10-1-2003

Water Current, Volume 35, No. 4, Fall 2003

WATER CURRENT

UNL Water Center — Part of the School of Natural Resources

Vol. 35, No. 3 Fall 2003

UNL Scientists Earn $1.8 Million NSF Grant to Study Sandhills Ecosystem

Weather, water, wind, sand and grass have shaped and reshaped Nebraska's Sandhills over thousands of years. University of Nebraska-Lincoln scientists are launching research to understand these and other complex interactions that drive this rare ecosystem.

The National Science Foundation has awarded university scientists $1.8 million for a four-year comprehensive study of this 36,000-square-mile region. While expanding knowledge of the Sandhills is a primary goal, researchers believe results also could help expand understanding of broader potential impacts of global climate change.

"This is a study of sand, grass and water and how they interact to stabilize the Sandhills. We

(continued on page 8)

UNL research hydrogeologist Jim Goeke talks about the geology of the Ogallala aquifer where outcroppings of the formation are visible at Harry Strunk Reservoir near McCook. His presentation was part of a July tour of the Republican River watershed sponsored in part by the UNL Water Center. For more tour photos, go to pages 6-7 (photo: Steve Ress).

Finding Solutions to Water Conflicts Subject of UNL Conference

by Steve Ress

Finding solutions to multi-jurisdictional water conflicts will be the focus of an upcoming two-day conference at the University of Nebraska-Lincoln College of Law.

The conference is Mar. 4 and 5 at the College of Law auditorium on the UNL East Campus.

"The conference is an inaugural event for UNL's interdisciplinary Water Resources Research Initiative (WRRI)," said visiting associate professor of law Sandi Zellmer.

(continued on page 8)

Inside

Water Center Part of new SNR; WRRI Holds Promise for Research Efforts

from the DIRECTOR

Kyle D. Hoagland

Change is good, but it's in our very natures to avoid it (nobody wants their cheese moved!). Those who welcome change move forward and those who don't, don't.

The SNR

We embraced change at the Water Center this summer when we became one of several environmental and natural resources units to merge into the new School of Natural Resources (SNR).

Other units joining to create this merger were UNL's Conservation and Survey Division and School of Natural Resource Sciences. This has resulted in a combination of strengths and related synergy in natural resources as the SNR's approximately 200 faculty and staff, now formally linked, increasingly work together toward common research, teaching and outreach goals. In this day of diminishing budgets and increasing competition for students, as well as research and outreach funding, this only makes sense.

One of UNL's many strengths is the quality, diversity and commitment of Institute of Agriculture and Natural Resources faculty and staff in the natural resources disciplines. That's another reason it makes sense to strengthen our linkages in those areas.

Other UNL research centers that are part of the SNR include Great Plains Regional Center of the National Institute for Global Environmental Change; National Drought Mitigation Center; High Plains Regional Climate Center; Center for Advanced Land Management Information Technologies; and Great Plains Cooperative Ecosystem Studies Unit. A Cooperative Fish and Wildlife Research Unit also will be joining soon.

Each of these centers, including the Water Center, will retain their own directors and a measure of autonomy in conducting their share of the SNR's research and daily business, yet each is an important part of the whole.

Thanks Mike

After 20 months as interim director of the former School of Natural Resource Sciences, a job I took on due to the untimely death of director Ted Elliott, I am now back as director of the Water Center. During those 20 months, Mike Jess did a wonderful job as the Water Center's acting director and I thank him for taking on those additional administrative responsibilities while I was away.

Another change is that in order to trim some costs and devote some attention to publicizing the works of the new SNR, we have decided to produce this publication quarterly, beginning with this issue. We will continue to use it primarily to publicize the research, outreach and educational endeavors of the water faculty.

