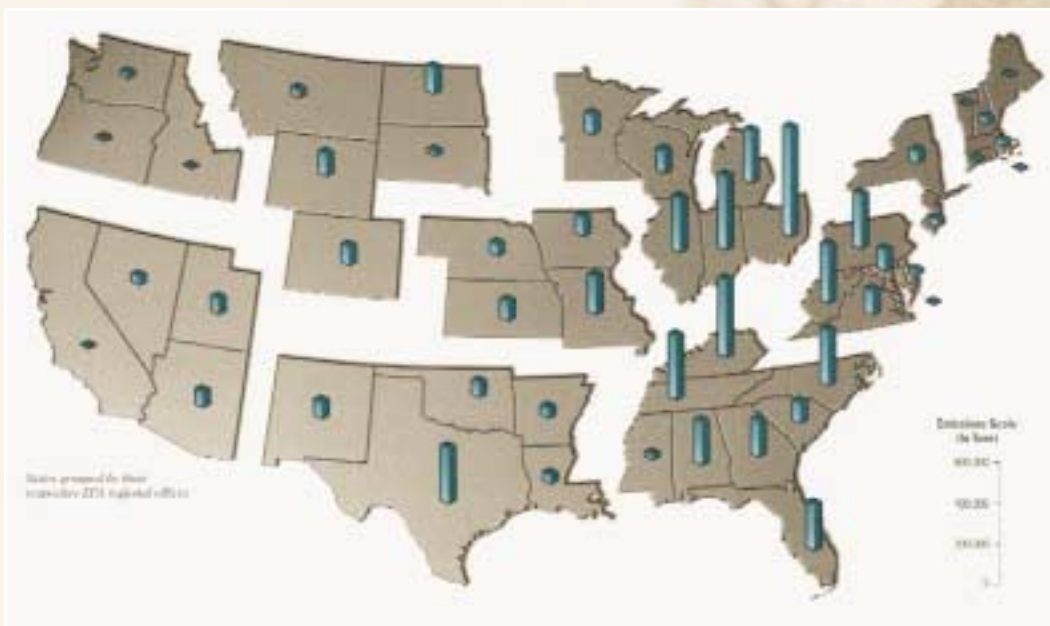
Art by Rani Stack

**The mechanics of Acid Rain.** As the above graphic shows, acid-rain-causing pollution is carried on prevailing winds and can drift for hundreds of miles before it is deposited by precipitation. Adirondack, Catskill and Appalachian mountain regions are the hardest hit because prevailing winds carry the pollution from several other states onto those mountain ranges. As the winds rise over the mountains, the moisture they contain cools and condenses into clouds, which reach the point of saturation. The resulting, rain, snow, sleet and/or fog has high concentrations of sulfur and nitrogen pollution. The sulfur-dioxide becomes sulfuric acid. The nitrogen becomes nitric acid. Alkaline minerals such as calcium and magnesium in soil and the air (a.k.a. base cations) help buffer acidity. But acid rain washes those minerals out of the soil faster than weathering can replace them by breaking down rock.



Sulfur-dioxide Pollution (1996)  
 US Environmental Protection Agency

Sulfur-dioxide emissions. The U.S. Environmental Protection Agency (EPA) scorecard for sulfur-dioxide emissions from the nation's dirtiest power plants. Relatively low emissions in the Northeast don't translate into clean air. In fact, some of the states with the lowest emissions have been damaged the most, by pollution created by their neighbors.



