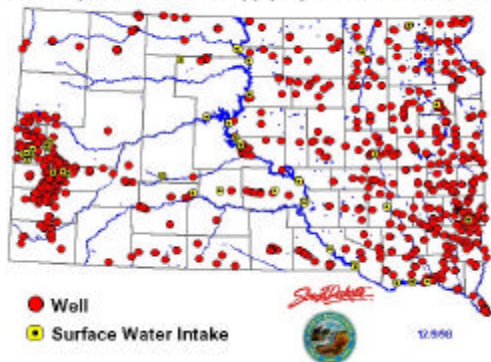


SOUTH DAKOTA GROUND WATER CONDITIONS

Importance of Ground Water: South Dakotans are dependent on ground water. Safe and adequate water supplies are vital for health and necessary for local and regional economic development within South Dakota. In 1995, 41 percent of the 460 million gallons of water used everyday in South Dakota was ground water. The ground water is used for domestic, commercial, livestock watering, irrigation, mining, and industrial purposes. The two most significant ground water uses are for irrigation and domestic purposes, with irrigation being the largest use. In 1995, ground water supplied 32 percent of the 269 million gallons of water used for irrigation per day. Eighty-three percent of the state's public water supplies rely on ground water. Virtually all residences and businesses not served by a public water supply system are dependent on ground water for domestic use.

Location of All Wells and Surface Water Intakes
Used by Public Water Supply Systems in South Dakota

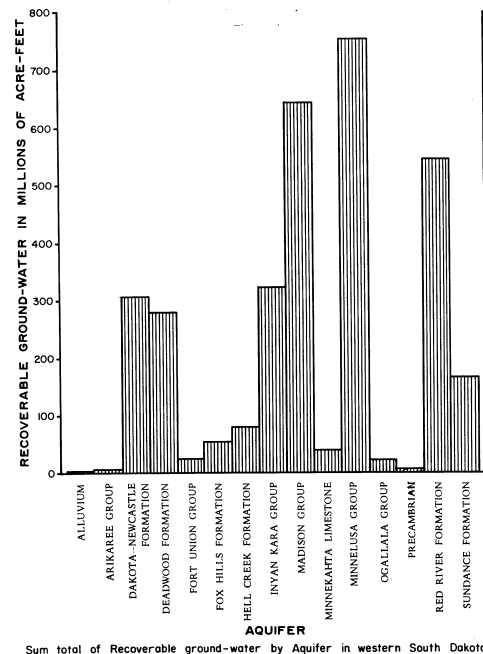


Approximately 78 percent of South Dakotans rely on ground water as the source of their domestic water supply, both private and public.

Ground water also provides the base flow to streams in many areas of the state and is essential to watershed ecology.

Availability and Use: For domestic purposes, the largest amounts of ground water are withdrawn from the Madison and Minnelusa aquifers in the Black Hills in western South Dakota and from the shallow Big Sioux aquifer in eastern South Dakota. For irrigation purposes, however, the largest amounts of ground water are withdrawn from the Ogallala

aquifer, located in the south-central portion of the state. The storage capacity of the Ogallala aquifer is relatively small, compared to the Madison and Minnelusa aquifers. However, use of the Madison and Minnelusa aquifers outside of the Black Hills region is generally limited due to economic and water quality considerations related to the depth of these aquifers.



Sum total of Recoverable ground-water by Aquifer in western South Dakota.

How good is the water? South Dakota is fortunate to have relatively large quantities of high-quality ground water. Laboratory analysis of water samples collected from South Dakota's statewide ground water quality monitoring network indicate that the overall quality of the shallow ground water is good. However, water quality degradation or contamination results from point and nonpoint sources of pollution in some localized areas. Deeper aquifers generally have poorer water quality in terms of dissolved solids content than shallow aquifers, but are also generally less susceptible to contamination. In some agricultural areas, the quality of ground water in the underlying shallow aquifers has been degraded by the routine application of agricultural chemicals. In those areas, data collected by public water suppliers in South Dakota and from the

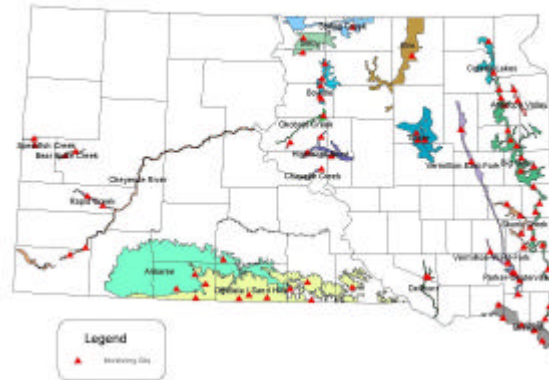
statewide ground water quality monitoring network indicate that pesticide contamination is generally not a problem but nitrates can be present at concentrations greater than drinking water standards. However, in certain areas, elevated nitrate concentrations in the ground water have been determined to be naturally occurring.

Costs of Contamination: A comprehensive monetary summary of the costs of contamination in South Dakota is not available. Monetary costs of contamination, however, are in the range of millions of dollars when a public water supplier must abandon and replace a wellfield. Several individual communities and rural water systems in South Dakota have abandoned and/or replaced a wellfield over the past 20 years. From 1988 through 1998, over 60 million dollars were spent in South Dakota to assess and clean up petroleum spills alone, many of which have impacted shallow ground water.

Major Ground Water Initiatives: South Dakota's ground water protection goal is attained through implementation of pollution prevention measures, correction of existing ground water pollution problems, and the close control of limited degradation where it is determined to be socially and economically necessary. The South Dakota Department of Environment and Natural Resources has made considerable progress in ground water protection through the establishment and enforcement of ground water quality standards, regulatory oversight of potential pollution sources, and the development, promotion, and implementation of both Wellhead Protection and Source Water Assessment and Protection programs. South Dakota's Wellhead Protection Program utilizes both regulatory and non-regulatory measures to protect ground water quality. Ongoing efforts that contribute to the protection of ground water include the statewide

ground water quality monitoring network and ground water resource assessments, which include aquifer studies and aquifer mapping.

Statewide Ground Water Monitoring Network



Other Ground Water Challenges: There is still a significant need to develop and implement pollution prevention programs locally, especially in areas where ground water resources are considered susceptible to contamination. In addition to the on-going efforts, the needs for ground water protection in South Dakota include the following:

- ◆ Expanded assistance to small community water systems to develop local ground water protection programs which may include ordinances and other pollution prevention measures;
- ◆ Expansion of conservation easement programs;
- ◆ Expansion of education and outreach programs to children, industry, and agriculture; and
- ◆ For the statewide ground water quality monitoring network, expansion of the suite of analyses to include more testing for pesticide metabolites.