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Nebraska Earth Systems Education Network – Fall 2004

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Careers for Students – Help Them Think Outside the Box

Dave Gosselin, NESEN Director

Have any of your students indicated an interest in pursuing a career related to science? First, and foremost, encourage them to pursue a science-related career. With an ever-increasing need for people who understand the technical aspects of our world, we need good people and we know you have plenty of them in your classrooms. There are many great careers in the “traditional” scientific disciplines, such as geology, biology, chemistry, and physics. However, your students should also be encouraged to think outside the traditional disciplinary boxes and look into areas where the basic scientific principals are applied to environmental and natural resource issues. In the School of Natural Resources at the University of Nebraska-Lincoln, the goal is to provide a high-quality educational experience where students are successful and valued members of the natural resources and environmental sciences community. The School offers seven undergraduate majors including environmental soil science, environmental studies, fisheries and wildlife, natural resource and environmental economics, rangeland ecosystems, water science, and preforestry. These programs help students develop important problem-solving skills through hands-on activities using state-of-the-art science and technology. In addition to education, SNR provides many other enrichment opportunities for its students such as student run organizations, the Range Club, the Soil and Water Resources Club, Ecology Now or the Wildlife Club. These organizations help students develop leadership skills and interact with each other, professionals, and alumni. The College of Agricultural Sciences and Natural Resources, along with SNR, offer \$250,000 in scholarships each year. For more information on the School of Natural Resources, please visit its web site: www.snr.unl.edu.

(Although to some extent this piece is a commercial for the School of Natural Resources, the primary point is to get your students to explore a range of career possibilities in the sciences and think outside the traditional career box.)

NATS Annual Conference

The Nebraska Association of Teachers of Science is set to hold their annual fall conference Oct. 28-30. The theme this year is “Growing and Keeping our Own: Sustaining Highly Qualified Teachers.” Teachers from all over the state will be gathering at Camp Calvin Crest near Fremont to participate in workshops, field trips, and presentations held by their peers. The NATS conference is a great opportunity for science educators to learn from each other. For more information about the conference, visit their web page: <http://www.nebraskaacademy.org/nats/Conferences/index.htm>.

University of Nebraska State Museum Virtual Tour

Kathy French, Education Coordinator, University of Nebraska State Museum

Can you imagine seeing mammoths and rhinos right here in Nebraska? Have you ever thought about the fossil record beneath your feet? What animals and plants were living here millions of years ago? The University of Nebraska State Museum Vertebrate Paleontology Research Collections is filled with species from the past. These collections of our state’s fossil treasures are now available for you to access through the Internet. The Museum’s Research and Collections staff is developing a new Internet site to allow a “virtual” discovery of some of the state’s important fossil discoveries. Go to <http://www.museum.unl.edu/research/vertpaleo/NECounties/> for the fossil discoveries in your county. Check out the museum web site for other opportunities: <http://www.museum.unl.edu>.

Measurements from Nearly 5,000 Wells Show Groundwater Declines

Steven Ress, Communications Coordinator, UNL Water Center

Information from nearly 5,000 groundwater wells across Nebraska indicates groundwater in the state declined by one to five feet over the last year in many heavily irrigated areas. Continuing drought and recent legislation to prevent conflicts between groundwater and surface water users have contributed to the recent declines, said Jim Goeke, a University of Nebraska hydrogeologist.

"At least some of the depletions shown on the latest groundwater-level change map produced by the university are a result of drought-related spikes in well drilling and well pumping statewide," Goeke said. The map shows groundwater level changes in the High Plains aquifer that underlies more than 104 million acres of land in South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma and Texas.

Rises and declines in aquifer levels are common and also are affected by soil types, differences in geology and precipitation, said Mark Burbach, an assistant geoscientist with the University of Nebraska-Lincoln. The latest map, which shows groundwater level changes between spring 2002 and spring 2003, indicates groundwater declines of from less than a foot to more than five feet over much of Nebraska, particularly in the heavily irrigated Platte, Republican, Loup, Blue and Elkhorn river basins. Only the Sandhills and parts of southeast Nebraska indicate little to no changes in groundwater levels over the past year.

Very few locations indicated a rise in groundwater levels over the past year. In the past 50 years, there has been significant recharge of the aquifer in parts of Dawson, Gosper, Phelps and Kearny counties, where rises of more than 50 feet have been recorded. This groundwater mound is estimated to contain six to eight million acre feet of water, or about four to five times the 1.75 million acre-foot capacity of Lake McConaughy, Burbach said. An acre foot of water equals nearly 326,000 gallons.