(continued on page 9)

WATER CURRENT

Water Center
University of Nebraska
103 Natural Resources Hall
Lincoln, NE 68583-0844
Phone: (402) 472-3305
Fax: (402) 472-3574
E-mail: sress1@unl.edu

http://watercenter.unl.edu

Kyle D. Hoagland - Director
J. Michael Jess - Water Specialist
Daniel D. Snow - Director, Water Sciences Laboratory
Steven W. Ress - Editor
Patricia A. Liedle - Editorial Assistant
Anne M. Moore - UNL CIT, Layout and Design

This newsletter is published with partial financial support from the Department of the Interior; U.S. Geological Survey. The content does not necessarily reflect the views and policies of the Department of the Interior, nor does mention of trade names or commercial products constitute endorsement by the U.S. Government.

Meet the Faculty

Dr. Joseph H. Sherrard, P.E.

Distinguished Professor of Civil Engineering and Associate Chair, Department of Civil Engineering, University of Nebraska-Lincoln (Omaha campus). Dr. Sherrard has been awarded the American Society of Civil Engineer's (ASCE) Walter L. Huber Research prize for contributions to the area of biological wastewater treatment and ASCE's Wesley W. Horner Award for a research paper on *Modeling Phosphorus Transport in Grass Buffer Strips.* His research has also been recognized through the award of the Kelly Gene Cook, Sr. endowed chair in Civil Engineering at Mississippi State University. In addition, he has received three Fulbright-Hays lectureship awards to assist in improving university level instruction in environmental engineering in Ecuador and an additional Fulbright award and two Senior Specialist Awards to assist Guatemala. Dr. Sherrard is a registered professional engineer in the State of Nebraska.

Education:

— Ph.D., Civil Engineering, University of California, Davis, 1971 (specialization in Environmental Engineering)
— M.S., Civil Engineering, California State University, Sacramento, 1969 (specialization in Water Resources Engineering)
— B.S., Civil Engineering, Virginia Military Institute, 1964

Current Research Activities:

— Evaluation of Current Wastewater Design Criteria.

Joseph Sherrard

— Environmental Engineering Criteria for Developing Countries.
— Bioremediation.
— Hydraulic Modifications to the Missouri River.

(continued on page 10)

Sandra B. Zellmer

Visiting associate professor of law (2003-2004) at the University of Nebraska College of Law. She has been a member of the faculty at the University of Toledo College of Law since 1998 and has also been a visiting professor at both Tulane Law School and Drake University Law School. Zellmer teaches and writes about natural resources, water conservation and use, environmental law, American Indian law, property, and related topics. Prior to teaching, she was a trial attorney for the Environment and Natural Resources Division of the U.S. Department of Justice, litigating public lands and wildlife issues for the National Forest Service, National Park Service, Fish and Wildlife Service, and other federal agencies. She also practiced law at Faegre and Benson, Minneapolis, MN, and clerked for the Honorable William W. Justice, U.S. District Court, Eastern District of Texas.

Sandi Zellmer

Education:

— LL.M. - Environmental Law (with Highest Honors), The George Washington University National Law Center, Washington, D.C., 1996.
— J.D., Sterling Honor Graduate, University of South Dakota School of Law, Vermillion, SD, 1990.
— B.S., magna cum laude, Morningside College, Sioux City, IA, 1985.

Current Programs:

— Zellmer divides her time between teaching at the College of Law and providing legal and policy perspectives to UNL's Water Resource Research Initiative (WRRI). She is currently working on two articles for publication. The first, "Wilderness and The Paradox of Preservation through Presidential Edict," will be the topic of a speech to be delivered at Lewis and Clark College in March 2004. The second is tentatively entitled "Missouri River management: From the Corps of Discovery to the Corps of Engineers."

(continued on page 10)

Research Probes Land Use Impact on Stream Health

by Steve Ress

Streams with sandy bottoms are more likely to have healthy populations of fish than those with silty or mucky bottoms, preliminary University of Nebraska research shows.

"Streams lined with woody and other forms of natural vegetation also are more likely to have healthy populations than those bordered by crops or bare ground," said Ed Peters, a UNL School of Natural Resources (SNR) fisheries biologist.

