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Gleick Headlines April Water Management and Policy Conference

By Steve Ress

Peter Gleick, president of the Pacific Institute, will speak at this spring's Second Annual Water Law, Policy and Science Conference at the University of Nebraska-Lincoln.

The April 7-8 regional-level conference will be at UNL's City Campus Union.

Conference theme is "Water Management and Policy in the Great Plains: Implications of Drought and Climate Change."



Gleick is co-founder and president of the Pacific Institute for Studies in Development, Environment, and Security and is an internationally recognized expert on global freshwater resources, including hydrologic impacts of climate change, sustainable water use, privatization and globalization, and international conflicts over water resources.

Widely published, two of his more recent books are *The World's Water 2002-2003: The Biennial Report on Freshwater Resources* and *Water in Crisis: A Guide to the World's Fresh Water Resources*.

Gleick will address the two-day conference's first plenary session on "Water Management and Policy: Increasing Competition for a Scarce Resource."

Other notable speakers are James Detjen, director of Michigan State University's Knight Center for Environmental Journalism. He will speak on "The Role of the Media in Framing Debates on Environmental Policy."

Philip Mote, a professor in the Department of Atmospheric Sciences at the University of Washington will

speak on "Preparing for Climate Change in the Pacific Northwest," and Thomas Stewart, a professor in the Center for Policy Research, Rockefeller College of Public Affairs and Policy at the State University of New York speaks on "Uncertainty, Prediction, and Error in Water Management."

Local experts, many nationally known in their respective fields, include Don Wilhite, director of the National Drought Mitigation Center at UNL on understanding the hazards and reducing societal vulnerability to drought; and UNL geoscientist Sherilyn Fritz on what can be learned from the historical and paleoclimate record on drought.

Conference sessions focus on panel presentations and discussion of climate change and drought; drought history and predictability; climate change in a fragile

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Aurora Monitoring Well Records Indian Ocean Earthquake

By Steve Ress

When a massive undersea earthquake in the Indian Ocean generated deadly tsunamis last month, a groundwater monitoring well near Aurora recorded the catastrophic event.

"It's another poignant illustration of how small a planet we all inhabit," said University of Nebraska research geologist Matt Joeckel.

Groundwater level recordings from a 170-foot deep well near Aurora clearly show an anomalous, or

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USGS Funds Promising Research Projects; Many Activities on the Immediate Horizon

from the DIRECTOR



Kyle D. Hoagland

Best wishes for a happy and healthy 2005! We have many activities planned for this New Year, some of which are described in this issue. I draw your attention especially to the Second Annual Water Law, Policy and Science Conference, April 7-8 at the UNL City Campus Union. We have been fortunate to line up an outstanding group of speakers for an exciting conference entitled, "Water Management and Policy in the Great Plains: Implications of Drought and Climate Change." Presentations will include a unique mix of scientific experts, policy analysts, decision makers, and journalists. For those involved in any level of water

resources management in Nebraska and throughout the region, *this is a meeting not to be missed!* See the article in this issue for further details.

We're starting off an exciting new year of water research as well. The Water Center is pleased to announce the most recent recipients of USGS 104b grant funding:

- Dr. Xun-Hong Chen, School of Natural Resources, "Quantification of Stream-Aquifer Connection and its Implication for Modeling Surface Water-Groundwater Interactions." This project will address basic hydrologic parameters (hydraulic conductivity and streambed conductance) that are key components of a large-scale modeling effort on the Platte River basin. The fieldwork will be conducted between Kearney and Grand Island, Nebraska.
- Dr. Dean Eisenhauer and his graduate student Carla McCullough (Biological Systems Engineering), Dr. Michael Dosskey (USDA National Agroforestry Center), Dr. William Zanner and Dr. Scott Hygnstrom (School of Natural Resources), "Beaver in Agricultural Watersheds: Potential for Mitigating Degraded Midwestern Streams." This unique study, jointly funded by the Nebraska Game & Parks Commission, will help determine the extent to which beaver can restore

stability in stream channels at two sites in southeastern Nebraska, where channel incision and bank failure is a common problem.

- Dr. Alan Kolok (Department of Biology, University of Nebraska-Omaha) and Dr. Daniel Snow (Water Sciences Laboratory, UNL), "Androgenic Growth Promoters in Nebraska Rivers: Detection and Toxicity." This project will examine the effects of animal feedlot runoff on the reproductive biology of stream fishes, focusing on growth promoting steroids. The Nebraska Department of Environmental Quality jointly funds it.

As you can see, these projects share key features, namely they involve basic studies of research questions with applications to current water resources challenges in Nebraska, the Great Plains, and the nation. The fact that two of these projects are jointly funded by state water resource agencies speaks well of their immediate relevance to current management issues in Nebraska. We are excited about this cutting-edge research and look forward to the results!

Finally, I am pleased to report that the UNL Water Center received a very favorable five-year review in December 2004. See this issue for details, but suffice it to say that we're gratified to be recognized at the national level!

WATER CURRENT

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Meet the Faculty

Sharon O. Skipton

Extension Educator, University of Nebraska-Lincoln Southeast Research and Extension Center. Courtesy appointment to UNL Department of Biological Systems Engineering. UNL faculty member for 25 years.

Education:

M.S., Home Economics Education, University of Nebraska, 1979.
B.S., Home Economics Education and Extension, University of Nebraska, 1973.

Examples of Current Cooperative Extension Programming and Areas of Emphasis:

- Educational programming in Farm*A*Syst/Home*A*Syst, drinking water, on-site wastewater treatment, and healthy homes. Current programming

emphasis is on drinking water quality, on-site wastewater treatment, and lead poisoning prevention. Member of Water Quality Association, Groundwater Foundation, American Water Works Association, Nebraska Drought Planning Task Force Subcommittee on Municipal Water Supply, Health and Energy, Association of Natural Resources Extension Professionals, Nebraska Cooperative Extension Community and Residential Environment Team (co-chair water and waste group) and others.

