


1993

## Resource News-July/August 1993

Follow this and additional works at: <http://digitalcommons.unl.edu/conservationsurvey>

 Part of the [Geology Commons](#), [Geomorphology Commons](#), [Hydrology Commons](#), [Paleontology Commons](#), [Sedimentology Commons](#), [Soil Science Commons](#), and the [Stratigraphy Commons](#)

---

"Resource News-July/August 1993" (1993). *Conservation and Survey Division*. 592.  
<http://digitalcommons.unl.edu/conservationsurvey/592>

This Article is brought to you for free and open access by the Natural Resources, School of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Conservation and Survey Division by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

## CALMIT receives DOE grant to study change in Sand Hills lakes and wetlands

Shallow lakes and wetlands in the Sand Hills may prove to be important indicators of global environmental and climatic change. And a team of scientists from the University of Nebraska-Lincoln has just received a \$120,000 grant from the U.S. Department of Energy to use remote sensing to monitor changes in the water-related, climatic and biological systems of these lakes. The funding was provided through the Great Plains Center of the National Institute for Global Environmental Change.

"Shallow lakes and wetlands provide useful 'natural yardsticks' for detecting the onset and/or measuring the impacts of environmental change," says the grant proposal that yielded the award.

Variations in climate may lead to corresponding changes in lake levels, water chemistry and biological productivity, it says. The study will be coordinated through the UNL Center for Advanced Land Management Information Technologies (CALMIT) and take place predominantly at two sites, Crescent Lake National Wildlife Refuge in Garden County and Valentine National Wildlife Refuge in Cherry County, with some additional study at Threemile Lake in Arthur County.

Among the objectives is determining baseline conditions for the lakes and wetlands so that any further changes in hydrologic, biological or near-surface climatological conditions can be assessed  
(See DOE grant continued on page 3)

## *New Vice Chancellor for Research accepts appointments to geology department and Conservation and Survey*

The University of Nebraska-Lincoln's new Vice Chancellor for Research, Priscilla Grew, has accepted joint academic appointments with the Conservation and Survey Division (CSD) and the Department of Geology. She brings with her a wealth of experience in geology and related natural-resource fields.

Grew graduated magna cum laude in geology from Bryn Mawr College in 1962. She earned a Ph.D. in geology from the University of California, Berkeley in 1967. In 1972, Grew went to work as a research geologist at the Institute of Geophysics and Planetary Physics at the University of California, Los Angeles.

From 1977 to 1981, Grew directed California's Department of Conservation. The department, similar to Nebraska's own CSD, contains the state

geological survey, regulates oil and gas, and oversees soil conservation programs.

From 1981-86, Grew served as commissioner of the California Public Utilities Commission. The commission regulated the utility rates of 1,500 utility and transportation companies in California, totaling \$25 billion annually. Since 1986, she has held an appointment as a professor of geology and geophysics at the University of Minnesota, and has directed the Minnesota Geological Survey.

As Vice Chancellor for Research at UNL, Grew will oversee all research and a variety of related agencies, including the Experimental Program to Stimulate Competitive Research, the University of Nebraska State Museum, and the Office of Grants and Contracts.

## NASA award helps researchers and data users evaluate remote sensing and GIS for water-systems study

The evaluation of advanced remote-sensing technology and geographic information systems (GIS) for resource managers, high-school teachers and others as they are trained in their use is the focus of a \$56,000 grant awarded to the Center for Advanced Land Management Information Technologies (CALMIT) at the University of Nebraska-Lincoln by the National Aeronautics and Space Administration (NASA). The award should allow for research that more closely links remote sensing and GIS technology to the needs of the resource managers, conservationists and teachers using them.

The study intends to evaluate various remote sensors regarding their usefulness in better understanding and managing critical aspects of the hydrologic cycle, particularly natural or human-induced changes in surface-water or groundwater quantity or quality. These areas of study would include examination the impact of land-use change or global environmental change as it relates to lakes, wetlands, streams or irrigated areas. Coordinating the project will be CALMIT director Don Rundquist, research geographer with the UNL Conservation and Survey Division. Also participat-  
(See NASA grant continued on page 3)

## Nebraska Geological Survey celebrates 100th anniversary

In 1903, 10 years after being designated the first official state geologist by the Nebraska Legislature, Erwin H. Barbour published his investigation of Nebraska's coal, oil, gold, silver and natural gas deposits. In the first report of the state geologist, he said that every year Nebraskans wasted about \$50,000 in a fruitless search for wealth in the earth. However, a few years previously, in 1899, he had issued another report on the state's potential in small-scale groundwater development entitled, "Wells and Windmills in Nebraska." This study touted the life-giving properties of underground water pumped with windmills for gardens, small fields and livestock in a land with unpredictable rainfall.