Nitrogen-oxide Pollution (1996)  
 US Environmental Protection Agency

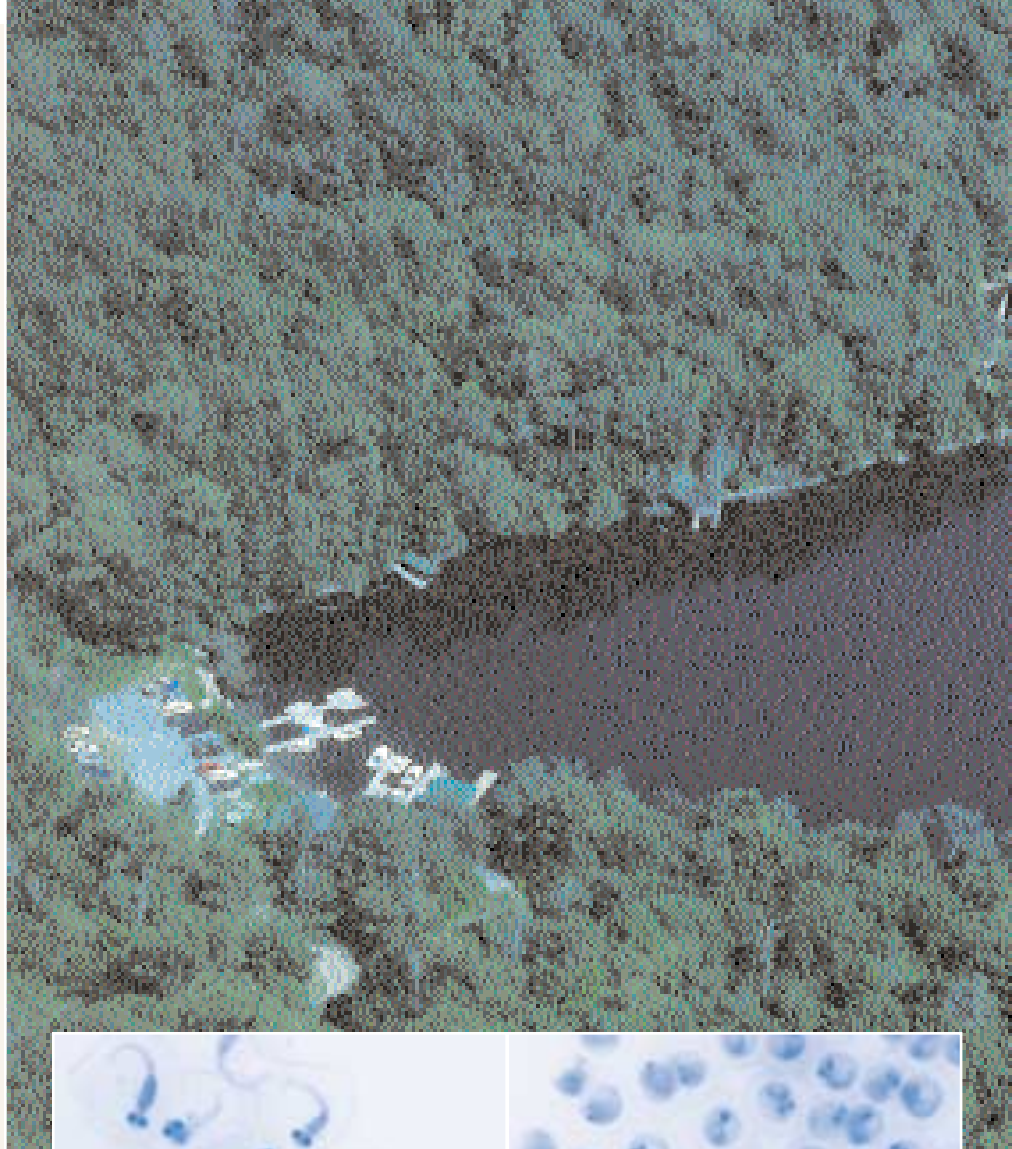
Nitrogen-oxide emissions. The EPA's latest scorecard for nitrogen-oxide emissions from utility plants. Aside from its contribution to acid rain damage, nitrogen-based air pollution plays a major role in the formation of smog.

**How Acid Rain Kills Fish.** Honnedaga Lake lies deep in the forests of the southwestern Adirondacks. Acid rain has already killed all of its fish.

It is now an eerie shade of blue because acid rain has killed off the plankton and other microscopic life that gives a healthy lake its aqua-marine color.

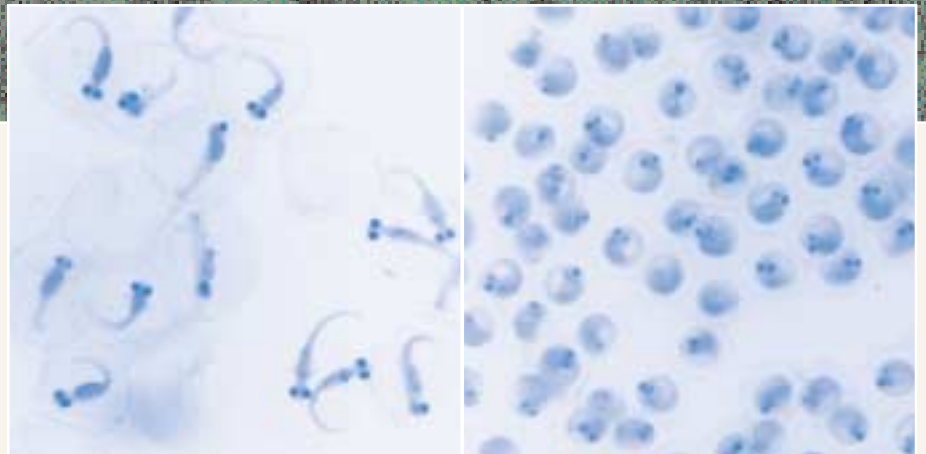
Acidic water leaches aluminum and other toxic metals from rocks, soil and decaying plants, where it otherwise would have remained bound to other elements in a harmless state. Unable to absorb oxygen from the water, the affected fish slowly suffocate.

