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Water Current Newsletter

Water Center, The

April 2001

Water Current, Volume 33, No. 2. April 2001

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"Water Current, Volume 33, No. 2. April 2001" (2001). *Water Current Newsletter*. 28.

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Simple Sampler Assesses Buffer Strip Effectiveness

by Steve Ress

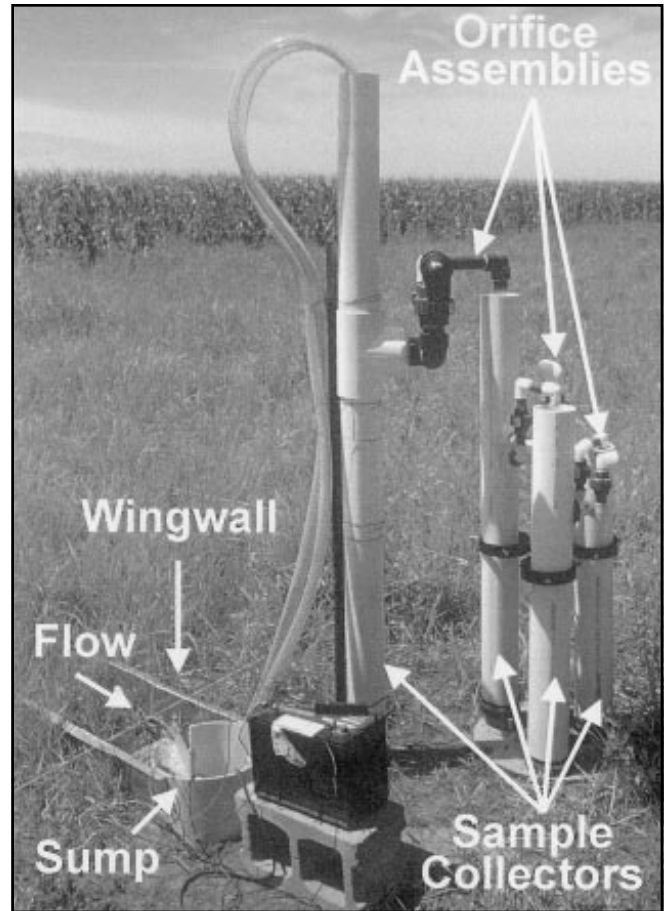
Benefits of riparian buffer strips in controlling sediment and chemical runoff from farm fields has long been recognized, but there haven't been simple ways of reliably evaluating their effectiveness under real world conditions in the Great Plains region.

"Evaluations of buffer strip effectiveness made under controlled conditions and those made in the field can be two completely different things," according to University of Nebraska-Lincoln hydrologic engineer Dean Eisenhauer.

Existing techniques for evaluating buffer strips are expensive and labor-intensive and most have been developed using small research plots that can't completely mirror what happens in an actual farm field. Measuring water flow into and out of an actual buffer can be something altogether different, particularly when flows through a buffer amount to thousands of gallons of water, much of which is concentrated in narrow flow paths rather than being uniformly distributed throughout the buffer.

"The idea is to create a sampling system that can catch a small fraction of the runoff flowing into and out of the buffer, near a stream or creek," said Eisenhauer; "It sounds simpler than it actually is."

For the past year, Eisenhauer and Mike Dosskey, a riparian ecologist with the U.S. Department of Agriculture's National Agroforestry Center; UNL



Irrigation and water resources specialists at the University of Nebraska are field-testing runoff water samplers that are being used to assess the effectiveness of riparian buffer strips that border many Nebraska fields (photo: Dean Eisenhauer).

surface water management specialist Tom Franti; and UNL graduate students Matt Helmers and Jason Brothers have been designing and testing samplers on buffer strip-bordered fields along Clear Creek in Polk County.

"The area is a 360-acre watershed that is over 70 percent buffered with planted grass buffers and natural grass and tree buffers," Franti said. For runoff comparison purposes, the area is adjacent to a 390-acre watershed that has no riparian buffer strips.

Over three years, beginning last year, research will measure spring runoff and chemical concentrations

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Washington 101

from the DIRECTOR



Kyle D. Hoagland

During the past month, I attended my first National Institutes for Water Resources (NIWR) meeting in our nation's capitol. NIWR (known to us as ni-wer) is comprised of water center directors from each of the 50 states, plus centers in Guam, the Virgin Islands and Puerto Rico.

The group gathers each year to discuss current water issues, interact with the U.S. Geological Survey and other water-related granting agencies and meet with congressional delegates to discuss the status of NIWR, water centers and current water research and programming issues.

All this occurs in two and a half days, so for us newcomers, it's trial by fire.

Here are a few historic facts about water centers that I learned which may be of interest (if you don't care for history, skip to the next paragraph!). The Water Resources Research Act of 1964 authorized establishment of a water center or similarly named unit in each state, typically at the state's Land Grant institution, such as here at UNL. Centers were charged with (1) arranging for competent research addressing water problems or expanding understanding of water and water-related phenomena; (2) aiding the entry of new research scientists into the water resources fields; (3) helping train future water scientists and engineers; and (4) getting results of sponsored research to water managers and the public. The federal funding for these centers, as relatively meager as it is, is passed through the USGS under Sections 104(f) for base funding and 104(g) for national competitive funding.