Other than the groundwater mound, significant measurable rises in the aquifer are primarily confined to smaller groundwater mounds in Lincoln County and another in Valley, Greeley, Sherman and Howard Counties. In both those areas, rises from five to as much as 40 feet have been recorded, Burbach said.

Other than these notable exceptions, water levels in aquifers underlying Nebraska have largely remained constant over the last 50 years, he said.

For copies of the groundwater-level change map, contact Judy Otteman at (402) 472-7523 or go to <http://csd.unl.edu> online.

Sources: James W. Goeke, professor, UNL School of Natural Resources, West Central Research and Extension Center, North Platte, (308) 532-3611

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Second Annual Water Law, Policy and Science Conference

The University of Nebraska-Lincoln's Second Annual Water Law, Policy and Science Conference has initially been set for April 7-8, 2005 at the UNL City Campus Union in downtown Lincoln. Co-organizer Kyle Hoagland, director of the UNL Water Center, said the general theme of the conference is "Water Management Under Stress: Climate Change, Drought and Water Quantity." Nationally known keynote speakers will be part of the conference venue, as will a host of UNL experts in *drought monitoring and management, climatology, water science and water policy. More details will be in the fall Water Current.* For now, mark your calendars and plan to attend. The conference is co-sponsored by UNL's Institute of Agriculture and Natural Resources, School of Natural Resources, College of Law, Water Center and Water Resources Research Initiative.

UNL Natural Resources Lectures Focus on Environment, Ecology

Steven Ress, Communications Coordinator, UNL Water Center

LINCOLN, Neb. — From prairie dogs and national parks to climate and flooding, experts will cover a variety of environmental and ecological topics in free weekly public lectures this fall at the University of Nebraska-Lincoln.

The UNL School of Natural Resources Seminars began Sept. 1 and continue Wednesdays through Nov. 17 except Oct. 20, said organizer Jim Merchant, a professor in the School of Natural Resources. The 11 free lectures will be from 3:30 to 4:30 p.m. on UNL's East Campus in L.W. Chase Hall Room 116 with a social gathering at 3 p.m. in L.W. Chase Hall Rooms 225/226.

"I am particularly pleased at the range of topics we are presenting this fall. I think we have at least one or two that anyone might find interesting. Each of the topics has relevance to our quality of life here in Nebraska," Merchant said.

Seminar speakers are from UNL, Doane College and universities and agencies in several states. Several of this fall's lectures are being presented as memorials to E.T. "Ted" Elliott who died in 2002. Elliott, a professor and former director of the School of Natural Resource Sciences, was an accomplished scientist, Merchant said.

"His scientific achievements were marked by an extraordinary vision of how living organisms, from microorganisms to humans, are linked through the manifold nature of soil," Merchant said.

On Sept. 1, Keith Paustian of the Natural Resources Ecology Laboratory at Colorado State University began the series with a retrospective on Elliot's life and science.

Other lecture dates, presenters and topics are:

- Oct. 6: Ted Elliott Memorial Seminar: Ken Kunkel, Atmospheric Environment Section, Illinois State Water Survey, "Climate Extremes During 1895-2003 in the Continental United States: A Context for Future Changes."
- Oct. 13 and Oct. 27: To be announced.
- Nov. 3: Mark Kuzila, professor and director, UNL School of Natural Resources, "A Study of Soils and Landscapes in the Rainwater Basin Area of Nebraska."
- Nov. 10: David Krementz, Arkansas Cooperative Fisheries and Wildlife Research Unit, University of Arkansas, "Fall Migration Ecology of Shorebirds through the Mississippi Valley."
- Nov. 17: Tala Awada, School of Natural Resources, UNL. "Water Use of Trees and Grasses in the Nebraska Sandhills."

The lectures are presented by the School of Natural Resources, Institute of Agriculture and Natural Resources and UNL. For information on lectures or parking arrangements, call (402) 472-3305 or e-mail stess1@unl.edu.

Environmental studies students chart multiple careers, find many prospects

George Green, SNR Editorial Assistant

Graduates of the University of Nebraska-Lincoln's Environmental Studies Program chart multiple career paths, finding work with a cornucopia of contrasting employers. This distinctive employment pattern largely mirrors the interdisciplinary collaboration that characterizes the major, from its structure and curriculum to its students.