In three studies conducted at Shenandoah National Park, Virginia, scientists found that fish species richness, population-density, age distribution and survival rate were all suppressed in acidic streams.



**Yellow perch larvae**, at left, in the process of hatching in a pH-neutral lake.

**Yellow perch eggs**, at right, from the same parents as those in the previous photo, which were transferred from neutral water to an acidic lake shortly after fertilization. While they are at the same stage of development, the larvae moved to acidic waters are compacted, deformed and unable to hatch.



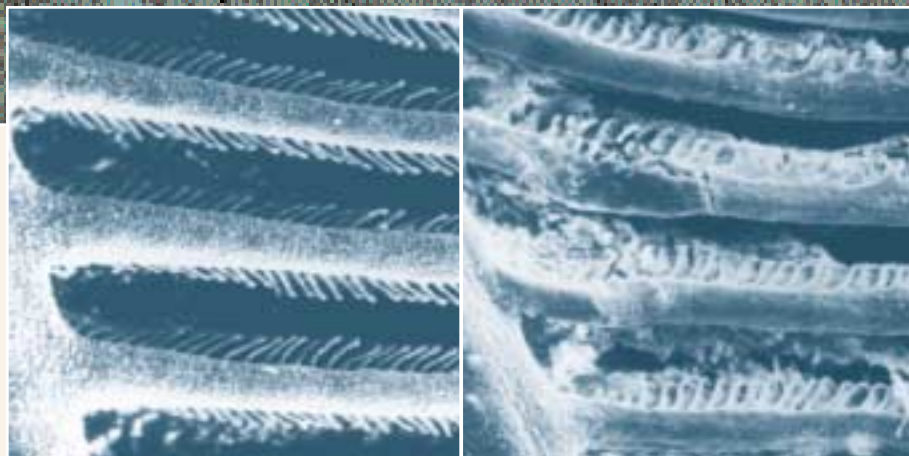
**Acidity Inhibits Hatching**

*Dr. Carl L. Schofield*



Honnedaga Lake, NY

*Gary Randorf*



### Aluminum Destroys Gills

*Dr. Carl L. Schofield*

Electron micrograph, at left, of a section of gill from a young brook trout that lived in neutral stream water.

Electron micrograph, at right, of a section of gill from a young brook trout that lived in acidic stream water. Note the erosion of gill tissue and cellular debris between the gill filaments.





Cranberry Lake  
*Gary Randorf*



Stillwater Reservoir  
*Gary Randorf*

Every single North-eastern state now has mercury-consumption warnings for fish taken from its waters.

**Mercury kills.** Loons require pristine shorelines and seclusion to successfully nest and breed. They find vast areas of suitable habitat within the Adirondack Park. But their habitat is shrinking in most other areas of the Northeast due to human encroachments. As a result, the loon has become a symbol of the health and solitude of the Adirondack wilderness.

Unfortunately, the fish that loons eat are becoming increasingly contaminated with mercury — one of the deadliest toxic metals associated with acid rain.

Cranberry Lake and Stillwater Reservoir are two of the largest and most popular water bodies in the western Adirondack Park. They lie at the northern and southern boundaries of the Five Ponds Wilderness Area, which contains the largest contiguous virgin forest remaining in the Northeastern United States. In the mid-1990s, both lakes were found to have substantial mercury contamination. Like aluminum, mercury can be leached out of soil by acidity, but it is also found in the same smokestack pollution that causes acid rain.

