Groundwater: a limited resource

by Rex Henderson

In the 19th century Nebraska was the beginning of what was called the Great American Desert. Even today, after an agricultural revolution has transformed the state, the vista of the sun-parched Nebraska Sandhills in mid-August supports that view.

But beneath the surface, Nebraska sits on one of the worlds largest underground water reservoirs with 1.6 billion acre-feet, enough to cover the state to a depth of 80 feet, the supply seems inexhaustible.

But according to Dr. Loyd Fischer, a University of Nebraska-Lincoln professor of agricultural economics, the appearance of an inexhaustible water supply is [illegible]

The real test, Fischer said, is "how much is economically available...in aquifers where you can install a well and recover at a cost that will pay for itself."

Of more than 49 million acres within Nebraska borders, about 20 million are irrigable, according to Dr. Fischer. But most of the water lies below the Sandhills--non-arable land even with today's most advanced farming techniques.

Until the passage of the Nebraska Groundwater Management Act in May 1975, Nebraska law treated groundwater (the legal term for underground water) as if it were unlimited.

The act provides for the creation of Groundwater Control Areas with the power to limit irrigation well drilling or allocate water between competing users.

It is the first attempt in the state to effectively manage groundwater development.

Chase County, a rural county in southwest Nebraska, is a prime example of the discrepancy between irrigable land and water supply: there is more land to irrigate than there is water to irrigate it with.

Until 1967 Chase County looked much like a desert. It was all wheatland and pasture.

But beginning in that year the local farmers began tapping the reservoir of water beneath it. Ten years later there are about 680 center-pivot irrigation systems irrigating about 82,000 acres of corn.

Irrigation development was an economic boon for the area. The farmers profited, Haggard Drilling, Inc., the local well drilling company, profited, and equipment retailers profited.

But in 1970 the water table in Chase County began to drop as much as two feet a year in some areas. Irrigators were pumping water out faster than the underground reservoir was recharging.

A few irrigation wells began sucking air instead of water in August, the most critical time in the corn growing season.

In 1976 the Upper Republican Natural Resources District, comprised of Chase, Dundy and Perkins Counties applied to the Department of Water Resources to become Nebraska's first Groundwater Conservation area.

Sometime this summer the Department of Water Resources, which must approve the Upper Republican NRD's application, is expected to announce its decision.

According to Micheal Jess, the department's deputy director, the Department of Water Resources has "tentatively decided that there is justification in most of the Upper Republican NRD to establish a Groundwater Control Area."

It will be the first time in the state's history that groundwater has been regulated by any governmental unit.

There is a possible flaw in the Groundwater Management Act. No one knows if it is constitutional.

Dr. Richard Harnsberger, UNL law professor, points that while the Nebraska constitution dedicates all surface water "to the people of the state for beneficial purpose," the constitution is silent on groundwater.

"The department (of Water Resources) assumes someone will want to challenge the constitutionality" of groundwater management, Jess said.

At least one farmer from the Upper Republican NRD has threatened to sue regardless of what decision the Department of Water Resources makes, Jess said.

"The gut issue," Dr. Harnsberger said, "is that a resource that heavily affects the public interest is being regulated by a private legal system," where the use of groundwater often depends on the outcome of civil suits between property owners instead of a system of laws.

The Groundwater Management Act should change that.

District 44 State Senator Jack Mills, who represents an area encompassing the Upper Republican NRD, said he believes that most of the people in the area support groundwater conservation.

Should the courts strike down the current law, Mills said he would introduce new legislation.

Lew Reese, a Dundy County Farmer-rancher, summed up the case of those who oppose groundwater management.

"I would like to make this statement," Reese said at a public public hearing on the Upper Republican Groundwater Conservation Area last February. "The water below our ranch is ours."

UNL Prof. Fischer, a long-time advocate of groundwater management, said that public ownership is in the interest of the farmers.

"Unless you give up the right to irrigate whenever you want to, you can't be sure water will be there when you need it," he said.

In 25 years Chase County may not have much groundwater left.

In 1975 the U.S. Geological Survey produced a computer model of changes in groundwater levels in Chase County. The model showed that unless exploitation of groundwater is limited, the water table could drop as much as 150 feet by the year 2000 in some areas.

Chase County could also become the focus of another legal battle, putting the rights of surface water users against the rights of groundwater irrigators.

Dr. Harnsberger said that when Nebraska water law was written the law-makers were not aware of the connection between the two.

That groundwater and surface water are connected has become abundently clear in the Frenchman Creek valley in Southern Chase County.

The inflow of water to Ender's Reservoir, a surface water project on Frenchman Creek irrigating 21,000 acres, has decreased 19 per cent since groundwater development began 10 years ago.

The USGS computer model predicts that inflow into the reservoir will be 10 per cent of today's in 25 years.

Already the water available to the irrigators depending on Enders Reservoir has been reduced by half.

One possible solution, according to David Aiken, a UNL water law specialist, is the "first in time, first in right" principle applied in Colorado.

Groundwater irrigators would be required to assure the surface water irrigators an adequate water supply under that principle, he said.

Art by Martin Almanza

wa·ter (wô′tər, wot′ər) *n.* **1.** A limpid, tasteless, odorless liquid compound of hydrogen and oxygen, H_2O, in the proportion by weight of approximately 2 parts of hydrogen to 16 of oxygen. When pure, water has its maximum density at 4° C. or 39° F.; at normal atmospheric pressure it freezes at 0° C. or 32° F., and boils at 100° C. or 212° F.

2 The Beaver