The environmental studies major bridges two colleges, the College of Agricultural Sciences and Natural Resources and the College of Arts and Sciences, giving students many opportunities. Students in the School of Natural Resources earn a bachelor's with an emphasis in natural resources. In the College of Arts and Sciences, they earn a bachelor of arts in environmental studies with an emphasis in anthropology, biology, geography or sociology, or they can earn a bachelor of science with an emphasis in geology, chemistry, meteorology/climatology and all of the other options except anthropology.

Sittler said students who prefer the scientific aspects of the major generally take more technical positions such as Department of Environmental Quality technicians. Their duties may include monitoring water quality or using geographic information systems to manage lands. Many of these students also opt to work in the private sector, she said. She said several alumni who have landed jobs with environmental consulting firms. These students perform several tasks, including conducting environmental assessments for companies that plan to develop parcels of land or install enterprises like gas stations that require environmental impact reviews, Kuzelka said.

Sittler said that students more interested in the public policy side of the environmental studies major find work at nonprofit organizations where they may manage public education campaigns or citizen involvement and outreach programs. State agencies and planning departments also frequently hire students for a variety of positions varying from managerial and strategic work to scientific assessments and research, she said. Some students who simply love the outdoors use their major as tool to get started in the burgeoning outdoor recreation industry, she said. Other students who wish to spend time outside take jobs as game wardens, she said. Still others, she said, enhance their educational credentials by attending law school or getting advanced degrees in biology or natural resource sciences.

Bob Hitchcock, UNL professor of anthropology and an advisor of environmental studies students within Arts and Sciences, said students pursuing the social science side of natural resources might end up working with a variety of organizations, here or abroad, involved in development and environment, helping to buffer the problematic side effects of conservation and development on people. Often anthropologists with advanced degrees specializing in ecology and development, for example, study the social and environmental side effects of large development projects such as dams and make recommendations to management organizations on how to mitigate them, he added.

As with most of the environmental studies program, diversity characterizes student research. Kuzelka said students have written papers on "cradle to grave" studies of consumer products or reviewed recycling. Sittler said recent thesis topics include a comparison of the environmental ethics of Christianity, Judaism and Islam, a study of the wintering habitats of beetles and an examination of the impact of certain international treaties on human population.

In addition to an undergraduate thesis, students in their senior year also take a seminar that introduces them to a number of topics in the field and prepares them for the post-graduation job hunt. The environmental studies program teaches students how to approach and analyze complex problems and think outside the box.

Job opportunities for foresters should be plentiful

George Green, editorial assistant, SNR

According to Professor Jim Brandle of the University of Nebraska-Lincoln School of Natural Resources, "Forestry is not just cutting down trees to make two-by-fours." To the contrary, he said, "there are a variety of tremendous opportunities in the program, despite a few common misconceptions."

Still widely available is the fundamental position with a government agency or private company, where foresters manage forests for timber, water resources, wildlife habitat and recreation, said Scott Josiah, state extension forester and assistant professor in the School of Natural Resources. In fact, these positions may well be opening up significantly in the near future as many state and federal foresters reach retirement age.

In addition, he said, several niche careers provide potential foresters an abundance of alternative professional opportunities. Some forestry majors find work with non-profit organizations like the Nature Conservancy, where they might help restore depleted and damaged forests or develop forests to make them better withstand destructive events like fire, Josiah said. Community forestry is another field where legions of forestry majors have found work, he said. Community foresters manage "urban forests," Brandle said, and educate about trees and tree care.

Another field that is particularly important in places like Nebraska is agroforestry, Brandle said. Agroforestry integrates woody plants into an agricultural system, he said. For example, he said, trees and shrubs are used in shelterbelts and windbreaks to protect crops, livestock or the family home. Traditional forests can be manipulated to increase forage production beneath their canopies and add profitability to a livestock operation.

Forestry also has international opportunities that complement its regional and local uses, Josiah said. "Personally, I have been able to see the world while getting paid to do it," Josiah said. A collection of government agencies, international organizations and non-profit organizations, such as the U. S. Agency for International Development, CARE International and the Peace Corps, hire foresters to assist native peoples and local governments with the maintenance of their forests, he said.

The UNL School of Natural Resources does not offer an undergraduate degree in forestry, Brandle said. But he said the university does have a long-standing pre-forestry program. This program hinges on a cooperative agreement between UNL and the University of Missouri that allows students to take a year or two of coursework before transferring to Missouri, which has a forestry program, to complete the degree.

"The arrangement gives students the chance to explore forestry before moving away from home," he said. If students decide to transfer, the University of Missouri will bill them at the in-state tuition rate and will accept the complete transfer of all of the credits they earned at UNL, he said. The cooperative arrangement with the University of Missouri has worked extremely well, Brandle said.

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