12-1995

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Water Current

Buffer strips trap contaminants

Three research and demonstration projects seek to determine ideal width for riparian buffer strips in Midwest.

They trap sediment, nutrients and pesticides.

That makes riparian buffer strips a valuable tool in preventing nonpoint source pollution, according to Kyle Hoagland, aquatic ecologist at the University of Nebraska-Lincoln.

Nonpoint source runoff of fertilizers, pesticides and sediment from agricultural fields is the primary cause of declining surface water quality nationwide.

Riparian buffer strips, or streamside vegetation, can reduce the amount of nutrients such as nitrogen and phosphorus and of pesticides entering a stream. They also offer other benefits, such as increasing habitat for wildlife and decreasing flood damage.

Three research and demonstration projects on riparian buffer strips are in progress at the NU Agricultural Research and Development Center near Ithaca.

Tim Schmitt, a Forestry, Fisheries and Wildlife graduate student; Mike Dosskey and Michele Schoeneberger of the USDA Forest Service-National Agroforestry Center, Lincoln; Tom Franti, UNL biological systems engineer; and Hoagland set up the series of studies and demonstrations.

Aerial view of the riparian buffer strips in place at the University of Nebraska Agricultural Research and Development Center near Ithaca. Photo — Kyle Hoagland

"Relatively little is known about the potential of buffer strips in the Midwest," Hoagland said.

Present recommendations call for a width of 95 feet, but these recommendations are not based on research in the Midwest.

"These figures may be unrealistic and perhaps not necessary here," he said. Since nonpoint source pollution is considered to be worst in the Midwest, it is important to conduct research on buffer strips here, he said.

Large-Scale Plots

The scientists installed several large buffer strips consisting of different types of vegetation last summer. The strips are 250 feet long and 50 feet wide and consist of grass; grass and shrubs; and grass, trees and shrubs.

See Strips. Continued on Page 3.

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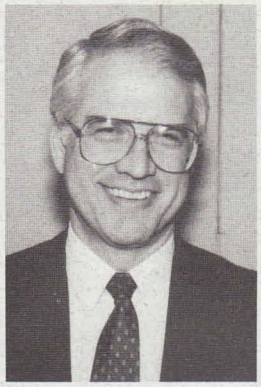
Lack of call for proposals sign of politics at work



Bob G. Volk

from the DIRECTOR

Usually at this time, the Water Center/Environmental Programs unit would issue its call for proposals for the U.S. Geological Survey (USGS) 104 program. But due to changes in the federal portion of our budget, there will be no call for proposals this year.

Although the Water Institutes program will receive the same amount of funding it received in the last fiscal year, the money will be distributed differently this year.

The USGS is considering a competitive program with the following stipulations: 1) grants would have to be matched 2:1 with funds from non-federal sources, 2) every participating institute would receive a modest base grant of $20,000, 3) the remainder of the funding for the program would be awarded competitively based on national program priorities established by the USGS.

The USGS is considering basing the program on regions. This means that Water Institutes might be grouped in four or five USGS regions to compete for the funds.

The Water Institute directors are not pleased with this proposal because it appears that the USGS would set water research priorities at the national or regional level rather than at the state or local level. We have always run a competitive grants program with these funds focusing research on Nebraska's priorities.

Several success stories on the use of USGS funds are featured in this issue, including the use of buffer strips along stream banks and landfill site characterization.

In the past, the USGS funds have also been targeted to graduate students and newer faculty to help them initiating water research. The 2:1 match could easily be called another unfunded federal mandate.

The Water Institute directors in the Missouri Basin and the North Central Region are planning a competitive grants program. The Water Center/Environmental Programs unit is currently part of the Missouri Basin region.

An interdisciplinary faculty team is investigating ways to reduce atrazine runoff in the Blue River Basins. Surface water in these basins is affected by sediment, nutrient, and pesticide runoff; stream channel erosion; and reservoir sedimentation. Concern over high levels of atrazine in the Tuttle Creek Reservoir in Kansas has prompted action by the U.S. Environmental Protection Agency, Kansas and Nebraska Departments of Water Resources, CIBA-GEIGY Corp., and the corn and sorghum grower associations in both Kansas and Nebraska.