Peters and Mike Dosskey, a riparian ecologist with USDA's National Agroforestry Center at NU, are leading research to better understand how land use and riparian characteristics influence stream health. Researchers collected information and samples on types and abundance of fish and invertebrates, in-stream habitat, water quality, riparian characteristics, land use and other information at 106 sites in every Nebraska river basin and research continues.

"The information we are assembling gives a detailed picture of the health of fish populations and stream quality at the sampled locations and should lead to recommendations on land management, riparian habitats and best management practices for agricultural land bordering streams," Peters said. The National Agroforestry Center also could use results to develop management guidelines for maintaining and improving Nebraska stream health.

"The information we are assembling gives a detailed picture of the health of fish populations and stream quality at the sampled locations and should lead to recommendations on land management, riparian habitats and best management practices for agricultural land bordering streams."

SNR Research Analyst Cynthia Taylor is linking land use and stream health using the U.S. Environmental Protection Agency's Index of Biotic Integrity, a system that grades relative stream health based on fish numbers, species diversity, relative sensitivities to pollution and other information. Part of her work involves identifying correlations between land use and stream health within the index.

The U.S. Environmental Protection Agency, through the Nebraska Department of Environmental Quality, help fund this project.

(Editor's Note: This article originally appeared in the September, 2003 issue of the University of Nebraska-Lincoln Agricultural Research Division's *Research Nebraska* magazine).

UNL research technicians Keller Kopf, Dane Shuman and Justin Krahulik electroshock fish in Weeping Water Creek for the Nebraska Statewide Stream Fisheries Inventory Project. The study is looking at the abundance, diversity and distribution of fish in Nebraska streams (IANR photo by Brett Hampton).

SNR Researcher Examines Predators' Impact on Nesting Songbirds

by Steve Ress

Each spring, millions of ducks, geese and other migratory birds rest and feed in Nebraska's Rainwater Basin wetlands.

After spring visitors head north, the basin's summer residents — at least 12 native songbird species — arrive to breed and nest.

UNL student Kelsi Niederklein lifts an opossum for ear tagging as summer research technician Jason Curinga prepares to administer anesthesia during the tagging process. The tagging process is part of placing radio collars on the animals to track their movements (IANR photo by Brett Hampton).

While the basin is widely regarded as essential for migratory waterfowl, its role for songbirds isn't well known. Larkin Powell, a University of Nebraska wildlife ecologist, hopes better understanding of how songbirds and animal predators interact could improve basin management and restoration efforts.

Rainwater Basin wetlands are scattered across south central Nebraska. Only about 21,000 acres — less than 10 percent — of the once vast wetlands remain. Wildlife agencies and others are working to preserve and restore this habitat.

Powell's Institute of Agriculture and Natural Resources team is looking for a wetland restoration recipe that offers habitat attractive to nesting songbirds and minimizes chances they'll fall prey to predators — mainly skunks and raccoons. That combination also will likely attract waterfowl.

"Many waterfowl species and songbirds nest in similar habitat and their nests are exposed to the same risks, so good habitat for songbird nesting should be good habitat for waterfowl nesting," Powell said.

For the past two summers, Powell and School of Natural Resources graduate students have charted songbird nests and nesting success rates on basin wetlands near Clay Center that vary in size, proximity to other wetlands and habitat diversity.

In 2002, they captured nearly 50 predators that eat songbirds and eggs. This summer and last, researchers placed radio collars on about 15 raccoons and skunks to track their movements.

"The radio telemetry information ... helps us determine what kinds of wetlands they frequent the most which we can compare to songbird nesting patterns," he said.

Research continues but some patterns are emerging.

Predators tend to favor wetlands close to others, he said. This research indicates songbird nesting success depends

(continued on page 8)

School of Natural Resources graduate research assistant Max Post van der Burg and SNR wildlife ecologist Larkin Powell band a female red-winged blackbird at a Rainwater Basin wetland in Clay County (IANR photo by Brett Hampton).

Summer Water and Natural Resources Tour Explores Republican River Basin

Kearney Hub reporter Lori Potter interviews Ann Bleed of the Nebraska Department of Natural Resources during a stop on the tour (photo: Steve Ress).

