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WATER CURRENT

VOL. 38, No. 2

SUMMER 2006

Fall Colloquium Features Research, Programming

By **Lorrie Benson**

Water research and programming will be highlighted at the University of Nebraska–Lincoln’s 2006 Water Colloquium. The best faculty research and Extension programming will be featured in oral presentations and poster sessions. The Friday, October 27 event is hosted by the UNL Water Resources Research Initiative (WRRI) and Water Center and is open to the public.

“UNL is fortunate to house some of the most innovative research and programming in water, whether in the sciences, policy or law. This colloquium is a chance for faculty, the water community and the public to learn more about our work,” said UNL Water Center director and WRRI leader Kyle Hoagland.

The colloquium will open with 20-minute faculty presentations, followed later in the day by a poster session and reception. Research presented will include both basic and applied research in water sciences, economics, policy and law.

UNL Extension faculty will present community programming and projects. Undergraduate and graduate students have also been invited to present their research at the poster session.

Some of the presentations will focus on Nebraska, while others will be more universal in scope.

The colloquium is at Lincoln’s Embassy Suites and is free to the public, but attendees should register in advance. A schedule and registration form will be available in September.

For more information on the colloquium go to www.wrri.unl.edu or phone (402) 472-3305.

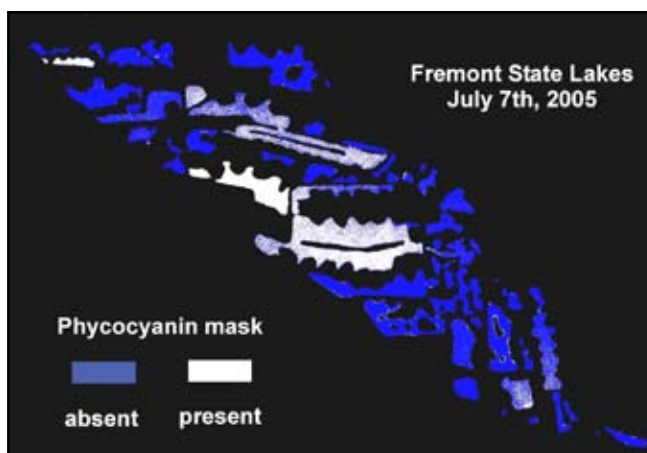
Seeing Toxic Algae Before it Blooms

By **Steve Ress**

Researchers at the University of Nebraska–Lincoln are using remote sensing instruments attached to satellites, airplanes and boats to detect the threat of toxic blue-green algae before the bacteria that produce it can grow into a full-scale bloom.

Now UNL scientists, working with the Nebraska Department of Environmental Quality (NDEQ), can identify, map and monitor in real-time, the water-borne agents that can cause toxic blue-green algae to flourish and become a health threat.

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Remote sensing equipment used by UNL’s Center for Advanced Land Management Information Technologies (or CALMIT) can detect microscopic phycocyanin, which is an indicator of lakes susceptible to blue-green algae blooms (image courtesy of UNL CALMIT).

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Taking a Global View on Water

from the DIRECTOR



Kyle D. Hoagland

As promised, I'm back from South Africa and South Sioux City, with lots of good stories to report, but I'll spare you most of them. The meetings I attended in Kruger National Park, in South Africa, focusing on adaptive management for sustainable ecosystems, were as inspirational as they were informative.

The park setting was especially pertinent to the topic, in part because the surrounding game preserve had several surprising similarities to issues in Nebraska and other parts of the world. For example, the park resource managers are faced with a dilemma not unlike that faced by resource managers in Fontenelle

Forest in Omaha, or by park managers in Yellowstone National Park: to thin or not to thin....in Africa the elephant herd, in Nebraska deer, and in Yellowstone bison.

Although the ecological solutions are more obvious, the societal dimensions of the management decision are far more complicated. Part of their approach will be to expand the park footprint by merging with parkland to the north into Zimbabwe, to avoid the habitat fragmentation issues they now face.

Also, much as we have been experiencing here in Nebraska, water was in short supply everywhere we visited in South Africa, most notably in Soweto where 60 families share a single water spigot. Although this reflected more of a water distribution and public health issue, it certainly reinforced the notion that readily clean, potable water is something that we in the U.S. often take for granted.

Locally, it typically requires a high nitrate or arsenic level in rural water systems, or a major irrigation reservoir fast-approaching 18 percent of its capacity to remind us of what we have and what we could lose.

This particular adventure also offered its share of stark differences, including marauding monkeys (gibbons) making daily forages into our camp at Shingwedzi and stealing food from the refrigerators of unsuspecting Nebraskans.... an ongoing oxymoron in South Africa.

South Sioux City was one of the stops on this year's water and natural resources tour in mid-July. About 40 participated in the tour, which focused on the middle Missouri River (see coverage elsewhere in this issue). Similar to the South African

experience, many of the challenges we heard about involved much more than scientific data or monitoring, but management decisions based on both the best available science balanced with social needs and perceptions.

No one envied the U.S. Army Corps of Engineers in their charge to balance the myriad of competing interests for managing the Missouri River, regardless of individual viewpoints.

A 2003 United Nations report estimates that a billion people lack clean water globally and that two million people die *each year* due to lack of clean water, mostly children (approximately 6,000 per day).

Some 35 million people in Bangladesh alone are exposed to elevated arsenic in their drinking water every day, a contaminant that sounds close to home for those living in southwest Nebraska.