Water Current

Water Center/
Environmental Programs
103 Natural Resources Hall
P.O. Box 830844
Lincoln, NE 68583-0844
Phone: (402) 472-3305
Fax: (402) 472-3574
Internet: bhurst@unlinfo.unl.edu

Bob G. Volk — Director
Roy F. Spalding — Associate Director, Water Sciences Laboratory Director
Edward F. Vitzthum — Coordinator of Environmental Programs
Robert D. Kuzelka — Assistant to the Director
Bettina Heinz — Editor

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Riparian buffer strips prevent pollution

Strips.
Continued from Front Page.

The strips are next to a stream that drains crop land. Their purpose is to demonstrate to producers what buffer strips look like and how they work. Eventually, the strips will be identified by signs.

Small-Scale Plots

Last spring, researchers installed 40 plots of smaller buffer strips. The plots have a variety of vegetative combinations, such as switchgrass; mixed grass, trees and shrubs; pasture; and conventional row crops. The plots also vary in width; they are either 25 feet or 50 feet wide. On these plots, researchers simulate rainfall and add a known amount of contaminants. This design allows the researchers to determine which design best filters and retains contaminants. Researchers have completed one run of the experiment and are now analyzing the samples.

Watersheds

Last summer, the researchers also installed three stream flumes. The goal is to gauge the waterways in the watershed to find out how much water and how many nutrients and pesticides are entering the stream. An automated sampler takes samples when sufficient rainfall occurs. These data will be used for comprehensive modeling of the watershed and to compare the extent of contamination with other Nebraska watersheds.

The ultimate goal is to obtain accurate measurements of runoff quality and quantity data for an entire watershed typical of the Midwest. That information can be used to develop nutrient budgets under different landuse practices. "Riparian buffer strips are indeed a good practice for farming in Nebraska," Hoagland said.

Mighty Missouri conference topic

The past and future of the Missouri River.

That is the topic for the 25th Annual Nebraska Water Conference scheduled March 11-13, 1996, at the Red Lion Inn in Omaha.

Attendees will hear a wide variety of perspectives on the subject. Invited speakers include an archeologist, a Native American rights attorney, a retired Army general, a hydrologist and a historian.

Ray Wood, archeologist at the University of Missouri at Columbia, will present slides depicting changes in the Missouri River.

Susan Williams, an attorney from Albuquerque, N.M., will speak on Native American water rights. John Galloway, ret. brigadier general of the U.S. Army, has been invited to talk about the Galloway Report on Flood Protection. John Thorson, special water master, Tucson, Ariz., will deliver the conference challenge and wrap-up.

Larry Cieslik, project manager of the U.S. Army Corps of Engineers, will give a presentation on the Missouri River master manual, and John Ferrell, U.S. Army Corps of Engineers historian, will talk about the 1994 Flood Control Act.

Richard Bad Moccasin of the Mni Sose Water Rights Coalition in Rapid City, S.D., will talk about Native American historical perspectives on the Missouri River.

Other speakers will present the views of landowners and the Missouri River Coalition. Richard Opper, executive director of the Missouri River Basin Association, will give a presentation on conflict resolution.

The conference will begin with a review of historical perspectives, continue with an analysis of current solutions and then address future challenges.

Conference planners are organizing several special events for the meeting. These include a tour of a Missouri River habitat restoration project and a panel discussion involving political leaders of Nebraska, South Dakota and Missouri.

For more information on the conference, contact the Water Center/Environmental Programs unit, 103 Natural Resources Hall, University of Nebraska, Lincoln, NE 68583-0844, (402) 472-3305. *Water Current* recipients will receive a registration flier in the mail in January 1996.

The conference is sponsored by the Nebraska Water Conference Council, the Water Center/Environmental Programs unit, the Conservation and Survey Division, UNL, and the Nebraska Department of Water Resources.

