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## Resource News-Spring 1996

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## Information investment passes manufacturing: expert

More than half the capital investment in the United States goes to information technology, said Richard Varn, director of telecommunications at Northern Iowa University in Cedar Falls, Iowa. Varn added that in 1992, dollars invested in the information economy exceeded those invested in manufacturing for the first time, by about \$5 billion. By 1994, this lead had increased to about \$40 billion.

Varn delivered the keynote address on "Power, Politics, GIS and a Long Stare into the Future" at a luncheon on the second day of the first Nebraska GIS Symposium: "Promoting Cooperation in Nebraska," held in late February in Lincoln. "GIS" stands for geographic information systems--powerful, computer-based methods of handling and displaying spatial data. They are transforming the

way map data is used similar to the way word-processing has transformed the handling of text. Varn has also served in the Iowa Legislature for 12 years, most recently as Majority Whip and Chair of the Communications and Information Policy Committee.

Other points Varn related were that the nation bought more computers than televisions last year, management of business and government is changing to match the new technology and the gap between rich and poor is becoming a mirror of the information "haves" and "have nots." Covering a wide range of issues on information technology, he stressed that we are moving from an information to  
(See *Investment* continued on page 2.)

## Power along the Missouri returns to state, tribal and local levels, says former director of Missouri project

Power and authority are being returned to the states, tribes and regions along the Missouri River so the federal government will have to meet fewer conflicting management objectives. So said John E. Thorson, special master for Arizona's general stream adjudications and keynote speaker at the 25th annual Nebraska Water Conference, held March 11-13 in Omaha. Thorson was formerly director of the Missouri River Management Project and is the author of *River of Promise, River of Peril: The Politics of Managing the Missouri River*.

The Nebraska Water Conference is co-sponsored by the Water Center/Environmental Programs unit and the Conservation and Survey Division (CSD), both of the University of Nebraska-Lincoln, the Nebraska Water Conference Council, the Nebraska Department of Water Re-

sources, the UNL Institute of Agriculture and Natural Resources and the university itself. Conference co-chairs were Bob Kuzelka, assistant to the director of the Water Center, and Karen Stork, administrative assistant for CSD.

When the Missouri River dam system was created, "Fort Peck and the dams that followed were promises of hope," Thorson said, providing jobs, power and flood control.

That hope has been tempered considerably by the increasing complexity that besets the management of the river system. Now, the federal government is charged with protecting the environment and endangered species, providing clean water for all and correcting historical and cultural wrongs, besides the original goals of providing power, navigation and flood control.

(See *Missouri* continued on page 3.)

## CSD adds researcher on biological diversity project

The University of Nebraska-Lincoln Conservation and Survey Division (CSD) and Center for Advanced Land Management Information Technologies (CALMIT) gained a staff member on Feb. 1, when Marlen Eve joined CALMIT as Gap Analysis Program (GAP) research coordinator and research associate.

GAP is a national state-by-state project designed to determine how well all native plant and animal species are represented in protected or

conservation lands. Nebraska joined the project last year, and the project is "starting to get rolling" quite successfully in Nebraska, said Eve, formerly a research specialist at New Mexico State University.

"We're at an important point in the Nebraska GAP project right now," Eve said. "A lot of people are getting involved with it and it's exciting to be a part of."

## **Investment** continued from page 1

a communications revolution that is increasing almost daily in speed, power, capacity and connectivity. It is bringing about a paradigm shift in the way we think and work, with one of the results, among many, being that "the power of technology pulls decisions remorselessly down to the individual," he said, quoting George Gilder.

After those comments on putting GIS in context, he noted that, regarding GIS and public policy, most people see the world in terms of--in descending order--stories, institutions, people, words, charts and, lastly, maps. Since GIS involves combining map data with other information to achieve a huge array of dynamic data bases, overcoming these barriers to understanding remains a fundamental challenge for those committed to GIS.

GIS is a movement, Varn explained, and it must be run like one. The obvious benefits of GIS to policy makers must be communicated persistently by the key players and the rank-and-file. Characteristics of a movement are that it: have a mailing list; learn from successful models; have good leaders and organization; direct 90 percent of its efforts to prospective converts and 10 percent to the faithful; have power and money, friends and enemies; and have good stories.

Regarding the "selling" of GIS to policy makers, Varn added that though it may seem less likely than the Greek Orthodox, Roman Catholic and Protestant churches reuniting, the eventual marriage of data processing and GIS should be expected, enhancing the strength of both. The critical question should be whether it can improve decision-making. The critical integration activity involves adding meaning to data for policy makers, Varn said.

