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Water Center, The

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## Water Current, Volume 22, January 1990

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# Water Current

Water Center

University of Nebraska

January 1990

## Gold Accepts Position at Texas A&M University

Dr. Roger E. Gold, director of the Nebraska Water Center for nearly two years, has accepted a position at Texas A&M University. Beginning January 2, 1990 Gold will occupy an endowed chair in the department of urban entomology. This chair was financed by the commercial pest control industry that raised the funds with the funds matched by Texas A&M.

He will be involved in research and extension activities associated with the control of insects in and around structures. Specific emphasis will be on cockroaches, termites, fleas and killer bees.

"We will also be looking at alternatives to chemical control measures as part of an urban integrated pest management program," Gold said. "We're interested in researching the impact of pesticides used in urban environments on the environments."

He said that this includes the ground and surface water, air and soil contamination. "It's our intention to also look at the phenomenon of 'building sickness' when people report illness after a pesticide application."

Gold became director of the Water Center in June 1988. Since then, he said, the Water Center has attracted resources, personnel and support from diverse interests.

"The Water Center also has become an integral element in Nebraska's research initiative program," Gold said.

Research initiative funds have enabled the Water Center to provide

support for research, establishment of eight graduate assistantships and four new faculty positions, and development of the Water Sciences Laboratory.

"I feel very good about the support provided to the Water Center and its focus," Gold said. "The expectations are great, but so are the opportunities."

He said that the course is set and the momentum needs to be maintained and even increased to effectively address the challenges of water quality issues in Nebraska. Dale H. Vanderholm, associate dean for agricultural research at the University of Nebraska, will be interim director while a national search for the Water Center director is conducted.

Vanderholm said, "I'm pleased to have the opportunity to give interim leadership to the Water Center until a

*(continued on page 9)*

## Platte River Policy

"Why Nebraska Needs the Platte" is one of 14 topics of the annual Water Resources Seminar Series during the 1990 spring semester. Announcement of the series topics came from Roy Spalding, associate director of the University of Nebraska Water Center.

Spalding said, "This is an opportunity for students, faculty and interested persons to receive in-depth information about one of Nebraska's valuable resources." He said University, local and state specialists will be among the midwest experts presenting the series.

The series will be Wednesdays at 3:30 p.m., in Bessey Hall 117 on City Campus. Students may receive an hour's credit. The public is invited. Call (402) 472-3305 for more information.

The schedule includes:

Jan. 17: Introduction to course—Roy Spalding, course coordinator; Slide Presentation "The Platte River" by the Nebraska Game and Parks Commission;

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Ground  
Water



Groundwater

See page 3  
for  
Survey  
Results.



## CONGRESSWOMAN SMITH RECEIVES WATER STATESMAN OF THE YEAR AWARD

San Antonio, Texas—Rep. Virginia Smith (R.-Neb.) has called for a “new consensus” of environmental and development groups to guide the President and Congress in allocating decreasing federal dollars available for domestic water programs.

“We need neutral ground on which to negotiate solutions to our increasingly complex energy and water issues,” she said in remarks prepared for at the 58th annual convention of the National Water Resources Association.

Earlier, the association announced it has conferred its highest award, “Water Statesman of the Year,” upon Representative Smith in recognition of her 13 years of work on the House Appropriations Subcommittee on Energy and Water Development.

Severe budget constraints are forcing Congress to make devastating choices,” Representative Smith said. “Shall we provide assistance to the victims of Hurricane Hugo and the San Francisco earthquake? Or shall we go all out to protect water quality?

“Shall we build the Garrison Diversion Unit in North Dakota or the



**Congresswoman Virginia Smith**

### Risks Not Always Easy To Measure

We can take risks, or we can be taken by risks, Gregg Wright, director of the state Department of Health, told about 185 people at the fifth annual fall symposium of the Nebraska Groundwater Foundation in November.

Participants in small-group discussions verbally scuffled with the problem of setting a maximum contaminant level for Methyl Ethyl Awful, hypothetical contaminant found in a make-believe Nebraska river.

Wright, in his keynote address said, “Some risks can be measured and some risks are estimated.” He said that our perception of risk is sometimes “irrational.”

Wright explained that the concept

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so-called supercollider research facility in Texas? Shall we clean up the menacing nuclear waste mess or put up a space station?”

She said these options plus such other high priorities as fighting drug abuse and treating and preventing the spread of AIDS are among the difficult funding choices she and the rest of Congress will face next year.

The Nebraska member of the House

said Congress needs outside help to assist in setting priorities for funding the unmet needs of a growing, more sophisticated population.

“The choices are getting tougher every year; and no one—not Congress, not the water industry, not the environmental organizations, not the states—is providing the effective leadership desperately needed,” she said.

January 1990

Vol. 21 No. 3

### Water Center

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# ONE WORD OR TWO?

Those letters just keep coming in that were requested in the September issue on "Groundwater—One Word or Two?" So far, consensus is two words, or ground water, as the most popular usage.

Responses include:

**Jess C. Nielsen, attorney, Nielsen and Birch, North Platte, Nebraska,** "I think perhaps this confusion all started when, several years ago, we pointed out to the Director of Water Resources (Mike Jess's predecessor) that, in hearings before him, the words underground water and groundwater were being incorrectly used interchangeably.

"Groundwater is generally accepted as a term of art referring specifically only to water found underground in aquifers and potentially available to recovery for domestic, agricultural, and industrial or commercial purposes. Underground water is all other.

"If you consult Webster's Unabridged Dictionary, you will find groundwater recorded as one word.

"Unfortunately, in 1963, the Nebraska Legislature in typical fashion has loused up both the concept and spelling by enacting S46-635; and even though Richard Harnsberger and Norman W. Thorson in their masterwork on 'Nebraska Water Law and Administration,' page 12, try to preserve the proper spelling, groundwater, they must refer to the statute which, unfortunately, spells it, ground water. You will note also that the legislature gives the two words a broader definition; '... which occurs or moves, seeps, filters, or percolates through the ground under the surface of the land.'"

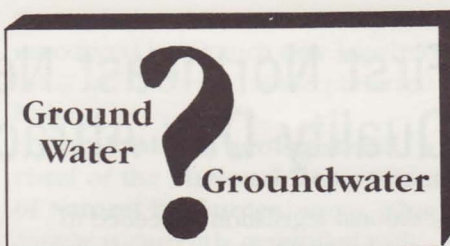
**Ann Bleed, Nebraska state hydrologist,** said: "In the Nebraska Department of Water Resources, ground water is written as two words. Besides, this is the way the state law reads.

