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Water Current

University of Nebraska Water Center/Environmental Programs

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August 1994

CRP reduces flood damage

Alton, Ill. — The headlines have moved on to new stories, and the water has receded, but the flood of '93 is all too real in the minds and lives of Midwestern flood plain residents.

Sandbags and boarded up residences along the Mississippi and Missouri rivers showed the legacy of the '93 flood to the 45 participants of the annual Nebraska Water Resources Tour July 25-28.

That legacy, however, also includes positive aspects, said Bob Volk, director of the Water Center/Environmental Programs unit.

"I was impressed by the flexibility that allowed federal and state agencies to respond immediately and efficiently to the disaster. Cooperation was fantastic," Volk said.

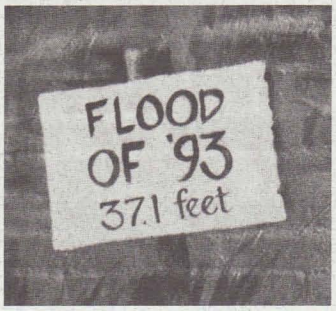
The Water Center/Environmental Programs unit, the Nebraska Water Conference Council, UNL; and the Nebraska Natural Resources Commission co-sponsored the tour.

In West Des Moines, Iowa, the tour observed volunteers raising houses in an area flooded last year. Sandbags still top some of the levees there.

"The flood has taught us a lot," said Marty Lamberti, director of General Services, Water Works, Des Moines. Flood levels took everyone by surprise, Lamberti said. In July 1993, the Des Moines Water Works plant was flooded, making it the first plant of its size to be flooded in the United States. Since then, the levee around the Water Works area has been raised by 6 feet, and floodgates have been added.

Al Austin, civil engineer at Iowa State University, said those who were flooded out last year remain nervous.

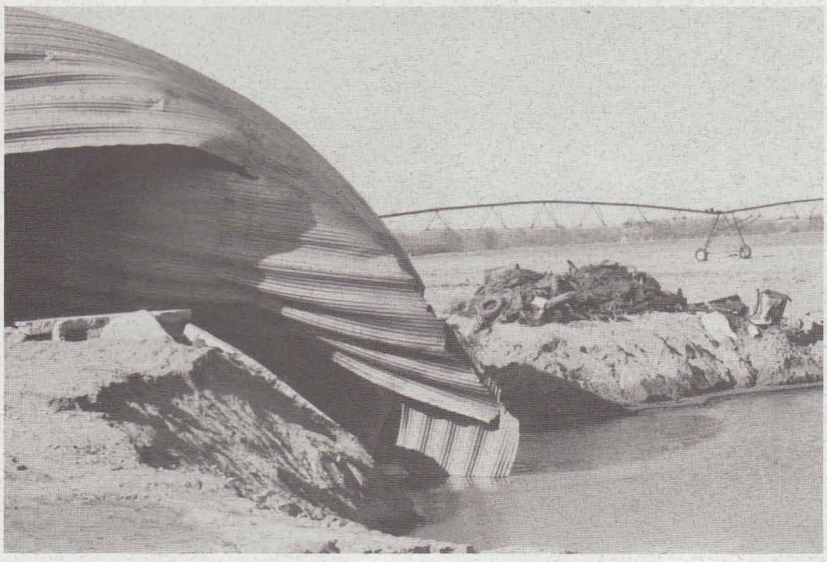
"This spring, when there was a cloud in the sky, everybody thought of last year," Austin said.



Special emphasis of the four-day tour, which visited Iowa, Illinois and Missouri, was on agricultural damage and recovery. Despite the havoc the flood caused, much damage to agricultural land was prevented due to conservation programs, said Jim Gulliford, director of the Iowa Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship.