We also learned that the 106th Congress reauthorized the Act through 2005, including modest increases in base funding and competitive grant funding each year. However, one of the first lessons of politics in Washington is that *authorization is not the same as appropriation!* In other words, despite what has been authorized, each year intense negotiations take place to divvy-up the funds to pay for all those good intentions.

This year is no exception, indeed budget discussions dominate the political landscape more than ever because of the arrival of a new administration. As a result, most budgets, including that for the USGS

(i.e., ours!) was a major topic of conversation and consternation. Preliminary budget numbers from the Office of Management and Budget (OMB) included significant cuts in the USGS budget, potentially eliminating base programs such as water centers. Budget negotiations have not been completed and continue to be a serious concern.

On the lighter side, I also learned another lesson in DC politics, that being that Congress is essentially run by 21-year-olds! Well not exactly, but certainly a crucial amount of decision-making relies on the informed input of congressional staff members, many of whom are bright young people with college degrees in political science, not natural resources.

This obviously makes it even more important for the water center to offer its help in providing information on critical water resource issues as needed. To that end, we are currently working on a "pocket directory" of key contact people for Nebraska water resources information, including faculty, state and local agency personnel and others. When published, these will be made available to anyone wanting copies. In addition, we have added the individual staff members in Washington responsible for natural resource issues to our mailing list and plan to keep in close touch with them. We already know and work closely with several of them, but last fall's elections added new faces that we need to get acquainted with.

I want to personally thank Congressman Bereuter and his assistants,

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WATER CURRENT

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

Meet the Faculty

Dr. Diana S. Aga

Environmental Analytical Chemist and Assistant Professor, Chemistry Department, University of Nebraska at Kearney since 1998. Current research focuses on the development and applications of immunochemical techniques for environmental analysis. Emphasis is placed on ELISA methods for pesticide analysis. Study on the occurrence of antibiotics in soil and water. Concentrations and persistence of antibiotic residues in the field where animal manure has been applied as fertilizer are being investigated. Specific current research includes: 1. investigating the occurrence of antibiotics in the environment using LCMS and ELISA; 2. Monitoring of PCE groundwater contamination at an EPA Superfund site; 3. Developing an ELISA for the analysis of the new herbicide Isoxaflutole; and 4. Separating chiral herbicide metabolites by SPE, HPLC and GC/MS/MS.

Education:

- Ph.D. in Environmental and Analytical Chemistry, University of Kansas, Lawrence, KS, 1995.
- B.S. in Agricultural Chemistry, University of the Philippines, at Los Banos, Philippines, 1988.

Other Recent Research/Extension Programs:

- Analyzed chiral herbicides and their metabolites by CZE and GC/MS and determined the liposome-water partition coefficients of pesticides by CZE at the Swiss Federal Institute for Environmental Sciences and Technology, Duebendorf, Switzerland.
- Optimized ELISA for pesticides using biotin-streptavidin signal amplification systems at the Technical University of Munich, Germany.
- Conducted a field study on the fate and transport of acetanilide herbicides I soil and synthesized



Diana Aga

and characterized pesticide metabolites by NMR and FAB/MS/MS at the U.S. Geological Survey in Lawrence, KS.

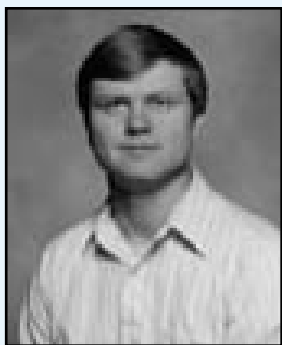
Teaching:

- Courses in analytical, environmental and general chemistry and seminars on current research activities.

(continued on page 9)

Dr. Dave Gosselin

Research Hydrogeologist/Geochemist and Associate Professor, UNL School of Natural Resource Sciences and Conservation and Survey Division. Director, Nebraska Earth Science Education Network. Joined the University of Nebraska-Lincoln in 1989.



Dave Gosselin

Education:

- Ph.D. in Geology, South Dakota School of Mines and Technology, Rapid City, SD, 1987.
- B.A. (Magna Cum Laude) in Geology, College of St. Thomas, St. Paul, MN, 1982.

Current Research/Extension Programs:

- Long-term monitoring of the hydrologic dynamics of lakes and wet meadows in the Nebraska Sandhills.
- Quantifying the use of Rb for labeling corn pests to monitor the dispersal of European corn borer and western corn root worm.
- Investigating the chemical evolution of groundwater in the Great Plains (Dakota) Aquifer of Nebraska and its implications for the management of the regional aquifer system.

- Integrating groundwater dynamics, water chemistry and stable isotopes to assist local natural resource entities in the development of groundwater management strategies.
- Nebraska Earth Science Education Network, whose purpose is to promote and enhance K-12 earth science education in Nebraska to enhance the transfer of earth science information to the K-12 teaching community.

Other Recent Research/Extension Programs:

- Statewide analysis of domestic well water quality in rural Nebraska.
- Monitoring lakes and wetlands for detecting environment/climatic change with a focus on the western Nebraska Sandhills.