"However, when I was with the Water Center, I wrote 'groundwater' which continued during my Conservation and Survey Division affiliation. And the Sandhills Atlas that I edited there reads one word—

groundwater."

**Ray Bentall,** "As an ex USGS employee, I'm strong for the two-word form. The best argument I can offer to substantiate my opinion is that ground water and surface water are comparable terms and no one in his (her) right mind uses surface water as one word and likewise doesn't write ground water as one word.

"Vince Dreeszen (former director of the Conservation and Survey Division) and I have had a running battle on this usage for many years now, and as a Conservation and Survey Division employee I unwillingly acceded to Vince's foible in this one matter! Even though, for Vince's edification, I made a long list of water journals using the two-word form, he refused to 'see the light.'"



**David Chambers, Ground Water Section, Water Quality Division, Nebraska Department of Environmental Control,** "DEC engaged in a similar debate for several years until five or six years ago when a decision was made to use the two-word version. This was mainly based on the term's common association with the term 'surface water' in correspondence and reports (which may in itself have been due to the increased recognition of the relationships between the two waters).

Chambers enclosed "Background to Justify Spelling 'Ground water as two words' from Ivan Johnson, Water and Soils Engineering Consultant of Arvada, Colorado, dated December, 1988.

Johnson wrote, "Why should ground water be one word, while surface water and other combinations of these words always are two words, i.e. ground crew, ground floor, ground squirrel, ground wave, or salt water,

rain water, brackish water, saline water? Ground water is two words, or more, in French, Russian, Spanish, Italian, and Portuguese (and possibly some other languages). He gave results of a study:

"Major thesauri and microthesauri list the two-word version of ground water: 'GEOREF Thesaurus and Guide to Indexing,' 1986, American Geological Institute, Alexandria, VA; 1977 National Technical Information Service and Environmental Protection Agency, Springfield, VA.

He said, "The latest published editions of dictionaries were checked in bookstores, and other editions were checked in libraries. One-word spelling was found in only one dictionary in bookstores, the 'Merriam-Webster Dictionary, Merriam-Webster, Inc. 477 Federal St., Springfield, MA. In a few cases, older editions of dictionaries found in libraries had a one-word spelling, whereas newer editions in bookstores had the two-word spelling.

"The following technical glossaries and dictionaries also use the two-word version of ground water; 'Interagency Glossary on Ground-Water Flow and Transport- (1985), Subcommittee on Ground Water of (Federal) Interagency Advisory Committee on Water Data, Washington, D.C.; 'Glossary in Ground-Water Management, ASCE Manual 40, 1986; International Dictionary of Metallurgy, Mineralogy, and Geology, 1968; A Dictionary of Mining, Mineral, and Related Terms, 1968, U. S. Dept. of the Interior, Bureau of Mines; Nomenclature for Hydraulics, 1962, ASCE Manual No. 43, ASCE, NY and others.

Technical journals and reports that use two words for ground water: "Ground Water" and "Ground Water Monitoring Review" Journals, report "Ground Water—Defined" many movies and books of the National Water Well Association, Johnson said probably the primary technical society in the world that specifically specializes in ground water; the international organization UNESCO a manual "Ground-Water Studies" and

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## One Word Or Two?

(continued from page 3)

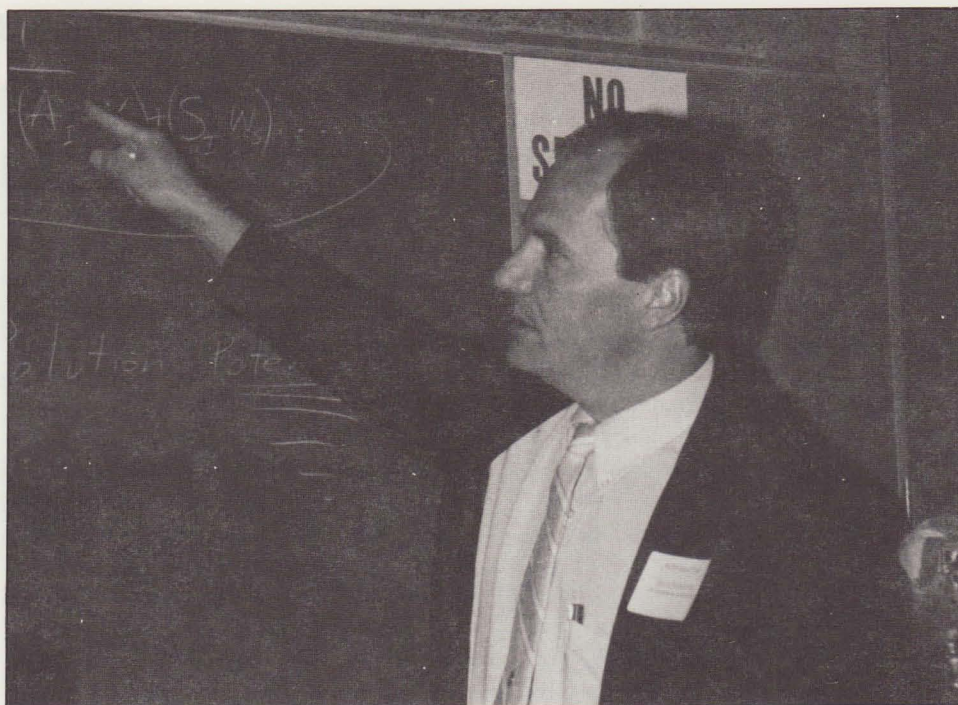
the report "Guidebook to Studies to Subsidence due to Ground-Water Withdrawal, 1985; EPA's Office of Ground Water Protection and EPA's reports such as 'Ground-Water Protection Strategy' (which likely was the prime mover in emphasizing ground-water problems that need solving in the future), their 1987 'Handbook—Ground Water' (EPA 1625-87/016), and 'RCRA Ground-Water Monitoring Technical Enforcement Guidance Document; 'Manual of Construction Practices,' 1975; the biweekly newsletter 'Ground-Water Monitor' of the Business Publishers, Inc., Silver Spring, MD, publishers of many water and environmental newsletters; 'GPO Style Manual which all Federal agencies are supposed to use, according to Johnson; publications produced during the 100-year history of the U. S. Geological Survey.