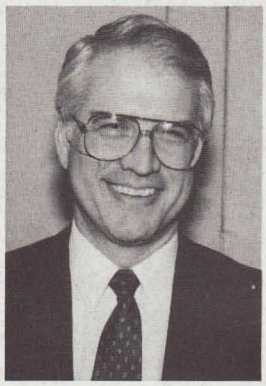
Gulliford said despite a 170-percent increase in rainfall during the spring and summer of 1993, there was 40 percent less severe erosion that year than in 1984. In 1984, 4 million acres in Iowa suffered severe erosion under a precipitation of 27.5." In 1993, that number could have been 8.6 million acres, Gulliford said.

However, due to conservation reserve program (CRP) practices implemented since 1983, only 2.4 million acres were damaged from severe erosion, with a precipitation of 41.2."



FLOOD DAMAGE — The area near Boonville, Mo., along the Missouri River suffered heavy agricultural damage during the '93 flood. Participants in the 1994 Nebraska Water Tour visited some of these areas to observe the pace of recovery.

From the Director



Bob G. Volk

First of all, I am expressing appreciation to U.S. Sen. J. Robert Kerrey of Nebraska for taking the leadership and writing Sens. Byrd and Nickles requesting the subcommittee to restore funding for the U.S. Geological Survey's Water Resources Research Institutes program. The letter was signed by U.S. Sen. J.J. Exon of Nebraska and 30 other senators as well.

The Senate Appropriations Committee responded by recommending an increase of $5,770,000 for the Water Resources Research Institutes program. This would restore the program to last year's level.

The Nebraska portion of these funds supports six research programs helping to solve local problems in water quality.

More good news! The Nebraska Water Center was recently reviewed by an independent panel of national water experts who commended the center "for its excellent report and for a well-administered, diverse, productive Section 104 program."

The panel continued:

"The research program and water research projects cover a broad range of state problems and offer a good balance. Participation is spread over several departments of the University system. The follow-on support for research initiated under the Section 104 program is impressive. Also, most projects led to notable achievements.

"The information transfer program is broad in its service and outreach. The student education and training afforded is excellent. Many M.S. and Ph.D. dissertations result from research projects. The Center is providing visible, strong, pro-active leadership."

I commend the staff and faculty for their hard, diligent and excellent work. The research and extension education efforts of many impressed the independent panel with the many activities taking place in Nebraska.

The Nebraska Research Initiative has contributed greatly to the success of faculty in obtaining additional research support as well.

As reported previously, the Water Center has obtained a $100,000 grant from the National Water Resources Association in California. This money is matched equally by the Nebraska Research Initiative. A competitive grants program was held, and the winners of the grants are:

- Gregory Binford, NU Panhandle Research & Extension Center, "Evaluation of New Techniques for Managing Nitrogen in Crops that Follow Sugar Beets;"
- Steve Comfort, University of Nebraska-Lincoln, "Remediating RDX and HMX Contaminated Soil and Water Using Chemical Pretreatments;"
- Richard Ferguson, NU South Central Research & Extension Center, "Conservation Tillage Effects on Denitrification From Irrigated Corn;"
- Kyle Hoagland, UNL, "Effects of Atrazine Metabolites on Freshwater Algae;"
- Norman Klocke, NU West Central Research & Extension Center, "Irrigation Management Strategies to Reduce Chemical Leaching Potential and Sustain Economic Return;"
- Vitaly Zlotnik, UNL, "A Dipole Method of Measurement of Transport Parameters in Contaminated Aquifers."

Water Current

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Glossary of water-related terms

Editor's Note: This is the second excerpt of the "Glossary of Water-Related Terms," published as NebGuide G93-1191-A by Cooperative Extension, UNL.

The guide was co-authored by William Kranz, David Gosselin, DeLynn Hay and James Goeke.

Contaminant is any unnatural biological, chemical, physical or radiological substance or matter contained in water. Tri-chloroethylene (TCE) is a synthetic cleaning solvent sometimes found in groundwater near manufacturing sites.

Discharge area is an area where groundwater moves toward or is delivered to the soil surface. Groundwater can flow into springs, or seeps; contribute baseflow to streams; or provide supplemental water for plant use.

Distillation is a two-stage water treatment method: 1) the liquid is boiled, producing water vapor; 2) the water vapor is condensed, leaving most contaminants behind.