Such a transformation requires "aggregating the greed to meet the need," he said. An intergovernmental enterprise panel should knock down barriers, raise projects to the intergovernmental level, pursue political leverage, and emphasize information technology and GIS across disciplines. Specific plans could be to create a foundation; to highlight greater productivity, displacement of costs and redirection of spending; to seek vendor discounts and gifts; to apply for grants; and to find new funding sources.

Regarding a national spatial data infrastructure, Varn proposed a vision statement: "The data you need is available when and where you need it, can be related to any other data, and the symbolic and physical relationships between the data elements can be expressed in narrative, tabular, graphical, spatial, and simulated form." In addition, a GIS must be a true system, or really, a system of systems, requiring a systems inventory, metadata (data on data) across systems, data sharing and publishing systems, a list of data-acquisition plans and GIS projects, matching of common needs, models that are interrelated and a system of communication, collaboration and continuing education.

Some "modest proposals" include developing spatial data infrastructures that are interrelated on the local, state, national and international, levels. Applications could be to monitor probationers and parolees with a GIS tied in to a global positioning system--using satellites to precisely locate any spot on the globe; to locate and monitor all point and nonpoint pollution in the environment; to track public funding--where it came from, who had it when and where it went; to classify and display all relevant dietary, genetic and environmental data related to health; to come to a more objective analysis of public human services, including mental health, substance-abuse treatment, special education, all other education and early childhood programs, medical services, corrections and employment data; and to calculate return on public investment in human resources.

Varn's conclusions were to urge conference participants to "play the game," including thinking big and analyzing the return on investment and likely risks, to aim high, to "walk the talk," to use information technology to teach the unconverted and the already converted, and to understand GIS in its social and political context and its potential contribution to social and organizational change.

The symposium was sponsored by the Nebraska GIS Steering Committee, the Professional Surveyors Association of Nebraska, the League of Nebraska Municipalities, the state's Association of County Officials, Intergovernmental Data Communications Advisory Council, Association of County Assessors, its Planning, Zoning and Development Officials and Association of Resources Districts, as well as Geographic Educators of Nebraska and a number of other co-sponsors.

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## Missouri continued from page 1

The dam system was originally built with relatively simple objectives and analyses. River management was geared to navigation and flood control, and to a lesser degree, irrigation. The main players were power consumers and managers, floodplain residents, farmers and some recreation interests. The environmental impact was barely considered.

In light of all the new demands on the federal management of the river and its dams, it's no wonder the government has been found lacking, Thorson said.

Changes in river management in the last decade, Thorson said, are as follows:

--Tribes have become organized and are part of the Missouri River Basin Association. Two tribes have negotiated water allocations with states. They are in direct communication with the Corps of Engineers about water and direct negotiation with the Department of Energy about power rights.

--A decade ago, drought had a large impact on management. Since the 1980s, two major floods have taken place in the basin, in 1993 and 1995, demanding a focus, once again, on flood control.

--U.S. Fish and Wildlife and other scientists brought to the forefront the need for wildlife habitat and fish-run protection.

--Up until a decade ago, the Corps ran the river by the master manual, the book of policies and procedures, in an authoritarian way. Since then, the Corps has sought general public opinion and responses from the states and tribes; it is now revising the manual.

--Today, everyone in the basin is more knowledgeable, which is both positive and negative. The negative impact is that basin managers know more and are more aware of the complexity of the issues, so they are more reluctant to act. In the past, a narrow set of values provided clear directives for management; now, the managers are almost paralyzed.

Other trends affecting the river, Thorson said, are that litigation is becoming less desirable because of the cost and time involved. U.S. Attorney General Janet Reno is encouraging alternative means of resolution such as mediation. In addition, a series of sophisticated, successful settlements of lawsuits in the West have solved some of the biggest western

water disputes. These settlements have produced win-win scenarios, but all require huge federal support.

In addition, more detailed analysis has shown that there's a great deal of water in the system and the key is flexibility and sophisticated management, Thorson said. New management options involve regional water banks, groundwater recharge projects and water-conservation requirements. Lastly, changes are coming in the power industry, toward deregulation and hydropower marketing. Congress is trying to privatize the authority that markets the river's hydropower. Much of the power is sold at low cost outside the basin. An estimated \$200 million a year could be raised if power was sold at full price. The revenue could compensate tribes for lost land and restore wildlife habitat.

The principal challenge to Missouri River basin residents is to develop a consensus on the functions, goals and strategies for the river, Thorson explained. Other challenges are the need to better understand the hydrologic system; to bring adequate amounts of potable water to rural and urban areas; to get states and tribes to realize they can agree on some issues, such as adequate potable water; and to develop innovative institutions to manage a complex river system.