Call for Papers

Scientists, managers and administrators are invited to take part in the 1996 Platte River Basin Ecosystem Symposium. The symposium will take place Feb. 27-28 at the Holiday Inn in Kearney.

Papers and posters should be related to the study, management and administration of ecological resources throughout the Platte River Basin.

Reports on completed research are encouraged. Progress reports may be considered. Presenters will have approximately 20 minutes to deliver their talks. Final papers for a published proceedings should be submitted at the symposium. Posters will be accepted for dedicated poser sessions. Abstracts and titles of presentations and/or poster topics are due to Mike Eckert, 221 L.W. Chase Hall, University of Nebraska, Lincoln, NE 68583-0726, by Jan. 19, 1996.

Platte River Basin Ecosystem Symposium
Feb. 27-28, 1996
Kearney, NE

The symposium is sponsored by the University of Nebraska Cooperative Extension Platte Watershed Program and the Water Center/Environmental Programs unit, the U.S. Environmental Protection Agency Region VII and the U.S. Fish and Wildlife Service.

Doug Korth demonstrates the need for manure spreader calibration at a field day on his custom feedlot near Randolph. More than 60 producers attended the event, which was sponsored by the Cedar County Livestock Feeders and Cedar County Cooperative Extension. Photo — Charles Shapiro

Manure application studied

CONCORD — Producers typically do not know how much manure they are applying to a field, and when they guess, they tend to underestimate the amount of manure applied.

These are the findings of a University of Nebraska project that not only surveys producers but also gives them the tools to fine-tune their manure application.

Charles Shapiro, soils specialist at the NU Northeast Research and Extension Center near Concord, and several colleagues recognized the need for quick and easy calibration methods. The team received a grant from the NU Water Center/Environmental Programs unit to purchase a set of small, portable scales and conduct 15 calibrations. So far, the equipment of 10 area producers has been calibrated. An essential part of the project is the free nutrient analysis. Researchers had the manure samples analyzed for nitrogen and phosphorus content.

Nitrogen availability in the samples ranged from 120 pounds per acre to 470 pounds per acre, indicating that additional nitrogen applications would be excessive. Normal dryland corn should have 125 pounds to 150 pounds of nitrogen per acre.

Phosphorus content ranged from 178 pounds to 499 pounds per acre. Recommended rates for dryland corn are up to 80 pounds of phosphorus per acre.

Producers need to realize that the nutrients available in the manure are just as good as commercially bought nutrients, Shapiro said.

Survey results showed that most producers did not know how much manure they were putting on per acre and if asked to guess, they guessed too low.

One producer, for example, estimated he applied 25 tons of manure per acre but the calibration showed he was applying 40 tons.

Another producer, Doug Korth of Randolph, said the manure calibration project fulfills a need among producers.

"Manure is a byproduct, but it still has an awful lot of value to it, if you do it right. This gives you a chance to get some numbers," Korth said.

Nebraska Water News

Guide for sealing wells available from UNL

Plugging abandoned wells may not be a glamorous environmental issue, but it is still a very important one. Contaminants can reach the water table through wells left unsealed.

A 22-page booklet, "Guidelines for Decommissioning Water Wells" (MP-37), gives directions on how to properly seal off a well in Nebraska. The booklet was written by Duane Eversoll, associate director of the Conservation and Survey Division, UNL; DeLynn Hay, UNL water quality specialist; and Rod Tremblay, Nebraska Department of Health.

To order, contact the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska, Lincoln, NE 68588-0517, (402) 472-7523. Cost per copy is $3. Add $1.50 per order for postage and handling as well as any appropriate city and state sales tax.

Symposium focuses on integrated approach

Presenters stressed the integrated systems approach to managing the environment at the NU symposium "Agriculture and People — Building a Shared Environment" Oct. 9-10 at the Agricultural Research and Development Center near Ithaca.

John Klosterman, David City farmer and cattle producer, said a complete systemic approach to waste management will yield the most desirable results.

"Animal wastes now pose a considerable risk or opportunity to today's producers, depending on how one wants to view it," he said.