Distillation can be used to remove inorganic chemicals, some non-volatile organic chemicals and bacteria.

Effluent is the discharge of a contaminant or contaminants with water from animal production or industrial facilities or waste water treatment plant.

Erosion is the process or series of processes that removes soils, crop residues and organic matter from the land surface in runoff waters, or by wind. Water droplets begin the erosion process by detaching soil particles.

Runoff waters transport the detached particles to local and regional streams or lakes. Soil erosion represents the single largest source of nonpoint pollution in the United States.

Evapotranspiration (ET) is the process of changing soil water into water vapor through the combination of soil evaporation and plant water use, or transpiration.

Groundwater is water that occupies voids, cracks, or other spaces between particles of clay, silt, sand, gravel or rock within the saturated formation.

Groundwater mining is the removal of groundwater from an aquifer in excess of the rate of natural or artificial recharge.

Continued groundwater mining reduces the groundwater supply until it is no longer an economical source of water.

Groundwater recharge is the process where water enters the soil and eventually reaches the saturated zone. Recharge varies from place to place due to the amount of rainfall, infiltration and surface vegetation.

Pesticide fate vital factor

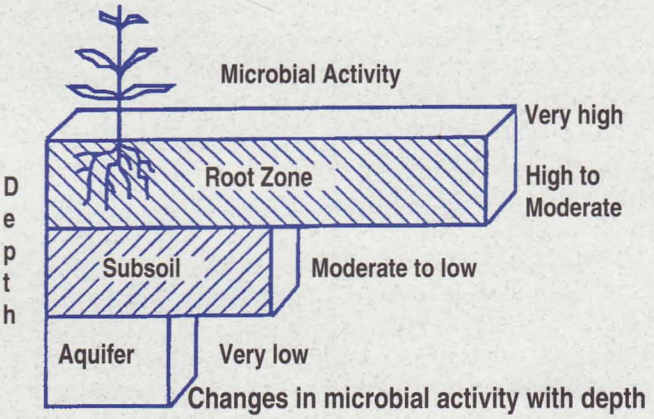
Every year in Nebraska, an estimated 33 million pounds of pesticides are applied. Nationally, an estimated 1.2 billion pounds of pesticides are sold each year, with about 70 percent used in agricultural production.

"This intense usage creates the potential for contamination," said Steve Comfort, soil chemist at the University of Nebraska-Lincoln.

A new publication of NU Cooperative Extension explains the fate of commonly used pesticides in soil and water.

"Understanding Pesticides and Water Quality in Nebraska," (EC 94-135) is co-authored by Comfort; Pat Shea, residue chemist; and Fred Roeth,weed specialist at the NU South Central Research & Extension Center, Clay Center. The publication is a compilation of reference material.

"It goes through all the processes that affect pesticide fate," Comfort said. Maps, tables and a glossary are included in the 16-page circular.



Changes in microbial activity with depth

Nebraska's groundwater needs to be protected.

"As users of pesticides we have a responsibility to know what happens to the product after it has been applied," Shea said.

The circular is available for $1 from local extension offices.

Pesticide. The term "pesticide" includes several categories of chemicals used to destroy, control or repel pests including weeds and insects. Herbicides (to control weeds), insecticides (to control insects) and fungicides (to control fungi) are all different types of pesticides.

California citrus production tied to groundwater

Citrus growers and anyone concerned with groundwater issues may be interested in the publication "Protecting Groundwater Quality in Citrus Production."

The 38-page book was published by University of California Agriculture & Natural Resources Publications. Author is Chuck Ingels of the UC Sustainable Agriculture Research & Education Program.

The three main herbicides used in citrus production have been found in hundreds of wells in the San Joaquin Valley. As a result, the use of these herbicides is restricted in many areas. Fertilizers used in citrus production can lead to nitrate leaching.

The book describes the scope of the problem and offers management strategies. It can be ordered for $5 from ANR Publications, University of California, 6701 San Pablo Ave., Oakland, CA 94608-1239, (510) 642-2431.