Two innovative solutions Thorson noted are the Boyer Chute habitat restoration project and H<sub>2</sub>Omaha. The Boyer Chute project involves restoring the water and habitat in and around a former oxbow lake near Omaha called Boyer Chute. H<sub>2</sub>Omaha is an interdisciplinary approach to making the Missouri River fun and meaningful to school children and adults through storytelling and music, as well as through traditional scientific approaches such as volunteer monitoring.

"I certainly have a love for the river," Thorson said near the start of his talk. Ten years ago, he served as director of the Missouri River Management Project, a Montana-based group that worked to get river groups to find new ways of balancing the system, and practiced environmental law in Helena. In parts of Montana, he said, the river still looks the way Lewis and Clark saw it on their 1804-1806 expedition.

"You live within the boundaries of (former President Thomas) Jefferson's vision, he added.

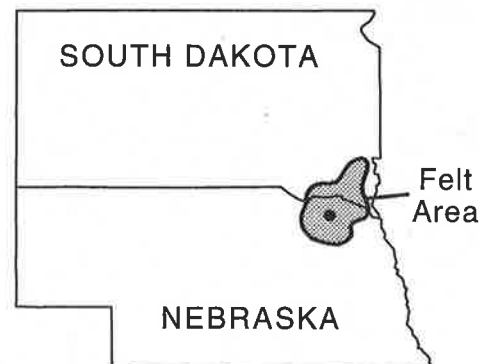
## Small quake near Creighton shakes northeastern Nebraska

by Ray Burchett, *CSD research geologist*

A small earthquake shook northeastern Nebraska at 9:10 a.m. on February 6, 1996.

The quake, measuring 3.6 on the Richter Scale according to the National Earthquake Information Center in Golden, Colorado, was centered in Knox County near Creighton. Minor structural damages, including cracked plaster and windows, were reported by residents of Bloomfield, Brunswick, Creighton and Coleridge. (See the map of felt area in Nebraska and South Dakota in next column.)

Since 1865 there have been 57 historical reported earthquakes that have had epicenters in Nebraska. This year's Creighton quake was reportedly felt by people in both Nebraska and South Dakota.



*Felt area of earthquake near Creighton*

## ***Smith honored for service by Groundwater Foundation***

Frank Smith, hydrogeologist and associate professor emeritus with the University of Nebraska-Lincoln Conservation and Survey Division, received the Maurice Kremer Groundwater Achievement Award at the annual Nebraska Water Conference last month.

The award, given annually by the Groundwater Foundation of Lincoln to individuals who have created a beneficial legacy of groundwater service in Nebraska, was presented to Smith at an awards banquet on March 12 at the Red Lion Inn in Omaha.

Smith, who joined CSD in 1956 and officially retired in 1994, said his most important contribution to groundwater studies in Nebraska during his 40-year career at CSD was his work on county test-hole log books and groundwater reports.

Smith said his lifetime of groundwater service was a joy to perform. "It was always pleasing to be able to provide the people, towns and villages with a service that was helpful to them," he said. "I got a great kick out of it and I always enjoyed it."

## **Coming up: local, state and national meetings and workshops**

### ***May***

**May 14 - Environmental Awareness Day**, Harlan County Reservoir, Alma. Sponsored by U.S. Army Corps of Engineers. Call Jim Brown, (308) 799-2105.

### ***June***

**June 1 - Program, housing and registration information available for Geological Society of America annual meeting.** Contact GSA Meetings Dept., Boulder, CO.

**June 10-14 - Society of Wetland Scientists 17th Annual National Meeting.** Kansas City Marriott Downtown, Kansas City, MO. Contact Tom Taylor, (913) 551-7226.

**June 20-21 - Nebraska Water Law**, Lincoln, Nebraska Center for Continuing Education. Sponsored by CLE International.

### ***July***

**July 7-10 - Soil and Water Conservation Society Conference**, Keystone Resort, CO.

**July 9 - Abstracts due, 1996 Geological Society of America Annual Meeting.** Contact GSA Meetings Dept., Boulder, CO.

**July 22-24 - Annual Nebraska Water Resources Tour**, Republican Basin. Contact UNL Water Center/Environmental Programs or Conservation and Survey Division.

**July 25 - "Customer Service for the Water Industry." AWWA Satellite teleconference.** For more information, contact Heide Burbach, AWWA, 6666 W. Quincy Ave., Denver, CO 80235. Phone: (800) 559-2885. Fax: (303) 794-8915.

**July 30-Aug. 2 - Universities Council on Water Resources '96: Integrated Management of Surface and Ground Water**, San Antonio, TX. Contact Wayne R. Jordan, Texas Water Resources Institute, Texas A & M University, College Station, 77843-2118, Phone: (409) 845-1851.

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