The report conservatively estimates that climate change will account for about 20 percent of the increase in global water scarcity, an estimate not lost on western Nebraska ranchers now in the midst of a multi-year drought.

Water quality and quantity are truly no longer local or even regional concerns as our population centers continue to grow and as the climate warms. In light of the global, regional, and local concerns for sustainable water supplies and good quality drinking water, as well as the importance of water to local economic viability and social well being, we must press even harder to place a greater emphasis on water here at the University of Nebraska and around the world.

The environmental clock is ticking ...

WATER CURRENT

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Meet the Faculty

Kevin L. Pope, Ph.D.

Assistant Unit Leader for the Nebraska Cooperative Fish and Wildlife Research Unit and Associate Professor, University of Nebraska–Lincoln School of Natural Resources. UNL faculty member since September 2005. Pope's primary responsibility is



Kevin Pope

graduate-research education. He was an Assistant and Associate Professor at Texas Tech University from 1998-2004 and an Assistant Professor at South Dakota State University in 1997.

Education:

Ph.D., Biological Sciences (Fisheries Science emphasis), South Dakota State University, 1996.

M.S., Fisheries and Allied Aquacultures, Auburn University, 1993.

B.S., Wildlife and Fisheries Sciences, Texas A&M University, 1991.

Examples of Current Research/Extension Programs:

Pope's present research emphasis is applied fishery ecology in lakes and reservoirs. Current projects include the following:

- Modeling phenotypic plasticity in growth of fishers and corresponding changes in life history.
- Determining habitat selection by juvenile common snook in lotic environments.
- Assessing the potential of predatory fishers to prevent stunting (establishing a dense population of slow-growing individuals) of white perch populations.
- Understanding recruitment bottlenecks of sport fishes in reservoirs with large fluctuations (greater than 20-feet) in water levels.

Examples of Past Research/Extension Programs:

Pope's past research focused on freshwater ecology issues, including the following:

(continued on page 12)

Steve Goddard, Ph.D.

Dr. Goddard is an Associate Professor in the University of Nebraska–Lincoln Department of Computer Science & Engineering, since August 1998. UNL College of Engineering Distinguished Scholar (2006-present). College of Engineering Faculty Research and Creative Activity Award (2004). Computer Science & Engineering Student Choice Outstanding Teaching Award (2004). College Distinguished Teaching Award (2001), College of Engineering.

Education:

Ph.D., University of North Carolina, Chapel Hill, NC, 1998.

M.S., University of North Carolina, Chapel Hill, NC, 1995.

B.A., University of Minnesota, Duluth, MN, 1985.

Examples of Current Research/Extension Programs:

As part of an interdisciplinary partnership with the USDA Risk Management Agency and the National Drought Mitigation Center, we are extending our Framework for Integrated Risk Management (FIRM) to provide risk management tools for ranchers, agricultural producers, decision makers and researchers. FIRM provides a robust technology framework using the latest research in distributed computing and enterprise software engineering. We have created an environment where observable data, GIS services and risk management best practices can easily be integrated to form new tools, which will be available at <http://firm.unl.edu/> in September.

Examples of Past Research/Extension Programs:

- Our first generation of geospatial decision support tools were developed for the National Agricultural Decision Support System (NADSS), and are

available at <http://nadss.unl.edu/>. An important contribution made by this project is the Self-Calibrating Palmer Drought Severity Index (SC-PDSI). The SC-PDSI uses the historical climate record to calibrate the index for a specific location, which makes it much more spatially comparable in the evaluation of drought over regions of the country.

(continued on page 12)



Steve Goddard

UNL Forms Public Water Resources Advisory Panel

A recently formed 10-member panel will help provide state decisionmakers with guidance on water research, education and outreach programs by the University of Nebraska–Lincoln.

The Water Resources Advisory Panel will meet regularly to share their thoughts and opinions on water resources issues and to offer UNL advice and assistance, according to Institute of Agriculture and Natural Resources Harlan Vice Chancellor and NU Vice President John Owens.

Owens and UNL Vice Chancellor for Research Prem Paul extended invitations for the 10 to serve on the panel.

The goal of the panel is to guide UNL as it continues to invest in water research, education and outreach efforts, a letter to the panelists from Owens and Paul said.

The letter also said “Because of pressing issues such as persistent drought, competing water needs in Nebraska and between states, legal actions, declines in the Ogallala groundwater aquifer, and critical habitat needs, etc., the University recently has renewed and strengthened its engagement in water resources through the Water Resources Research Initiative (WRRRI).”

A major goal of the WRRRI is strengthening the University’s ties with state and federal agencies responsible for water resources in Nebraska, as well as with the natural resources districts, irrigation districts, agricultural business organizations and other with ties to Nebraska water issues.

UNL Water Center director and WRRRI leader Kyle Hoagland said the panel would be a huge benefit to the entire state and to the University.

“It will increase UNL’s ability and research efforts to address pressing state needs,” he said.

At its initial meeting, the panel began developing a prioritized list of the state’s water research needs.

“Prioritizing will be extremely helpful,” said Lorrie Benson, WRRRI deputy program manager. “The University wants to ensure it is addressing needs Nebraskans have identified as most critical.”

The 10 panel members, who will serve one- to three-year staggered terms, are:

Ann Bleed, Nebraska Department of Natural Resources.

Eugene Glock, Cedar Bell Farms.

Mary Harding, Nebraska Environmental Trust.