In 1996, something new and alarming happened. New York State officials advised women of child-bearing age, the elderly and young children to avoid eating yellow perch and smallmouth bass from either lake. Both fish are less susceptible to aluminum-related gill damage than most species of trout and salmon. But that resistance allows them to live longer in acidic waters, where they slowly accumulate mercury in their fatty tissues.

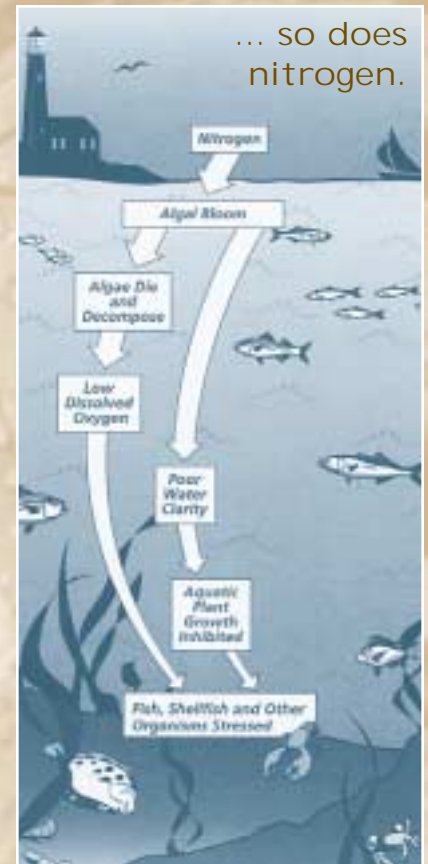
The NYS Health Department has now issued similar mercury warnings for more than a dozen Adirondack lakes. Every single Northeastern state now has mercury-consumption warnings for fish taken from its waters.

The poisoning of these valuable game fish is a tragic blow to the Park's tourism industry. And the contamination is growing deadly for bird and mammal species that rely on fish for food, since the accumulated mercury in fish is transferred to whomever, or whatever, eats the fish.



Common Loon  
Gary Randorf

Loon Chick Dead on Nest  
BioDiversity, Inc.



US Environmental Protection Agency

**Saltwater Damage.** The U.S. Environmental Protection Agency estimated in 1997 that the same nitrogen-oxide-based air pollution that causes acid rain is responsible for nearly one-sixth of the nitrogen pollution that is depleting the oxygen in Long Island Sound, killing fish, plants, shellfish and other organisms. A similar problem was first noticed in the Chesapeake Bay. In both locations, an overabundance of nitrogen leads to a lack of oxygen, which then impairs the feeding, growth and reproduction of all aquatic life.



## Hubbard Brook, NH

*R.S. Pierce*

**Hubbard Brook.** Renowned acid rain scientist Dr. Gene Likens and his colleagues at the Hubbard Brook Research Foundation reported an alarming trend in 1996. The mixed hardwood forest they studied in New Hampshire's White Mountains has essentially stopped growing. Calcium and magnesium are crucial to the growth and vitality of many tree species, but are washed away from the soil by acid rain. Likens found that the amount of calcium in Hubbard Brook's soil had decreased by 50 percent since 1950, when acid rain was less severe. The weathering of rock does not replace calcium in the soil as quickly as acid rain depletes it.

As a result, the emissions reductions called for in the current federal acid rain program cannot stop the damage. In addition, research suggests that some areas where acid rain has never been a problem may begin experiencing damage soon.



## Rocky Mountains, CO

*The University of Colorado*



**Rocky Mountains.** In 1996, researchers at the University of Colorado and Colorado State University reported the first extensive acid-rain-related damage in the Rocky Mountains. "Nitrogen saturation is occurring throughout the high elevation (watersheds) of the Colorado Front Range," they reported. Nitrogen-based air pollution falling on the watersheds of the Colorado high country has caused nitric acid to leach into otherwise pristine waters. The acid disrupts the lifecycles of the surrounding forests. Like the Adirondacks, the Rockies have thin soils and hard, unreactive bedrock that does little to neutralize acidic runoff. Consequently, damage to forests and aquatic ecosystems is progressing rapidly, especially during the early growing season, as the snowpack melts.

**Going, Going, Gone...** Sulfur-dioxide air pollution is hard on your lungs and the environment, but it is also hard on your eyes. As these 1995 photos from the **White Mountain National Forest** show, a cloudless sky doesn't always mean a clear day. As sulfur-based haze increases, this spectacular view disappears completely.