More food? Frenchman-Cambridge Irrigation District officials serve refreshments (photo: Steve Ress).

A happy busload on the way to another stop on the July 22 - 24 water and natural resources tour of the Republican River basin (photo: Steve Ress).

Frank Albrecht of the Nebraska Game and Parks Commission and Brian Werner of Northern Colorado Water Conservancy District, Loveland, CO talk at a diversion dam on the Republican River near Red Cloud (photo: Steve Ress).

UNL research geologist Bob Diffendal prepares to take the summer water tour group on a walking tour of geological exposures and faulting visible along the south shoreline of Harlan County Reservoir, near Alma (photo: Steve Ress)

UNL water specialist Mike Jess fields an interview with a North Platte television station when the tour stopped at the Dancing Leaf Lodge near Wellfleet (photo: Steve Ress).

Finding Solutions to Water Conflicts Subject of UNL Conference

(continued from page 1)

"From endangered species to ground and surface water use and management, Nebraska is at the crossroads of many of the most vexing and contentious legal battles over scarce water resources. We hope to foster continuing dialogue and research among legal experts, scientists, engineers, economists and other water-related disciplines in an effort to understand ecological and human needs and reach sustainable management solutions."

Conference topics include strategies for reaching consensus in multi-jurisdictional contexts, water marketing and its implications for human priorities and fish and wildlife; water as property; constitutional "takings" claims; and using best available science to resolve conflicts between water uses and the needs of endangered species. These issues will be explored through interdisciplinary discussions, and placed in context by looking at water management issues on the Platte and Missouri Rivers.

Keynote speakers include Sandra Postel, director of Worldwatch Institute's Global Water Policy Project, speaking on security, agriculture and the value of water: Joseph Sax, University of California-Berkley Boalt Hall College of Law; and Robert Glennon, University of Arizona College of Law, speaking on the impacts of groundwater pumping on stream flow.

Other invited speakers include Roger Patterson, director of the Nebraska Department of Natural Resources, on avoiding a litigation "shipwreck" and reaching consensus over scarce water resources; University of Colorado at Boulder economics professor Charles W. Howe on protecting public values in a water marketing setting; Lincoln attorney LeRoy Sievers on the nature of water as private property or as a public trust resource; and Tim Searchinger of the Environmental Defense Fund on management and restoration of the Missouri River ecosystem.

Conference outcomes will be published in a symposium issue of the *Nebraska Law Review* and used in other NU publications, Zellmer said.

The WRRI leverages external funding to help provide for a broad spectrum of surface and groundwater research. It involves faculty and staff from UNL's School of Natural Resources, Water Center, Departments of Geosciences, Biological Systems Engineering, Civil Engineering, Agronomy & Horticulture, Chemistry, and the College of Law, cooperating on research and programming relevant to Nebraska and the great plains.

The WRRI, along with UNL's College of Law, Institute of Agriculture and Natural Resources, and Water Center are sponsoring the conference.

Registration details will be available after the New Year by contacting the UNL Water Center at (402)472-3305 or emailing sress1@unl.edu.

SNR Researcher Examines Predators' Impact on Nesting Songbirds

(continued from page 5)

on how attractive a wetland is to animal predators.

"Not surprisingly, particularly for the small- and medium-sized wetlands in our study, those wetlands with the least predators exhibited the highest bird nesting success rates, while the opposite also tends to be true," he said.

Bull snakes and other predators not included in this study also effect nesting success but mammals are major players.

Mammalian predators' impact is so significant that restoring wetlands in ways that reduce their influence should improve nesting success, Powell said. Steps might include planning for larger, somewhat remote wetlands, as well as providing a border of upland habitat, which may buffer the wetland birds from foraging predators.

This is the first Rainwater Basin research conducted during the breeding season. Studies typically focus on spring and fall waterfowl migration.

"We'll make recommendations based upon the most favorable habitat for native songbirds and what factors seem to draw animal predators," he said. "Our results should be very applicable to wildlife managers and property owners wanting to increase waterfowl production in the basin."