Johnson reported miscellaneous item supporting two-word spelling: "Responses to a questionnaire by the General Secretary of the American Institute of Hydrology showed that three-fourths of state geological surveys and water resources and mining agencies use the two-word version of ground water.

Johnson concluded that the U. S. Geological Survey uses the two-word version and that the editor of Webster's New International Dictionary (G & C. Merriam Co., Springfield, MA, 1961, 2664 pages) had agreed that they had made a mistake in listing the one-word version in that dictionary.

**Dean E. Eisenhower, University of Nebraska Department of Agricultural Engineering:** "My preference for writing ground water is two words. Do we write surface water in one word? No. In Nebraska, we have a significant problem with the legal system making a distinction between ground water and surface water even though we know that hydraulically the two cannot be separated. In an attempt to change the attitude of the public and scientists, I think we should encourage the use of two words for ground water."

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**Donn A. Rodekohr, Conservation and Survey Division, UNL, presenter at Water Quality Day.**

## First Northeast Nebraska Water Quality Day Attracts 250 Persons

Additional legislation is needed to better protect Nebraska's groundwater quality, area high school students and teachers learned at a Water Quality Day held on October 16 in Norfolk.

J. David Aiken, a University of Nebraska water law specialist, said it will take many years to slow down the rate of groundwater contamination after decades of over-using farm chemicals. Aiken was one of several experts who spoke at the event.

"Farmers apply more fertilizer than necessary to grow maximum yields," Aiken said. "This over-application of chemicals is polluting Nebraska's groundwater."

Because fertilizer has been inexpensive for the past 30 years, the Institute of Agriculture and Natural Resources specialist said, the idea that "more is better" has influenced crop producers' nitrogen fertilizer application rate.

"Even if farmers completely stopped using fertilizers, it wouldn't solve the problem," Aiken said, "because of the chemicals already in the soil moving into groundwater."

Holding that prevention is more effective than cleanup of pollution, Aiken said "Nebraska may better address contamination problems by assuming responsibility for administering the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) in the state, and by adopting a prevention philosophy."

Taxation of pesticides and fertilizers to fund groundwater protection programs, as is done by several surrounding states "is an alternative for Nebraska," Aiken said.

Phillip Issenberg, a scientist with the University of Nebraska Medical Center's Eppley Institute for Research in Cancer, presented data on health concerns associated with nitrate consumption in food. Issenberg said recently it has been shown that nitrate is synthesized in small quantities in the human body. However, even if fertilizer preparations were stopped, we would still consume significant quantities of nitrate in our food supply, primarily in green vegetables."

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## One Word Or Two?

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**DeLynn R. Hay, UNL Extension Specialist, Water Resources and Irrigation:** "My vote is two words for ground water. The use of two words allows compatible usage with 'surface water.' In addition, the Nebraska statutes use 'ground water.' "

**Laura E. Casari, associate professor, Agricultural Communications,** "I'd vote for the two-word spelling. Until usage dictionaries (most of the modern ones) decided to let 'groundwater' in just as they let in 'develope' as a second spelling for 'develop' — because, a purist would say, enough people did not know how to spell the word so that its frequency of use misspelled became statistically significant, and thus qualified it for entry into the dictionary, albeit as a second spelling . . .

"But your spelling seems so idiosyncratic that it would be easier for you to change it . . . as one of the 'water institutes or centers' than it would be for all who use the words 'ground water' to change to what the 'research centers' decided as editorial policy to use."

**Amy Quandt, information/education coordinator for the Lower Platte South Natural Resources District, Lincoln,** wrote: "When I'm writing for the NRD, it is two words. And when I write for the Nebraska Groundwater Foundation it's one. At first it was a little confusing, but now I find it really easy to 'switch gears.'"

**David Kromm, professor of geography at Kansas State University,** said, "Groundwater is one word; two sounds as if you are grinding up water."

**Michael B. E. Bograd, Bureau of Geology, Mississippi Department of Natural Resources,** wrote, "I am very interested in your preference poll about ground water as one word or two. I have been a geologist at the Mississippi Bureau of Geology for 18 years. A large part of my work involves editing our publications. I am a member of the Association of Earth Science Editors, though I have no idea if that group has a preferred usage.

"My preferred sources for style and usage are the U. S. Geological Survey and the Glossary of Geology published by the American Geological Institute. Both use ground water as two words, hyphenated when used as an adjective. That is the usage I prefer as well."

**W. Hall C. Maxwell, editor-in-chief of "WaterInternational," at the University of Illinois,** wrote, "There are numerous publications and conferences directed towards this topic. Roughly half of the titles refer to 'ground water,' the other half to 'groundwater.' I have asked colleagues whose special interest is in this field for a definitive answer on the question of which form is correct. To date no one has been able to give me one. Both forms are strongly advocated by different groups, and neither form has become predominant. I suspect that the same may be true in the use of 'waste water' or wastewater.' To add to the confusion there has recently been introduced here much new legislation using 'groundwater' as the preferred form.

**Don E. Miller, geologist and chief of the Missouri Department of Natural Resources,** wrote, "Our Agency is currently embroiled with other agencies within the Missouri Department of Natural Resources on the spelling of groundwater. We are even having problems with administrators within our own agency.

"All of the people within the Water Resources Program, however, feel that one word for groundwater is the only way to go. The reason we feel that it is best is that it sets the resource apart from several forms of surface water and draws the readers' attention to the fact that it is a definite entity to itself."

**Joe Gelt, public information officer with the Water Resources Research Center at the University of Arizona at Tucson,** said, "I am glad that others are looking into the controversy between the one-worders and two-worders. Been involved in it myself at one time."

Gelt enclosed an August, 1974, memo from Gerald Meyer, chief of the Ground Water Branch of the Water Resources Division in the Geological Survey of the U. S. Department of the Interior.

The memo read: "Ground water vs.

groundwater. The term ground water in its two-word form is ingrained in the hydrologic literature of this country. In recent years the one-word form, groundwater, has appeared increasingly in certain outside publications and the dual forms have caused some confusion."

**William G. Mattox, assistant chief of the Division of Water of the Ohio Department of Natural Resources,** wrote: "This division prefers two words. We ask why surface water should be spelled with two words and not ground water?"

"I refer you to the enclosed two-page outline by A. Ivan Johnson dated December 17, 1988 for a solid basis for ground water's two-word usage."

