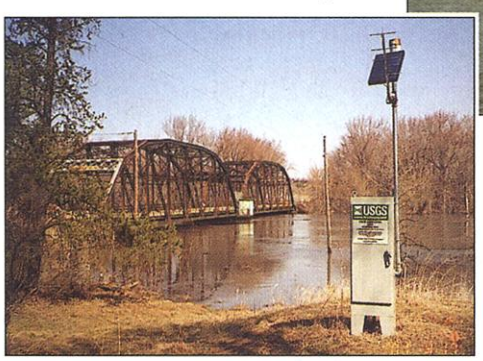
## Water Resources Programs Under the Ax

IN HIS ARTICLE "USGS BRACES FOR SEVERE budget cuts," Erik Stokstad does a good job of explaining the impacts of cuts to the Water Resources Division's Toxic Substances Hydrology Program and National Water Quality Assessment (News of the Week, 11 May, p. 1040). However, his report does not reveal the true depth of cuts to the U.S. Geological Survey (USGS) water resources programs. Also under the budget ax are the streamgaging program and the State Water Resources Research Institute Program.

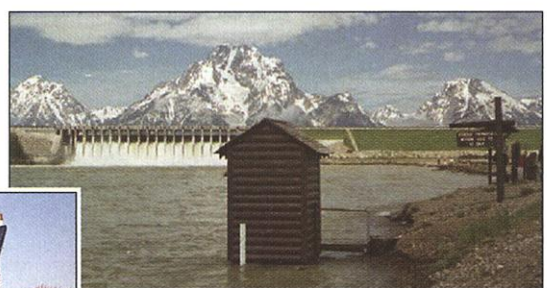



**Budget cut casualties? Streamgaging stations such as these provide critical data for many water resource–related decisions.**

CREDIT: USGS

Stage and flow data from USGS streamgaging stations support dozens of critical water quality, water supply, power generation, navigational, and recreational activities, as well as water-related research. When states struggle to comply with the total maximum daily load (TMDL) requirements of the Clean Water Act, stream flow data are indispensable, and we need many more—not fewer—streamgaging stations. Federal agencies (such as the Corps of Engineers) that have been cooperating with USGS on the streamgage network have drastically cut back funding in recent years, and for the Bush Administration to suggest that these agencies would make up for cuts in the USGS budget is simply disingenuous.

The State Water Resources Research Institute Program—which the Bush Administration proposes to completely eliminate—is a vital part of our nation's water science agency, leveraging a modest amount of federal funds with state, local, and private funds to sponsor hundreds of studies each year that are critical in solving water quality problems at the local and state level. Without federal funds to offer state and local agencies as incentives for investment in water science research and in the education of our future water scientists, many of our 54 state/territory water resources research institutes might disappear.



The cuts aimed at the USGS Water Resources Division are deep and serious. They are suggestive of a bias against physical science research and lead me to question the Administration's pledge to use "sound science" in setting environmental policy.

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## Directions to "Eureka!"

THE PROCESS OF SCIENTIFIC DISCOVERY IS presented by David Paydarfar and William J. Schwartz as a tongue-in-cheek flow diagram, as well as a (presumably) more serious set of informal heuristics (or "principles") (Editorial, 6 Apr., p. 13). I find it somewhat disappointing that the psychology of discovery would be treated in such an informal fashion.

Albert Einstein did say, as the authors quote him, "The whole of science is nothing more than a refinement of everyday thinking." But Einstein went on to say much more—and, in effect, he suggested a program of further investigation that we now call cognitive science. The full quotation reads as follows: "The whole of science is nothing more than a refinement of everyday thinking. It is for this reason that the critical thinking of the physicist cannot possibly be restricted to the examination of concepts of his own specific field. He cannot proceed without considering critically a much more difficult problem, the problem of analyzing the nature of everyday thinking" (*1*, p. 59).

In the more than 60 years since Einstein made this remarkable statement, the cognitive sciences have made substantial advances in our understanding of the "difficult problem…of analyzing the nature of everyday thinking." At the same time that we have gained scientific knowledge about human thought processes, we have also learned how those processes are used in scientific discovery. The connection between everyday thinking and scientific thinking is, as Einstein correctly suggested, more in the detail than in anything fundamental: "The scientific way of forming concepts differs from that which we use in our daily life, not basically, but merely in the more precise definition of concepts and conclusions, more painstaking and systematic choice of experimental material, and greater logical economy" (*2*, p. 98). Several decades of research on the psychology of the scientific discovery process have revealed how normal cognitive processes enable humans to generate the "precise definitions," "systematic choice of experimental material," and "logical economy" that Einstein identified as the hallmarks of scientific thought (*3*).

> **"The whole of science is nothing more than a refinement of everyday thinking."**
> **—Albert Einstein**

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References and Notes

1. A. Einstein, "Physics and reality" (1936), reprinted in A. Einstein, *Out of My Later Years* (Philosophical Li-