

Worst Fears on Acid Rain Unrealized: Significant problems, yes. An ...

By WILLIAM K. STEVENS

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disaster, no.

By WILLIAM K. STEVENS

A 10-YEAR, half-billion-dollar federally sponsored investigation is concluding that acid rain causes some significant environmental damage but far less than initially feared.

"The sky is not falling, but there is a problem that needs addressing," James R. Mahoney, the director of the National Acid Precipitation Program, said as about 700 scientists from more than 30 countries gathered here last week to digest, pick apart and argue about the results of hundreds of studies that will form the basis for the program's final report to Congress later this year.

"Acid rain does cause damage," Dr. Mahoney said, "but the amount of damage is less than we once thought, and it's much less than some of the characterizations we sometimes hear."

Some of the program's findings are riddled with uncertainty. Some scientists at the Hilton Head review, moreover, criticized the assessment as prematurely concluding that acid rain is causing little harm to American forests. And Canadian scientists charged that the assessment understated the problem in their country, a problem to which, it is generally agreed,

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Scientists say acid rain from industrial sources is contributing to the decline of the red spruce in the Northeast.

the United States greatly contributes.

But Dr. Mahoney said that while there is "a great deal of room, still, for debate and interpretation," the extremes of the debate — the view that acid rain represented an imminent environmental disaster

and the opposite view that it was not a problem — have now been eliminated.

The Federal research program, created by Congress in 1980 to provide the Government with a definitive study of acid rain, has engaged the efforts of hundreds of scientists. Last week's meeting was meant to be the last major critical scientific review of the findings, among them these major ones:

In the United States, fewer than 1,200 lakes have become fully acidified. Little can live in them, and acid rain is mostly responsible. This is about 4 percent of all lakes in areas where acidification might be expected. Earlier, it had been feared that thousands of lakes would be fully acidified by now. In the Northeast, where most of the concern has focused, those lakes that are going to become acidified have already done so. An additional 5 percent of American lakes on which acid is thought to fall, while not necessarily fully acidified, are acidic enough to threaten some species of aquatic life.

Except for red spruce at high elevations in the Eastern mountains, there is no evidence that acid rain has caused a general decline of American forests. But a sizable minority of scientists at Hilton Head argued that because this part of the research effort is relatively young, and because new, provocative but unevaluated data are still coming in, the door was being closed too soon. Furthermore, they argued, the report on forests had given short shrift to the possibility that over the long term, acid rain causes nutritional deficiencies in trees by altering soil chemistry.

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There is no evidence that acid rain in the United States harms crops.

Acid rain and dry acid particles in the atmosphere could pose a health risk to asthmatics, people with heart or lung disease, children and the elderly, either alone or in concert with other pollutants such as ozone. Symptoms include wheezing, shortness of breath and coughing. But, citing uncertainty surrounding the issue, the study report said the health risk was speculative at this time. The study found also that acidic deposition might cause the chemical release in the environment of enough lead to affect health.

In the Eastern United States, sulfates of the kind borne by acid rain are the dominant cause of haze and reduced visibility, accounting for half the degradation of light.

Acid rain damages such construction materials as marble and limestone and causes a number of metals and alloys to corrode more rapidly. At particular risk are an estimated 35,000 historic buildings and 10,000 monuments in the Northeast.

Debate in Congress

Congress is debating proposed amendments to the Clean Air Act. Acid rain is one target of legislation, introduced by the Bush Administration, to amend the law. Industries, electric utilities in particular, would be required to reduce emissions of sulfur dioxide and oxides of nitrogen

Questions remain about the damage to Canada's lakes and trees.

by 10 million tons and 2 million tons a year, respectively, by the year 2000, at a cost estimated by the Environmental Protection Agency as \$22 billion over the next decade.

Sulfur dioxide and nitrogen oxides, produced by the burning of coal, oil and natural gas, are the precursors of acid rain. In the atmosphere, they react with water and other chemicals to form sulfate and nitrate compounds that can be carried hundreds of miles by air currents before they are deposited on the earth by rain, snow, sleet, mist, fog or clouds. Dry sulfur dioxide and nitrogen oxides also sometimes fall to earth nearer the point of origin.