Chuck Francis, UNL agronomist, said researchers and teachers need to approach sustainability in a new manner. He emphasized the need for long-term research that examines agriculture and sustainability issues from a socioeconomic perspective.

"We need to think beyond our usual narrow definitions of property, inheritance and such," Francis said.

Darrell Watts, UNL biological systems engineer, gave an update on research at the Management Systems Evaluation Area (MSEA) site near Shelton. As part of this interdisciplinary water quality project, researchers identified that regional producers apply too much irrigation water and fertilizer. Research focuses on the effect of producers' actual and recommended practices.

Booklet helps find water information

"How To Access Water Resources Information," a 15-page booklet produced by the Water Center/Environmental Programs unit, offers an overview of water-related information sources.

The main focus of the booklet is access to electronic sources of information.

To obtain a free copy, contact Water Center/Environmental Programs, 103 Natural Resources Hall, University of Nebraska, Lincoln, NE 68583-0844, (402) 472-3305.

Speaker compares public, technical views

Kate Kramer, executive director of The Western Center for Comparative Risk, Boulder, Colo., spoke on risk-based decision-making at the symposium of The Groundwater Foundation Oct. 18 in Lincoln.

Cultural, technical and political perspectives on risk-based decision-making exist, Kramer said. The technical view of risk is probability, given in terms of 1:100, or 1:1000. The cultural or public perception of risk, however, focuses on one person.

The technical view is based on a basic trust in science, while the cultural view is based on trust in the political culture and the democratic process. The technical view appeals to authority and expertise, while the cultural view appeals to folk wisdom, peer groups and traditions.

The views also differ in that the technical view takes a narrow, reductionist perspective, while the cultural view has broader boundaries, taking into account similar situations and historical precedents.

While technical and cultural (public) perceptions of risk differ, they are both rational, important and should be considered complementary, Kramer said.

"The public can make very good choices using risk-based decision-making," Kramer said.

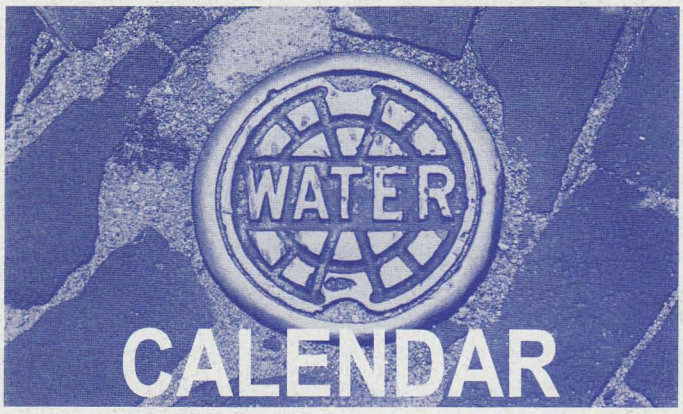
It is important for scientists to inform the public of the default assumptions underlying the technical view of risk, she said.

For example, the technical view presumes that animal data can be used to estimate human risk.

"It is important to educate the public because the public will make the decisions," Kramer said.

Kramer said she feared a misapplication of technical risk analysis in the political arena.

Citing political trends to pressure scientists for risks in numbers, she said that politicians need to do more than look at risk numbers. They need to take into account a holistic look at the future and public values, she said.



NOVEMBER

Nov. 19-20: Groundwater Guardian Conference. Oak Brook, IL. Contact The Groundwater Foundation, Lincoln, at 1-800-858-4844.

Nov. 20-21: Private Drinking Water and Wastewater Workshop, Omaha. Contact your local extension office or the Well Drillers Association.

Nov. 20-21: Research Symposium. Nebraska Fertilizer and Ag-Chemical Institute. Ramada Inn, Lincoln. Call (402) 476-1528 for more information.

Nov. 28-29: Private Drinking Water and Wastewater Workshop, Lincoln. Contact your local extension office or the Well Drillers Association.

Nov. 30-Dec. 1: Private Drinking Water and Wastewater Workshop, South Sioux City. Contact your local extension office or the Well Drillers Association.