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CLEAR Offers Help Restoring Community Lakes

by Steve Ress

A joint state and University of Nebraska program is offering Nebraska communities help in restoring park and community lakes that through the years may have silted-in, become choked with algae or suffer from general neglect.

The Community Lake Enhancement Restoration, or CLEAR program, combines aquatic resource experts from UNL's Lake Water Quality Cooperative Extension Program, the Nebraska Department of Environmental Quality and Nebraska Game and Parks Commission to provide technical and financial assistance to communities with lakes that may be experiencing a variety of aging problems.

"Many of these lakes were constructed when the community was founded, or were built as government projects during the Depression of the 1930's. They may now be in need of help to return them to their former glory as centers of community pride and recreation opportunities," said UNL water quality specialist John Holz.

He, UNL water resources specialist Tadd Barrow, environmental program specialist Paul Brakhage of the NDEQ and urban fisheries specialist Rick Eades of the Nebraska Game and Parks Commission comprise the joint UNL/state team that will consult with communities on lake restoration projects over the next three years using \$2.9 million in state grant funding.

"These funds allow us to design and implement restoration plans for community lakes that may have become largely unusable from shallow water due to silt buildup, low dissolved oxygen levels that contribute to fish kills, water cloudiness, algae growth and other problems," Holz said.

The team of experts will work with community leaders to develop complete overhaul plans. These plans may include addressing watershed and runoff problems effecting silt buildup, identifying and stopping sources of nutrients entering the lake that contribute to algae blooms, designing plans to dredge or drain lakes to make improvements, restocking appropriate species of sport fish, constructing wetlands to retain water quality improvements and other recommendations.

CLEAR will fund these restoration projects on a competitive basis. Limiting factors include funding for no more than one lake project per community over the next three years and a maximum lake size of 20 surface acres. Each project will be limited to a maximum of \$300,000 in assistance. A community match of at least 10 percent in cash and five percent in-kind services is required, Holz said.

"We will consult with community leaders in designing and executing the project with the desired result being a complete overhaul of the lake to improve water quality and recreational usefulness," he said.

Community involvement and youth education will be part of each CLEAR restoration project.

"Each community will help assess the quality of their project and evaluate it's impacts. We will increase community and student awareness of water quality, lake processes and stewardship," Holz said. High school students will be recruited and trained by the restoration team to collect water samples as a means of documenting water quality improvements to the lake by analyzing such factors as nutrient and algae content, presence of contaminants and dissolved oxygen content of the water. Schools and community will also be involved in planning reopening events for the restored lake.

"Since the earliest settlements in Nebraska, city park lakes have often been at the center of family gatherings, community events and recreational opportunities. Our hope is that in restoring these bodies of water, we can make them that way again," Holz said.

The \$2.9 million in funding over the next three years combines a \$1.85 million Nebraska Environmental Trust Fund grant with \$1.05 million in U.S. Environmental Protection Agency funding administered through the NDEQ. CLEAR will grant funds to eligible community projects on a competitive basis.

Communities wanting more information about CLEAR should contact Tadd Barrow at (402)472-7783 or email tbarrow2@unl.edu.

Program cooperators include UNL's Institute of Agriculture and Natural Resources, Water Center and School of Natural Resource Sciences.

UNL Water Lab Participates in NRD Water Programs Conference

Faculty and staff from the UNL Water Sciences Laboratory participated in a Natural Resources District Water Programs Conference in Kearney last month.

The March 7 conference at Kearney's Holiday Inn brought participants up-to-date on topics including well registrations, total maximum daily loads (TMDLs), wellhead protection areas, chemigation and others.

Morning sessions focused on surface water/groundwater interaction by UNL hydrogeologist Jim Goeke, of North Platte; monitoring well site selection and data analysis by hydrolo-

gist Greg Steele of the U.S. Geological Survey; and site characterization and site characterization, field and laboratory methods, and data interpretation by field manager Mark Burbach and environmental geochemist Daniel Snow of the UNL Water Sciences Laboratory.

In the afternoon, Central Platte NRD's Dan Clement and Duane Woodward concentrated on well location using GPS and a cooperative hydrology study.

Following those presentations, Rod DeBuhr of the Upper Big Blue NRD facilitated an open discussion of topics related to the NRDs.

Including presenters, 70 were in attendance, many of whom were NRD staff members involved in well sampling and analysis.

Conference organizers have applied for state continuing education unit (CEU) credits for those attending. The conference is an annual event that frequently includes presentations by UNL Water Sciences Laboratory faculty and staff.

For more information on the conference or CEU credits, contact Dave Clabaugh at the Lower Big Blue NRD at clabaugh@linux3.nrc.state.ne.us.

Summer Water and Natural Resources Tour Looks at Urban Water Quality and Quantity Concerns

by Steve Ress

The June 18-20 water and natural resources tour will focus on increasing demands and challenges to water quality and natural resources management in urbanized regions of the eastern Great Plains.

The tour follows a familiar three-day, two-night format, but dates shift a month in order to take advantage of cooler, early summer weather. Buses leave Kearney and Lincoln's UNL East Campus on Monday, June 18 and finish at those locations on Wednesday, June 20.