While Barbour was only partially right about Nebraska's mineral wealth--economic quantities of oil, natural gas and uranium have been found, for example--debate about the development and conservation of Nebraska's "earth-related" resources has persistently accompanied the growth of the state. Both agricultural and mineral resources have played important roles in the Nebraska's economic and cultural development, and the state's geological survey has consistently supplied scientifically based information about these resources. A part of the University of Nebraska-Lincoln (UNL) since its beginning in 1893, the Nebraska Geological Survey celebrates its one-hundredth anniversary this year.

In keeping with such themes, discussions of the roles and status of state geological surveys, as well as earth-science education and research in general, will mark the centennial celebration of the Nebraska Geological Survey. Alongside the state water, soils and geographical survey, the geological survey is now a unit of the UNL Conservation and Survey Division, becoming so in 1921.

In addition to the speakers, many other centennial activities are planned. Anyone interested in earth science is welcome and those not interested may find that the activities quicken their interest, says CSD director Perry Wigley. On three Tuesdays in September, the earth-science seminars are as follows:

--September 7, 3:30 p.m., Morrill Hall, UNL - Marilyn J. Suiter, director of Education and Human Resources at the American Geological Institute, will talk about "The Status of Earth Science Education." Career opportunities in the earth sciences have shifted dramatically, Suiter says.

--September 14, 3:30 p.m., East Campus Union, UNL - Jonathan G. Price, director of the Board on Earth Sciences and Resources of the National Research Council, part of the National Academy of Sciences, will discuss "Earth Science Research," based on the council's recent publication, *Solid Earth Sciences and Society*.

--September 21, 3:30 p.m., Morrill Hall, UNL - Charles Mankin, Oklahoma state geologist and director of the Oklahoma Geological Survey, will talk about "The Roles of State Geological Surveys."

Then, on September 23, Thursday of the celebration week, the division will sponsor an open house from 10 a.m. to 7 p.m. on the first floor of Nebraska Hall on UNL's city campus. The open house will highlight various activities of the Nebraska Geological Survey and other units of the division, including:

- A display of Nebraska's gems and minerals;
- Videos about Nebraska's geology and geologic research;
- Rock cores and samples from oil wells;
- The newest in computer generated maps and data sets;
- Research displays and demonstrations in water, soils, other natural resources and geographic information systems.

Lucky participants will win door prizes including polished Nebraska agates, copies of the popular books, *An Atlas of the Sand Hills* and *Flat Water: A History of Nebraska and Its Water*, T-shirts and more. Participants don't have to be present to win, just to register. Free souvenirs and refreshment will also be available. Parking will be available in the lots north and east of Nebraska Hall. Additional information is available from the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska-Lincoln 68588-0517; or by phone at (402) 472-3471.



University of Nebraska-Lincoln  
Graham B. Spanier, *Chancellor*

Institute of Agriculture and Natural Resources  
Irvin T. Omtvedt, *Vice Chancellor*

Conservation and Survey Division  
Perry B. Wigley, *Director*  
Charles A. Flowerday, *Editor*  
Troy Thompson, *Editorial Assistant*  
Jerry Leach, *Chief Cartographer*  
Dee Ebbeka, *Cartographer*  
Ann Mack, *Cartographer*

**Resource News is a bimonthly publication of the Conservation and Survey Division, 113 Nebraska Hall. Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, 68588-0517. It is distributed free to all interested in earth science in the state. To receive it, write to the address above. In addition, the Resource News audience will receive Resource Notes, the annual report of the division. The Conservation and Survey Division is the agency designated by statute to investigate and interpret the geologically related natural resources of the state, to make available to the public results of these investigations and assist in the development and conservation of these resources.** The Conservation and Survey Division provides information and educational programs to all people without regard to race, color, national origin, sex or handicap. Background of nameplate on page one depicts the layered rock column from the Geologic Bedrock Map of Nebraska. Layers shown are (from the bottom) Precambrian, Cambrian, Ordovician, Silurian and Devonian rocks.

