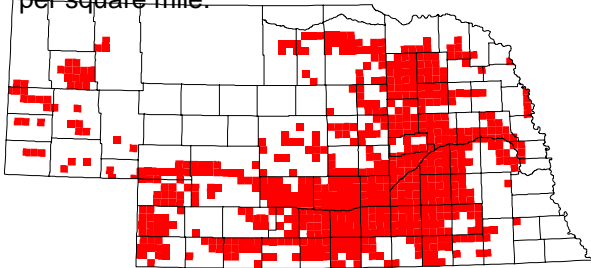


Nebraska Ground Water Conditions

Ground Water Importance: Nebraska receives about 80 percent of its public drinking water and nearly 100% of its private water supply from ground water sources. Agriculture (the largest business) is dependent on this resource as well. Nebraska is the third largest user of ground water in the nation, behind California and Texas. Nebraska has approximately 84,000 registered irrigation wells and an additional ~16,000 private or community drinking water wells (see Map 1). These wells draw about 2.5 trillion gallons of water per year

Map 1. Areas with greater than one registered well per square mile.



Where Is It? Nebraska overlies the northern part of the High Plains aquifer. Ground water can be found from 1 to 500 feet in depth. While ground water is usually abundant, the southeast, northeast and northwest corners have difficulty providing adequate yields.

How Good is the Water? Good quality ground water is available for most areas of the state; however, in some areas, nitrates and other agricultural contaminants have impacted ground water sources (see Map 2). Point sources of contamination have impacted localized areas, from sources including underground injection (UIC) wells, leaking underground tanks, livestock lagoons, landfills, improperly constructed wells, hazardous waste, grain bin fumigants, munitions sites, and septic systems. According to a Center for Disease Control (CDC) study (1998), one third of private drinking water wells surveyed in Nebraska have fecal coliform or other water quality problems. However, the majority of these problems can likely be attributed to well construction or location rather than widespread ground water contamination. Currently 15 of the state's 613 (2.5%) Community Public Water Supply Systems have exceeded drinking water quality standards for nitrate (Maximum Contaminant Level

(MCL) of 10 ppm). Ground water is the sole source of drinking water for 595 (97%) of these systems.

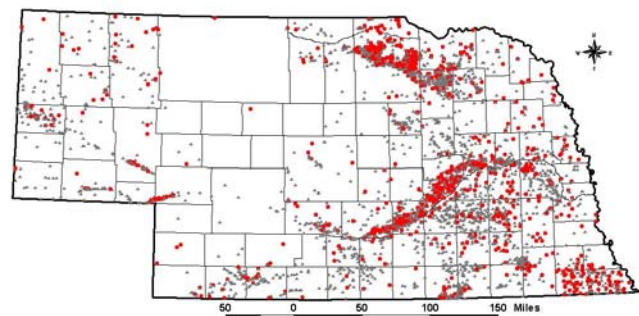
The new federal arsenic MCL of 10 ppb could have a big impact on Nebraska's public water supply systems. It is estimated that approximately 10% of the community public water supply systems may have to treat their drinking water to meet the new limit, because of high natural concentrations.

The state's 23 Natural Resources Districts (NRDs) and state and federal agencies routinely sample wells to determine water quality (see Map 2). An effort is underway to standardize sampling procedures and locations. All data are submitted to a database "clearinghouse" as part of a cooperative effort, where data are quality assessed and eventually stored for public access on a state website (www.dnr.state.ne.us).

Costs of Contamination: Nebraska's dependence on ground water for the vast majority of the state's 1.8 million population means that the cost of contamination is a major concern. Communities have been forced to abandon wells and/or construct expensive treatment systems. These costs can have a significant financial impact on communities.

Many of the private domestic wells are not properly sited or constructed, or have deteriorated since they were built. Additionally, nonpoint source contamination (usually evidenced by elevated nitrate levels) from agricultural practices impact large areas of the state, affecting both private and public drinking water wells. Both point and nonpoint source contamination cause increased costs to the public, in the form of treatment, new wells, or long-term management programs.

Map 2. Nitrate-N reported in Quality Assessed Agrichemical Contaminant Database (www.dnr.state.ne.us), 1974 – 2001.



- NO₃-N 7.5 – 20 ppm
- ▲ NO₃-N > 20 ppm

Efforts to Protect Ground Water: Despite the numerous problems Nebraska is facing with respect to ground water quality, the state is conducting many

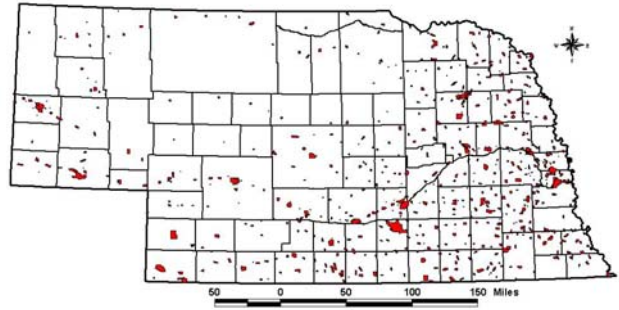
proactive efforts to meet this challenge. The 23 Natural Resources Districts have authority over nonpoint source ground water contamination and ground water supply. Eighteen of the 23 NRDs have implemented Ground Water Management Areas (GWMA) over their entire districts (see Map 3). These GWMA are formed to address ground water quality and quantity problems. Regulations used in GWMA include required education programs for farm operators, reporting of fertilizer and irrigation water inputs, soil and water testing, water use restrictions, and fertilizer application timing restrictions. Additionally, some NRDs have imposed well-drilling moratoria for new high capacity wells. Well moratoria are being implemented due to water level declines, pressure from interstate compact agreements, and drought impacts. These programs are long-term solutions to ground water quality and quantity problems, and the NRDs are only now starting to see some successes. Resources to implement these programs have decreased in recent years due to property tax lids and reductions in state funding.

Nebraska has established Wellhead Protection (WHP) and Source Water Protection programs to assist communities in protecting and improving their water supply (see Map 4). Several NRDs have secured Clean Water Act Section 319 grants to hire staff to help towns develop and implement WHP plans. The Department of Environmental Quality, Nebraska Rural Water Association, the University of Nebraska Cooperative Extension, and the Groundwater Foundation are partners in WHP, and quarterly meetings are held across the state to discuss and implement WHP efforts and needs.

What Else is Needed? Several state agencies have authority or state delegation to implement

programs that are protective of ground water quality

Map 4. Designated Wellhead Protection Areas.



and quantity. Nebraska faces many challenges in protecting this valuable, unique resource. Some of the most important current needs include:

- Assistance for correction or cleanup of identified contamination sources.
- Additional funds for ground water quality and ground water-surface water interaction studies.
- Funding for communities to implement local wellhead protection programs.
- Assistance for private well owners to improve or better protect their drinking water supplies.
- Increased ground water education throughout the state.

Costs associated with these needs are difficult to estimate. However, it is clear additional resources are necessary. Recent reductions in state funding mean that all ground water protection efforts in Nebraska must continually be re-evaluated and prioritized to ensure preservation of this important resource.

Map 3. Natural Resources Districts

