

Groundwater

itself. Enough time, however, likely means years or even decades, Hutton said.

Few water experts are willing even to consider mechanically cleaning nitrates out of groundwater.

Lock said that in a few cases of point-source pollution by hazardous wastes, the responsible party has been required to pump up the groundwater, purify it and pump it back into the ground — a very expensive task. Hutton said the cost to clean nitrates out of an aquifer would be extreme.

Homemade solutions such as boiling water can further increase the concentration of nitrates, Jacobs said. Many people think boiling will clean their water, she said, but nitrates do not evaporate in steam.

On a small scale, some systems can clean enough water for a household's drinking water needs. A federal study found that the systems are anywhere from 80 to 98 percent effective. However, they must be carefully maintained to clean properly, Hutton said.

These systems only work on small amounts of water. Hutton said he is not sure there is any way to clean large quantities of water — enough for a town, for example — that would be economically feasible.

Prevention is the answer that farm organizations and environmentalists endorse. Most also agree that farming methods must change. The differences lie in the question of what strategies should be adopted and who will control them.

Glen Huebert has changed the way he farms. He has started a five-year crop rotation cycle. He starts the cycle with crops that add nitrogen to the soil, and alternates with crops that use nitrogen.

"Agriculture has got to start facing up to the problem instead of acting like a self-interest group willing to jeopardize public health," Strange said.

Huebert did use some nitrogen fertilizer this year, up to 100 pounds an acre on some fields, but generally less. His neighbors rarely use less than 200 pounds of fertilizer an acre, Huebert said. By the time he starts the second rotation cycle, he expects he won't need to use fertilizer at all.

Most Nebraska farmers may not be ready to change methods as drastically as Huebert, but Marty Strange, co-director of the Center for Rural Affairs is convinced that farmers will have to do something.

"Agriculture has got to start facing up to the problem instead of acting like a self-interest group willing to jeopardize public health," Strange said.

In February the DEC proposed a groundwater management strategy. The strategy deals with nitrate pollution as well as other types of pollution. A bill or bills to put the strategy in effect are expected to be introduced in the next legislative session, Hutton said.

The DEC strategy would establish "Special Ground Water Protection Areas," Rowan said. Special protection areas would be created in regions where the groundwater is vulnerable to pollution, even if the groundwater is not yet polluted. Local government bodies and the DEC would work together in dealing with pollution sources and preventing further contamination of the groundwater.

In areas where nitrate pollution is possible, Best Management Practices would be established. Looking at the physical conditions of the area, good management techniques for using fertilizers would be designed.

A model of good management practices was demonstrated in Hall County in the early 1980s, Hutton said. Rather than supplying all of a crop's needs from applied fertilizer, the researchers used fertilizer only to add to the amount of nitrogen already available in the soil and in irrigation water. Also fertilizer was applied only when the plants could best use it.