Recreation, wildlife habitat, residential development and flood control projects in the sprawling Papio-Missouri River Natural Resources District, which extends along the Missouri River watershed from South Sioux City to south of the Omaha metropolitan area, comprise most of the stops on the first day of the tour.

We will visit the NRD's offices in Millard and the neighboring Wehrspahn Lake. An upscale residential development that is part of a flood control dam and reservoir project near Bennington will also be visited, as will the Boyer Chute wildlife project adjacent to Missouri River. Initially developed by the NRD, Boyer Chute is now managed by the U.S. Fish and Wildlife Service. Tentative plans include a stop at ConAgra's corporate campus in downtown Omaha.

First night lodging and an outdoor barbecue will be at Nebraska City's Lied Conference Center.

As buses continue south on the second day, discussions will focus on the economic importance and environmental concerns of the Missouri River and on the U.S. Army Corps of Engineers' proposed Master Manual which specifies the way river flows are controlled.

In Kansas City the tour visits offices of the U.S. Environmental Protection Agency, Region 7 and Johnson County Water District No. 1, where challenges to municipal water quality, quantity and delivery for the growing Kansas City metro area will be examined.

Tuesday's overnight will be in the city's famed Country Club Plaza area, where participants will have time to enjoy shopping and restaurants on their own.

On Wednesday morning, the tour visits the Brush Creek flood control and transportation corridor that runs through many commercial, industrial and residential sections of the city, including through the Plaza area. The project has been under devel-

opment for more than 20 years. It bears many similarities to Lincoln's proposed Antelope Valley project.

Those on the summer tour will be asked to help decide whether a longer and more involved out-of-area tour will be offered next year.

For more information, contact the Kearney Area Chamber of Commerce at (800) 652-9435. A registration mailing from the Kearney Chamber can be expected in the coming weeks.

Tour sponsors include Central Nebraska Public Power and Irrigation District, Nebraska Public Power District, Kearney Area Chamber of Commerce and UNL's Institute of Agriculture and Natural Resources, Water Center and Conservation and Survey Division.



Kansas City's well known Country Club Plaza commercial area. Landscaping improvements to Brush Creek can be seen at the bottom of the picture. A major transportation corridor flanks both sides of the creek (photo: Don Schepler).



Papio-Missouri River NRD Manager Steve Oltmans, UNL's Mike Jess and Don Schepler of Central Nebraska Public Power and Irrigation District look-over a flood control and residential development currently under construction near Bennington (photo: Steve Ress).



A stretch of Kansas City's Brush Creek flood control and transportation corridor near the Country Club Plaza area. The project has been under development since 1978 and bears similarities to Lincoln's proposed Antelope Valley project (photo: Steve Ress).

30th Annual Water Conference Held At Grand Island's I-80 Holiday Inn

by Steve Ress

The 30th annual Nebraska Water Conference drew about 75 registrants for a one-day groundwater quality monitoring workshop at Grand Island's I-80 Holiday Inn on Monday, March 12.

Severe winter weather the day before the conference, that left highways ice covered, kept some from attending. State and federal environmental agency representatives and Natural Resources District and irrigation district management and staff were heavily represented among those attending the workshop.

Nearly half took advantage of the workshop's 4.15 hours of continuing education credits from the Nebraska Water Well Standards and Contractors' Licensing Board.

Morning sessions were delivered by UNL Conservation and Survey Division research hydrogeologists Ed Harvey and Dave Gosselin. They were followed by Ray Ward, president of Ward Laboratories, Kearney. The morning sessions were devoted to monitoring objectives and purposes, monitoring well siting considerations and sampling, handling and analysis considerations.

Afternoon sessions by geologist Jim Cannia of the North Platte NRD and program specialist Brad Routt of the Nebraska Department of Environmental Quality, focused on a dedicated monitoring well network and recent clean-up experiences near Scottsbluff.

Workshop attendees previewed the annual Children's Groundwater Festival, which was held in Grand Island the following day.

They also attended The Groundwater Foundation's "Festival Feast" on Monday evening where the Nebraska Water Conference Council and UNL Institute of Agriculture and Natural Resources' Pioneer and Progress Awards and the foundation's annual Maurice

Kremer Groundwater Achievement award were presented.

The NWCC/IANR 2001 Pioneer Award went to former Nebraska Natural Resources Commission director Dayle E. Williamson, Lincoln. The Progress Award went to the Mirage Flats Irrigation District, Hemingford.

Longtime UNL Conservation and Survey Division hydrogeologist Jim Goeke, North Platte received the Kremer Award.

Groundwater Foundation president Susan Seacrest was honored with a citation from Nebraska Game and Parks Commission director Rex Amack for her "Outstanding contributions to Nebraska's wildlife resources and parklands."

The groundwater quality monitoring workshop was sponsored by the Nebraska Water Conference Council, The Groundwater Foundation, Nebraska State Irrigation Association, Nebraska Public Power District, Nebraska Water Quality Foundation, Nebraska Association of Resources Districts and UNL's Water Center, Conservation and Survey Division and Institute of Agriculture and Natural Resources.