- Skipton works as part of a team addressing the University of Nebraska Cooperative Extension's focus on Community and Residential Environment - Water and Waste. Her focus is on private drinking water and onsite wastewater management. Her team's current extension drinking water programs include workshops on

private drinking water system operation and maintenance, private wellhead protection, drinking water quality, and drinking water treatment.

- Current extension wastewater programs focus on septic system operation and maintenance. In addition, the extension team works with the Nebraska Onsite

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Sharon Skipton

William W. Hoback, Ph.D.

Associate Professor of Biology, Department of Biology, University of Nebraska, Kearney. UNK faculty member since 1999. Adjunct faculty University of Nebraska-Lincoln, Department of Entomology.

Education:

Ph.D., Entomology, University of Nebraska-Lincoln, 1999.
M.S., Biology, Southwest Missouri State University, Springfield, MO, 1995.



William Hoback

B.A., Biology/Ecology, Randolph-Macon College, Ashland, VA, 1990.

Examples of Current Research/Extension Programs:

- Hoback is conducting research projects on two irrigation reservoirs in Nebraska in conjunction with Nebraska Game and Parks. In Harlan Reservoir, he is examining zooplankton structure along with water quality parameters to better understand factors influencing walleye production. In Sherman Reservoir, he is tracking adult crappie and examining larval crappie production. Hoback and his students are also quantifying fish lost through water releases. In addition to these fisheries projects, they are examining the distribution of plains topminnow and mosquitofish to determine if mosquitofish pose a risk to the native topminnow.
- During his Masters work at SMSU, Hoback examined amphipod response to hypoxia associated with a tailwater of a large reservoir.

- Part of his work also concerns the impact of exotic species on ecosystems. During Harlan Reservoir sampling, he and his students discovered *Daphnia lumholtzi*, an exotic cladoceran previously unknown from the state.

Selected Past Research/Extension Programs:

- Ph.D. Dissertation: Ecophysiology of habitat use and competition in an assemblage of salt marsh tiger beetle species.
- M.S. Thesis: Hypoxia limited survival, respiration, and mating behavior in the amphipod, *Gammarus pseudolimnaeus* Bousfield.

Teaching Responsibilities:

- Hoback teaches Freshwater Biology, Limnology, Ichthyology, and Entomology along with Evolution and Introduction to Graduate Studies.

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Gleick to Speak at April Water Management and Policy Conference (continued from page 1)

ecosystem: water in the Great Plains; decision making under uncertainty: water management and policy instruments to mitigate drought and climate change; and translating science into policy and to the public, which will be a panel discussion led by Carolyn Johnsen of the UNL School of Journalism.

Those unable to attend the actual conference can opt to view it online at a reduced rate at <http://snr.unl.edu/waterconference/>.

The conference is co-sponsored by UNL's Institute of Agriculture and Natural Resources, School of Natural Resources, Department of Geosciences, College of Law, Water Center, Water Resources Research Initiative, and School of Journalism Public Policy Center.

For more information, go to <http://snr.unl.edu/waterconference/>

Water Management and Policy in the Great Plains: Implications of Drought and Climate Change April 7-8, 2005 University of Nebraska, City Campus Union Thursday, April 7

Opening and Welcome (8:00-8:10)

Dr. Harvey Perlman, Chancellor, University of Nebraska

Plenary Session (8:10-9:15)

"Water Management and Policy: Increasing Competition for a Scarce Resource" Dr. Peter H. Gleick, Director, Pacific Institute

Session I. Framing the Issues in the Great Plains Context - Panel Discussion (9:15-10:45)

- "Climate Change Science: Prospects for Change in North America and the Central U.S." Dr. Jerry Meehl, National Center for Atmospheric Research
- "Drought: Understanding the Hazard and Reducing Societal Vulnerability" Dr. Donald Wilhite, Director, National Drought Mitigation Center, University of Nebraska
- "Role of the Media in Framing Debates on Environmental Policy" Dr. James Detjen, Director, Knight Center for Environmental Journalism, Michigan State University

Break (10:45-11:15)

Session II. Climate Change and Drought in Western North America (11:15-12:15)

- "Incidence of Drought: What Can We Learn from the Historical and Paleoclimatic Record?" Dr. Sherilyn Fritz, Department of Geosciences, University of Nebraska
- "Preparing for Climate Change in the Pacific Northwest" Dr. Philip Mote, University of Washington

Lunch (12:15-1:45)

- "Addressing Water Conflicts: Lessons Learned (or Not Learned)" David J. Hayes, Chair of the Environment, Land and Resources Department, Latham & Watkins, LLP, and former Deputy Secretary, U.S. Department of Interior

Session III: Decision Making under Uncertainty: Water Management and Policy

Instruments to Mitigate Drought and Climate Change (2:00-3:00)

- "Drought and critical water problems in the Colorado River Basin: ARE THE Lessons Learned?" Dr. Roger Pulwarty, Research Scientist, NOAA Climate Diagnostics Center, University of Colorado
- "Uncertainty, prediction, and error in water management." Dr. Tom Stewart, Center for Policy Research, SUNY-Albany

Break (3:00-3:30)

Session III cont': Decision Making under Uncertainty (3:30-4:30)

- "Nebraska's New Surface Water/Groundwater Law" Roger Patterson, Director, Nebraska Department of Natural Resources

- "Making the Case for a National Drought Preparedness Policy" Shaun McGrath, Program Manager for Drought Response, Western Governors' Association, Denver, CO

Reception and Dinner (6:30-9:00)

Pat Mulroy, General Manager, Southern Nevada Water Authority

Friday, April 8

Welcome & Introduction (8:00-8:05)

Dr. Prem Paul, Vice Chancellor for Research, University of Nebraska-Lincoln

Opening Remarks (8:05-9:00)

Congressional Delegates

Session IV: Translating Science into Policy and to the Public - Panel Discussion (9:00-10:30)