Glenn Johnson, Lower Platte South Natural Resources District.

Don Kraus, Central Nebraska Public Power and Irrigation District.

Kirk Nelson, Nebraska Game and Parks Commission.

Lee Orton, Nebraska Well Drillers Association.

Jay Rempe, Nebraska Farm Bureau Federation.

Ed Schrock, Nebraska State Senator.

Susan Seacrest, The Groundwater Foundation.

Atema Joins Water Center as Student Worker

University of Nebraska–Lincoln master’s student Brent Atema is a new student worker at the UNL Water Center.

He will assist with writing, publishing and grant writing for both the Water Center and Water Resources Research Initiative.

Atema earned a bachelors degree in journalism with a public relations emphasis from Baylor University in 22003 and currently pursuing a masters degree in journalism with a news-editorial emphasis at UNL’s College of Journalism and Mass Communications, where he also works as the graduate assistant for Dean Will Norton.

While at Baylor, he also worked as a student intern for the Baylor University Public Relations Department.

After earning his masters degree, he hopes to begin a career in magazine publishing, preferably in a warm climate, the Rochester, New York native said.

“Eventually I would like to start a magazine focusing experiencing different world cultures through their traditional cuisine,” he said. Atema also hopes to earn a Ph.D. and teach journalism in foreign countries someday.

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Brent Atema is a new student worker at the UNL Water Center. He is working to complete a master’s degree in UNL’s College of Journalism and Mass Communications (photo courtesy of Brent Atema).

Hardin Hall Rededicated; SNR Moves In

Former UNL Chancellor Clifford Hardin, his wife Martha and members of their family were front and center for the formal rededication of the newly renovated Hardin Hall on June 13.



North view of Hardin Hall on the UNL East Campus. The recently rededicated building now houses UNL's School of Natural Resources, Water Center and other units. The building was originally constructed in 1960 (photo by Steve Ress).

offices on the top floor of the building's former hotel tower, along with SNR administrative offices.

Originally constructed 45 years ago, the building was previously known as the Clifford Hardin Nebraska Center for Continuing Education.

On hand for the June rededication and ribbon cutting were Dr. Clifford Hardin, his wife Martha Hardin, and several family members, including daughter Cynthia Hardin Milligan, who serves as Dean of the UNL College of Business Administration.

Brief speeches were given by Regent Chairman Jim McClurg, University President James B. Milliken, UNL Chancellor Harvey Perlman and NU Vice President and IANR Harlan Vice Chancellor John Owens, who also served as emcee for the event. They joined the Hardins in

The building, which dominates the northeast corner of 33rd and Holdrege St. on UNL's East Campus, is now the home of faculty, staff and students of the UNL School of Natural Resources, associated centers and the Department of Statistics.

Faculty and staff of the UNL Water Center and Water Resources Research Initiative occupy

cutting a ribbon to formally mark the occasion.

Milliken praised Hardin for his vision in "Expanding the scope of the university" as well as opportunities for research.

After the brief program in the main floor lobby, those attending were able to tour laboratories, classrooms and offices.

In January 2003, the University of Nebraska Board of Regents approved a plan to completely renovate the 157,000 square foot facility to provide faculty, staff and students in the SNR with state-of-the-art laboratories, classrooms and offices to support UNL's teaching, research and extension programs in natural resources. The facility also serves as the academic home for the UNL Department of Statistics

First opened in 1961 as the Nebraska Center for Continuing Education, and renamed in 1994 in honor of Hardin, the building was constructed with a \$1.5 million W. K. Kellogg Foundation grant, plus \$1 million in private donations. It provided study facilities, housing and meal service for thousands of adult and youth groups who came to the UNL campus for conferences, workshops and institutes.

Hardin served as Chancellor from 1954 to 1968, when he accepted nomination from President Richard Nixon to serve as the U.S. Secretary of Agriculture, a position he held until 1971. During Hardin's tenure as chancellor, UNL enrollment climbed from 7,000 to 19,000 students.

Hardin's record of service to Nebraska and the nation has been exemplary.



University of Nebraska Regent Jim McClurg (from left), Institute of Agriculture and Natural Resources Harlan Vice Chancellor and NU Vice President John Owens, Martha Hardin, former UNL Chancellor and U.S. Secretary of Agriculture Clifford Hardin, NU President John Milliken and UNL Chancellor Harvey Perlman cut the ribbon rededicating Hardin Hall (IANR photo by Brett Hampton).

Potential For Algae Blooms Continues; Test Kits Available From UNL Extension

By Steve Ress

Warm weather brought a return of toxic blue-green algae to Nebraska lakes and ponds, with the extent of the problem remaining at about the same level as in recent years, University of Nebraska–Lincoln water quality experts say.

“Weather patterns, drought conditions and other factors contributing to the blooms aren’t dramatically different this year than they were last year,” said UNL water resources specialist Tadd Barrow said.

Rapid algae growth is called a bloom. Blooms can appear and linger anywhere from days to weeks and can persist until the first hard frost in the fall, said UNL lake ecologist Kyle Hoagland, who directs the UNL Water Center.

Numerous environmental factors can trigger blooms. Lakes with higher concentrations of nutrients, or fertilizers, especially phosphorus, generally are more susceptible to blue-green algae blooms, he added.

Some types of blue-green algae produce chemical toxins that harm people and animals. “These colorless and odorless toxins may linger in the water for as long as two weeks after the bloom has disappeared,” Barrow said.