## **DOE grant** *continued from page 1*

against a norm, according to Don Rundquist, research geographer with the UNL Conservation and Survey Division (CSD) and CALMIT director, the study's principal investigator. Other researchers are Dave Gosselin, CSD research hydrogeologist; Kyle Hoagland, associate professor in forestries, fisheries and wildlife at UNL; Ram Narayanan, assistant professor of electrical engineering at UNL; Jeff Peake, of the University of Nebraska-Omaha; and Doug Goodin, of Kansas State University.

One of the main reasons for choosing the two refuges and their lakes is that water-level monitoring has been done since the 1950s at the Valentine refuge and since the 1930s at the Crescent Lake refuge. Combining these with old aerial photographs and two decades of multi-spectral scanner (MSS) imagery of the lakes will provide vital long-term information about lake-size fluctuation and changes in biological activity.

The shallow lakes and wetlands should serve as initial

## **NASA grant** *continued from page 1*

ing will be Jim Merchant, CSD research geographer and CALMIT associate director, and Chris Keithley, CALMIT facilities manager.

The study will look at two regions of lakes and wetlands in or near the Sand Hills: the region near Crescent Lake National Wildlife Refuge in Garden County and extending north into Sheridan County and the area of irrigated agriculture around Alliance in Box Butte County.

The prospective end users of this information will also be involved in formal short-course training in remote sensing and GIS and field trips that provide on-site data collection, as well as informal discussions of the project's progress and activities, Rundquist said.

"Results of the proposed research should be directly relevant to NASA's Earth Observing System (EOS) program," says the grant proposal. "Furthermore, the work will contribute knowledge about remote sensing, GIS, and the hydrologic cycle because we will select problems (and

## **Value of Nebraska's mineral production up 1.8 percent**

The value of Nebraska's mineral production increased 1.8 percent in 1992 over the previous year, a \$379,700 hike, interrupting a one-year decline in 1991, two University of Nebraska-Lincoln geologists said in an annual report on the state's mineral production.

Raymond R. Burchett and Duane A. Eversoll, UNL Conservation and Survey Division geologists and authors of "Nebraska Minerals Operations Review, 1992," said that the value of total statewide mineral production increased to \$214,698,000 in 1992 from \$210,901,000 in 1991. Values for statewide mineral production, including oil and gas, peaked in 1981, declining from then until 1989, when they began to rise again.

The value of oil and gas production fell 19 percent, from \$122.5 million in 1991 to \$99,467,000 in 1992, the report said. The value of statewide oil and gas production has declined steadily since 1989.

The number of producing oil wells decreased from

indicators of stress on the High Plains Aquifer, because global warming should cause a change the primary productivity of these lakes and wetlands, which will be evaluated by measuring the "spectral signature" of algae and other larger species such as cattails, bulrushes and reeds.

The third variable and crucial to the study will be the change in net radiation--a function of incoming solar radiation and reflectance from the earth, from vegetation and from water--occurring in and around the wetlands. Few studies have examined the energy budget of the Sand Hills lakes and wetlands environment. Remote sensing, both close-range and high altitude, will be used to assess the relevant energy budget and its impact on the hydrologic and biological systems.

In each area of investigation, remotely sensed information will be evaluated against "ground-truth" data to determine the reliability of using remote sensing for these assessment and to indicate which information is the most valuable.

issues to address such as:

- Identifying land under irrigation, determining the type of irrigation technology being implemented, calculating irrigated acreage and estimating consumptive water use;

- Analyzing water-quality components in rivers, lakes and surface- or ground-water pollution;

- Evaluating selected areas with regard to vulnerability to surface- or ground-water pollution;

- Forecasting land-use change and the potential environmental impacts of such change (for example, wetland reduction, irrigation); and

- Assessing the relationships between land-surface changes and impacts on the hydrologic cycle (for example, drought, desertification)."

Lastly, the research should be of value to a number of graduate and undergraduate students who will help with data gathering and processing and will receive the benefits of this research as its lessons are incorporated into remote sensing and GIS instruction at UNL, Rundquist said.

5,832 in 1991 to 5,474 in 1992. Production of 42-gallon barrels of oil dropped from 5,832,115 in 1991 to 5,474,188 in 1992. Producing gas wells in the state increased from 12 in 1991 to 22 in 1992, and gas production rose from 784 million cubic feet in 1991 to 1,177 million cubic feet in 1992.