(Above)
UNL hydrogeologist Jim Goeke of North Platte accepting The Groundwater Foundation's annual Maurice Kremer Groundwater Achievement Award (photo: Steve Ress).

(Left)
Receiving awards at last month's annual water conference were (from left) UNL hydrogeologist Jim Goeke, Maurice Kremer Groundwater Achievement Award; Lee Garrett and Brett Skinner, Mirage Flats Irrigation District, NWCC Progress Award; Dayle Williamson, NWCC Pioneer Award; and Susan Seacrest, Nebraska Game and Parks Commission achievement award (photo: Steve Ress).



On the Subject of Lawns

When I first saw this, I liked it well enough to reproduce it here. We hope we don't insult your sensibilities with the piece and that you can find the same humor in it that we did.

Imagine the conversation The Creator might have had with St. Francis on the subject of lawns and lawn care:

GOD: Frank, you know all about gardens and nature. What in the world is going on down there in the Midwest? What happened to the dandelions, violets, thistle and stuff I started eons ago? I had a perfect, no-maintenance garden plan. Those plants grow in any type of soil, withstand drought and multiply with abandon. The nectar from the long-lasting blossoms attracts butterflies, honey bees and flocks of songbirds. I expected to see a vast garden of colors by now.....but all I see are those green rectangles.

ST. FRANCIS: It's the tribes that settled there. The Suburbanites. They started calling your flowers 'weeds' and went to great lengths to kill them and replace them with grass.

GOD: Grass? Bit it's so boring. It's not colorful and it doesn't attract butterflies, birds and bees, only grubs and sod worms. It's temperamental with temperatures. Do these Suburbanites really want all that grass growing there?

ST. FRANCIS: Apparently so. They go to great pains to grow it and keep it green. They begin each spring by fertilizing the grass and poisoning any other plant that crops up in the lawn.

GOD: The spring rains and warm weather probably make grass grow really fast....that must make the Suburbanites happy!

ST. FRANCIS: Apparently not! As soon as it grows a little, they cut it....sometimes twice a week.

GOD: They cut it....do they then bail it like hay?

ST. FRANCIS: Not exactly. Most of them rake it up and put it in bags.

GOD: They bag it....why? Is it a cash crop? Do they sell it?

ST. FRANCIS: No sir...just the opposite. The pay to throw it away.

GOD: Now let me get this straight....the fertilize grass so it will grow, and when it does, they cut it and pay to throw it away?

ST. FRANCIS: Yes sir.

GOD: These Suburbanites must be relieved in the summer when we cut back on the rain and turn-up the heat. They surely slows the growth and saves them a lot of work.

ST. FRANCIS: Well....not exactly. When the grass stops growing so fast, they drag out hoses and pay more money to water it so they can continue to mow it and pay to get rid of it.

GOD: What utter nonsense! At least they kept some of the trees. That was a sheer stroke of genius, if I do say so myself. The trees grow leaves in the spring to provide beauty and provide shade. In the autumn, they fall to the ground and form a natural blanket to keep moisture in the soil and protect the trees and bushes. Plus, as they rot, the leaves form compost to enhance the soil....it's the natural cycle of life.

ST. FRANCIS: Well....you'd better sit down. The Suburbanites have drawn a new circle. As soon as the leaves fall, they rake them into great piles and pay to have them hauled away.

GOD: Then what do they do to protect the shrub and tree roots in the winter and to keep the soil moist and loose?

ST. FRANCIS: After throwing away the leaves, they go and buy something they call mulch. Then they haul it home and spread it around in place of the leaves.

GOD: And where do they get this mulch?

ST. FRANCIS: They cut down the trees and grind them up to make it.

GOD: Enough....I don't want to think about this any longer. St. Catherine, you're in charge of the art. What move have you selected for us tonight?

ST. CATHERINE: Dumb and Dumber. It's a real stupid move about....

GOD: Never mind....I think I've heard this whole story from St. Francis.

Irrigation, by the Numbers

Nebraska irrigators watered more than 8.1 million acres of crop and forage land in 2000. That ranks Nebraska second nationally in irrigated acres, trailing only California's 9.6 million acres.

The acreage total estimates and other statistics were published in the January/February issue of *Irrigation Journal* and reproduced in the March issue of *Nebraska Farmer*. DeLynn Hay, NU extension

specialist and water resources specialist, provided the numbers for the annual survey.

Total sprinkler (pivot, linear movement and other sprinkler types): 5.15 million acres (of the pivots, 35 percent chemigate).

Total gravity: 2.99 million acres.

Corn: 4.92 million acres.

Soybeans: 1.58 million acres.

Alfalfa: 350,000 acres.

Dry beans: 210,000 acres.

Wheat: 110,000 acres.

Pasture/hay: 90,000 acres.

Sugarbeets: 72,700 acres.

Popcorn: 50,000 acres.

Potatoes: 22,000 acres.

Sorghum: 20,000 acres.

Turfgrass sod: 2,500 acres.

Irrigation wells: 82,382.

Irrigation well power unit

types: electric: 35 percent, LP or natural gas: 33 percent, diesel: 31 percent, gasoline: 1 percent,

from the two watersheds, shallow groundwater aquifers below the buffers strips and chemical concentrations in the water running into and out of several buffer strips in the buffered watershed.