Fremont State Lake #20, which has chronically suffered from toxic algae blooms in recent years, is being monitored for algae toxins on a weekly basis by the Nebraska Department of Environmental Quality (NDEQ) and tested very high in toxins earlier this year, Barrow said, noting a health alert was issued for the lake last spring. Other Nebraska lakes have also exhibited potentially harmful levels of toxic algae this summer.

Algae blooms can pose serious health threats to humans and animals.

Skin irritations and gastrointestinal problems are the main risks to people from algal toxins. In very rare cases, extremely high toxin levels can be fatal.

In recent years, blooms have resulted in only a few reported cases of human

illness and skin irritation, but livestock and pets have died after drinking lake water during an algae bloom, Barrow said.

The normal season for algae blooms is May through September, but some lakes still can have high toxin levels in them as late as December, he said.

UNL Extension’s lake management program is continuing a volunteer monitoring program to check lakes for blue-green algae. Free test kits are available from Barrow’s office so lake

owners, users and managers can check their lake for potential toxin-producing algae.

In 2005, the program sent out 227 free kits across Nebraska. After testing at UNL, “Forty five percent of them contained potentially toxin producing algae and 58, or about 20 percent overall, tested positive for moderate to high concentrations of blue-green algae and went to the NDEQ’s lab for toxin analysis,” Barrow said.

Of the 58 that tested positive for blue-green algae, 11 had

levels above 20 parts per billion (ppb) of microcystin, a toxic bacteria contained in blue-green algae.

“All public lakes with a toxin concentration of more than 20 ppb microcystin are put on the state’s health alert status and remain closed to activities such as swimming and other full-body water contact until subsequent toxin samples drop below 20 ppb for two consecutive weeks,” Barrow said. “During these health alerts, boating and fishing are still allowed with caution.”

The free UNL test kits contain instructions on sample collection, a sheet for recording measurements, a questionnaire about the lake, and sample bottles for water and algae. Samples are returned to Barrow for processing and those who submit samples are notified of results.

For more information or a test kit call Hilary Hansen at (402) 472-8190.

Knowing what an algae bloom looks like and avoiding water contact during blooms is important, the two School of Natural Resources experts said.

People should avoid swimming, water skiing, riding personal watercraft or similar activities involving physical contact or swallowing water from lakes with blue-green algae blooms, Barrow said.

During a bloom, lake water becomes cloudy with a green or blue-green cast and blue-green streaks may be visible on the water’s surface, Hoagland said.

“At this stage, the lake looks like pea soup or as if someone dumped a light colored green paint in the water. It often develops a strong musty or fishy odor as the algae accumulates and begins to decompose,” he said.

Winds can increase the danger of a toxic bloom by blowing algae to the leeward side of a lake where it concentrates in coves or along shorelines.

Blue-green algae, which are cyanobacteria, are microscopic organisms commonly found in lakes and ponds worldwide. Special characteristics of blue-green algae often allow them to multiply faster than other types of algae, Hoagland said.



Research Technician Hilary Hansen displays the contents of a free algae test kit that can be obtained by contacting the University of Nebraska-Lincoln (IANR photo by Brett Hampton).

Harder, NRDs Identify Research Needs

The University of Nebraska–Lincoln Water Center’s mission includes implementing and facilitating water and water-related research, extension and outreach programming within the University of Nebraska system.

In line with this mission, water outreach associate Jessica Harder has been working to connect the needs of Nebraska’s 23 natural resources districts more closely with the University water faculty.

As a part of this effort, Harder requested NRDs to identify unmet research needs. Eleven of the 23 have provided detailed responses, enabling her to compile a list of research needs submitted by the respondents.

Harder broke down the information into categories and combined those into a master list, while keeping language original to the individual NRD writers.

“The result should prove to be a useful reference point for water faculty to use when preparing grant proposals, or in deciding what state needs they may be able to address through research efforts,” she said.

Highlights of the identified state research needs include water modeling, hydrology including aquifer research, nitrate

contamination, water efficient crops, evapotranspiration and riparian vegetation, water quantity, and water economics and policy concerns.

The most recent Water Resources Research Initiative Retreat focused in part on Nebraska water policy and corresponding research needs.

Harder presented the NRD research needs list to water faculty at that event. Other water faculty not attending have also received the list.

In addition, the newly instituted Water Resources Advisory Panel, consisting of water experts representing a cross-section of constituent groups which consults with UNL faculty on water policy and water research issues, decided it wanted a similar, expanded list.

Through a joint effort of the Water Center and panel member State Senator Ed Schrock, stakeholders selected by panel members have been asked to weigh in on what they see as Nebraska’s pressing research needs.

Harder is working to expand the list for the panel as responses come in from stakeholder groups.

Atema Joins Water Center as Student Worker (continued from page 4)

His interest in other countries and cultures peaked in summer 2003 when he studied German in Würzburg, Germany.

“This experience, combined with trips to Israel and Europe, sparked my interest in different people, cultures and news coverage around the world,” he said.

Atema, 27, lived in five houses in four states during his first five years, finally settling in Brentwood, Tenn., a Nashville suburb, where he attended Brentwood Academy.

There he won two 5A state championships on a nationally ranked football team, and was the only senior on the first boys soccer team.

His interests lie in four primary areas: journalism, sports, food and travel.

“I love to grill and cook, and particularly enjoy finding the perfect wine to match any meal.