## RISK

(continued from page 2)

of risk is "slippery" in the case of a harmful event. For example, some risks, such as groundwater pollution are difficult to put into perspective.

"One of the reasons for this is because scientists communicate risk in statistical quantities, or parts per million or billion. The public has problems translating this into reality."

He explained that most people take voluntary risks: skiing, mothers who neglect to put children into seat belts in cars, and smoking cigarettes.

Mohamed Dahab, University of Nebraska department of civil engineering, said that communication of scientific and economic information is important for political and decision making.

Steve Seibel, managing editor of U.S. Water News, post-luncheon speaker, traced the history of his specialized newspaper through a mock television program that he narrated.

Other experts from Dow Chemical and American Cyanamid provided background for the groups.



# Who Will Get the Water?

*(Ann Bleed, State Hydrologist for Nebraska, at a Center for Great Plains Studies Seminar on November 1, 1989, described the Platte River as it was in 1850 and what it is today. She explained some of the social, political, and cultural forces that have led to changes on the Platte River. Finally, she discussed some of the factors that will change the Platte River in the future. The following is taken from this final part of Dr. Bleed's presentation.)*

In the late 1800's and early decades of the 1900's, water diversions and large dam projects created major changes in the flow regime and channel structure of the Platte River system. As a result, the agricultural economy grew but wildlife habitat along the Platte River changed dramatically. Since the building of Lake McConaughy in 1941, the rate of dam building and water diversion projects along the Platte River has been much slower. However, recent decades have seen some other types of changes that, in my opinion, will have a tremendous impact on the Platte River.

What were some of these changes? In 1969, the National Environmental Policy Act (NEPA) was passed. NEPA established the requirement that any project having federal involvement had to be assessed for its environmental impact. This assessment had to do a number of things. It had to describe the project and the impacts the project would have on the environment as well as the economic and social resources. It also had to describe alternatives to the project and the impacts of those alternatives. This assessment process was to be open for public scrutiny.

Many people do not understand that nothing in the NEPA says the proposing agency must choose the least environmentally damaging alternative. They can choose a very environmentally damaging alternative if it can be justified on economic or social grounds and if there are no

viable alternatives.

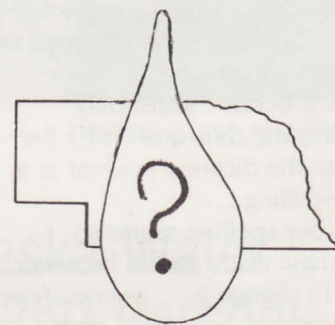
Another act which consolidates a series of acts that were passed in the late 60's and 70's is the Endangered Species Act. This law has a lot of teeth in it. Essentially, it allows the federal government to identify species whose existence is endangered or threatened and to designate their habitat as critical. The government may then stop any project that would harm an endangered species or its critical habitat if there is no alternative that would allow a project and still avoid jeopardy. An example: When a dam is built on a river in which salmon migrate, fish ladders could be required. This would allow the project to be built and still avoid jeopardy by allowing the fish population to migrate up the stream.

The Endangered Species Act has, and will have, a tremendous impact on the Platte River because there are endangered and threatened species on the Platte: the whooping crane, least tern, piping plover and bald eagle. The act has become a very powerful tool among environmental groups who are seeking to maintain habitat for these species.

Section 7 of this act in particular contains key provisions. Essentially, this section directs any government agency which is doing a project that requires an environmental impact statement to consult with the U.S. Fish and Wildlife Service to determine whether there will be jeopardy on the endangered species that might be in the area.

As described at the beginning of my talk, the appropriative right system in Nebraska was established in 1895. The South Platte compact between Nebraska and Colorado was 1929. The North Platte decree between Nebraska, Wyoming and the federal government was reached in 1945 and amended in 1953. The environmental laws have all come after the major water rights system in the west was in place. The North Platte decree doesn't even talk about instream flows for fish and wildlife. It strictly concerns the storage and/or diversion of flows for domestic

use, irrigation, industry and hydro power. The South Platte compact and other compacts all over the west do not consider fish and wildlife habitat and other environmental consequences. Thus, these recent environmental laws may turn the whole appropriative rights system and system of decrees and compacts on end. This will not happen, I think, without a tremendous amount of conflict and litigation. Here are a few examples of how these environmental laws can really complicate things for



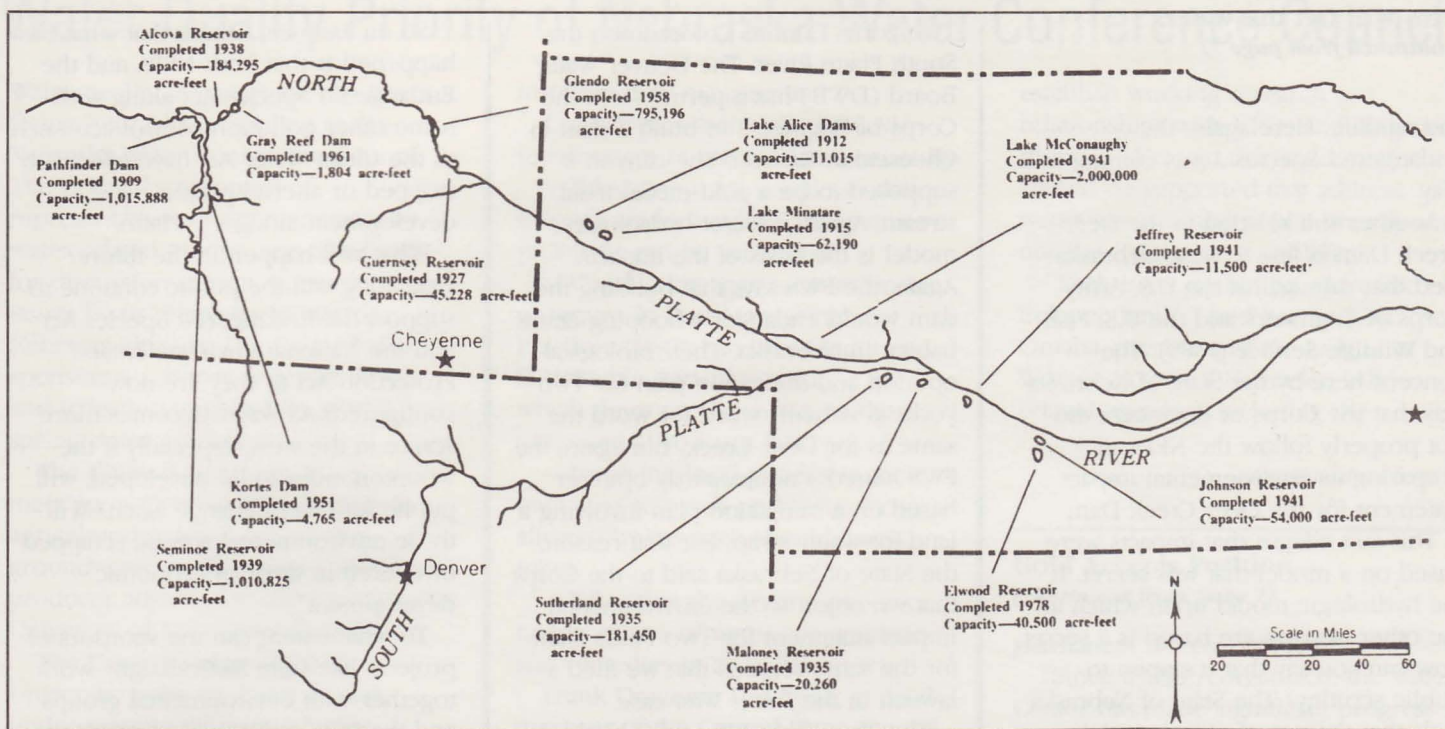
water project owners or developers:

The Grey Rocks Dam was built recently in Wyoming. Construction was allowed to proceed only after the resolution of lawsuits that challenged the project because it would jeopardize the endangered whooping crane and other wildlife in both Wyoming and Nebraska. Part of the settlement on that dam was to provide a certain amount of water for instream flows and seven and a half million dollars to form the Whooping Crane Habitat Trust in Nebraska. The trust is now one of the environmental groups involved in another major water development issue.

In 1941, the Central Nebraska Public Power and Irrigation District (CNPPID) and the Nebraska Public Power District (NPPD) got a permit from the federal government to construct and operate an irrigation and power project including Lake McConaughy. There was no requirement for the project operators to consider endangered species because none were officially designated. Now, the Federal Energy Regulatory Commission (FERC) must

*(continued on page 7)*





## Who Will Get the Water? (continued from page 6)

decide whether to grant them a new permit or tell them they can't operate. Because of Section 7 of the Endangered Species Act, FERC now has to consult with the U.S. Fish and Wildlife Service. Endangered species will have to be considered.

Operating a project like McConaughy is difficult. High flows come down in the spring and there should be enough room in the reservoir to prevent flooding. At the same time, there must be enough water in the reservoir to provide for irrigation later in the summer. Add the need to provide water for instream uses below McConaughy and you create a lot of problems for CNPPI and NPPD. Recently, there have been negotiations between NPPD and CNPPI and a number of environmental groups including the Whooping Crane Trust. At the meetings they are trying to work out some kind of compromise on how to operate Lake McConaughy in order to provide for instream flows for fish and wildlife and the endangered species, and at the same time allow the project to provide water for hydro power and for irrigation.

Another example is litigation involving the North Platte decree. This

is a decree that, after eleven years in the U.S. Supreme Court, was finalized in 1945 and amended in 1953. The decree establishes the rules that allocate the water of the North Platte River to the federal projects and the states of Colorado, Wyoming and Nebraska.

Back in the 70's when there was a large energy boom, Wyoming was also booming. Its cities were growing; the population of Casper mushroomed! Wyoming was also looking at potential water needs for industry. Of course that changed somewhat in the 80's, but nevertheless, Wyoming realized that it would need to try to develop some more sources of water. One of the places considered was Deer Creek, a small tributary to the North Platte River. Deer Creek provides water which flows into the North Platte and eventually some of it gets into the Inland Lakes — water storage reservoirs in Nebraska for irrigation, fish and wildlife, and recreational purposes.

The Inland Lakes are a part of the North Platte project which has a 1904 priority date and includes the Pathfinder and Guernsey Dams in Wyoming and irrigated land in both Wyoming and Nebraska. Water for the Inland Lakes is diverted from the North Platte River in Wyoming through the Interstate Canal. Concurrently with

proposing the Deer Creek project, Wyoming also was questioning the water right for the Inland Lakes. Wyoming claims there is no 1904 water right for the Inland Lakes. Nebraska contends that the lakes are part of the North Platte project, and for over 60 years have been operated as part of it, with a priority date of 1904. Wyoming proceeded to sue Nebraska in Federal District Court and the State of Nebraska sued Wyoming in the U.S. Supreme Court. Nebraska's suit reopens the North Platte decree.

Several other issues in addition to the Inland Lakes are also included in the Nebraska suit. One of them pertains to a part of the decree that says dams for ordinary domestic and municipal use can be built on tributaries. The permit application to dam Deer Creek, a tributary, mentions other uses such as industrial, irrigation, and recreation, in addition to municipal and domestic use. Nebraska is saying that Wyoming can't build a dam for these other uses without violating the decree. Another issue relates to some of the other proposed projects that Wyoming is looking at for other tributaries, such as the Laramie River. And finally, Nebraska has asked that the Supreme Court consider the flows below the Tri-State Dam that are needed for fish

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## Who Will Get the Water?

(continued from page 7)

and wildlife. Here again, the Endangered Species Act is coming into play.

Another suit relating to the Deer Creek Dam is *Jess v. West*. Nebraska filed that suit against the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service (FWS). The concern here by the State of Nebraska was that the Corps of Engineers did not properly follow the NEPA in preparing its environmental impact statement for the Deer Creek Dam.

This suit alleges that impacts were based on a model that was secret. If the hydrologic model upon which all the other impacts are based is a secret, how can you say that it's open to public scrutiny? The State of Nebraska feels that the use of secret models violates the NEPA requirements that the decision-making process be open to public scrutiny.

Nebraska also objects to the proposed mitigation scheme to avoid jeopardy to endangered species' critical habitat. The FWS said in their biological opinion on Deer Creek that by depleting Platte River flows, the Deer Creek project would jeopardize the continued existence of the whooping crane and their critical habitat. Then, the FWS turned around and said that Deer Creek still can be built if Wyoming will buy some land in Nebraska. No water releases were required. Nebraska claims that land is no substitute for water. Thus, the proposed FWS mitigation scheme is not a viable alternative that would in fact create a non-jeopardizing situation for whooping cranes.