Moderator: Carolyn Johnsen,

- "Beauty and the Beast: External Review of Restoration Science" Dr. Will Graf, Professor of Geography, University of South Carolina and former chair, National Research Council Committee on Endangered and Threatened Species in the Platte River Basin
- "Science, Judgment and Controversy in Natural Resource Regulation" Holly Doremus, School of Law, University of California-Davis

Break (10:30-11:00)

Session IV cont': Translating Science into Policy and to the Public (11:00-12:30)

- "Water Management, Science and Decision-making" Dr. Kathy Jacobs, Deputy Director, SAHARA, University of Arizona
- "Role of the Media in Communicating Science" Ed Marston, Publisher Emeritus, and Matt Jenkins, Reporter, High Country News

Concluding Comments

Lunch



Xun-Hong Chen, a hydrogeologist in UNL's School of Natural Resources conducts streambed conductance tests on the West Fork near Eldorado, south of Aurora. Chen's project, "Characterization of aquifer hydraulic conductivities of an alluvial aquifer and streambed conductance in the eastern part of central Nebraska" is jointly funded by Upper Big Blue and Central Platte NRDs. Permeameter tests were performed in the river to measure the hydraulic conductivities of the streambed and a Geoprobe was used to collect sediment cores in the channel and to measure electrical resistivity to help estimate the thickness of streambed. This fieldwork was conducted on Dec. 8, 2004. Additional tests were conducted about two weeks later. Data on streambed conductance in most streams/ivers of Nebraska do not exist, preventing full understanding of the hydrologic relationship between stream and aquifers. Chen's investigations will fill the knowledge gaps on streambed conductance in the study area, a key parameter in the analysis or modeling of the hydrologic interactions between stream and the surrounding aquifers. The results of this investigation will likely be used as inputs to a groundwater flow model and improve the reliability of groundwater modeling outputs for this area (photo: Jay Bitner, Upper Big Blue NRD).

Planning for June Water and Natural Resources Tour Taking Shape

By Steve Ress

Planning for this summer's water and natural resources tour to the Nebraska Sandhills and Pine Ridge is taking shape, though a final program has not yet been set.

"We're facing the dilemma we normally have at this time each year, which is trying to select the most appropriate stops and speakers from a list of possibilities that unfortunately won't all fit into the amount of time we have available for the tour," said co-organizer Michael Jess, associate director of the UNL Water Center.

The June 28-30 tour begins and ends in Kearney. Stops and presenters will focus on local response to LB 962 and Sandhills water issues.

Stops being considered on the tour's first day include the headgate for the Kearney Canal, which is the oldest water right in Nebraska then Jeffrey Island, to see and hear about a Central Nebraska Public Power and Irrigation experiment using goats to graze leafy spurge, phragmites and other invasive plant species that choke rivers, streams and irrigation canals using already scarce water supplies.

From there, buses will likely stop at Lake McConaughy's visitor center and possibly lunch at a golf course, marina and residential development on the south side of the lake.

The tour then heads to Crescent Lake National Wildlife Refuge, north of Lewellen for presentations on wildlife breeding and habitat restoration projects by the U.S. Fish and Wildlife Service and University of Nebraska.

The remote refuge, established in 1931, covers nearly 46,000 acres and is dotted with numerous shallow lakes. It has hosted nearly 275 species of birds through the years.

Buses then head toward Alliance, which could be the hub for many area stops over the next day and a half. Locations being considered for tour stops include the Box Butte irrigation project, Pine Ridge area near Chadron, agriculture and irrigation projects in the Alliance area,

discussions about the University of Nebraska's Sandhills Biocomplexity Project, a stop at a working ranch and others.

Third day tour stops are being planned for as buses head east from Alliance toward the tour's end at Kearney.

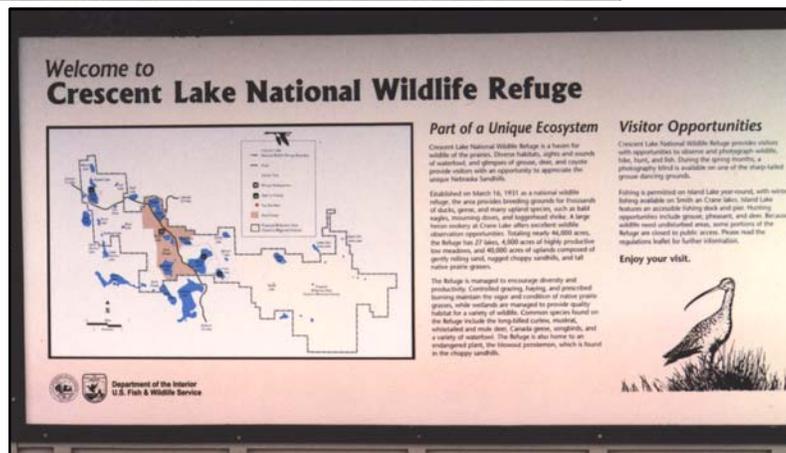
"We're planning stops at locations where we believe a good number of those signing-up for the tour will not have been before," Jess said. He added that "The uniqueness and vastness

of the Sandhills and Pine Ridge areas should make for a fun and educational tour."

Registration fees for the three-day tour have not yet been set. As soon as tour details and costs are established, the Kearney Area Chamber of Commerce will make a registration mail-

ing to past tour attendees and the university will send additional information.

Central Nebraska Public Power and Irrigation District, Gateway Farm Expo, Kearney Area Chamber of Commerce, Nebraska Association of Resource Districts, Nebraska Public Power District and the University of Nebraska-Lincoln School of Natural Resources are sponsors.



Crescent lake National Wildlife Refuge will be one of the stops on the June 28-30 water and natural resources tour of the Sandhills and Pine Ridge (photos: Steve Ress).

UNL Water and Natural Resources Research Lectures Continue Through April

By Steve Ress

Regional water issues and natural resources research highlight free weekly public lectures at the University of Nebraska-Lincoln that began Jan. 26.

