ENVIRONMENT

More dam earthquakes

Dam planners may be unsettled by the seismic data recorded during filling of the Manic-3 dam reservoir on Quebec's Manicouagan River. About 10 percent of all reservoirs with dam heights of 100 meters or more have produced earthquakes, although there is no way "to determine ahead of time which sites will be safe from reservoir induced earthquakes,"writes Goetz Buchbinder in the fall 1977 GEOS. Buchbinder heads the seismology section of Canada's Department of Energy, Mines and Resources which recorded the more than 1,000 Manic-3 quakes.

He described the small but frequent quakes as unusual because they are felt only a short distance from the source. The largest, registering 4.1 on the Richter scale, was only felt within 15 kilometers of the source, he said. All quakes occurred about 10 km upstream from the dam and at depths of 0.5 km to 4 km. Although a magnitude 4.1 event is not likely to cause damage, the 6.3 quake that followed 4 years after impounding a reservoir behind India's 103-meter Koyna dam damaged its hydroelectric plant, killed 200 people and left thousands homeless.

"The conventional wisdom that a head of at least 100 m of water is needed to induce earthquakes has clearly been proven false," Buchbinder writes, because quakes began when the water was only 55 m high, the largest when the water was only 80 m high. That quakes began when the water level was so low suggests that it is not pressure from the water load "but rather the availability of water at pressure, that is, fluid injection, is responsible," he says.

Diffuse pollution the major problem

More than half of the pollution entering waterways comes from "nonpoint sources" — sediment, acid-mine drainage, pesticides and other pollutants carried by rainwater runoff. Since sources are diffuse, nonpoint pollution is hard to collect and treat. The situation is aggravated by the fact that state, local and federal pollution-control agencies lack the money and data to design programs that will curb it, and 1983 water-quality goals cannot be met without such programs. In a review of the problem and its impacts, the General Accounting Office recommends that the Environmental Protection Agency do the following: Collect cause and effect data on diffuse pollutants and on what methods are available to control them; find out what resources are needed to collect this data; develop legislative proposals that give planning agencies the time and money to get the data (time, money and sometimes expertise are generally lacking at all levels now); give nonpoint-source control higher priority attention; make personal contacts throughout government to increase the interest in the problem; and estimate funds necessary to control the problem.

How much is clean water worth?

Sharon Oster, a Yale University economist writing in the December WATER RESOURCES RESEARCH, says her 1973 telephone survey of residents along the Merrimack River basin indicated an average willingness to pay slightly more than $12 per person for complete river cleanup. Respondents indicated interest in using the river about 13 days per year if the water was clean. Water quality in the Merrimack's main stem is currently among the worst in the country, ranked in 1972 as the nation's third most polluted waterway. Oster computed the annual cost of cleaning the basin, assuming a 20-year lifetime and discount rate of 7 percent, at a per capita cost in most communities of "somewhat less than $12." Willingness to pay for cleanup and to use the water for recreational purposes increased with income; median family income among respondents was $11,800.

SCIENCE & SOCIETY

Changing college entrant populations

Fewer of "the brightest" 25 percent of 1972 high school graduates entered four-year colleges than did the brightest 10 years earlier. This was among findings in Research Triangle Institute's National Longitudinal Study, being conducted for the National Center for Education Statistics. "A population which is both highly able and even financially well off is now decreasing its enrollment in four-year colleges," says RTI study director Jay Levinsohn. "This may represent effects of several factors including an increase in the attractiveness and availability of two-year programs, some loss of attractiveness of any college to this group and the rapidly escalating costs of four-year colleges," he says in RTI's November HYPOTENUSE.

RTI also found that race is no longer a direct factor in keeping blacks out of college, although "the vast majority of black college students, including half of the brightest 25 percent, still attend schools with third-rate entrance requirements." RTI's Jack Bailey says race indirectly affects college entry in its link with socioeconomic status. "The American system of postsecondary education is well on the road to equality ... of opportunity," he said, although "we may have a long way to go" before there is a better match between minority students and the schools they attend.

What college-career patterns have emerged within the 1972 class? Details should be out soon; statistics on RTI's 1976 follow-up survey are being interpreted. Clues on what future college-enrollment changes to expect emerge in the Carnegie Foundation's newly published study, *The States and Private Higher Education*.

Technical assistance to states

To upgrade the quality of government action and decision-making on issues involving science and technology, the National Science Foundation has funded a one-year, $3 million program that allows states to determine their technical needs. The program offers each state and governor's office up to $25,000 (a total of $50,000 per state) for the planning. State governments generally need outside technical assistance in such areas as energy policy, land-use planning, toxic-substances control and hazardous-substances transport, says John Reuss, director of the program servicing state legislatures through the National Conference of State Legislatures in Denver. Such planning may lead to states hiring staff scientists, contracting out scientific analyses to private researchers or to initiating cooperative programs with universities and such technical associations as engineering societies, he said. More than 40 governors' offices and 31 state legislatures have already received funding.

Directory of Handicapped Scientists

The American Association for the Advancement of Science is compiling a list of handicapped scientists and science students. Respondents will be listed with a biographical entry including the nature of their handicap, age of its onset, summary of educational and professional experience and whether the individuals are willing to advise or consult with organizations on their special problems and their experience with coping strategies. Janette Alsford Owens, who is working on the project, said the directory may aid the handicapped in organizing, in analyzing problems and in helping educate fellow scientists. The list will include scientists in the natural and social sciences, mathematics, engineering, medicine, economics and some education specialties. If you wish to receive the directory or be listed in it, contact the Project on the Handicapped in Science, Office of Opportunities in Science, AAAS, 1776 Massachusetts Ave., N.W., Washington, DC, 20036. Publication is scheduled for June.

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