Calendar

August

Aug. 30: Turfgrass Field Day, John Seaton Anderson Turfgrass and Ornamental Research Facility, Mead. Contact Roch Gaussoin, UNL Dept. of Horticulture, (402) 472-8619.

September

Sept. 10: Festival of Color. Open House, UNL Horticulture Department. Theme: Water Quality. John Seaton Anderson Turfgrass and Ornamental Research Facility, Mead. Contact Amy Greving, UNL Dept. of Horticulture, (402) 472-1640.

Sept. 24: Annual Meeting, Nebraska Water Conference Council. 8 a.m. to 11 a.m., UNL, East Campus Union. For more information, contact the Water Center/Environmental Programs unit.

Sept. 27: Annual Water Policy Forum for NU Faculty. Sponsored by Water Center/Environmental Programs unit.

October

Oct. 4-5: Earth Jamboree, Adams County Fairgrounds.

Oct. 8-10: Global Affairs Conference. Topic: Natural Resources. University of Nebraska at Kearney, Kearney. Contact Allan Jenkins, (308) 234-8461.

Oct. 14: World Food Day. "Water Needs of Farms, Cities and the Environment in Growing Conflict." Contact Susan Miller, International Programs, UNL, (402) 472-2758.

Oct. 16-18: 39th Annual Midwest Ground-Water Conference, Bismarck, N.D. Sponsored by North Dakota State Water Commission, North Dakota State Geological Survey, University of North Dakota-Energy and Environmental Research Center, U.S. Geological Survey, Water Resources Division and North Dakota Water Resources Research Institute. Contact Robert B. Shaver, 900 East Boulevard, Bismarck, N.D. 58505-0850, (701) 224-2754.

Oct. 18: The Groundwater Foundation's Annual Symposium. "The Drinking Water Challenge: Groundwater and Public Health." Ramada Hotel and Conference Center, Lincoln. For more information, contact The Groundwater Foundation at (402) 434-2740 or 1-800-858-4844.

Oct. 19-21: Great Plains Animal Waste Conference: Confined Animal Production and Water Quality. Denver. Contact GPAC Confined Animal Production and Water Quality, Attn. Reagan Wascom, Department of Agronomy, Colorado State University, Fort Collins, CO 80523, (303) 491-6103.

Oct. 26-27: Integrated Watershed Management in the South Platte Basin: Status and Practical Implementation. Greeley, Colo. Contact Colorado Water Resources Research Institute, 410 University Services Building, Colorado State University, Fort Collins, CO 80523. Attn. Kathleen C. Klein, coordinator, (303) 491-6308 (phone), (303) 491-2293 (fax).

November

Nov. 6-10: American Water Resources Association 30th Annual Conference, Chicago. "National Water Quality Assessment." Contact General Chairman, Phillip E. Greeson, U.S. Geological Survey, Norcross, GA, (404) 409-7700.

Nov. 17-18: 1994 Groundwater Guardian Conclave of The Groundwater Foundation. "Promoting Community Groundwater Protection." Doubletree Hotel - National Airport, Washington, D.C. Contact The Groundwater Foundation at (402) 434-2740 or 1-800-858-4844.

Nov. 30-Dec. 2: Nebraska Nonpoint Source Pollution Management Workshop, Ramada Inn, Kearney. Contact Elbert Traylor, Nebraska Department of Environmental Quality, (402) 471-4700.

December

Dec. 5-6: "Reslicing the Water Pie." Nebraska Water Resources Association Annual Conference, Ramada Inn, Kearney. Contact Sara Kay at (402) 474-3242.

Festival of Color

MEAD — Water will add a special sparkle to this year's "Festival of Color."

Maintaining water quality in the landscape is the theme for the Lawn and Garden Open House set for Saturday, Sept. 10, at the John Seaton Anderson Turfgrass and Ornamental Research Facility near Mead.