Of the 103 wells drilled for oil and gas during the year, 57 were for exploration, 43 for development and 3 were classified as tests or miscellaneous service. The largest number of exploration and development wells completed occurred in Cheyenne County, followed by Kimball, Hayes, Hitchcock and Banner counties.

In addition, the geologists reported an increase in the value of the non-fuel minerals mined in Nebraska, such as sand, gravel, crushed stone and lime, from about \$85 million in 1991 to about \$115.2 million in 1992, a 35.5 percent increase. The report also said:

*(See Minerals continued on page 4)*

## Minerals *continued from page 3*

--The state's active uranium mine, operated by Ferret Exploration near Crawford in Dawes County, produced about 400,000 pounds of yellowcake uranium in 1992. Its value was about \$4 million.

--Twenty-four limestone quarries produced 5.8 million tons of crushed stone in 1992, up from 4.3 million tons in 1991. Value of crushed stone production amounted to \$28.7 million last year, compared with \$22.4 million in 1991.

## New publications on Nebraska geology, geography, and water

Available from the Conservation and Survey Division

--Flat Water: A History of Nebraska and Its Water: R.D. Kuzelka, project manager; C.A. Flowerday, editor; 292 p. (RR-12) - \$20

--Nebraska Mineral Operations Review, 1992: R.R. Burchett and D.A. Eversoll; 15 p. (MP-35) - \$1

--Information and Regulations Pertaining to Industrial Minerals in Nebraska; June, 1993: R.R. Burchett, CSD; 7 p.

--Geology of Arbor Day Farm, Nebraska City, Nebraska; Nebraska Geonotes, June 1993: R.R. Burchett and D.A. Eversoll, CSD; 7 p. (GIM-52) 50 cents

--Earthquakes in Nebraska; Nebraska Geonotes, 1993

--The number of sand, gravel and silt or siltstone pits decreased by 32 last year, to 644 from 676. But the value of sand and gravel used in construction increased from \$28.4 million in 1991 to \$32.6 million last year.

The report is available from the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska-Lincoln, Lincoln, Neb., 68588-0517 for \$2 plus appropriate city and state sales tax.

update: R.R. Burchett, CSD; 2 p. (GIM-23); 50 cents

--Mineral Facts for Nebraska; Nebraska Geonotes, 1993 update: R.R. Burchett, CSD; 7 p. (GIM-38) 50 cents

--Oil and Gas Facts for Nebraska; Nebraska Geonotes, 1993 update: R.R. Burchett, CSD, and P.H. Roberts, Nebraska Oil and Gas Conservation Commission; 8 p. (GIM-47) 50 cents

--Uranium Deposits in Nebraska; Nebraska Geonotes, 1993 revision: R.R. Burchett, CSD; 3 p. (GIM-44) 50 cents

Please use order numbers (in parentheses) and add \$1.50 for shipping and handling. Nebraska residents should also add city and state sales tax.

## Coming up: National, state and regional meetings

--ExpoVisions '93, July 8-10, 4th floor, Nebraska Hall, Lincoln

--IANR Irrigation Tour, July 21-23

--IANR Congressional Tour, August 9-11

--Water Wells Standards and Contractors Licensing Board meetings, August 11; October 13, State Office Building, Lincoln

--"Earthbound," State Fair, September 3-12, Ag Hall, State Fairgrounds, Lincoln

--Husker Harvest Days, September 13-15, Grand Island

--Central USGS Cluster annual meeting (hosted by CSD), September 19-21, Cornhusker Hotel, Lincoln

--Omaha Gem and Mineral Show, October 2-3

--Water Policy Forum (sponsored by the Water Center), October 5, Aksarben, Omaha

--Association of Engineering Geologists annual meeting, October 9-15, San Antonio, Tex.

--Nebraska Groundwater Symposium, October 10-12, Ramada Hotel, Lincoln

--Geological Society of America annual meeting, October 23-29, Boston, Mass.

--Nebraska Association of Teachers of Science Fall Conference, October 28-30, Camp Calvin Crest, Fremont

### Conservation and Survey Division

Institute of Agriculture and Natural Resources  
University of Nebraska-Lincoln  
113 Nebraska Hall  
Lincoln, NE 68588-0517

Printed on recycled paper

NON-PROFIT ORG.  
U.S. POSTAGE  
PAID  
Lincoln, Nebr.  
Permit No. 46