Wyoming, however, did get their permit, which is why Nebraska brought suit. Wyoming has bought land in Nebraska. The FWS now will be asked to maintain the land, with tax dollars, for the whooping crane. Also, there is no guarantee that maintenance by FWS will, in fact, create viable habitat for the whooping crane. It's an untested process and unknown as to whether it will work or not. This, in Nebraska's opinion, is not an appropriate way of mitigating, or offsetting, the impact of dams.

Another example is the proposed

Two Forks Dam in Colorado on the South Platte River. The Denver Water Board (DWB) has a permit from the Corps of Engineers to build a dam in Cheeseman Canyon. The canyon is supposed to be a gold medal trout stream. Again, a secret hydrologic model is the basis of the impacts. Again, the FWS says that building the dam would endanger whooping crane habitat in Nebraska. Their biological opinion and mitigation plan for Two Forks is virtually word for word the same as for Deer Creek. But again, the FWS issued a nonjeopardy opinion based on a mitigation plan involving a land-for-water swap. For that reason, the State of Nebraska said to the Corps that we object to the environmental impact statement for Two Forks Dam for the same reasons that we filed a lawsuit in the *Jess v. West* case.

The Two Forks EIS said it couldn't be insured that water from as far away as the Rocky Mountains would get to Nebraska. Therefore, sources of water closer to the critical habitat area would be used to provide instream flows. Sources of water closer to critical habitat include Lake McConaughy. Such a source could be used to make up some of the water that Two Forks may be getting. That was not stated explicitly in the impact statement, but that is what Nebraska fears, especially in light of the FERC relicensing process. If McConaughy does have to release flows for fish and wildlife, there will be economic and recreation and environmental impacts as a result. Those impacts were not assessed in the Two Forks environmental impact statement. Nebraska feels those impacts should be assessed, if that's to be the source of replacement water for the project.

Fortunately for Nebraska, the Environmental Protection Agency (EPA) also had some problems with Two Forks Dam and William Reilly, the new head of the EPA, has started a veto process on the permit which is ongoing. Reilly will make a final decision on whether to veto the Two Forks project. In my opinion, it is likely that the veto will be sustained. In fact, no project has survived the veto process intact. They have either been killed outright or significantly modified.

So, in essence, I think that what has happened is that both NEPA and the Endangered Species Act along with some other pollution control acts such as the Clean Water Act have effectively stopped or altered project development along the Platte.

What will happen in the future? How long will the public continue to support the Endangered Species Act and the National Environmental Protection Act as they are now configured? As water becomes more scarce in the west, especially if the west continues to be developed, will public sentiment change again? Will those environmental acts be scrapped or altered in favor of economic development?

To what extent can the sponsors of projects like Lake McConaughy work together with environmental groups and the Fish and Wildlife Service to develop some kind of compromise scenario that will allow a certain amount of habitat for endangered and other species as well as a certain amount of economic use of the water out of stream? Hopefully, the FERC relicensing consultations and other joint efforts will start to pave the way for that kind of cooperation.

One should keep in mind, however, that even if there are no further projects built on the Platte River, the Platte will not necessarily stay the way it is now. Rivers change over time. In the recent past, the Platte has narrowed as a result of changes in the flow regime. Is the Platte now in equilibrium with its flow, or will it continue to change and degrade whooping crane habitat?

Could the salvation of endangered species habitat be the development of new projects that in turn will provide some kind of habitat protection and money in order to develop habitat? Birds and fish don't generate a lot of money to preserve their own habitat.

These are all unanswered questions. For now and for the future, we do know that environmental acts are going to drastically affect water development on the Platte and perhaps change the river significantly. These laws will, in part, answer the question of who will get the water.



# Water Quality Priority of Nebraska Water Conference Council

Water quality is one of the top issues facing Nebraska, according to the Nebraska Water Conference Council. The Council, composed of representatives of approximately 90 water-related groups, acts as a forum for discussion of vital statewide water issues by its members as well as Nebraska citizens. The Council also sponsors a summer water resources and irrigation tour and an annual spring water conference.

The Council agreed at its annual meeting in October that changes in agricultural practices to prevent groundwater contamination and other producer adjustments are a priority for University of Nebraska research.

The Council suggested that University water research include: understanding the groundwater system, multi-use of irrigation, wildlife, ag production, wetlands and public supplies, water marketing and

instream flow management.

Council members called for NU involvement in water-related issues by:

—Educating rural people so that through understanding, water quality problems can be remedied.

—Conducting aggressive extension programs in Best Management Practices (BMPs) and Low Input Sustainable Agriculture (LISA) for which there are incentives in the proposed 1990 Farm Bill.

—Involving local citizens in their own area research problems; those affected by research should have input.

—Educating the general public on needs, causes of water contamination and remedies in an unbiased way.

Frank Dragoun, Holdrege, general manager of the Central Platte Natural Resources District (NRD), and vice chair of the Council, said, "It's important for the University to

establish working research relationships with NRDs and irrigation districts." He said that water projects should be supported that address water needs of the public broadly and not just irrigation or wildlife.

"Each issue cannot be addressed independently," said Karren Kerr, Omaha, president of the League of Women Voters of Nebraska. "All related agencies, including the

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## Gold Accepts Position

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permanent director is found.

"Since it was reorganized, the Water Center has made significant progress under the leadership of Dr. Roger Gold. I hope we can continue the momentum.

"Prior to my shift to administration, I spent most of my professional career in water-related research, extension and teaching. I'm looking forward to returning to the water arena, even if temporarily, and to working with the many dedicated people so heavily involved in this area which is critical to the economics and quality of life in Nebraska."

Water Center search committee chairperson, Glenn Hoffman, head of Agricultural Engineering, reported following the first committee meeting: "The deadline for nomination or application letters was December 15 in the nation-wide search for a new director of the Water Center."

Irvin Omtvedt, vice chancellor of the Institute of Agriculture and Natural Resources, chose the 12 member Search Advisory Committee that represents faculties of various departments, agencies and industry, the Colleges of Arts and Sciences and Engineering and Technology, the University of Nebraska Medical Center, the faculty senate and IANR administration.

At the December 5 meeting, the Search Advisory Committee was charged with providing a list of recommended candidates to Dr. Omtvedt by March 15, 1990.