“I’m an avid fan of almost all sports, especially college football and the University of Tennessee and the rest of the Southeastern Conference,” he said.

He is also a big fan of international soccer, especially European club soccer.

While sports and food are significant, journalism and travel are more important.

“I think Americans should know more, and care more, about people and cultures in other parts of the world and I believe journalism and travel are important to reaching that goal,” he said.

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.

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or e-mail changes to sress1@unl.edu

2006 Water and Natural Resources Tour

July 18-20, 2006



2006 Water and Natural Resources Tour participants gather for a picture at the U.S. Army Corps of Engineers visitor's center at Gavins Point Dam.



A view of the Missouri River upstream of Gavins Point Dam, taken from Niobrara State Park.



A view of the Missouri River and South Sioux City from the Sgt. Floyd Monument on the Iowa side of the river.



Sgt. Charles Floyd Monument in the Iowa bluffs above the Missouri River and Interstate 29. Floyd was the only member of Lewis and Clark's Corps of Discovery to die during the legendary cross country expedition.



Gavins Point Dam



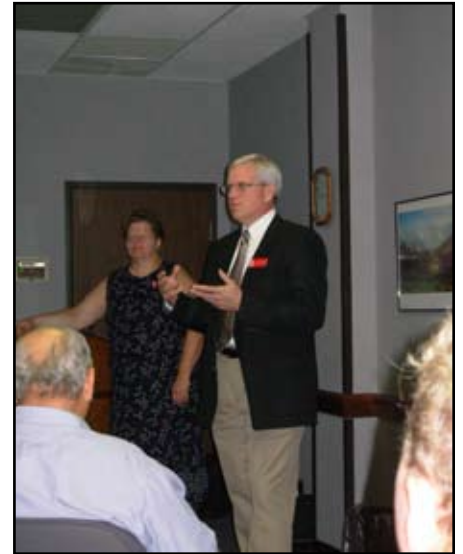
Getting a view from the water of the Missouri River above Gavins Point Dam.



UNL School of Natural Resources geoscientist Sue Lackey talks to the tour at Creighton's water treatment plant.



Shady hats and dark tinted sunglasses were a necessity on this year's water and natural resources tour, where temperatures frequently were in the triple digits.



Rose Hargrave and Larry Cieslik spoke to the tour about the U.S. Army Corps of Engineers operation of Missouri River mainstem dams, threatened and endangered species and other issues effecting operation of the much-contested Missouri River.



Gerald Mestal of the Nebraska Game and Parks Commission talks to the tour about Pallid Sturgeon and other threatened and endangered species issues on the Missouri River.



Charles Schlabs of Hereford, Tex. Talks with tour co-organizer Sara Rector of the Kearney Area Chamber of Commerce.



Troy Larson, executive director of the Lewis & Clark Rural Water System, (left) led discussions about the innovative rural water system project that began in 1989 and will one day supply drinking water to 250,000 users in three states.



Jessica Harder wades in the Missouri River during a stop in a Nebraska Game and Parks Commission boat tour of the river near Niobrara.

The Middle Missouri River Valley & Northeast Nebraska

(photos by Steve Ress)

Seeing Toxic Algae Before it Blooms (continued from page 1)

Using the latest in fiber-optic sensing equipment to rapidly monitor water quality changes over time, remote sensing specialists at UNL's Center for Advanced Land Management Information Technologies (CALMIT) can see algae pigments, such as chlorophyll and cyanobacteria that blue-green algae contains, before a pond or lake turns oily green from a full-fledged bloom.

"Our monitoring procedures constitute a very important component of an early warning system to detect the presence of toxic algae in recreational waters," said CALMIT remote sensing specialist Anatoly Gitelson.

This early warning, based on the presence of bacteria, chlorophyll and suspended matter in lake water that could contribute to the growth of an algae bloom, helps pinpoint where and when an actual sample of the water should be taken for laboratory analysis to check for the level of blue-green algae that may turn toxic.

If a water sample from a public lake contains 20 parts per billion or more of a toxic bacteria called microcystin, NDEQ will put the lake on the state's health alert status and close it to activities such as swimming and other full-body water contact until subsequent toxin samples drop below 20 ppb for two consecutive weeks, according to UNL Extension water quality specialist Tadd Barrow. "During these health alerts, boating and fishing are still allowed with caution," he said.

The highly toxic algae, which can make people and animals sick and in rare cases can cause death, has been responsible for closing a number of public lakes in southeast Nebraska over the past few summers, including Pawnee Lake near Lincoln and Carter Lake in Omaha this year.

Sandpit lakes, which Nebraska has more than 800, are particularly susceptible to blue-green algae blooms due to the phosphorus that infiltrates them and blue-green algae thrive on. Repetitively hand-sampling all of them, even just those that are public, is expensive and time and labor intensive.

The electronic sensors that UNL researchers can deploy on aircraft, boats and satellites, allows for quick reconnaissance and a mechanism for monitoring large numbers of lakes and ponds in a single pass by air or satellite. The sensors measure differences in reflected light at various wavelengths to see chlorophyll concentrations, bacteria, phytoplankton and other matter that in many

cases the human eye cannot see except in very high concentrations.

"Graphically displayed, the bacteria and chlorophyll are easy to see and can show not only what body of water should be sampled for toxins, but exactly where in that body of water the sample should be taken from," Gitelson said.

Public recreation lakes that have proven to be particularly susceptible to blue-green algae blooms can be monitored more closely and more often for the early warning signs of a potential toxic algae bloom.