The 12-lecture UNL School of Natural Resources Research Seminar is 3:30 to 4:30 p.m. Wednesdays through April 27, except March 16 and April 6, at L.W. Chase Hall on UNL's East Campus.

Several of the series' speakers are from UNL or within Nebraska. Others will travel from as far as Utah, Texas and Vermont.

"The strength of this lecture series lies in the excellence of the speakers and the applicability of their lectures to local water and natural resources issues, across the board," said Jim Merchant, seminar organizer and professor in UNL's School of Natural Resources.

On Feb. 2, Cecil Steward, director of Omaha's Joslyn Castle Institute for Sustainable Communities and former UNL dean of architecture, speaks on balancing population growth and demands on water and natural resources in the Lower Platte River between Lincoln and Omaha.

On Mar. 2, UNL fisheries biologist Ed Peters talks about viewing the Platte River from a fish-eye perspective. Other scheduled UNL lecturers are civil engineer Matt Morley on Feb. 9 and SNR hydrologist Xun-Hong Chen, who gives the final lecture on April 27.

Outside speakers include chemist Judy Westrick of Lake Superior State University on algal toxins in water; geologist Kip Solomon of the University of Utah, on using inert gas tracers in groundwater research; civil engineer David Maidment of the University of Texas-Austin speaking on using geographic information sys-

tems (GIS) technology in furthering water research and Robert Costanza, director of the Gund Institute for Ecological Economics at the University of Vermont.

Other speakers are from Iowa State and South Dakota State Universities and the U.S. Geological Survey in Kansas and Missouri.

"There are topics here that everyone interested in water, wildlife and natural resources can benefit from, not just university researchers or academics," said seminar co-organizer Kyle Hoagland, director of the UNL Water Center.

Lectures are co-sponsored by UNL's Institute of Agriculture and Natural Resources, School of Natural Resources and Water Center.

Presenters from School of Natural Resources are listed as SNR. For more information, contact Merchant at jmerchant1@unl.edu or go to <http://watercenter.unl.edu> online.

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UNL Water Center Passes USGS Five-Year Review Process

Calling it "One of the stronger" institutes among the 54 Water Resources Research Institutes nationwide, the U.S. Geological Survey recertified the UNL Water Center to continue to receive USGS funding it uses to help fund many of its research, extension and public outreach programs.

Recertification was based on a five-year review of the center's research, extension and outreach activities from 1998 through 2002.

"The center has a strong research program that shows evidence of high quality, and the information dissemination program is likewise fully satisfactory," the evaluation said in part. "The peer review process is solid, and there is excellent discretionary support from multiple sources."

Independent panel members reviewing the center and recommending it for funding recertification represented Cornell University, the National Ground Water Association, University of California-Berkeley, and the Bureau of Indian Affairs - U.S. Department of Interior.

"I'm naturally pleased that we did well in the review process. It's another indicator that we're heading in the right direction, but there is still much to be accomplished," said UNL Water Center director Kyle Hoagland.

The UNL Water Center receives matching grant funds administered by the USGS under provisions of the Water Resources Research Act of 1984. The act requires periodic evaluation of the center to determine eligibility for continued support.

Evaluation of the UNL Water Center further found that "The center does a good job of involving non-host institutions and faculty in its programs and has appropriate involvement of students and junior faculty...the (review) panel commends the director and the University of Nebraska for their support and management of the center's programs."

The network of Water Resources Research Institutes was authorized by Congress in 1964 and currently operates at 54 land-grant colleges and universities nationwide.

Report Emphasizes Areas for Water Research in Coming Years

More than 40 areas of water resources research that should be emphasized in the coming 10 to 15 years are identified in *Confronting the Nation's Water Problems - The Role of Research* recently published by the National Research Council of the National Academies.

Among the national committee members compiling and editing the report was Roger K. Patterson, director of the Nebraska Department of Natural Resources.

Water resources research areas that should be emphasized in the next 10 to 15 years, according to the book, were subcategorized and listed as follows:

Water Availability

1. Develop new and innovative supply enhancing technologies;
2. Improve existing supply enhancing technologies such as wastewater treatment, desalting and groundwater banking;
3. Increase safety of wastewater treated for reuse as drinking water;
4. Develop innovative techniques for preventing pollution;
5. Understand physical, chemical and microbial contaminant fate and transport;
6. Control nonpoint source pollutants;
7. Understand impact of land use changes and best management practices on pollutant loading to waters;
8. Understand impact of contaminants on ecosystem services, biotic indices and higher organisms;
9. Understand assimilation capacity of the environment and time course of recovery following contamination;
10. Improve integrity of drinking water distribution systems;
11. Improve scientific bases for risk assessment and risk management with regard to water quality;
12. Understand national hydrologic measurement needs and develop a program that will provide these measurements;
13. Develop new techniques for measuring water flows and water quality, including remote sensing and in situ;
14. Develop data collection and distribution in near real time for improved forecasting and water resources operations;
15. Improve forecasting the hydrological water cycle over a range of time scales and on a regional basis;
16. Understand and predict the frequency and cause of severe weather (floods and droughts);
17. Understand recent increases in damages from floods and droughts;
18. Understand global change and its hydrologic impacts;

Water Use

19. Understand determinants of water use in the agricultural, domestic, commercial, public and industrial sectors;
20. Understand relationships between agricultural water use and climate, crop type and water application

21. In all sectors, develop more efficient water use and optimize the economic return for the water used;
22. Develop improved crop varieties for use in dryland agriculture;
23. Understand water-related aspects of the sustainability of irrigated agriculture;
24. Understand behavior of aquatic ecosystems in a broad, systematic context, including their water requirements;
25. Enhance and restore of species diversity in aquatic ecosystems;
26. Improve manipulation of water quality and quantity parameters to maintain and enhance aquatic habitats;
27. Understand interrelationship between aquatic and terrestrial ecosystems to support watershed management.