The Layman Foundation, UNL Research Council, Nebraska Game and Parks Commission and U.S. Fish and Wildlife Service help fund this research.

(Editor's Note: This article originally appeared in the September, 2003 issue of the University of Nebraska-Lincoln Agricultural Research Division's *Research Nebraska* magazine).

From the Director (continued from page 2)

WRRI

One subject you'll be hearing more about in upcoming issues of the *Water Current* is the Water Resources Research Initiative that Dr. Sheri Fritz in Geosciences and I are co-leading. We have university support for the next several years that we will use to leverage interdisciplinary research and education external funding for a broad spectrum of surface and ground water research areas. Our goal is to make UNL a world leader in water research, education, and outreach! As it unfolds, the WRRI will involve faculty and staff from SNR, Water Center, Departments of Geosciences, Biological Systems Engineering, Civil Engineering, Agronomy & Horticulture, and Chemistry, and the College of Law, cooperating on research relevant to the state and region.

UNL Scientists Earn $1.8 Million NSF Grant to Study Sandhills Ecosystem

(continued from page 1)

want to know how climate interacts with processes like overgrazing and fire to devegetate and destabilize this massive sand dune system, and, on the other hand, how vegetation returns to bare, moving sand to stabilize the system," said David Wedin, an Institute of Agriculture and Natural Resources ecosystems ecologist. He will head the 15-member team for this Sandhills Biocomplexity Project along with co-leaders Geoffrey Henebry, a School of Natural Resources landscape ecologist, and David Loope, a geologist in the geosciences department.

"This grant is an example of the impressive interdisciplinary expertise UNL can bring to research on complex environmental systems," said Prem Paul, UNL vice chancellor for research and graduate studies. "Studying and understanding the Sandhills and the immense water resources that lie beneath them is a major research focus for UNL and one that is critically important to Nebraska."

Today the Sandhills are stabilized by a protective cover of native grasses, but the dunes have gone from grass-covered to barren several times over the millennium. This large-scale study will focus on the links between the region's grass cover, wetlands, groundwater and regional climate. Ultimately, the UNL team hopes to develop a better overall picture of how climate and environment interact to create and maintain this fragile ecosystem.

"Today the dunes are covered by grasses that anchor or stabilize them, but even the smallest wind blowout on a ranch is a reminder that under that short vegetation lies the largest sand dune area in the Western Hemisphere ... a desert in disguise," Loope said.

The grant officially begins in September and builds on years of Sandhills research by team members and other UNL scientists. Next spring, scientists will establish research plots at the university's Barta Brothers Ranch near Rose and the Gudmundsen Sandhills Laboratory near Whitman.

Some research plots will help researchers study what happens to the system when vegetative cover disappears. Other researchers will map dune movement over the past 2,500 years and examine lake sediments to chart the timing of past droughts.

The team has many questions and they're all inter-related. For example, researchers want to know whether water evaporating from wetlands and wet meadows might reduce impacts of short-term drought by altering local climate. Conversely, they hope to learn whether loss of grass cover and wetlands can intensify a drought, leave sand bare and destabilize dunes.

From climate and water to drought and range ecology, the research team features diverse expertise. This range of expertise and the university's extensive Sandhills research facilities are an ideal combination for this project, Wedin said.

He and many scientists who will work on the this project have

(continued on page 12)

Cattle ranching in the Nebraska Sandhills. (IANR photo by Brett Hampton)

Water News Briefs

2004 SNR Calendar and New Publications

Full-color 2004 UNL School of Natural Resources wall calendars are available free from the UNL Water Center, while supplies last, by emailing sress1@unl.edu or phoning (402)472-3305. A limited number of 2003 SNR calendars, featuring historic black-and-white photography also remain available. Readers desiring a copy of the new SNR informational brochure, 2004 Water Center pocket resources directory or the summer, special edition of the SNR's Resource Links newsletter can obtain them at the above points of contact, as well.