"Nothing replaces the need to take a hand sample of the water for analysis in the laboratory, but we can certainly help point NDEQ technicians in the right direction on where to take their samples, which aids efficiencies and effectiveness," said CALMIT director Don Rundquist.

On ground monitoring and sampling of public lakes for algae toxins is labor-intensive and can't possibly monitor every square inch of every lake over the long summer algae bloom season. Remote-sensing equipment can look at the various indicators for these toxins over an entire body of water as often and as many times as a satellite, aircraft or boat can pass over them, Rundquist said.

"Analyzing a water sample is expensive and time consuming and it reveals nothing if it happens to be taken in the wrong place or at the wrong time," Gitelson said.

The NDEQ, U.S. Environmental Protection Agency and North American Lake Management Society are helping to fund this research, which began as a partnership between CALMIT and NDEQ to explore remote-sensing options for algae last year.

CALMIT has experimented with the technology on many similar research projects across the county, including in Mississippi, Maryland, Minnesota and Florida.

While NDEQ closely monitors public lakes for blue-green algae, those living or using private lakes and ponds can have a sample of their water tested for algae toxins by requesting a free test kit from UNL Extension. The kits contain instructions on sample collection, a sheet for recording measurements, a questionnaire about the lake, and sample bottles for water and algae. Samples are returned to Barrow for processing and those who submit samples are notified of results.

For more information or a test kit call Hilary Hansen at (402) 472-8190.



Rodney Verhoeff, coordinator of the Lower Platte River Corridor Alliance, talks about ongoing improvement projects on the Platte River during a recent airboat tour of the river that was attended by several faculty and staff from the UNL Water Center. The alliance is a consortium of three Natural Resources Districts and six state agencies dedicated to working with people to protect the long-term vitality of the lower Platte River corridor (photo: Tricia Liedle).



Mike Jess, associate director of the UNL Water Center, takes a break on a recent Platte River Corridor Alliance airboat tour of the Platte River. The boats allow for a unique perspective of the river (photo: Tricia Liedle).

Meet the Faculty

Kevin Pope (continued from page 3)

- Assessments of fish populations as a baseline for understanding aquatic communities and ecosystems.
- Investigations of biotic and abiotic factors that affect recruitment and growth of fishes, and how these processes structure fish populations.
- Evaluations of the selectivity of recreational angling and its influence on fish populations.

Teaching:

Pope normally teaches one graduate-level course per year.

Currently:

- Managed Aquatic Ecosystems (teamed with Dr. Mark Pegg).
- Quantitative Fishery Assessments.

Selected Publications:

- Chizinski, C.J., C.L. Higgins, C.E. Shavlik, and K.L. Pope. 2006. Multiple hypotheses testing of fish incidence patterns in an urbanized ecosystem. *Aquatic Ecology* 40:97-109.

Durham, B.W., K.L. Pope, and G.R. Wilde. 2005. Regional variation in growth of channel catfish. *North American Journal of Fisheries Management* 25:93-97.

Pope, K.L., and G.R. Wilde. 2004. Effect of catch-and-release angling on growth of largemouth bass, *Micropterus salmoides*. *Fisheries Management and Ecology* 11:39-44.

Pope, K.L., G.R. Wilde, and B.W. Durham. 2004. Age-specific patterns in density-dependent growth of white crappie, *Pomoxis annularis*. *Fisheries Management and Ecology* 11:33-38.

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Steve Goddard (continued from page 3)

- Goddard also conducts interdisciplinary research in embedded real-time systems with grants from the National Science Foundation, NASA, and the Air Force Office of Scientific Research.

Teaching:

- Sophomore-level courses:
JDEP 283H Data Structures and Algorithms.
JDEP 284H Foundations of Computer Systems.
- Graduate-level course:
CSCE 990 Real-Time Systems.

Selected Publications:

- Zhang, S., and S. Goddard. 2006. A Software Architecture and Framework for Web-based Distributed Decision Support Systems. *Journal of Decision Support Systems*. (in press)
- Tadesse, T., D.A. Wilhite, M.J. Hayes, S.K. Harms, and S. Goddard. 2005. Discovering Associations Between Climatic and Oceanic Parameters to Monitor Drought Using Data Mining Techniques in Nebraska. *Journal of Climate*. 18 (10): 1541-1550.

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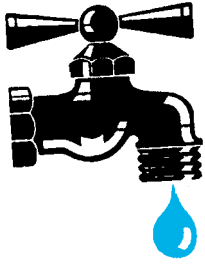
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National Agricultural Decision Support System (NADSS):



Water News Briefs

Yoder Heads Ag Water Management

Ron Yoder, director of the University of Nebraska–Lincoln's Department of Biological Systems Engineering, has accepted an additional three-year assignment of helping guide UNL's Institute of Agriculture and Natural Resources (IANR) work in agricultural water management.

Yoder will serve in the new position of associate director for extension and agricultural research for agricultural water management. In this role, he will promote, facilitate and coordinate faculty research and extension programs in this high-priority area. He also will help IANR better integrate agricultural water management into the broader Nebraska Water Resources Research Initiative, where he serves as one of four faculty co-leaders.

In this new capacity, Yoder will help apply basic research results to high priority Nebraska agricultural water management needs, encourage linkages between IANR researchers and constituents throughout the state, and work with extension specialists and educators to improve delivery of programming to Nebraskans.