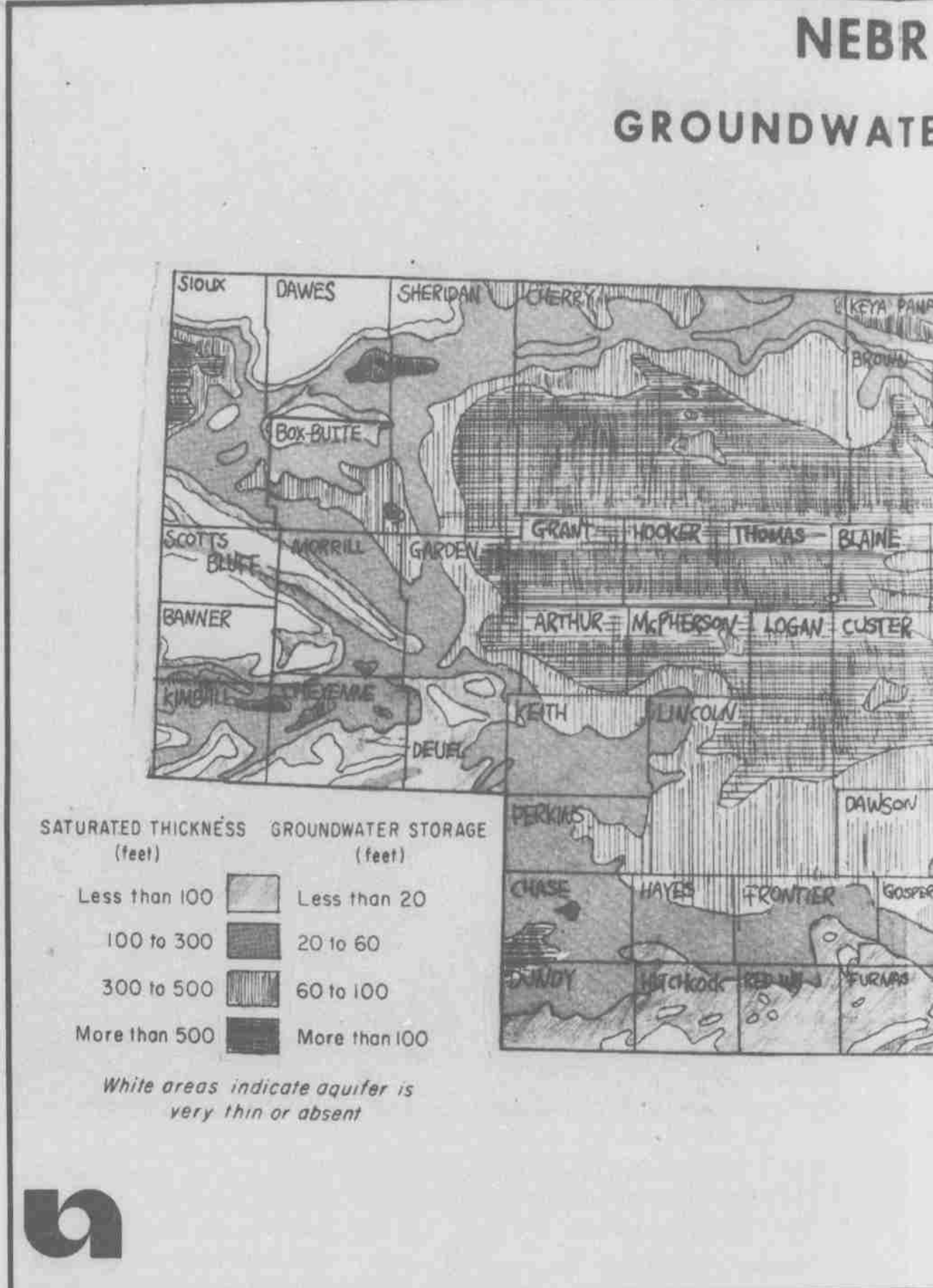
The system used in Hall County was very effective, Hutton said. While four years of the new management techniques did not stop the increase of nitrates in the groundwater, the rate of increase slowed. Lock noted that four years of good management is not long enough to actually reverse built-up contamination.

The fertilizer management practices used in the Hall County study are costly. Laboratory tests are required to discover the levels of nitrates in soil and irrigation water. Several, smaller applications of fertilizer cost more than one large application.

During the study, farmers were paid to participate. Without similar financial support, Hutton said, there would be little incentive for other farmers to incur the additional costs of best-management practices.

To deal specifically with nitrate contamination, the DEC strategy would also:

- Study the long term health effects of nitrate in groundwater.
- Establish regional groundwater monitoring programs.



- Review the state certification program for soil testing laboratories.
- Require certification for people who apply fertilizers.
- Develop regulations for fertilizer chemigation.

A special fee on fertilizers sold in the state is proposed to finance the nitrate regulation program. Hutton said the fees would be charged to fertilizer manufacturers and wholesalers, not landowners.

"Nebraska is ahead of the federal government in this case," Hutton said. "We can't sit and wait for the federal government to allocate enough money for the program."

One of the most controversial parts of the DEC's strategy is the state agency's role in relation to Nebraska's 24 Natural Resources Districts.

Presently, the NRDs have authority to control the amount of groundwater used in their districts, if the groundwater levels are declining. Under the Groundwater Management and Protection Act of 1975, the NRDs can also take steps to protect the quality of groundwater.

If an area is threatened with nitrate contamination, the local NRD, with the approval of the state Department of Water Resources, can establish a

control area, Kissel said. The NRD can limit nitrate leaching, for example, by regulating the amount and timing of irrigation. But it can not regulate fertilizer use itself.

No NRDs have attempted to create a control area for water quality since receiving the authority to do so, Kissel said.

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Some people criticize the NRDS for being too slow in protecting groundwater, Kissel said. But the NRDs tend to be caught between the pro-development people and the environmentalists, he said, and the slower pace is needed to get both sides to agree with the policies.

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Katherine Hare, executive director of the