Sponsored by the University of Nebraska Department of Horticulture, the Open House at the Agricultural Research & Development Center will feature displays of water-conserving flowers, new shrub cultivars, chrysanthemums, daylilies and water gardening. The event is scheduled for 10 a.m. to 4 p.m.

"How you plan, plant and maintain your landscape can influence both the quality and quantity of water used," said Donald Steinegger, horticulturist in the NU Institute of Agriculture and Natural Resources.

Flower displays, home landscaping demonstrations and children's activities will round out the event. University specialists, nursery professionals and master gardeners will be on hand throughout the day to answer plant questions.

For the first time, commercial booths featuring gardening and landscape merchandise will be part of the festival.

Festival of Color is supported by the U.S. Environmental Protection Agency Region VII through the Nebraska Department of Environmental Quality; the Nebraska Association of Nurserymen; Nebraska Turfgrass Foundation; Earl May Seed and Nursery, Limited Partnership; and Water Center/Environmental Programs unit, UNL.

For more information, contact the Horticulture Department at (402) 472-2854.

USDA team visits two projects

by Edward F. Vitzthum
Coordinator of Environmental Programs, UNL

Nebraska's Central Blue Valley and Elm Creek Hydrologic Unit Area (HUA) projects received high marks from U.S. Department of Agriculture officials who visited both sites in early June.

Good interagency cooperation, implementation of innovative management practices and innovative funding were cited as pluses in both projects by the three-person team.

The team included David Sawyer, Water Quality Program manager (HUAs), Soil Conservation Service; Bob Stephenson, deputy director, Conservation & Environmental Protection Division, Agricultural Stabilization & Conservation Service; and Mary Ann Rozum, Water Quality Program manager, Extension Service.

The tours of both HUAs included briefings by local representatives of ASCS, SCS, Cooperative Extension and the respective Natural Resources Districts.

The Central Blue Valley project near Beatrice focuses on containing high nitrate concentrations in groundwater. During the tour of that area, the team saw surge valves being used to improve efficiency of irrigation operations, irrigation runoff/reuse structures and animal waste treatment lagoons.

The objective of the Elm Creek HUA is to reduce siltation and other types of pollution that adds to the loading of the Republican River and impairs suitability of Elm Creek as fish habitat. Here the USDA officials saw examples of streambank stabilization and a variety of other practices in place.

The two-day tour also included visits to the farms of Mid-Nebraska Water Quality Demonstration Project cooperators and an informal briefing on that project at the University of Nebraska's South Central Research and Extension Center at Clay Center.

Symposium to take on water challenge

"The Drinking Water Challenge: Groundwater and Public Health" is the theme for the fall symposium of The Groundwater Foundation.

The symposium will take place Tuesday, Oct. 18, at the Downtown Ramada Hotel in Lincoln.

John Gaston, National Drinking Water Advisory Council, Oakland, Calif., will provide an overview of drinking water issues.

Dr. Joan Rose of the University of Southern Florida, Tampa Bay, Fla., will address the health consequences of unsafe drinking water, and Dr. Dennis Weisenburger of the University of Nebraska-Medical Center, Omaha, will speak about Nebraska's drinking water problems.

Other experts will discuss the status of federal drinking water policy and related issues.

For more information, contact The Groundwater Foundation at (402) 434-2740 or 1-800-858-4844.

Farmer to Farmer

Demonstration project encourages better practices

by Krista De Groot, UNL communications assistant

CLAY CENTER — Information from a 3.4 million-acre demonstration project in south-central Nebraska has shown farmers have reduced the amount of nitrogen they are applying by as much as an average of 29 pounds per acre in the last three years.

The Mid-Nebraska Water Quality Demonstration Project (MNWQDP) began in 1990. Using farmers as demonstrators, the project is designed to encourage farmers to voluntarily adopt management practices which reduce groundwater contamination from agricultural production. The project spans 15 Nebraska counties, and the Agricultural Stabilization and Conservation Service (ASCS) estimates there are approximately 12,000 farmers in the project area.