On the Web

“Water Faculty Expertise” and “Water Faculty Grant Awards” databases are convenient tools for decision-makers and the public to better connect with UNL water faculty and their research.

The water faculty database helps easily identify water faculty members with expertise in a wide range of specific water-related disciplines and can be

searched by entering the faculty member's name or other key words.

The grant awards database adds another dimension by allowing users to search through water-related grants awarded since 2001.

Both database sets can be easily found at <http://wri.unl.edu>.

Water Colloquium

8 a.m. – 6 p.m. Friday, October 27, 2006
Embassy Suites, Lincoln

Purpose: To showcase faculty and student research to other faculty members and others interested in water-related research.

Oral presentations: These will be 15 minutes long with 5 minutes for audience questions. All oral presentations will use a single digital projector with PowerPoint software. An overhead projector will be available if requested. Abstracts should include the PI or co-PIs, other collaborators, name of the presenting author, presentation title, and an

abstract of the presentation not to exceed 300 words. Individuals may submit more than one abstract, either on their own or in conjunction with others. Deadline to submit an abstract for oral presentation is Friday, September 1. Accepted authors will be notified no later than Friday, September 15. Competition for oral presentations is expected to be strong; if you'd also like to have your abstract considered for the poster session please indicate this on your submission.

Poster Presentations: Poster size will be a maximum of 4 ft x 8 ft. Authors will need to put their posters on display by 8 a.m. on the day of the Water Colloquium. At least one author is required to be present during the poster session, which is tentatively scheduled from 4 to 6 p.m. Abstracts should include the PI or co-PIs, other collaborators, name of the author(s) who will be present during the poster session, poster title, and an abstract describing the research not to exceed 300 words. Deadline to submit an abstract is Friday, September 1. Accepted authors will be notified no later than Friday, September 15.

All abstracts are to be submitted by email to lbenson2@unl.edu.

Questions? Contact Lorrie Benson at 326-8614 or lbenson2@unl.edu.

**Come See Us at
Husker Harvest Days
Sept. 12, 13, 14**

Grand Island, Nebraska

**UNL Water Center & School of Natural Resources
faculty and staff will be there to say hello and
answer your questions in the RED Institute of
Agriculture and Natural Resources building at
Lot #321 on the showground.**

See you at the show!!!

Water Internships

Coordinated by the UNL Water Resources Research Initiative

Students are masters and doctoral candidates in areas such as natural sciences, geosciences, computer science, engineering, economics, journalism, or law—all with an interest in water science, policy and management.

Internships provide students with meaningful work experiences related to water issues. Work experiences may be on a project basis, calendar basis, school term or summer basis. Students are not required to be paid, but paychecks are always appreciated.

Host Employers are entities that will provide students with meaningful work experiences useful to both a host and a student's education.



Examples: Water science student working with *state or local government* on a water quality study, law student working with *city government* on a wellhead protection ordinance, natural resources/economics student assisting *economic development group* with assessment of value of water for different uses, journalism student working with *Natural Resources District* on outreach materials, engineering student assisting an *engineering or consulting firm* with remediation project design.

For more information: See the Water Resources Research Initiative website at ww.wrri.unl.edu or contact Lorrie Benson at lbenson2@unl.edu or 402-472-3305

The University of Nebraska-Lincoln does not discriminate based on gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin, or sexual orientation.

Internships Through the Water Resources Research Initiative

With the right project, internships can be a win-win situation for both students and their hosts.

The Water Resources Research Initiative (WRRI) at the University of Nebraska-Lincoln has established a new

program to provide meaningful internship opportunities for students that help host institutions accomplish their goals.

A side benefit of this program is that internships are often used by both students and employers to determine

whether a future employment option is desirable. WRRI internships can be arranged for any length of time—from a brief project to multiple years—and in any location that a student and host agree upon.

CREP Could Help Nebraska Solve Water Woes:

UNL's Jess Notes Lists Creative Uses for Instate and Out-of-State Water Conflicts

By Charles Flowerday, Editor
UNL School of Natural Resources

Using the federal Conservation Reserve Enhancement Program (CREP) to help Nebraska comply with various water agreements is a classic example of the “Creative Solutions, Multiple Resources, (and) Many Partners” that a state-federal conference with that title, focused on CREP and its benefits, was designed to highlight.

Water saved from irrigated acres taken out of production and put into grass or other conservation uses can then be passed downstream to meet binding water agreements, both in and outside of the state.

So said Mike Jess, School of Natural Resources (SNR) water engineer and associate director of the UNL Water Center, speaking as part of a panel addressing “Creative Solutions for Water Quantity Needs.” Nebraska, in fact, has been a pioneer in this innovative use of CREP, and other states, particularly in the West, are now adopting it as well. CREP is an outgrowth of the well-known Conservation Reserve Program.

The gathering was important enough to bring the Secretary of Agriculture to Lincoln's Cornhusker Hotel Aug. 15, the first full day of the conference. With Gov. Dave Heineman offering the opening address, the head of the U.S. Department of Agriculture, and former Nebraska governor, Mike Johanns gave the keynote address.

“When I first accepted this invitation to talk,” Jess said, “I made one note: not enough water. I then began to elaborate on this, and I noted that demand has exceeded supply in the past; it exceeds supply today, and it will probably exceed supply in the future.”

Part of a panel addressing “State and Regional Water Quantity Concerns,” he then summarized various water conflicts in the West he had dealt with as the former director of the state Department of Water Resources, or has become familiar with in a career in water management: those involve the Colorado, Missouri and the Platte rivers, the first and last of which have the most stress on allocations.