DECEMBER

Dec. 3-5: Nebraska Water Resources Association and the Nebraska State Irrigation Association Annual Conference. "New Directions in Water." Ramada Inn, Kearney. Contact Sara Kay at (402) 474-3242.

JANUARY

Jan. 4-8: CONSERV96, "Responsible Water Stewardship," Orlando, FL. Sponsored by American Society of Civil Engineers, American Water Resources Association (AWRA) and American Water Works Association. Contact AWRA, 6666 W. Quincy Ave., Denver, CO 80235.

Jan. 10: "History of Platte River Use and Development," Steve Gaul, Nebraska Natural Resources Commission. 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Jan. 15-17: Nebraska Turfgrass Conference. Contact Roch Gaussoin, UNL, (402) 472-2854.

Jan. 17: "Overview of Current Platte River Issues," Leroy Seivers, Nebraska Department of Water Resources. 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Jan. 24: "A Colorado Perspective," Doug Robotham, Colorado Department of Natural Resources. 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Jan. 31: "A Wyoming Perspective," Mike Purcell, Wyoming Water Development Office. 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

FEBRUARY

Feb. 7: "A Nebraska Perspective," Jim Cook, Nebraska Natural Resources Commission. 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Feb. 14: "Irrigation and Power Production Management." 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Feb. 15: Deadline for communities to enter the 1996 Groundwater Guardian program. Contact The Groundwater Foundation, Lincoln, at 1-800-858-4844.

Feb. 20-21: Nebraska GIS Symposium. Cornhusker Hotel, Lincoln. Sponsored by the Nebraska GIS Steering Committee and the Professional Surveyors Association of Nebraska. Contact Larry Zink, (402) 471-3206.

Feb. 21: "Endangered Species Act Enforcement," 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Feb. 27-28: Platte River Basin Ecosystem Symposium. Holiday Inn, Kearney. Sponsored by Cooperative Extension Platte Watershed Program, Water Center/Environmental Programs Unit, UNL, and U.S. EPA Region VII. Contact Mike Eckert, (402) 472-0891.

Feb. 28: "Ecosystem Management," 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

MARCH

March 5: Children's Groundwater Festival, Grand Island. Sponsored by The Groundwater Foundation, Lincoln. Contact The Groundwater Foundation at 1-800-858-4844.

March 6: "Instream Flow Rights," 3 p.m., 116 L.W. Chase Hall, UNL, and via satellite. Water Resources Seminar Series. Contact Mike Eckert, (402) 472-0891.

Drijber gets into microbial communities

When Rhae Drijber was in high school, she did not know her future field of specialization even existed.

"I didn't know that people study soil," said the soil microbiologist at the University of Nebraska-Lincoln. "When you are in high school, you don't realize that the study of soils is a whole academic discipline."

Drijber, who joined UNL last year, grew up Canada. She received her B.S. and M.S. from the University of British Columbia in Vancouver in agriculture and soil science and her Ph.D. in soil science from the University of Alberta at Edmonton.

Originally, Drijber set out to become a veterinarian, but during the pre-vet program offered in the Department of Agriculture, she developed an interest in soil courses.

"I became very interested in soil chemistry, particularly organic soil chemistry," she said. This became the topic for her undergraduate and master's dissertations. In her Ph.D. work, Drijber studied the use of lipid, or fat, biomarkers to monitor gliding bacteria in soils worked by earthworms.

After working as a research associate at the University of Alberta, Drijber came to UNL a year ago. The adjustment from Alberta to Nebraska was easy due to the similarity of the regions, Drijber said. Both regions have lots of sunshine, open plains and friendly people, she said.

Drijber has a research and teaching appointment. She teaches courses in microbiology, and in January she will offer a new course called "Applied and Environmental Microbiology." Students will be introduced to microbial taxonomy, physiology and genetics. The class material will also address the role of microorganisms in waste management, remediation, nutrient cycling, health and water and food issues.

Her main research interest lies in finding out more about microbial communities as they exist in soil in situ (in place).The main emphasis in microbiology has been on isolating organisms, determining their characteristics in laboratories and then predicting from the lab to the field.