### White Mountain National Forest

*White Mountain National Forest / L. Bruce Hill*



**An Adirondack Case Study.** Fifty years ago, Big Moose Lake was teeming with life. For a half-century, tourists flocked to the lake from near and far to escape city life and relax on the shore of a pristine lake, fifty miles from the bustle and pollution of the nearest urban center.

Trophy-sized brook trout, white fish, landlocked salmon and lake trout abounded, beckoning anglers from throughout the world to ply its remote, chilly waters. Acid rain has exterminated those fish species. Former natives such as crayfish, freshwater shrimp, frogs, hooded mergansers and otters are rarely seen anymore.

By 1980, the tourist hotel operators had given up on Big Moose Lake's fishing as a means of attracting tourists. They watched helplessly as millions of dollars in potential revenues slipped from their collective fingers. Worse yet, one lake-side business was about to discover that acid rain can make people sick, too.

Covewood Lodge owners Diane and C.V. "Major" Bowes were dumbfounded when their children began complaining about the taste of their drinking water, which was drawn from a well next to the lake. When one of their young daughters developed stomach cramps and diarrhea, the Boweses had their water tested.

Test results showed the water contained five times as much lead as is deemed safe for human consumption. The water contained copper as well. Both metals were being leached out of the inside of their pipes and plumbing fixtures due to the corrosive water. Lead is highly toxic to humans. But copper also kills the beneficial bacteria that allow septic systems to break down wastes and purify wastewater. The Boweses now treat their water to make it safe for drinking.

In 1996, the NYS Dept. of Health began conducting tests of water supplies throughout the state. Health officials reported that nearly all of the lakes, ponds and reservoirs they tested for toxins in the Adirondacks and Catskills were at least slightly acidic. Often, the tests showed no chemical contamination in the source of the water, but high levels of lead and copper coming out the taps in people's homes.





## Big Moose Lake, NY

*Gary Randorf (2)*

C.V. "Major" Bowes came to Big Moose Lake in the Adirondacks in 1951, when fishing was good and waterfowl was plentiful. Big Moose Lake teemed with all kinds of aquatic life.



**How do we solve this problem?** Given all of the damage done to our health and environment by acid rain and the toxic chemicals associated with it, it is unconscionable that this destruction is allowed to continue. But utility companies that burn coal and produce the most acid rain also produce the cheapest electricity in the country. That is a strong incentive to keep doing what they are doing. In 1992, the U.S. Environmental Protection Agency created an acid rain control program designed to reduce sulfur-dioxide emissions by 50 percent nationwide. We now know that this goal is too low. In addition, the federal government has done little to control nitrogen-oxide emissions from electric plants. Research has demonstrated that nitrogen-based air pollution is a main culprit in the destruction of many life forms in lakes, rivers and coastal estuaries. The good news is that there is a solution to the acid rain problem. Scientists in Northeastern states and southern Canada agree that sensitive areas of the country would have a fighting chance at recovering from decades of pollution if utility companies reduce their sulfur-dioxide and nitrogen-oxide emissions by 70 to 75 percent below 1990 levels. Better yet, the solution is simpler and less expensive than most people think:

**1 Make the existing program work.** Private industry has already grown accustomed to the current sulfur-dioxide control program. Making the program work better would be more practical than trying to tear it down and start over. The program sets a cap on the total amount of pollution allowed nationwide and allows individual companies to buy and sell the rights to that pollution. This allows those who can make the largest and least expensive cuts to do so right away. They are then free to sell the rights to the pollution they don't emit. Over time, the total number of pollution rights (a.k.a. allowances) issued by EPA will drop by 50 percent below 1990's pollution levels. **Action: Reduce the cap another 50 percent. This would bring the total reduction in pollution to 75 percent below 1990 levels.**

**2 Create a new pollution-trading program for nitrogen-oxides.** Creating a federal allowance-trading program similar to the sulfur-dioxide program would give utility companies a financial incentive to make deep cuts in emissions. **Action: Create a nitrogen-oxide pollution trading program that reduces nitrogen-based air pollution by 70 percent below 1990 levels.**

**3 Keep monitoring the results.** Cuts in smokestack emissions have caused a drop in the amount of acid rain chemicals hitting the ground, but some watersheds have been so hard-hit for so long, deeper cuts will be needed— nationwide or in a targeted geographic region — to ensure that they recover. In addition, any new cuts in sulfur, nitrogen and mercury should be coupled with monitoring of the effects of the cuts on the ground. **Action: Biological surveys and chemical tests should be performed on a regular basis at least through the year 2020 to ensure that the pollution cuts made in the meantime have the anticipated effect.**