Thirty-four farmers are cooperating with the University of Nebraska, the Soil Conservation Service, the ASCS, Natural Resources Districts (NRDs) and local agribusiness to demonstrate Best Management Practices (BMPs).

Further information from the project's 1991 and 1994 surveys showed over half the farmers surveyed have attended nitrogen and water management tours and meetings since the project began. Survey results also showed increased deep soil sampling for nitrate credit and a threefold increase in the use of surge irrigation systems since the project began.

"Project staff from the various agencies have worked directly with farmers," said Andy Christiansen, UNL project coordinator. The project staff has helped farmers employ more efficiency irrigation management systems by using such tools and techniques as reuse pits, sprinkler irrigation, surge valves and irrigation scheduling on 93,672 acres, he said. At the demonstration sites, 13 farmers use reuse pits, and 11 use surge valves for improved irrigation water distribution.

Further, Christiansen said, demonstrators have shown they can achieve maximum economic yield when they apply nitrogen according to UNL recommendations.

Since 1990, nearly 100 field-length plot comparisons have shown yields on rows receiving reduced nitrogen application by crediting for deep soil nitrogen (2-4 feet deep), legumes, manure and irrigation water nitrate nearly equal yields of rows overfertilized by 50 pounds.

The decreased application directly affects the farmer's profits by reducing the input costs of nitrogen application.

Initially, the demonstration project was scheduled to last five years. But NRDs in the area, which include the Lower Republican, the Tri-Basin, the Upper Big Blue and the Little Blue, have expressed interest in continuing the project beyond 1994.

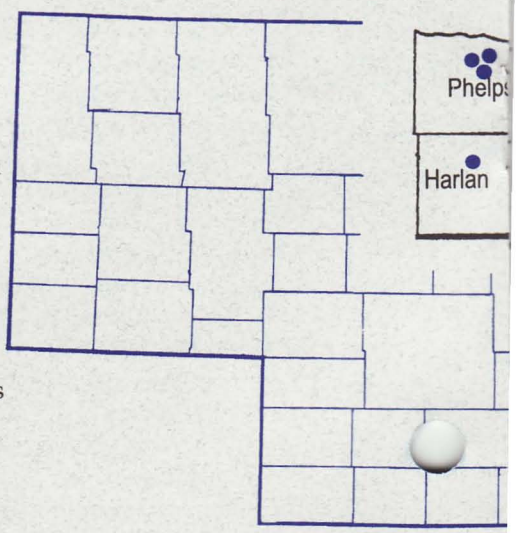
"We have benefited from the project," said Rick Anderbery of the Tri-Basin NRD. "It has been a good educational tool in our management area because farmers are more willing to accept the information from their peers. It could have been one of the keys to make our management area program a success."