Though rainwater flow through the buffers was minimal last year, due to drought conditions across much of the Great Plains, the UNL engineers have collected enough information from limited rain and irrigation water runoff to be able to refine and further test their most promising sampling device.

"The need for a simple, inexpensive and easily installed tool to evaluate buffer strip performance is particularly important due to the USDA's Conservation Filter Strip Initiative, which will publicly fund two million miles of new buffer strips nationwide by 2002," Eisenhauer said. That is one of several state and federal programs that promise to further expand the use of buffer strips as a protection for water quality over the next several years.

The device Eisenhauer and others are evaluating catches a small percentage of the runoff water flowing through the buffer and holds it, so researchers can measure how well the buffer strip is reducing the amount of sediments and pesticides reaching the stream. This sample is compared to another sample of

water taken from where the runoff water first leaves the edge of the field.

"One of the challenges is designing a system that will trap and hold only a very small percentage of the water actually going through the buffer," Eisenhauer said.

The device being refined does not alter water flow within the buffer and requires no operator or external power source. Because of the large amounts of water that can flow through a buffer during a major storm or rain event, the sampler only collects a 1:2000 sample....where one part water is collected to every 2000 parts of water that flow through the buffer.

Riparian buffer strips can vary greatly in width, vegetative composition and age, or level of development. These, plus other variables, such as soil type can also effect their performance in trapping sediments and pesticides. Still, it is known that properly buffered fields can be up to 90 percent effective in controlling runoff.

The sampling devices now under development and evaluation at UNL will help farmers, researchers and others be able to more accurately assess buffer strip design and construction so that they can be made as efficient as possible for the Great Plains region's unique cropping conditions and climate.

From the Director (continued from page 2)

Alan Feyerherm and Judi Smith; Christina Muedeking from Congressman Osborne's office; Bev Paul from Senators Nelson's office; and Aloysius Hogan from Senator Hagel's office for taking time to meet with me. They were all very well informed and very hospitable!

The big lesson I took with me from my visit to Washington is that high speed information transfer has become both a necessity and an art. Communication, even on complex water issues, generally must be compressed into 15 minute-or-less "sound bites" for delegate consumption, simply because of the sheer volume of issues and information elected officials and their staffs are dealing with on a daily basis. Each Congressional office apparently receives about 150 requests for individual meetings of constituents with senators, representatives and their staff each week! Consequently, we must strive to crystallize the information we send, rather than inundate them with lengthy reports and reprints we often want to use to communicate our activities.

If they are to make informed decisions regarding water and natural resource issues, we have to be willing to provide the kinds of information they need in a useable format and in a timely manner. I consider this to be a very important responsibility of our water center.

I would also encourage you to visit with your representatives and their staffs whenever the

opportunity presents itself. There *will* be a quiz.

Also since our last issue of the Water Current:

—The Nebraska Water Conference Council and other sponsors hosted a very successful one-day workshop on groundwater quality monitoring that was our 30th annual Nebraska Water Conference. Congratulations to annual award winners Dayle Williamson, Jim Goeke and The Mirage Flats Irrigation District.

—Water center staff participated in both the Groundwater Festival in Grand Island and Earth Wellness Festival in Lincoln, helping several thousand Nebraska elementary students learn more about water quality, aquatic habitat and native Nebraska fish species.

—Planning for the June water and natural resources tour to Omaha and Kansas City continues and is at the stage where we are dotting the i's and crossing the t's on details. You can expect to receive a registration mailing from the Kearney Area Chamber of Commerce very soon. We look forward to seeing old and new friends at this annual event.

—Take a few minutes to fill-out and return the annual reader survey on the back of this issue. We need and want your comments. Compliments are appreciated, but constructive criticism and suggestions will help make the Water Current and other water center publications that much better.

Meet the Faculty

Dr. Diana S. Aga (continued from page 3)

Publications:

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Dr. Dave Gosselin (continued from page 3)

Application of remote sensing to monitoring lake and wetland environments.

Documenting the geochemical variability of groundwater-fed lakes in the Western Lakes Region of the Nebraska Sandhills.

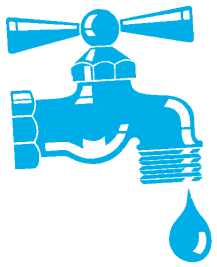
Evaluation of irrigation wells as sampling mechanisms.

Teaching:

- NRES 299a, Earth Systems Science for Educators.
- NRES 103, recitation.
- NRES 896, independent study: Integrated Earth Systems Science Research.
- Curriculum and Instruction 895, independent study, NESEN summer workshops for graduate credit.