**4 Give EPA the authority to keep making cuts.** Congress expected EPA to fix the nation's acid rain problems when it approved the Clean Air Act Amendments of 1990. That did not happen and EPA says it has no authority to order deeper cuts on its own. **Action: EPA's Administrator should have explicit authority to order new cuts to protect human health and sensitive ecosystems without further Congressional action.**

**What is all of this going to cost?** In 1992, utility companies said it would cost them a total of \$6 billion a year to comply with the federal acid rain program. A recent study by the Massachusetts Institute of Technology showed that the actual cost of compliance is less than \$800 million annually. That is less than one-seventh of the projected price. EPA predicted in 1990 that allowances would trade for \$1,200 to \$1,500 per ton by now. The average cost in 1998 was less than \$120.

Creating an allowance trading program to control both sulfur-dioxide and nitrogen-oxide emissions would be very attractive to utility companies and securities brokers, who can help us convince Congress to act right away — before more lakes and forests die.

**For the same amount that we expected to spend as a nation just on sulfur-dioxide, we can reduce both sulfur-dioxide and nitrogen-oxides by 70 to 75 percent below 1990 levels and continue monitoring the results.**

**Dedication** This publication is dedicated to a small group of individuals and organizations whose hard work and vision have helped us identify and fight the problem of acid rain, especially in the Adirondack Park. They include Arthur A. Crocker, Hope Donovan, State Senator John Dunne, Congressman Maurice D. Hinchey, Edwin H. Ketchledge, Clarence A. Petty, Daniel R. Plumley, Gary A. Randorf, the American Lung Association's Albany office, and the Coalition of Adirondackers to Neutralize Acid Rain Inflow (CANARI).

Special appreciation is extended to Barbara Glaser and to the Norcross Wildlife Foundation, whose generous contributions helped to underwrite the production of this publication.

**Acknowledgements** The Adirondack Council would like to thank the following individuals and organizations for their assistance in making this publication possible: Adirondack Park Agency; Adirondack Lakes Survey Corp.; Alpine Images, Inc.; Appalachian Mountain Club; Association for the Protection of the Adirondacks; Havard Ayers; BioDiversity, Inc.; The Boston Globe; C.V. "Major" Bowes; Citizens Campaign for the Environment; Colorado State University; Environment Canada; Hubbard Brook Foundation; Institute for Ecosystem Studies; Walter Kretser; Dr. Gene Likens; National Atmospheric Deposition Program; National Audubon Society; Natural Resources Defense Council; New York Caucus of the Northern Forest Alliance; New York State Department of Education/NYS Museum; NYS Dept. of Health; NYS Dept. of Environmental Conservation; NYS Dept. of State; Dr. Michael Oppenheimer; Karen Roy; Dr. Carl L. Schofield; Dr. Ward Stone; Mike Storey; Tom Suzuki Inc., U.S. Environmental Protection Agency; University of Colorado.

Congress must complete the job it started in 1990 by ensuring that all of the nation's most sensitive ecosystems are protected from the ravages of acid rain.

Our environment, our health, our heritage and our future depend on it.



## The Adirondack Council

The Adirondack Council is an 18,000-member, privately funded, not-for-profit organization dedicated to protecting and enhancing the natural and human communities of the Adirondack Park through research, education, advocacy and legal action. The Council's member organizations include the Association for the Protection of the Adirondacks, Citizens Campaign for the Environment, National Audubon Society, National Parks & Conservation Association, Natural Resources Defense Council and The Wilderness Society, with total memberships of more than 1.4 million people.

**Main Office** P.O. Box D-2, Two Church Street, Elizabethtown, NY 12932 **Telephone** 518-873-2240  
**Albany Office** 342 Hamilton Street, Albany, NY 12210 **Telephone** 518-432-1770  
**e-mail** [adkcouncil@aol.com](mailto:adkcouncil@aol.com) **Home Page** [crisny.org/not-for-profit/adkcncl](http://crisny.org/not-for-profit/adkcncl)

**Credits** Written by John F. Sheehan. Edited by Adirondack Council staff. Design by Matt Paul/Yankee Doodles. Cover photo by Gary A. Randorf/The Adirondack Council. Back cover photo Jenny Hager.