## Platte River Policy

*(continued from page 1)*

Jan. 24: Platte River Flows and Geomorphology—Garnett Williams, research hydrologist, USGS Water Resources Division, Denver, CO;

Jan. 31: Economic Impact of the Platte River—Ray Supalla, Department of Agricultural Economics, UNL;

Feb. 7: Platte River Wetlands—Bob Henszey, research associate, Water Center, University of Wyoming, Laramie, WY;

Feb. 14: Fisheries of the Platte River—Ed Peters, Department of Forestry, Fisheries, and Wildlife, UNL;

Feb. 21: Water Quality in the Platte River and its Tributaries—Roy Spalding;

Feb. 28: Cumulative Impacts of Bank Changes in the Platte River—Doug Latka, research assistant, Department of Animal Ecology, Iowa State University, Ames, IA;

March 7: Future Research Needs for the Platte River—Dave Bowman, Platte River coordinator, Fish and Wildlife Service, Grand Island, NE.

March 14: No class—Nebraska Water Conference.

March 21: Platte River Compacts and Decrees—Mike Jess, director, Nebraska Department of Water Resources, Lincoln.

March 28: No Class—Spring Break.

April 4: Agencies as Players—Jim Barr, coordinator of Agriculture and Natural Resources for Congressman Douglas K. Bereuter.

April 11: Perspective on Platte River Conflicts—J. David Aiken, Department of Agricultural Economics, UNL.

April 18: Issues on the Platte River—Jack Maddux, trustee representing Nebraska, Platte River Whooping Crane Trust, Wauneta, NE;

April 25: Why Nebraska Needs the Platte—Panel: John VanDerwalker, executive director, Platte Whooping Crane Trust; Dave Mazour, Federal Energy Regulation Commission Relicensing Coordinator; John Turnbull, manager, Big Blue NRD; Jerry Obrist, chief engineer, Lincoln Water Works.

May 2: Future Management Alternatives—Bob Kuzelka, assistant director, Water Center, UNL.



# Water Quality Outlook for the 90s Topic for Conference

Perspectives on the water quality outlook for the 1990s will be presented March 13 and 14 at the 19th annual Water Conference. The theme of the conference was announced by Les Sheffield, University of Nebraska farm management specialist and secretary of the Nebraska Water Conference Council.

Presenters will be from the University of Nebraska, the agricultural chemical industry, natural resources districts, environmentalists, medical researchers, federal and state agencies, and agricultural producers.

Conference participants will be able to examine the theme from three perspectives: water quality detection and analysis, ramifications and consequences of contamination, and management and policy options.

The conference will be held at the Cornhusker Hotel Convention Center

in Lincoln.

Sheffield said, "This conference has always attracted a state-wide forum to discuss current water issues since 1972 and this year continues that tradition."

The year's schedule of topics and speakers is sure to be pertinent in addressing Nebraska's water quality issues, he said.

Speakers will include John Campbell, deputy under secretary of the Department of Agriculture, formerly of North Platte. He will discuss the provisions and outlook for the 1990 Farm Bill. Tom Maddock, of Boyle Engineering Corp., Newport Beach, Calif., will talk about prospects for future water policies. William Reilly, director of the Environmental Agency, Washington, D.C. is an invited speaker.

Other speakers include representatives of the U.S. Geological

Service, Corps of Engineers, U.S. Department of Agriculture and the Bureau of Reclamation. They will give reports on water quality programs in their federal agencies.

"A highlight of this year's conference," Sheffield said, will be a report on the Burlington Northern Foundation Water Quality Project. The Burlington Northern Foundation provided a \$1,000,000 grant over five years to the University to conduct research on best management practices that would minimize ground water contamination potential under irrigated agriculture conditions.

For a detailed conference agenda and registration information call the Water Center, (402) 472-3305.

(See p. 12 for advance registration.)

## Water Quality Priority (continued from page 9)

University and other interest groups, must begin to look at the impact of water-related issues totally and take a broader view.

"We can't just focus on narrow concerns such as methods and technology to deal with water contamination problems, water marketing and changes in agriculture practices due to water quality and quantity concerns," she said.

Council concerns regarding Nebraska's water legislation include: the sale and economic uses of water—intrastate and interstate, interstate cooperation on water issues, funding for water management and management of instream flows.

J. David Aiken, NU water and agricultural law specialist, said, "Holdover" bills to be considered by the Unicameral during the 1990 session include several related to water quality."

Among those bills are:

—LB 161, which would authorize the Department of Agriculture to administer the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

program in Nebraska. This includes administering certification of pesticide applicators and establishing state restrictions on pesticide use.

"Nebraska is the only state in the U. S. that does not administer FIFRA. LB 161 would remedy this," Aiken said.

—LB 383, which would authorize the sale of water and the export of water. This bill would make several significant changes to Nebraska water law, including clarifying when groundwater may be used off-site, authorizing the sale of water rights and establishing environmental review criteria for water appropriations, transfers and sales.

—LB 364 would establish restrictive criteria for water exports.

The Council's 1990 spring conference will be March 13-14 at the Cornhusker Hotel Convention Center in Lincoln. Theme of the conference is "Water Quality Outlook for the 90s." The conference will explore these aspects of that topic: The status of detection and analysis of the state's water, ramifications and consequences of contamination, and management and policy options.

The Council is headquartered in the University of Nebraska Water Center.

## Water Quality Day (continued from page 4)

He said that the National Research Council reports the average American consumes 75 milligrams of nitrate per day—87 percent from vegetables and 2.6 percent from drinking water. But, Issenberg pointed out, persons who drink high-nitrate drinking water that contains 23 parts per million (ppm) nitrate-nitrogen consume a total of 233 milligrams of nitrate from all sources. Drinking water represents 68 percent of this total.

"The long-term effects of elevated levels of nitrate consumption on healthy adults is unknown," Issenberg said. "The levels of nitrate in some drinking water supplies in Nebraska is above the Environmental Protection Agency standard of 10 parts per million.

"Of greater concern, these levels are increasing. We should not wait until the levels become uncontrollable or cause significant health effects," Issenberg said.

Mary Spalding, a research chemist at IANR's Conservation and Survey Division, told the students and

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# Forum Addresses State Water Issues

Water that contains more than 30 parts per million of nitrate-nitrogen is a cause for health concerns, according to a report presented recently at the University of Nebraska's fourth annual Water Policy Forum.

