

lish a global system of regional research networks to "ensure communications between the scientists and private and public sector decision makers" (1). This is in addition to research, training, data management, and synthesis modeling.

Envisioned is the assessment of issues related to global environmental change, in order to provide timely and responsible scientific information for regional and national needs within the region."

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REFERENCES

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Roberts' article "Learning from acid rain" missed a key lesson. NAPAP strived to focus research on developing the information needed for assessments. There was inevitable tension between curiosity-driven science and the required policy-driven research. The challenge was conducting relevant assessments with sufficient scientific credibility for such a politically charged issue.

The NAPA program could have been in sync with the legislative process if the 1985 interim assessment had been released as planned. Instead, the momentum developed during the first 5 years was lost when leadership and consensus-building were replaced with autocratic management. The resulting lack of participation in the assessment process eroded NAPAP's technical and political credibility.

The remaining years of the program had to be spent regaining legitimacy by reinstating the laborious but necessary consensus-building and review activities. The clear lesson is that for assessment programs, well-defined processes for consensus-building and broad scientific review are essential for ensuring credibility. Unfortunately, learning that lesson made NAPAP's results too late to be of full value. The true payoff now is in applying the relevant lessons to global climate change.

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Leslie Roberts describes "what went wrong with NAPAP," but there was also much that went right. Since its inception, NAPAP has provided a unique interagency mechanism for the long-term critical examination of an important environmental issue, acid rain, where views have differed widely. Through the free exchange and open discussion of ideas and the scientifically rigorous testing of hypotheses, NAPAP advanced environmental science. That such discussions were often spirited and controversial is an indication of the scientific health of the program.

NAPAP also pioneered a framework for the administration of scientific research, monitoring, and assessment. Through interagency coordination, research gaps and redundancies were minimized. Through regular interagency peer reviews of program plans and projects in progress, high quality was assured. Much of the science initiated under NAPAP will contribute to the evaluation of other environmental concerns.

During its first 10 years, NAPAP produced numerous public reports and findings updates, hundreds of articles in refereed journals, and generally informed the debate on acid rain issues. The program provided a credible source of information for all sides, allowing the congressional debate to focus on policy issues.

As NAPAP begins its second decade, it will address new goals set forth by the Clean Air Act Amendments of 1990, capitalizing on its successes, learning from its errors, and meeting the challenges of the future.

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For a short period of time, I was active in a key element of NAPAP, the National Surface Water Survey. We collected samples from several hundred lakes, performed some analysis, and processed the remaining portions for further analysis. My role was that of a field laboratory manager.

I agree with the observation that "NAPAP became obsessed by the need to have the best science." This obsession was practiced at the expense of common sense. In the selection and development of analytical procedures, the approach was to consult a few "experts" in the field. However, once the procedures were proposed, they were not subject to peer review. During the training program, I identified several biases or systematic errors in procedures.

When we started fieldwork, it became apparent that these and other procedures required adjustment. When too many lakes

on the sample list had to be rejected because of size, depth, or stratification criteria, the "statisticians in Corvallis" changed the criteria. The entire program was designed without a single lake being prescreened before sampling.

After 10 years and hundreds of millions of dollars, it is appropriate to ask whether NAPAP was a wise investment. Although Roberts' article focused on the political aspects of NAPAP, I believe the scientific aspects should also be reviewed: specifically, the basic assumptions and procedures used in the name of "good science."

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Where Zagreb Is

We were interested to see a reference to our observation of the 17.2-kiloelectron volt neutrino in the Research News article, "Is there a massive neutrino?" (22 Mar., p. 1426). The article attributes the work to the "Ruder Bošković Institute in Zagreb, Czechoslovakia."

The work is actually a Rudjer Bošković Institute-University of Ottawa collaboration. Zagreb is in Croatia, Yugoslavia, a country that has a common border with Italy, Austria, Hungary, Romania, Bulgaria, Greece, and Albania, but not with Czechoslovakia. Ottawa is the capital of Canada, a country to the north of most of the United States.

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Sununu Diplomacy?

A Briefing of 5 April (p. 35) plaintively asks, "Was John Sununu joking?" in reference to Leon Lederman's well-publicized survey of science funding. Apparently Sununu said, "I don't know who Leon Lederman is." Perhaps he was just being diplomatic, and so refrained from observing that a survey that implicitly asks people, "Do you need more money?" is likely to produce the response, "Yes, lots more."

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