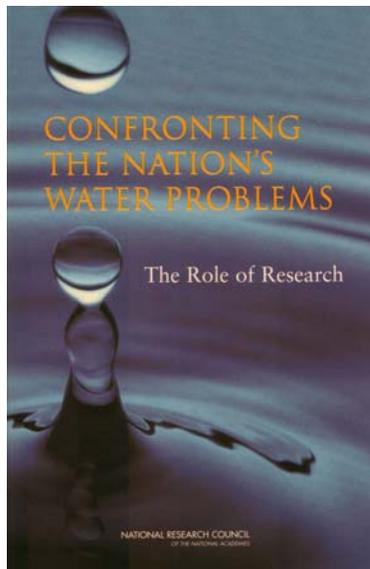
Water Institutions

28. Develop legal regimes that promote groundwater management and conjunctive use of surface water and groundwater;
29. Understand issues related to the governance of water where it has common pool and public good attributes;
30. Understand uncertainties attending to Native American water rights and other federal reserved rights;
31. Improve equity in existing water management laws;
32. Conduct comparative studies of water laws and institutions;
33. Develop adaptive management;
34. Develop new methods for estimating the value of non-marketed attributes of water resources;
35. Explore use of economic institutions to protect common pool and pure public good values related to water resources;
36. Develop efficient markets and marketlike arrangements for water;
37. Understand

38. Understand role of the private sector in achieving efficient provision of water and wastewater services;
39. Understand key factors that affect water-related risk communication and decision processes;
40. Understand user-organized institutions for water distribution, such as cooperatives, special districts and mutual companies;
41. Develop different processes for obtaining stakeholder input in forming water policies and plans;
42. Understand cultural and ethical factors associated with water use;
43. Conduct *ex post* research to evaluate the strengths and weaknesses of past water policies and projects.

The report is expected to have a significant impact on federal grant programs, the level of funding available to support research in water-related field and the specific areas targeted for funding.

To learn more about the book, or obtain a copy, contact The National Academies Press online at www.nap.edu or go to the National Academies at www.national-academies.org.



Missouri Water Research Center, University of Missouri-Columbia

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University of Missouri-Columbia
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Director:

Thomas E. Clevenger, Ph.D. Dr. Clevenger has more than 30 years experience working in the environmental field and has spent the last 20 years as Director of the Missouri Water Research Center. He is an associate professor in the Civil and Environmental Engineering Department at the University of Missouri-Columbia. His research activities have included hazardous waste, wastewater treatment and emerging drinking water issues. Under his direction, the Water Center operates the Center for Environmental Technology, an EPA Technology Assistance Center for drinking water, and the Water Resources Research Program for the U.S. Geological Survey.

Faculty/Staff:

Randy Curry, Ph.D., Associate Director of the Missouri Water Research Center. Areas of expertise include: pulsed power, electron beam, gamma radiation, uv radiation, and pulsed field.

Ed Hinderberger, Chemist. Areas of expertise include being in charge of the center's laboratory, maintaining lab equipment and performing analyses. He is also involved in quality control.

Dan Crosby, Research Specialist. Areas of expertise include assisting in the laboratory, performing field samplings and serving as quality assurance coordinator.

Karen Turner, Technology Transfer Coordinator. Areas of expertise include responsibility for organizing meetings and conferences, as well as designing, developing and producing educational products such as publications, brochures and fact sheets. She is also responsible for web site development and updates.

Areas of Emphasis:

The Missouri Center is responsible for three programs: EPA, USGS and ENTECH.

USGS Program: The Water Research Institute program for the State of Missouri is funded by the U.S.

Geological Survey (USGS) and administered through the Missouri Water Research Center. The USGS program was established in 1964 following enactment of the National Water Resources Research Act. This act created a national network of 54 research centers, one in each state and territory, which provides the national with a coordinated effort to solve state, regional and national water problems. The federal research dollars administered through the center are available to all universities in Missouri. The center's primary purpose is to sponsor and administer research projects on the state's water and related land-use and environmental problems. Through these projects, training opportunities are provided for young men and women interested in careers in water and environmental resources. Other research and outreach programming is conducted by the center under this program.

EPA: Under the Safe Drinking Water Act, the need for assistance to small drinking water systems was recognized. New federal regulations will greatly impact small communities, most without the resources to respond. Currently, eight centers have been funded. Missouri's center is unique in that it is technology based. The center has the expertise to assess current drinking water technologies and is establishing nationally recognized test sites. Industry, small communities and the Missouri Department of Natural Resources are also contracting the center for this purpose. In addition, the center is in a position to help new companies and many small Missouri industries to develop and assess their current technologies. Other research and outreach programming is conducted by the center under this program.

ENTECH: The Institute for Environmental Technology (ENTECH) provides training programs and services related to environmental issues in infrastructure development of emerging markets. For example, the Wastewater Division offers a special one-week training program entitled "Aeration and Biological Wastewater

Treatment Process" that focuses on technical transfer and application of current advanced technologies used in the U.S.

The training program is unique because it is designed specifically for industrial and municipal water and wastewater treatment design engineers, plant owners and operators; government and regulatory agency individuals; and senior management involved in infrastructure development. Any person with a need for understanding application of advanced treatment technologies will benefit from the training.

There are numerous training programs offered by universities, community colleges and other institutions in the U.S. for domestic application. However, few are marketed specifically for global application and none to our knowledge for emerging market needs. Most training are considered "short courses," with only one or two day agendas, making them non cost effective for international participation.

Undergraduate / graduate fields of study offered:

The center sponsors undergraduate and graduate students in all environmental areas through all universities in Missouri.

Annual events:

Environmental engineering seminars are offered on the University of Missouri-Columbia campus on Monday's at 2 p.m. but vary per semester. The seminars cover all areas of new emerging issues of environmental concern and environmental research within the University of Missouri-Columbia, as well as professional guest lecturers in the field. If you are interested in receiving upcoming seminar notices, email Karen Turner at turnerk@Missouri.edu.