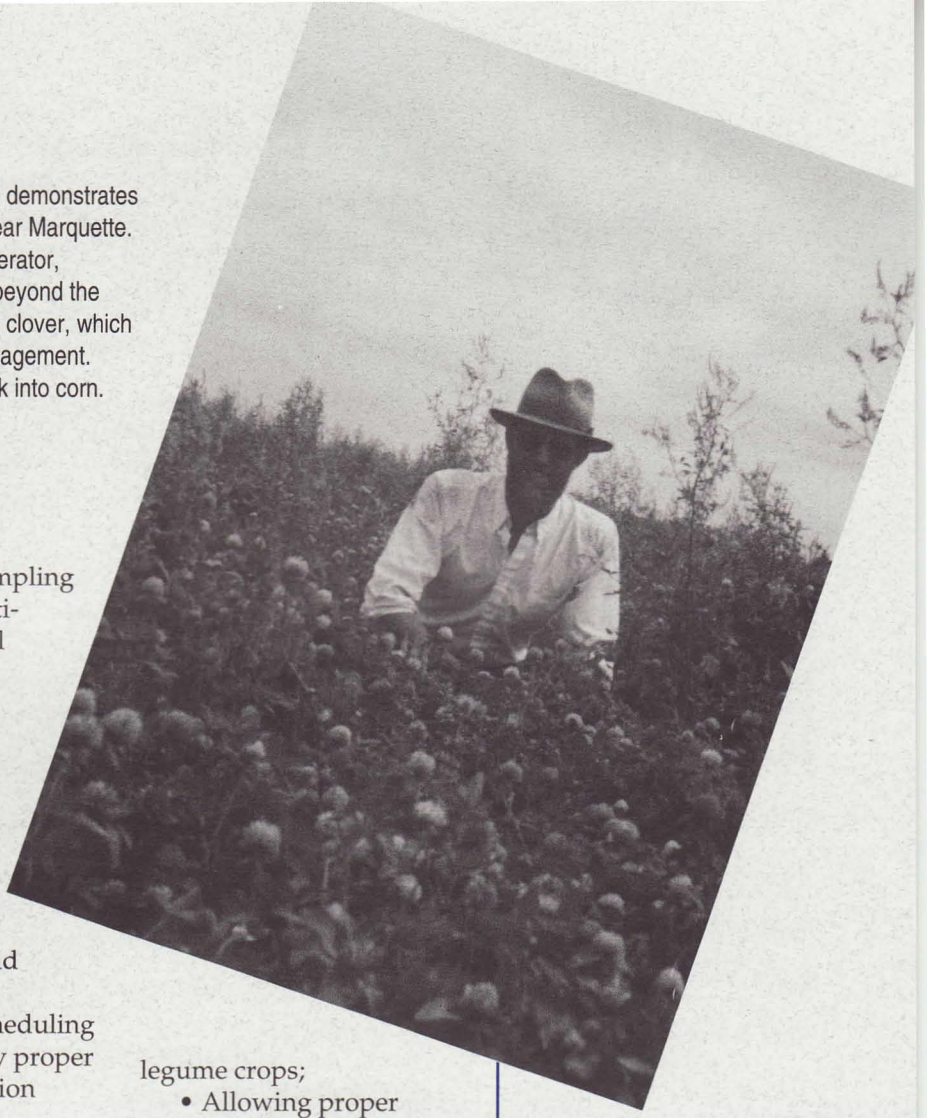
"We're going to continue to develop an educational program, hoping to avoid regulations," Anderbery said, emphasizing that it is Tri-Basin's hope the Mid-Nebraska project will continue for that reason.

Ron Wunibald, manager of the Lower Republican NRD, echoed Anderbery's sentiments.

"We definitely support demonstration projects to

Mid-Nebraska Demonstration Project





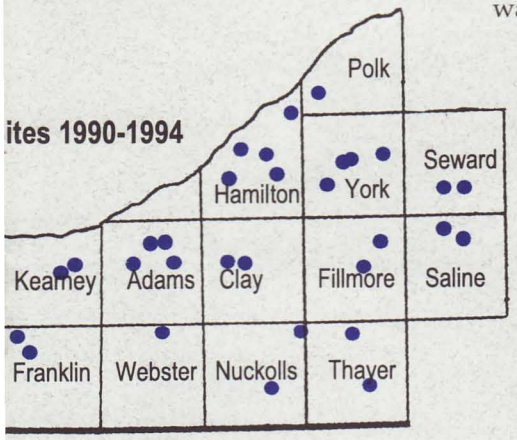
INNOVATIVE ROTATION — Mike Herman demonstrates Best Management Practices on his farm near Marquette. An organic farmer and Mid-Nebraska cooperator, Herman has an elaborate rotation system beyond the corn/soybean rotation. His system includes clover, which aids both nitrogen and integrated pest management. Eventually, Herman will rotate the field back into corn.

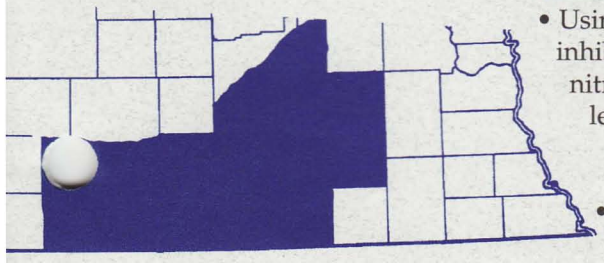
illustrate to farmers wise use of resources through BMPs," Wunibald said.