While Nebraska is the most downstream state involved in a three-state agreement on Platte River flows, in-state allocations have put nearly as much stress on those resources as those upstream. This agreement, among Colorado, Wyoming and Nebraska, must satisfy agricultural and municipal needs while supplying sufficient in-stream flows to satisfy federal requirements for endangered birds that use the river and adjacent wetlands, Jess explained.

According to this cooperative agreement, negotiated in concert with various water use groups such as Central

Nebraska Public Power and Irrigation, which operates Kingsley Dam at Lake McConaughy, Nebraska needs to find 50 percent more water than historically in the river. And the kicker is, Jess said, the Platte is now dry at Grand Island due to a multi-year drought gripping western Nebraska, Colorado and Wyoming.

In the other most-stressed river in the state, the Republican, an agreement resulting from an out-of-court settlement with Kansas over water Nebraska owes its downstream neighbor has resulted in discussions that show that Nebraska has used more than 100,000 acre-feet over what the settlement allows for water years 2003-2005. If the state can't find the water, Jess noted, it will face substantial financial penalties.

In addition, conflicts between users in the state are sometimes overlooked but bear watching, he said. Signed into law in 2005, Nebraska's integrated management law, LB 962, requires the state to make sustainable use of the integrated management of ground- and surface water resources, he noted. This has resulted in many areas being declared over-appropriated. CREP should also help the state find ways to better comply with its own usage regulations, Jess explained.

Some of these conflicts are between surface water users downstream, who have been regulated for some time, and groundwater pumping upstream in the same basin, the use of which has only recently come under legal scrutiny and may now make them subject to lawsuits.

“Some of the arguments that the operators of Lake McConaughy (Central Nebraska Public Power and Irrigation) have voiced are: ‘How many acre-inches were allocated near Bertrand (in south-central Nebraska) in 2006?’ Eight acre-inches, by law,” Jess noted. “And how many acre-inches are irrigators in most of the North Platte Valley restricted to, they want to know.”

Except for the Pumpkin Creek watershed, there is no limit, he added. Due to LB 962, the irrigation district now has a basis to challenge this in court.

The good news, according to Ann Bleed, acting director of the state Department of Natural Resources, who presented after Jess on “Nebraska's Water Quantity and CREP,” is that the goal is to enroll about 100,000 acres in CREP within two miles of the Platte and Republican rivers. So far, more than 53,000 acres in the Platte and Republican basins were offered for enrollment, and about 41,000 were approved in February, most of those in the Republican basin. Bleed said that these acres had to meet four main criteria: improvement in water quantity and quality; increased wildlife habitat; decreased irrigation water use; and decreased water contamination from agricultural use.

UNL Extension: A One-Stop Husker Harvest Days Information Center

University of Nebraska–Lincoln Extension programs covering a wide array of topics will be on display at UNL’s Husker Red exhibit building at Husker Harvest Days near Grand Island.

Husker Harvest Days is Sept. 12-14. The UNL exhibit building is located at Lot 325 on the showground.

UNL’s Institute of Agriculture and Natural Resources (IANR) has the most exhibits ever for Nebraska producers and families attending the show.

“Exhibits target key topics and issues impacting Nebraskans. We’re a one-stop information center.” said Larry Schulze, IANR Husker Harvest Days coordinator and UNL pesticide education specialist.

New this year are ornamental plantings of grasses, wildflowers and shrubs for Nebraskans to consider for their own landscapes.

“We like seeing people and answering questions. Our exhibits are oriented to maximizing agricultural production efficiently and maintaining our high quality of life. Nebraskans have been learning at our exhibits since the very first Husker Harvest Days in 1978,” Schulze said.

New are interactive Horticulture Highlight discussions with UNL Extension specialists,” Schulze said.

UNL exhibits focus on topics such as college, classrooms and courses for students, linking producers and markets, soybean rust, UNL Food Processing Center: From Imagination to Market, managing Soybean Aphids, new

seed varieties, precision agriculture and technology in the field; national I.D. tags for animal health, summer rainfall variation and drought, managing plant pathogens, quarter-scale tractors, UNL Market Journal interviews with Nebraska ag experts, test kits for toxic algae, student careers, Nebraska’s LEAD program, pesticide safety and security and ag and natural resources economics.

Potential UNL students can learn about enrollment and educational opportunities by talking with representatives from the College of Agricultural Sciences and Natural Resources, School of Natural Resources and Nebraska School of Technical Agriculture. Information on all IANR courses of study and majors will be available.

UNL will host a news conference for Governor Dave Heineman and Nebraska Department of Agriculture director Greg Ibach at 9:30 a.m., Wednesday, Sept. 13 at the UNL exhibit building. The event will be carried live on UNL’s Market Journal web site at <http://marketjournal.unl.edu>

IANR’s Market Journal program will deliver live Internet programs from its showground studio.

Schulze said attendees can watch these programs produced for broadcast online at <http://MarketJournal.unl.edu>. One-hour programs will be broadcast twice daily during the show. Times and topics are: Tuesday, Sept. 12, 11 a.m. and 2 p.m., “Getting started with precision ag;” Wednesday, Sept. 13, 11 a.m. and 2 p.m., “Marketing for profit;” and Thursday, Sept. 14, 11 a.m. and 2 p.m., “Marketing tools to reduce risk.”



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