

To the Editor:

Editor's Note: *Proceedings of the two-day June 1983 conference, Acid Rain in the Rocky Mountain West, are available for \$10 each from the Colorado Department of Health, Office of Health Protection, 4210 E. 11th Ave., Denver, CO 80220. Because acid rain is a high priority item on the national agenda and an increasingly significant resource management problem for the NPS, Park Science offers the following subjective account of what occurred as viewed by one NPS scientist participant.*

In June I attended a conference on Acid Rain in the Rocky Mountain West, sponsored by the Colorado Department of Health and a lengthy list of co-sponsors including the National Park Service. It focused for two days on what is *known* about western acid rain, and just as importantly, what is *not* known. To my mind, the conference defied objective reporting, but it was too interesting to ignore – especially in such a publication as *Park Science*, where views on scientific subjects are supposed to be aired.

In the words of the planners, the conference progressed "from the realm of science into the realm of religion," and ended with a short exclamatory session between the Environmental Defense Fund people and representatives from Ford Motor and Kennecott companies. I would like to comment on the conference – the good, hard scientific facts it reported and the smattering of speculative conjecture.

Acid rain is an emotional issue, charged on both sides with believers and non-believers. The Rocky Mountain West conference was a microcosm of the national debate and for two days emotions ran high.

It is a fairly well accepted fact that for acidic fallout to be damaging to an environment there must be a sensitive receptor. Croplands are rarely "sensitive re-

ceptors" because their soil chemistry is highly manipulated by farmers to maintain optimum crop-growing conditions. On the other hand, high elevation lakes and streams can be quite sensitive, depending on the inherent buffering of their surroundings to the incoming acids.

Of the first session, four papers dealt with areas found by researchers to be sensitive to acidic rain. Alkalinity was defined as the buffering capacity available to counter incoming acids; there was no dispute that alkalinity decreases with increasing elevations. Well presented arguments made the case for the sensitivity of high country areas of much of Colorado: the Flattops Wilderness Area, the Galena Lake/Mexican Cut area near Aspen, and Rocky Mountain NP.

Not so convincing was research claiming to document the loss of alkalinity from acid rain. Much of the work was conducted in reservoirs and other manipulated receptors such as croplands. The contention that a 20 percent drop in buffering capacity has occurred over the last 15 to 40 years implies a 100-fold increase in the acidity of rainfall – a claim not supported by national deposition chemistry data.

The afternoon sessions of the first day were highlighted by two outstanding papers on the nature of acidity in Colorado. Fred Fehsenfeld reported indisputable evidence of nitric oxide pollution in the mountains near the Continental Divide when updraft winds blow from the Denver metropolitan area. Since there has been much speculation on the source of acidic rain in the mountainous areas of the West, this paper was exciting in that it confirmed at least one source. Adding to this excitement was the presentation by Michael Grant of the results of a statewide network of precipitation collectors. Point sources, notably Four Corners area and the Denver metropolitan area were implicated in contributing to noticeably higher sulfate and nitrate concentrations downwind. The reporting that pH values throughout much of the western part of the state, including the high elevation areas, averaged 5.6 or less, sent reporters off to formulate headlines of the occurrence of acid rain, the sensitivity of our resources, and the gravity of the problem. So ended the first day, with conference participants in a general uproar.

Day two of the conference will be known as the day of the voice of reason. The first day had given good press to some questionable conclusions, the second day was to highlight uncertainty. Acid rain is an emotional issue in part because researchers give conflicting results. The tools are not available for allowing us to say yes or no unequivocally to the sources of acid deposition and to the effects it causes. One of the tools affording us the luxury of conclusions is a long-term monitoring network. The chemistry of precipitation is of dynamic and varied composition. This was clarified in a presentation by Jim Gibson, coordinator of the National Atmospheric Deposition Program. He pointed out spatial changes in rainfall chemistry, the perceived "acid rain" in parts of the west can be attributable in part to airborne gypsum; a natural phenomenon. Also discussed were the temporal trends now in question. Does rainfall appear more acidic today than 30 years ago due to the rain of pollutants, or due to artificially high pH's of the drought-wracked '50's?

Setting the tone of the day, Gibson discussed the limits of our knowledge and just how to interpret them. Carrying on in this vein, other nationally known scientists came back again and again to the uncertainties involved in measuring the acid deposition

phenomenon. An unknown amount, possibly 50 percent of total deposition, comes as dryfall. At present there is no accurate way of quantifying dry deposition. The best scientists in their fields are up against the state of the art in modeling transport, measuring dry deposition, or predicting damage thresholds, and their predictions are necessary for adequate government standards decisions on how to regulate.

This conference emphasizes that we have come a long way. One could say with certainty that regions of the Rocky Mountains are sensitive to the effects of acid rain. One could talk with confidence about the chemistry of the region; whether there was "acid rain" with all its unpleasant connotations was less certain. One could only speculate on where our pollution comes from, and it was pure conjecture that one could predict where the emissions from a point source would end up.

The final session began with a plea for statements from the scientific community to help the policy makers devise some way to gauge change, set emissions

regulations, and then enforce these regulations. This came from Dennis Haddow, speaking directly for the agencies with Class I responsibilities: The U.S. Forest Service and the National Park Service. No matter how nebulous the results of acid rain research are today, he implied, policy makers have to act, and those of us with Class I responsibilities have to act soon. "God gave us this land," said Bob Yuhnke of EDF in the next presentation, "and we have not yet reached that sad point in time where we have to destroy our last vestiges of wilderness." A representative of the Kennecott Mining Company gave the other side of the picture. The control of stack emissions are costs that must be passed on to the consumer, for to bear the costs themselves will put many industries out of business. Big industry did not deny the existence of acid rain, but rather conceded it is an industrially caused problem. The cost of cleaning it up and preventing further acidification, however, presents another story. The problem becomes one of forcing more costs on an already strapped industrial econ-

omy, or allowing some degradation (how much?) of pristine natural areas, or some combination of both of these. At this point, the discussion is no longer a scientific question, but rather a political one.

Earlier in the day Congressman Tim Wirth spoke knowledgeably about acid deposition nationally and just how Congress might go about writing legislation to deal with its cleanup. Government works by COMPROMISE; *on one side* should have to bear the costs of a problem that affects the entire country, resources and economy alike.

To bring these disparate groups together for two days to discuss such an emotionally charged topic as acid deposition, to air the facts, the speculations and the exploratory routes toward solution was a big task. The conference planners must be highly commended.

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