The more voluntary compliance the NRDs get, the fewer mandatory requirements they would have to enforce to accomplish their water quality goals, Wunibald said.

The Best Management Practices incorporated into the Mid-Nebraska project are based on economic principles that make them cost-effective for producers, Wunibald noted.

Practices to be demonstrated throughout the project are:

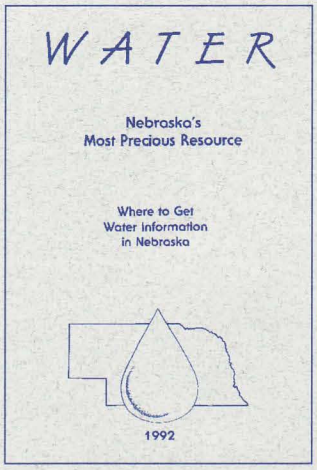




- Deep soil sampling and analysis to estimate available soil nitrogen;
- Irrigation water testing to estimate the irrigation water nitrogen contribution;
- Selecting realistic yield goals based on field history;
- Irrigation scheduling to efficiently apply proper amounts of irrigation water;
- Using irrigation flow meters to accurately measure applied irrigation water.
- Using an integrated pest management approach to minimize pesticide applications and to optimize efficiency when applied;
- Using irrigation surge valves to more uniformly apply water;
- Using delayed nitrogen application to more efficiently use fertilizer nitrogen;
- Using nitrification inhibitors to delay nitrification, restrict leaching and increase nitrogen use efficiency;
- Allowing proper nutrient credits for preceding legume crops;
- Allowing proper nutrient credits for manure, compost, sewage sludge and other waste;
- Applying manures and other waste products by methods to allow efficient use of nutrients contained in the products;
- Minimizing irrigation water runoff through the use of proper land leveling, reuse basins and surge valves;
- Using proper pesticide mixing and application procedures to prevent point-source contamination;
- Using crop rotations to reduce nitrogen fertilizer use and impact of insect and weed infestations;
- Using winter cover crops to retain residual soil nitrate between growing seasons.

"It has been a good educational tool in our management area because farmers are more willing to accept the information from their peers."

— Rick Anderbery, Tri-Basin NRD



S▾U▾R▾V▾E▾Y

Return this survey to participate in a drawing for a water publication of your choice.* Tear off entire page or photocopy page to mail survey.

The Water Center/Environmental Programs unit at the University of Nebraska-Lincoln published a directory of Water Resources in 1992. Now we're considering publishing an update. But first, we want your suggestions!

1) Do you have a copy of the 1992 Water Directory pictured above? _____ Yes _____ No

2) If yes to #1: Do you still use this directory? _____ Yes _____ No If yes: How often? _____

3) If yes to #1: Would you be interested in an update of the 1992 directory? _____ Yes _____ No

4) If no to #1: Would you find a directory of Nebraska water resources helpful? _____ Yes _____ No

5) Would you be willing to pay for a 1994 directory of Nebraska water resources? _____ Yes _____ No

6) How much? $_____

7) Would you prefer the information in the form of an electronic database? _____ Yes _____ No

8) What information would you be interested in ? (University of Nebraska resources; federal, state and local agencies; other Nebraska colleges; private groups; etc.) _____

_____

9) Would you be interested in a directory of University of Nebraska resources only? _____ Yes _____ No

10) Whom do you first contact when you need water-related information? _____

* Surveys must be returned to Water Center/Environmental Programs by Oct. 1, 1994 by mail to address below or by fax to (402) 472-3574. All surveys will be entered in the drawing. Three winners will each have a choice of "Flat Water: The Story of Nebraska and Its Water" or "The Platte River: An Atlas of the Big Bend Region" or "Occurrence of Pesticides and Nitrate in Nebraska's Ground Water."

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