Sidney Mirvish, a researcher at the University of Nebraska Medical Center Eppley Institute for Research in Cancer, said he can't predict the health effects of 30 parts per million nitrate-nitrogen. The Environmental Protection Agency sets 10 parts per million as the drinking water standard; however, water in some Nebraska

wells has higher nitrate levels.

Mirvish said researchers want to find out if water with a high nitrate content contributes to development of certain cancers suspected of being caused by N-nitroso compounds. These cancers include cancer of the stomach and esophagus, neither of which is usually common in the state.

However, Mirvish said lymphoma and leukemia are two cancers that are "rather common in Nebraska and could be caused by N-nitroso compounds."

His study measured the formation of

nitrosoproline, a nontoxic indicator of total nitroso compound formation, in people who consumed large amounts of nitrate in their drinking water. There was an increase in nitrosoproline formation among the study's participants, when the water contained more than 30 parts per million of nitrate-nitrogen, Mirvish said.

In contrast to humans, animals can suffer from acute toxicity from consuming water with 100 parts per million nitrate-nitrogen, said Norman Schneider, associate professor of veterinary science in the NU Institute of Agriculture and Natural Resources. He added that lower concentrates in water may be associated with long-term health effects in animals.

"There has been a very significant increase of high nitrates in forages due to drought that contributed to deaths of livestock," Schneider said. More than 564 requests were received in 1988 and 1989 by the Veterinary Diagnostic Center on the UNL East Campus for nitrate analysis in body fluids of animals suspected of having excessive nitrates.

"The present trend in toxicology evaluation is examination of nitrates in forage before use. Feed containing more than 6,000 ppm nitrate ion can be potentially hazardous to pregnant livestock ingesting it," Schneider reported.

"We've seen nitrate concentrations as high as 50,000 ppm in sudex and millet," he said. Schneider said that miscarriages in animals can be caused by high nitrate content in forage.

Shripat Kamble, extension specialist-pesticide impact assessment, discussed research that could determine the impact of tillage and crop residues on soil-applied corn rootworm insecticide loss during rainfall.

Kamble said "approximately 3.7 million pounds of insecticides (active ingredients) used for corn production in Nebraska are targeted toward corn rootworm control."

About 90 percent of these insecticides are applied at planting or

## Water Quality Day

*(continued from page 10)*

teachers attending this first Water Quality Day that the nitrate problem in the Central Platte Valley has gotten worse.

"Results from a 1984 survey show that since 1974 the extent of the areas underlain by groundwater with more than 10 ppm has increased and the average concentrations have also increased," she said. "Now there is high nitrate groundwater from Kearney to the Cornhusker Ordnance Plant and from Grand Island to Silver Creek."

In Holt County, where the center pivot and a profitable corn market in the 1960s changed the economic base from ranching to irrigated corn production, about 115,000 acres are underlain by groundwater with more than 10 ppm nitrate-nitrogen, Spalding said. The Central Platte Valley contains approximately 500,000 continuous acres underlain by high nitrate groundwater. The leaching of nitrate from commercial fertilizers is the cause of the contamination in both areas, Spalding said.

"We measure nitrate in groundwater in order to protect human health," Spalding said. She showed students methods to analyze water samples they brought from home.

Spalding said not all nonpoint nitrate contamination is from the leaching of commercial fertilizer. Using the Sidney area as an example, she said, "Nitrate concentrations in the

(Sidney) municipal wells have been increasing for the past 20 years and at present, three of the eight municipal wells have concentrations above 10 ppm nitrate-nitrogen."

Animal waste is the primary source of nitrate in the three-mile-long plume that extends from west of Sidney to the center of the city, Spalding said. These fields are fertilized with large amounts of manure from a nearby livestock feeding operation and also with commercial fertilizer, she said.

At the eastern end of the plume — in the urban area where there are many fertilized and irrigated lawns — there is a change in the relative contribution of the two sources, Spalding said. This suggests that nitrate leached from commercial fertilizer applied to lawns may be contributing nitrate to the groundwater.

Summing up the day, Bill Kranz, irrigation specialist at NREC and chair of the Water Quality Day, said, "This program provided an opportunity for about 220 high school science students from 15 schools in northeast Nebraska, along with science teachers, to interact with water scientists who research water quality problems."

Among the 20 teachers attending was Ed Brogie of Wayne, instructor at Laurel-Concord Public School. Brogie received the Presidential Award for excellence in Science and Mathematics Teaching. This National Science Foundation award is presented annually to 112 teachers around the U. S.

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**Forum Addresses State Water Issues**  
(continued from page 11)

cultivating before mid-June when heavy rainfall creates a high potential for insecticide runoff. This can cause contamination, Kamble said.

He said that about 36 million pounds of pesticides are used annually in Nebraska at a cost of \$189 million.

James D. Carr, UNL professor of chemistry, said that his measurements of atrazine in water samples will be used to assess questions of groundwater movement in the Platte River Valley.

The study of atrazine movement in the Lincoln water wellfield, monitored by wells in and near the riverbed, shows that "every time we have heavy rains in the growing season, the atrazine levels jump very high."

Over two dozen water scientists presented summaries of their research at the one-day forum sponsored by the University of Nebraska Water Center.

## ADVANCE REGISTRATION FORM

### 1990 NEBRASKA WATER CONFERENCE

March 13th & 14th/Cornhusker Convention Center/Lincoln

Please complete one form for each person. Copying forms okay.

Mail to Water Center, 103 NRH, Lincoln, NE 68583-0844

<u>Option Number</u>	<u>Includes</u>	<u>Price/ Person</u>
1	Registration, 2 Lunches, 1 Banquet & 1 Breakfast	\$ 75.00
2	Registration for 13th, 1 Lunch & 1 Banquet	\$ 50.00
3	Registration for 14th, 1 Breakfast & 1 Lunch	\$ 33.00
4	13th & 14th Registration only with no meals	\$ 35.00
5	13th Registration only with no meals	\$ 25.00
6	14th Registration only with no meals	\$ 16.50
7	13th Lunch	\$ 9.00
8	13th Banquet	\$ 16.50
9	14th Breakfast	\$ 6.50
10	14th Lunch	\$ 10.00

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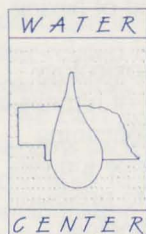
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