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UNL Water and Natural Resources Research Lectures Continue Through April

(continued from page 6)

Dates, presenters and topics are:

Jan. 26: Judy Westrick, Department of Chemistry, Lake Superior State University, "Algal Toxins - Source to Tap."

Feb. 2: W. Cecil Steward, Joslyn Castle Institute for Sustainable Communities, Omaha, "The Flatwater Metroplex: People, Water, and Natural Resources in S.E. Nebraska — Can We Have Growth and Sustainability?"

Feb. 9: Matthew Morley, Department of Civil Engineering, University of Nebraska-Lincoln, "Methods for Remediation of Explosives-Contaminated Groundwater."

Feb. 16: Kip Solomon, Department of Geology and Geophysics, University of Utah, Salt Lake City, UT, "Inert Gas Tracers in Groundwater."

Feb. 23: Kyle Juracek, U.S. Geological Survey, Lawrence, KS, "Reservoir Bottom Sediments: An Archive of Historical Human Activity and its Environmental Effects."

Mar. 2: Ed Peters, SNR, UNL, "Trying to Develop a Fish's View of the Platte River (Where has all the water gone?)."

Mar. 9: Scott Sowa, USGS Missouri Resource Assessment Partnership (MoRAP), Columbia, MO., "Aquatic Gap Analysis."

Mar. 16: no seminar (UNL spring break)

Mar. 23: Carol Johnston, Director, Center for Biocomplexity Studies, South Dakota State University, Brookings, SD, "Great Lakes Coastal Wetlands."

Mar. 30: Kremer Memorial Lecture: John Downing, Department of Ecology, Evolution and Organismal Biology, Iowa State University, Ames, IA, "Notes from the Upper Edge of the Nutrient Spectrum: The Ecology of Waters in Agricultural Watersheds."

Apr. 6: no seminar (week of UNL water conference)

Apr. 13: Kremer Memorial Lecture: Robert Costanza, Director, Gund Institute for Ecological Economics, University of Vermont, Burlington, VT, "Ecological Economics: Reintegrating the Study of Humans and the Rest of Nature."

Apr. 20: Williams Memorial Lecture, David Maidment, Department of Civil Engineering, University of Texas, Austin, TX, "GIS in Water Resources."

Apr. 27: Xun-Hong Chen, SNR, UNL, "Evaluation of stream-aquifer hydrologic connection in the Platte and Republican River Valleys of Nebraska."

Aurora Well Records Indian Ocean Earthquake (continued from page 1)

inconsistent, rise and fall in the groundwater level – as much as two-tenths of a foot above and below normal levels occurring over a 15-minute period directly corresponding to the Dec. 26, 2004 Indian Ocean earthquake.

"The graph from the well shows very rapid rise and fall in the groundwater level, creating very clearly seen spikes on the graph," Joeckel said. The distinct spikes were discovered by UNL School of Natural Resources associate geoscientist Scott Summerside and cartographer Jerry Leach in conjunction with a groundwater level monitoring program conducted by the university.

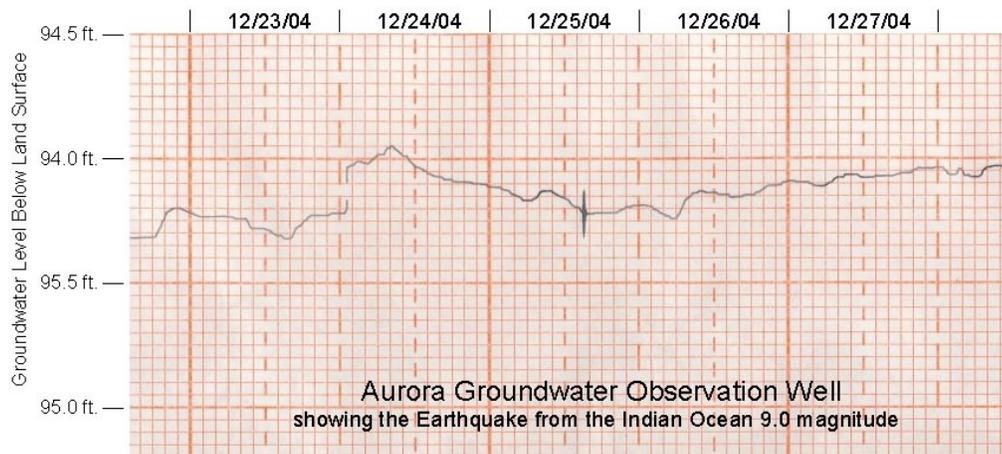
The well is one of only three in Nebraska equipped with a continuous electronic recording device that monitors groundwater levels and is the only one of the three that recorded the clear spikes corresponding to last month's 9.0 magnitude earthquake, the largest since the Alaskan earthquake of 1964.

The same well also has recorded graphic spikes corresponding to other quakes worldwide, particularly in Mexico and Central America, Joeckel said.

"Frankly, we're not absolutely certain why this is, other than some wells are more apt to respond to seismic energy than others," he said. "Some geologists believe there is a resonance effect at work in the response of aquifers to earthquakes."

Groundwater level changes in response to earthquake activity are called hydroseism, a well known, if inexact, science.

"We may not have felt the Indian Ocean earthquake here in Nebraska, but there's little doubt in my mind that we recorded it," Joeckel said.



A graph of an Aurora monitoring well clearly shows spikes in the groundwater level of the well coinciding with the Dec. 26, 2004 earthquake that caused massive tsunamis in the Indian Ocean (courtesy of: UNL School of Natural Resources).

Meet the Faculty

Sharon Skipton (continued from page 3)

(NOWWA) by helping to provide training for onsite wastewater professionals.