"Now we know that this doesn't answer what they're doing in the field," Drijber said. To address this question, Drijber tries to "fingerprint" communities by using their lipids or DNA as markers. This allows her to demonstrate when the composition of that microbial community changes, through management or accidental spills.

Rhae Drijber

"Rather than trying to separate individual organisms, I'm taking a holistic approach and try to look at the community of organisms within their habitat," Drijber said.

To do so, field samples are taken and analyzed as soon as possible in the lab for lipids and genetic information. The majority of microbes in the soil are inactive or resting, Drijber said. Only a small number of the microbes are active at any one time, depending on the input of carbon and energy sources.

Her research can be applied to biological control of plant diseases, bioremediation, global warming, nutrient cycling and crop growth. Her research fits into new efforts to catalog the planet's species.

Microbes can and should be included in current cataloging efforts of species, she said.

"This is very difficult," Drijber said. "Most species of soil microbes cannot be identified because most of the soil organisms cannot be cultured. But we can identify genetic material in the samples and add that to the directory."

Dishrags breeding ground for bacteria

The lowly sponge or dishrag is a breeding ground for potentially dangerous bacteria, according to Chuck Gerba, University of Arizona water quality expert.

Gerba studied 100 sponges and dishrags collected in the New York City area and found 39 percent of the rags contained either Staphylococcus or Salmonella — two leading causes of food-borne diseases in the United States. He also discovered that 68 percent of the rags and sponges contained bacteria with the potential to cause illness in humans, including fecal coliform bacteria, indicators of filth and bacterial contamination.

To minimize risks of illness, Gerba suggests to use germ-resistant sponges, run sponges or rags through the dishwasher or washing machine daily, or regularly spray counter tops and other surfaces with a kitchen disinfectant and wipe with paper towels.

— Arizona Water Resource

Seminar series to present views on Platte River management

In spring 1996, the annual Water Resources Seminar of the University of Nebraska-Lincoln will bring together perspectives on Platte River management goals.

"The management of the Platte River is an issue that affects thousands of citizens in Colorado, Wyoming and Nebraska," said Mike Eckert, Platte Watershed Program coordinator, UNL.

As new federal and state management policies are debated and legislated, a comprehensive management goal for the Platte remains undefined and divisive, he said.

The seminar series will take place on Wednesdays from 3 to 3:50 p.m. in 116 L.W. Chase Hall on the UNL East Campus. It will also be available via satellite with downlink sites at Cooperative Extension offices in Grand Island, Holdrege, Kearney, Lexington, North Platte and Scottsbluff and other locations. The seminar is also offered as a one credit-hour course on and off campus.

The first sessions of the series are designed to provide an introduction to the topic. Steve Gaul, water resources planner, Nebraska Natural Resources Commission, will present a history of the Platte River use and development Jan. 10.

On Jan. 17, Leroy Seivers, special assistant to the director, Nebraska Department of Water Resources, will give an overview of current issues.

Colorado, Wyoming and Nebraska will lay out their perspectives on Jan. 24, Jan. 31, and Feb. 7, respectively.

Seminar sessions from Feb. 14 through April 10 will be moderated sessions. Panels of experts will examine issues such as irrigation and power production management (Feb. 14), Endangered Species Act Enforcement (Feb. 21) and ecosystem management (Feb. 28).

On March 6, a panel will discuss instream flow rights, and on March 27 conjunctive use implications. Flood plain development issues will be in the spotlight April 3 and economic and municipal impacts April 10. Student debates on April 17 and April 24 will conclude the series.

The series is coordinated by the Cooperative Extension Platte Watershed Program and the Water Center/Environmental Programs unit, UNL. Partial funding for the Platte Watershed Program is provided by the U.S. Environmental Protection Agency Region VII. For more information, contact Bob Kuzelka, (402) 472-3305.

WATER CENTER/ENVIRONMENTAL PROGRAMS
103 Natural Resources Hall
University of Nebraska
P.O. Box 830844
Lincoln, NE 68583-0844

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