UNL faculty and staff traveling to symposiums, conferences and other events may also check-out an SNR display and supporting hardware, or a groundwater flow model from Water Center through the above points of contact. The Water Center reserves the right to collect a damage or loss deposit on these items.

Interesting Sites

- http://www.angelfire.com/nh/cpkumar/hydrology.html—created by a student at India's National Institute of Hydrology, contains a comprehensive list of hydrology-related web resources with links to sites around the world.
- http://mail.cris.ac.uk/-glcjh/ivhhn/ — The International Volcanic Health Hazard network, began in February 2003 to determine the health effects of volcanic emissions.
- http://www.wateruseitwisely.com — "Water Use It Wisely" website, lists 100-plus ways to conserve water and includes printable files of water conservation materials.
http://www.sph.unc.edu/cehs — Center for Environmental Health and Susceptibility.

Water Facts

- There are more than 56,000 community water systems providing water to the public in the United States.
- There are approximately a million miles of pipelines and aqueducts that carry water in the United States and Canada. That's enough to circle the earth 40 times.
- Typically, households consume at least 50 percent of their water by lawn watering. Inside, toilets use the most water, with an average of 27 gallons per person per day.

  The average five-minute shower takes between 15 to 25 gallons of water.
- You can refill an eight-ounce glass of water approximately 15,000 times for the same cost as a six-pack of soda.
- An automatic dishwasher uses approximately nine to 12 gallons of water while hand washing dishes can use up to 20 gallons.
- 300 million gallons of water are needed to produce a single day's supply of U.S. newsprint.

We're Updating!!

We are updating our mailing list. If you have a change of address, title and/or name, or would like to have your name added to or removed from the *Water Current* mailing list, please let us know. Also, if you know of anyone who might be interested in receiving our publications, please give us their names and we will be glad to add them to our mailing list.

_____ Change my address

_____ Delete me from your list

_____ Add to our list

Name: _____

Address: _____

City, State, Zip: _____

Send update to:

Water Center, University of Nebraska, 103 Natural Resources Hall,
P.O. Box 830844, Lincoln, NE 68583-0844
FAX (402)472-3574
or e-mail changes to sress1@unl.edu

Meet the Faculty

Joseph H. Sheppard (continued from page 3)

Teaching:

— Introduction to Environmental Engineering and Public Health Engineering.

Recent Journal Articles/ Major Presentations:

— Sherrard, J.H. "Fulbright: New Dimensions to a Classic Program: Senior Specialist Program," presentation at the 55th Annual NAFSA Conference, Salt Lake City, UT, May 2003.

— Sherrard, J.H. "Environmental Engineering in Guatemala," Proceedings American Society for Engineering Education Annual Conference, Montreal, Canada, June 2002.

— Shrivastava, A. and J.H. Sherrard, "Evaluation of State Design Standards for Biological Wastewater Treatment," paper presented at the 46th Annual Great Plains Waste Management Conference, Omaha, March 2002.

— Shrivastava, A. and J.H. Sherrard, "Evaluation and Comparison of Design Standards for Biological Wastewater Treatment," 2nd Latin American Water Environment Federation Technology Conference, San Juan, Puerto Rico, November 2001.

— Sparks, J.T. and J.H. Sherrard, "The Potential for Cryptosporidium in Mississippi's Drinking Water," Proceedings, Mississippi Water Resources Conference, April 1998, p. 227.

— Mines, R.O. and J.H. Sherrard, "Activated Sludge Temperature Effects," Abstract submitted for publication to *J. Environ. Sci. Health*.

— Sherrard, J.H., D. Tucker, R.O. Mines and J. Gill, "Dengue Fever: Potential Threat to the Southern States," Proceedings, ASCE Water Resources and Urban Environment Conference, Chicago, IL, June 1998, p. 482.

— Mines, R.O. and J.H. Sherrard, "Oxygen Transfer in the Completely Mixed Activated Sludge Process Revisited," Proceedings, 1997 CSCS/ASCE Environmental Engineering Conference, Edmonton, Alberta, Canada, July 1997, p. 1381.