Current Organizational/Citizenship Activities:

- Member of Water Quality Association, Groundwater Foundation, Nature Conservancy, American Water Works Association, Nebraska Onsite Waste Water Association, National Onsite Wastewater Recycling Association and Nebraska Drought Planning Task Force Subcommittee on Municipal Water Supply, Health and Energy.
- Member of Epsilon Sigma Phi; Association of Natural Resources Extension Professionals and Nebraska Cooperative Extension Community and Residential Environment Team (co-chair water and waste group).

Recent Selected Publications:

- Kocher, J., B. Dvorak, and S. Skipton, 2003. Drinking Water Treatment: An Overview. University of Nebraska Cooperative Extension.
- Kocher, J., S. Skipton, B. Dvorak, and S. Niemeyer, 2003. Drinking Water Treatment: What You Need to Know When Selecting Water Treatment Equipment. University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, and S. Skipton, 2003. Drinking Water Treatment: Sediment Filtration. University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, and S. Skipton, 2003. Drinking Water Treatment: Activated Carbon Filtration. University of Nebraska Cooperative Extension.
- Kocher, J., S. Skipton, B. Dvorak, and S. Niemeyer, 2003. Drinking Water Treatment: Water Softening (Ion Exchange). University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, and S. Skipton, 2003. Drinking Water Treatment: Reverse Osmosis. University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, and S. Skipton, 2003. Drinking Water Treatment: Distillation. University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, and S. Skipton, 2004. Drinking Water Treatment: Continuous Chlorination. University of Nebraska Cooperative Extension.
- Skipton, S., B. Dvorak, and J. Albrecht, 2004. Drinking Water: Storing an Emergency Supply. University of Nebraska Cooperative Extension.
- Kocher, J., B. Dvorak, S. Skipton, and T. Dorn, 2004. Drinking Water Treatment: Emergency Procedures. University of Nebraska Cooperative Extension.
- Skipton, S., and B. Dvorak, 2005. Drinking Water: Arsenic. University of Nebraska Cooperative Extension.

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William W. Hoback (continued from page 3)

Selected Publications:

- Hoback, W.W., Bishop, A.A., Kroemer, J., Scalzitti, J., and Shaffer, J.J. 2004. Differences among anti-microbial properties of carrion beetle (Coleoptera: Silphidae) secretions reflect phylogeny and ecology. *Journal of Chemical Ecology* 30: 719-729.
- Hoback, W.W., Clark, T.L., Meinke, L.J., Higley, L.G., and Scalzitti, J.M. 2002. Immersion survival differs among three *Diabrotica* species. *Entomologia Experimentalis et Applicata*, 105: 29-34.
- Bishop, A.A., Hoback, W.W., Albrecht, M., and Skinner, K.M. 2002. GIS reveals niche partitioning by soil texture among carrion beetles. *Transactions in GIS* 6: 457-470.
- Hoback, W.W. and D.W. Stanley. 2001. Insects in hypoxia. *Journal of Insect Physiology* 47: 533-542.
- Nor Aliza, A.R., Bedick, J.C., Rana, R.L., Tunaz, H., Hoback, W.W. and Stanley, D.W. 2001. Arachidonic and eicosapentaenoic acids in tissues of the firefly, *Photinus pyralis* (Insecta: Coleoptera). *Comparative Biochemistry and Physiology* 128: 251-257.
- Hoback, W.W., L.G. Higley, and D.W. Stanley. 2001. Tigers eating tigers: Evidence of intraguild predation operating in an assemblage of tiger beetles. *Ecological Entomology* 26: 367-375.
- Hoback, W.W., J.E. Podrabsky, L. G. Higley, D.W. Stanley, and S.C. Hand. 2000. *Anoxia*.
- Shaffer, J.J., E.C. Hurley, and W.W. Hoback. 2003. Microbes and Mosquitoes: A Laboratory Exercise to Investigate the Non-target Effects of Bt. *Bioscience* 29: 27-32.
- Skinner, K.M. and W.W. Hoback. 2003. Web-based, active learning experiences for biology students. *Bioscience* 29: 23-29.
- Jehorek, M. and W.W. Hoback. 2002. Flies in the soup and maggots in the marmalade: A laboratory exercise to investigate food contamination by insects. *Bioscience* 28: 21-27.
- Wright, R., Hein, G., Hoback, W.W., and Pavlista, A. 2002. Biology and management of potato insects. Nebraska Cooperative Extension EC02-1565-S. 15 pp.
- Walker, T.J., J. Volesky, and W.W. Hoback. 2004. Loess hills conservation measures improve range-land conditions and aid American burying beetle in Nebraska. *Center for Grasslands Studies* 10 (2): 6-7.

Web/e-mail addresses:

Web Pages:

- Hoback, W.W. and Riggins, J.J. 2002. Tiger beetles of North America. <http://159.189.96.216/tmp/tbeetles/TIGBUSA.HTM>
- Hoback, W.W., Skinner, K.M., and Higley, L.G. 2002. Exotic species curriculum and problem-solving exercises. <http://www.unk.edu/ESCAPE>
- Hoback, W.W., Skinner, K.M., and Ratcliffe, B.R. 2001. Carrion beetles of Nebraska. www.unk.edu/carrion_beetles
- Hoback, W.W., S.M. Spomer, and L.G. Higley. 1998. Tiger beetles of Nebraska. http://www.ianr.unl.edu/ianr/entomol/tiger_beetles/tiger_homepage.html

(continued on page 11)



Water News Briefs

Online Resources

For more information on the UNL Water Center and its many and varied focus areas and programs, please visit the following sites:

UNL Water Center:

<http://watercenter.unl.edu/>

Water Resources Research Initiative:

<http://wrri.unl.edu/>

Second Annual Water Law, Policy and Science Conference:

<http://snr.unl.edu/waterconference/>

UNL School of Natural Resources:

<http://snr.unl.edu/>

Great Plains Cooperation

Ecosystem Studies Unit (CESU):

<http://greatplains.cesu.unl.edu/>

Hawaiian Deep-Sea Water

Think bottled water at the local mini-mart is a fast moving commodity at \$1 to \$1.50 for a 16 to 20-ounce bottle?