Publications:

- Gosselin, D.C. and M. Khisty, 2001. Simulating the influence of two shallow, flow-through lakes on a Groundwater System. *Hydrogeology Journal*, in review.
- Gosselin, D.C., F.E. Harvey and C.D. Frost, 2001. Geochemical Evolution of Groundwater in the Great Plains (Dakota) Aquifer of Nebraska: Implications for the Management of a Regional Aquifer System. *Journal of Ground Water*, 39(1), 98-108.
- Gosselin, D.C., D.C. Rundquist and S. McFeeters, Remote Monitoring of Selected Groundwater-Dominated Lakes in the Nebraska Sand Hills, *Journal of the American Water Resources Association*, 36(5), 1039-1052.
- Gosselin, D.C., 2000. Sand Hills Lakes, *Encyclopedia of the Great Plains*, in press.
- Rundquist, D.C. and D.C. Gosselin, 1999. Natural responses of shallow lakes and wetlands measuring and analyzing impacts of climatic/environmental change, Final Report to the Great Plains Regional Center for Global Environmental Change, *National Institute for Global Environmental Change*.
- Gosselin, D.C. and J. Hurst, 2001. An Earth System Science Class for Elementary/Middle School Education Majors. *Journal of Geoscience Education*, in review.
- Gosselin, D.C., G.A. Buck, R.J. Bonnstetter and R.H. Levy, 2001. Effects of Research Experiences for Teachers on the Knowledge and Understand of Scientific Principles and Practices. *National Association for Research in Science Teaching*, in press.
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Water News Briefs

EPA Cuts Safe Arsenic Level

After years of study and negotiation, EPA approved a lower standard for arsenic in drinking water. The new standard, approved Jan. 16, 2001, could be caught in the regulatory freeze or overturned by Congress. Also, lawsuits remain a possibility and the standard can still be revised by EPA, pending results of ongoing studies.

The new maximum level of 10 parts per billion is one-fifth the former level, established in 1942. EPA had proposed a new standard of 5 ppb, and many environmental groups had requested 3 ppb. Many industry representatives had requested 20 ppb.

About 4,000 of the country's 74,000 water system operators subject to the new rule will have to revamp treatment methods. The vast majority of substandard systems, primarily in the West, Midwest, and New England, each serve fewer than 10,000 people and in all they serve about 13 million.

Improvements are expected to cost anywhere from \$1 to \$327 per household, and must be completed in 5-14 years, depending on the circumstances for each system. EPA and other agencies have funding assistance programs. Elevated arsenic levels can have both natural and human causes.

Arsenic has been linked to certain cancers and can affect the immune, pulmonary, endocrine, cardiovascular, and neurological systems. The new rule also adds requirements for arsenic-related information in annual reports to consumers.

For more information, contact: Robin Woods, EPA, 202-564-7841, woods.robin@epa.gov; EPA Safe Drinking Water Hotline (800)426-4791

American Rivers Online

A wealth of information about river conservation is now available online at www.americanrivers.org. According to American Rivers, the "New web site is an online community dedicated to helping river activists and river friends save, share and enjoy America's rivers. The online community includes a resource center, forum boards for users and features such as clickable maps and electronic magazines.

New Online Sources

The Quality of our Nation's Waters, U.S. EPA, 2000: This brochure summarizes the National Water Quality Inventory: 1998 Report to Congress document. It is available online at <http://www.epa.gov/>.

Liquid Assets 2000: America's Water Resources at a Turning Point, U.S. EPA, 2000: This report explores the current condition of the nation's water resources and demonstrates the link between clean water and a strong economy by focusing on specific businesses and activities that rely on clean water. Available online at <http://www.epa.gov/ow/liquidassets/index.html>.

Common Ground: a new online feature of the National Ground Water Association, where the entire community of groundwater professional

can exchange information and access valuable services. A message board, free e-mail accounts, the latest environmental news and searchable weather information are at <http://www.ngwa.org/community.html>.

Guide to Environmental Restoration: The Water Education Foundation has a new title in its "Layperson's Guide" series. The 24-page guide offers an overview on ways to restore wetlands, rivers and wildlife. Copies are \$6. To order, or for more information, got to <http://www.watered.org>.

Sniffing-Out Air and Water Quality

NASA is currently engaged in a project called "E-nose," an electronic nose to sniff out hazardous odors before crew members suffer adverse effects.

Compared to airborne odors, groundwater is more difficult to monitor because of its special conditions. Remote and out of sight, and almost an abstraction to some people, groundwater is more difficult to know and understand than surface water.

With a newly patented USGS robotic groundwater technology, scientists will be better able to track groundwater conditions. Robotwell will measure water levels and water quality on a regular schedule at a groundwater monitoring well.

More information about Robotwell is available at <http://ma.water.usgs.gov/automon/>.



Tricia Liedle of the UNL Water Center helps fifth graders paint fish as part of a fish identification and water quality presentation at last month's Children's Groundwater Festival in Grand Island (photo: Steve Ress).

APRIL

18: 2:30 p.m., UNL Water Resources Seminar: "Williams Lecture: Water Marketing: The Good, The Bad and The Ugly," Bonnie Colby, Professor of Natural Resource Economics and Public Policy, University of Arizona. Room E103 Beadle Center, UNL city campus, Lincoln.

18-20: Fourth National Mitigation Banking Conference, Radisson Bahia Mar, Ft. Lauderdale, FL. How to conference on mitigation and conservation banking. For information, contact the Terrene Institute at www.terrene.org or phone (800)726-5253.