In broad perspective, say Dr. Mahoney and some others associated with the Federal study, acid rain cannot be seen as ranking at, or even near, the top of a present-day priority list of environmental issues that also includes urban air pollution, destruc-

tion of tropical forests, depletion of the earth's ozone layer and the possibility of global climate change.

"I completely disagree with that," Deborah A. Sheiman of the Natural Resources Defense Council, an environmental advocacy group, said as the conference was ending. Not least, she and others said, this is because in one respect, there are more reasons, not fewer, to be concerned about acid rain today than there were 10 years ago. Then, the concern focused on damage to lakes and streams in the Northeast. Now it involves lakes and streams in other regions as well, along with forests, human health, atmospheric visibility and damage to materials.

Ten years ago, Dr. Mahoney recalled, some environmentalists predicted that within a decade, acid rain would increase by tenfold the acidity of thousands of lakes in the United States. In fact, the research shows, the acidity actually increases by up to fivefold over 20 to 50 years, and far fewer lakes are involved. (Tenfold is equal to one point on the 14-point pH scale, which is the standard measure of acidity and alkalinity. A pH of zero is totally acid; of 14, totally alkaline. Seven is neutral.) Damage to aquatic life begins to take place below a pH of 6, according to findings presented at Hilton Head. The Federal study found that 9 percent of lakes in areas of the United States known to be targets for acid rain had acid levels below pH 6, and that 4 percent were totally acidified. These lakes, though a small fraction of the national total, were concentrated not only in the Northeast, as had long been suspected, but also in Appalachia, on the mid-Atlantic coastal plain, in northern Florida and in contiguous parts of northern Wisconsin and the Upper Peninsula of Michigan.

The survey also found that 2.7 percent of streams in areas where acid rain falls from the sky were acidic, and that many streams in the Appalachians were vulnerable to future acidification.

"I'm not saying there's no problem," said Dr. Mahoney. "But we don't have very rapid decay of large numbers of lakes." While many lakes will recover once no more acid falls into them, he said, the recovery will take some years.

Questions About Canada

The Federal study incorporates data from Canada showing that 5 percent of a sample of 8,500 Canadian lakes were acidified. If that is an accurate sample of the whole, it would mean that perhaps 14,000 Canadian lakes are fully acid. And about a quarter of the Canadian lakes sampled had a pH of 6 or less. Canadian scientists say that perhaps 150,000 lakes could fall in this category.

By treating these findings separately, burying them in the body of the study, leaving them out of the summary and generally underplay-

Not all data are in on the question of harm to forest nutrition.

ing them, the scientists "greatly diminished" the extent of the Canadian problem, contended Tom Brydges, a lakes expert from Environment Canada, his country's environmental agency.

Lawrence Baker of the University of Minnesota Water Resources Center, who was the chief author of the lakes report, said that ideally, the Canadian data should be integrated with the overall study. But he said that it was unclear whether the Canadian sample was a true random sampling and that the two studies did not examine the same variables.

"I'm not exactly sure if it can be resolved, scientifically speaking," he said.

Patricia Irving, the associate director of the Federal study and its science coordinator, said a major purpose of the Hilton Head meeting, was to uncover and ventilate concerns like Canada's before the final report.

At the levels at which acid is now being deposited in North America, the study found that with the exception of Eastern red spruce at high elevations, there is "no evidence of widespread forest damage." Moreover, it found that acid rain "is not associated with crop damage." The real villain, it found, is ozone, which "is capable of regional-scale crop growth and yield reduction."

Beyond that, the reports on forests and vegetation generated considerable contention. There is wide agreement that to the extent acid rain does harm forests, it is just one of many stresses, including natural ones like drought and cold. Scientists say it is extremely difficult to sort out cause and effect. Moreover, critics at Hilton Head said that data collection on forests was still going on and not that much information was in hand.

The study was also criticized for drawing a sweeping conclusion that hardwoods like the sugar maple are not harmed by acid rain. Some studies in Canada suggest the opposite.

And in one of the biggest reservations on the forest issue, a number of scientists said that there was much evidence that acid rain changes the balance of nutrients in forest soils and that the issue would have to be re-evaluated before a final report.