Hawaii's Big Island is now cashing in with an offering of \$6 bottled water from the bottom of the sea. It's a new industry to compliment the island's \$30 per pound Kona coffee and \$1,000 a night hotel suites.

Desalinated deep-sea water from Kona is the state's fastest growing export, with demand soaring in Japan. Super cold water sucked up from 2,000 feet below the surface of the sea is being marketed as healthy, pure, mineral-rich drinking water.

Koyo USA Corp. is producing more than 200,000 bottles a day and says it can't keep up with demand in Japan, where it sells 1.5 liter bottles of its MaHaLo brand water for \$4 to \$6 each.

Four other companies hope to cash in on the deep-sea water fad and so is the state, which collects royalties and rent from bottlers based at the state Natural Energy laboratory of Hawaii Authority property. The state pumps the water and the companies pay a few cents per bottle to use the official NELHA logo on their labels, certifying that the deep-sea water was collected at the state facility (*U.S. Water News*, November, 2004).

Summer Tour Brochure and Postcard

For a color brochure giving initial details of the 2005 Water and Natural Resources Tour, and an accompanying postcard to get on the tour's registration mailing list, contact the UNL Water Center at P.O. Box 830844, Uni-

versity of Nebraska, Lincoln, NE 68583-0844, phone (402) 472-3305 or email sress1@unl.edu.

Registration mailings will come from the Kearney Area Chamber of Commerce later this spring.

The 2005 Water and Natural Resources Tour is June 28-30, departing and ending at Kearney. The tour will stop at a variety of locations in the Sandhills, including Lake McConaughy, Crescent Lake National Wildlife Refuge, headgate of the Kearney Canal (oldest water right in Nebraska), Box Butte Table Lands and City of Sidney wellfields, among others.

Many of the presentations will center on local response and implications of the recently enacted LB962 water use legislation.

Tour stops and agenda are subject to change.

Tour co-sponsors include Central Nebraska Public Power and Irrigation District, Gateway Farm Expo, Kearney Area Chamber of Commerce, Nebraska Association of Resources Districts, Nebraska Public Power District, Lower Platte River Corridor Alliance, Nebraska Water Conference Council and the University of Nebraska-Lincoln.

More details will be published in the Spring issue of the *Water Current*.

2005 SNR Calendars

Full-color School of Natural Resources wall calendars are also available from the Water Center by writing in care of SNR Calendar, Water Center, P.O. Box 830844, University of Nebraska, Lincoln, NE 68583-0844, phoning (402) 472-3305 or emailing sress1@unl.edu. If you need a quantity for distribution to staff, students, colleagues, etc. please call or email and we'll see if we can meet your request. Calendars are free. Quantity requests may need to pay postage expenses.

First in Pivot Irrigated Acres

Nebraska had more acres irrigated by center pivots than any other state in the country in 2003 and ranked second for total irrigated acres in a U.S. Department of Agriculture report.

In 2003, according to the report released by the National Agriculture statistics Service, there were 16,278 irrigated farms and 7.52 million total acres irrigated, of which 5.61 million acres were irrigated by sprinklers and 1.96 million by gravity flow irrigation.

Nebraska also had the highest number of wells used for irrigation last year with almost 70,000. Those wells provided 93 percent of the total water applied to crops, the agency reported.

Nebraska farmers and ranchers spent about \$159 million on irrigation equipment, facilities and improvements in 2003 and the cost for the energy to run all the on-farm irrigation was \$219 million, the agency said.

Meet the Faculty — Hoback

(continued from page 9)

- Hoback, W.W., D. Golick, L. Cheng, and L.G. Higley. 1998. The few, the proud, the marine insects. <http://www.unk.edu/marineinsects>
- Golick, D., Higley, L.G., and W.W. Hoback. 1999. Know your insect. <http://www.ianr.unl.edu/ianr/entomol/kyi/index.html>

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2004 Saw Gains in Water Science Lab Capabilities and Methods

By Daniel D. Snow, Ph.D.
Director of Laboratory Services
UNL Water Sciences Laboratory

Staff and students processed more than 4,000 samples last year at the University of Nebraska-Lincoln Water Sciences Laboratory.

Most of these were for research projects directed by NU faculty from an ever-growing variety of departments and disciplines.

In addition, support from UNL's Water Resources Research Initiative and acquisition of several key pieces of new analytical equipment have provided opportunities to broaden the lab's range of analytical services supporting advanced water research.

Our focus on analytical methods has improved our ability to respond more rapidly to requirements for both water research and monitoring. For example, the flexible design of the AQ2 discrete chemistry auto-analyzer permits both routine and trace level analysis of nitrate-N by a standard-

ized and modified Cd-reduction method. New methods using liquid chromatography-mass spectrometry (LC/MS) last year include analysis of a variety of steroids, antibiotics, coolant additives, and pesticides.

Our focus on analytical methods has improved our ability to respond more rapidly to requirements for both water research and monitoring.

Existing methods were modified to include other herbicides such as clopyralid, dicamba, dimethenamid, and 2, 4-D. Components of the lab's method for acetamide degradation products was used as a basis for development of a U.S. Environmental

Protection Agency method for these compounds that will be released later this year.

The Water Sciences Laboratory is definitely on the cutting-edge for analysis of emerging organic contaminants.

Developing these new methods and mastering new equipment requires a significant investment of time and expertise. To that end, we are extremely fortunate to have three highly competent new technical staff on our analytical team together with two talented, experienced, and dedicated chemists. This work would not be possible without their efforts.

The coming year will bring more new equipment and opportunities for increasing the range of analytical services we provide.

More information and a brochure listing methods available at the WSL can be found at <http://waterscience.unl.edu>. The WSL is part of the UNL Water Center and School of Natural Resources.

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