— Mines, R.O. and J.H. Sherrard, "Biological Treatment of a High Strength Nitrogenous Wastewater," *J. Environ. Sci. Health*, Volume A32, No. 5, 1353, 1997.

— Britto, R. J.H. Sherrard and D.D. Truax, "Kinetics of Pseudo-Continuous Bioreactor Treatment of Diesel Contaminated Soils," *Water, Air and Soil Pollution*, Vol. 86, 125, 1996.

Web/email address:

— http://www.civil.unl.edu/faculty/personal/FacultyDetail.asp?ID=70

— jsherrard@mail.unomaha.edu

Sandra B. Zellmer (continued from page 3)

Teaching:

— Natural resources law course, as well as an interdisciplinary seminar on water and environmental issues in the fall academic semester 2003. She will teach a course on environmental law and pollution control in the spring academic semester 2004.

Publications:

— Natural Resources Law & Policy (West casebook, forthcoming 2004) (with Laitos, Cole and Woods).

— Managing Interjurisdictional Water Resources in the Great Lakes, 18 NR & E 8 (2003) (with Mark Squillace).

— The Improvement of Water and Water-Dependent Resources, 4 J.G.L.L., Sci. & Pol'y 289 (2003) (with Kori A. Mann and David Gecas).

— Sustaining Geographies of Hope: Cultural Resources on Public Lands, 73 U. Colo.L.Rev. 413 (2002).

— Biodiversity In and Around McElligot's Pool, 38 U. Id. L.Rev. 473 (2002) (with Scott Johnson).

— The Roadless Area Controversy: Past, Present & Future, 48 Rocky Mt. M.L. Inst. 21-1 (2002).

— The Nondelegation Doctrine: Fledgling Phoenix or Ill-fated Albatross?, 31 ELR 11,151 (2001)

— The Protection of Cultural Resources on Public Lands, 31 ELR 10,689 (2001), reprinted in 39 Public Ld. & Resources Law Dgt. 101 (2002) (anthology of natural resource articles)

— Conserving Ecosystems Through the Secretarial Order on Tribal Rights, 14 NR & E 162 (2000)

— The Virtues of Command and Control Regulation: Barring Exotic Species from Aquatic Ecosystems through the Clean Water Act, 2000 U. ILL. L. rev. 1233 (2000).

Email address:

szellmer2@unl.edu

UNL Scientists Earn $1.8 Million NSF Grant to Study Sandhills Ecosystem

(continued from page 9)

experience with research in the Sandhills but this is the first time they've teamed up to develop an integrated, interdisciplinary understanding of what keeps the Sandhills from turning into a barren desert.

"The funding marks an important commitment and beginning. We perceive this as a very long-term research project with many additional possibilities to explore," he said.

The project features a key educational component, Wedin said. Coordinated through UNL's Nebraska Earth Science Education Network, it will involve elementary and high school teachers, undergraduate science majors and others who can learn from the project and share information with students.

As part of this project, the UNL team is building partnerships with Sandhills groups such as the Sandhills Discovery Foundation and the Sandhills Task Force, Wedin said.

More information about this Sandhills Biocomplexity Project is available on the Web at http://sandhills-biocomplexity.unl.edu/home.htm

This research is conducted in cooperation with IANR's Agricultural Research Division and the College of Arts and Sciences at UNL.

University of Nebraska scientists are embarking on a four-year comprehensive study of the Nebraska Sandhills with the recent awarding of a $1.8 million National Science Foundation grant. They will look at how weather, water, wind, sand and grass have shaped and reshaped this rare ecosystem over thousands of years. Potential results could also help expand understanding of broader potential impacts of global climate change (IANR photo by Brett Hampton).

Nebraska WATER CENTER

103 Natural Resources Hall
P.O. Box 830844
Lincoln, NE 68583-0844

ADDRESS SERVICE REQUESTED

Non Profit
U.S. Postage
PAID
Permit 46
Lincoln NE

Printed with soy ink on
15% post-consumer recycled paper