22-25: Small Drinking Water and Wastewater Systems: Treatment, Management and Financing, Washington, D.C. Contact Cherrie Bacon, NSF International, 789 N. Bixboro Rd, Ann Arbor, MI 48105, phone (734)827-6865 or e-mail bacon@nsf.org.

25: 2:30 p.m., UNL Water Resources Seminar: Concluding panel: Gene Glock, former staff member of former U.S. Senator Bob Kerrey's office; and Sandy Scofield, J. Michael Jess and Alan Tomkins, UNL faculty. Room E103 Beadle Center, UNL city campus, Lincoln.

MAY

15-17: Second National Nonpoint Source Pollution Information and Education Conference, Chicago Botanic Gardens, Clencoe, IL. For information, contact conference coordinator Bob Kirschner at (847)835-6837, FAX (847)835-1635 or e-mail bkirschn@chicagobotanic.org.

20-23: National Watershed Conference: Small Watershed Programs - Past, Present and Future, Richmond, VA. Contact John W. Peterson at (703)455-6886 or e-mail jwpeterson@erols.com.

JUNE

4-7: In Situ and On-Site Bioremediation, San Diego, CA. Contact Andrea Leeson at (614)424-5942 or e-mail leeson@battelle.org.

4-8: 46th Institute in Water Pollution Control, Manhattan College, Riverdale, NY. Two one-week concurrent courses on Water Quality Modeling and Treatment of Contaminated Waters. Courses are designed for engineers and scientists. For information, contact Leah Christenson at (718)862-7276 or e-mail lchriste@manhattan.edu.

14-16: 2001 annual meeting of the Nebraska Chapter-Soil and Water Conservation Society, "The Missouri River: Understanding a Resource," Lied Conference Center, Nebraska City. For more information, access <http://incolor.inetnebr.com/dougg/swcs/>.

21-26: Symposium on Marine Conservation Biology, San Francisco, CA. Forum on the nascent science of marine conservation biology. Contact Julie Morrison at (877)712-3777 or e-mail jmevents@bigsky.net.

JULY

8-13: International Congress of Toxicology, Brisbane, Australia. Phone (61)7-3858-5496 or e-mail ictix2001@im.com.au.



29-Aug. 1: An Engineering Odyssey, Sacramento, CA. Annual international meeting of the American Society of Agricultural Engineers. Contact ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659, phone (616)429-0300 or email hq@asae.org.

30-Aug. 2: Managing River Flows for Biodiversity, Ft. Collins, CO. Conflicts between meeting ecosystem needs and human demands. Contact Nicole Silk at nsilk@tnc.org.

AUGUST

4-9: Ecological Society of America annual meeting, Madison, WI: "Keeping all the parts: Preserving, Restoring and Sustaining Complex Ecosystems." Contact Nadine Lynn, 1707 H St., NW, Suite 400, Washington, D.C. 20006, phone (202)833-8773 or email nadine@esa.org.

OCTOBER

9-11: Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Minneapolis, MN. Sponsored by the National Ground Water Association. Contact Bob Masters,

NGWA, 601 Dempsey Rd., Westerville, OH 43081, phone (800)551-7379 or email rmaste@ngwa.org.

14-18: Optimizing Nitrogen Management in Food and Energy Production and Environmental Protection, Potomac, MD. Contact Rhonda Kranz, Ecological Society of America, 1707 H St., NW, Suite 400, Washington, D.C. 20006, phone (202)833-8773 or email N2001@esa.org.

16-19: Stream Repair and Restoration: A Focus on the Urban Environment, Jane S. McKimmon Center, NC State University, Raleigh, NC. Case study presentations of urban stream restoration projects completed within the last five years. Presenters being solicited until May 15. For information on the conference or presentation topics/formats, contact

22-25: International Conference on Contaminated Soils, Sediments and Water, Amherst, MA. Contact Denise Leonard, Environmental Health Sciences, N344 Morrill, University of Massachusetts, Amherst, MA 01003, phone (413)545-1239 or email dleonard@schoolph.umass.edu.

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Let us know what you think, what you want to see in the newsletter and what we can do to make it better. Please take a few minutes to fill-out and return our annual reader survey. In turn, we will enter your name in a drawing for one of three NEW Water Center coffee mugs. To be eligible for the drawings, return your completed survey by **Friday, June 1** to Steve Ress, Water Center, P.O. Box 830844, University of Nebraska, Lincoln, NE 68583-0844 or FAX it to (402)472-3574. NU subscribers may return surveys via campus mail to Steve Ress, 103 NRH, EC 0844. Please mail or FAX the **entire page** (so we have your name for the coffee mug drawings).

Responses will be tabulated. Individual responses will be held in confidence.

1. Rank, in order of importance, the usefulness of the following general areas of the *Water Current* (1 - most important to 6 - least important):

- News Briefs
- Calendar
- Articles on faculty members and/or researchers
- Previews of upcoming events, seminars, conferences, etc.
- Director's Notes
- Articles on water and environmental research

2. What articles would you like to see in upcoming *Water Currents*?

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9. Do you ever access the virtual copy of the *Water Current* on the Water Center's web site at <http://watercenter.edu.unl/>? Yes No

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