THE U.S. GEOLOGICAL SURVEY'S NATIONAL WATER-QUALITY ASSESSMENT PROGRAM— HIGH PLAINS REGIONAL GROUND WATER STUDY

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ABSTRACT

Knowledge of the quality of the Nation's streams and aquifers is important because of the implications to human and aquatic health and because of the significant costs associated with decisions involving land and water management, conservation, and regulation. Thus, nationally consistent information on the status and the trends of the Nation's water quality is needed to assess past investments in water-quality management and to provide a base of knowledge for future decision making. To meet this need, the U.S. Congress in 1991 appropriated funds for the U.S. Geological Survey (USGS) to begin the National Water-Quality Assessment (NAWQA) Program. The long-term goals of NAWQA are to assess the status of and trends in the quality of the Nation's ground- and surface-water resources and to link the status and trends with an understanding of the natural and human factors that affect the quality of water.

The NAWQA Program is assessing the water-quality conditions of more than 50 of the Nation's largest river basins and aquifer systems. Collectively, these study areas include water resources available to more than 60 percent of the population in watersheds that cover about one-half of the land area of the conterminous United States. NAWQA assessments are based on existing information collected by the USGS and many other agencies as well as a nationally consistent scientific study approach that uses standardized methods for sampling and analysis. The consistent design allows for comparisons among watersheds and helps improve our understanding of the factors that affect water-quality conditions regionally and nationally.

One of these studies is an assessment of the ground-water quality in the High Plains aquifer. Assessment activities in the High Plains NAWQA study area began in 1998. The High Plains aquifer is an extensive regional aquifer system that underlies 174,000 mi^2 in parts of eight States, extending from southern South Dakota to central Texas. The High Plains aquifer is a very important water resource nationally. About 27 percent of the irrigated land in the United States is in the High Plains, and about 30 percent of the ground water used for irrigation in

the United States is pumped from the High Plains aquifer system. Irrigation is the dominant water use; however, the aquifer system also provides drinking water to about 98 percent of the people who reside within the aquifer boundary.

Major activities of the High Plains Regional Ground-Water Study include the compilation of available ground-water-quality information, sampling and analysis of ground-water quality for an array of physical and chemical properties, and the interpretation and reporting of results. The national study design includes the following ground-water components:

1) Study-Unit Surveys—broad-scale assessments of ground-water quality in the major aquifers within the study area;
2) Land Use Studies—focused assessments of the occurrence and distribution of water-quality constituents in recently recharged ground water associated with regionally significant combinations of land use and geohydrologic conditions; and
3) Regional Transect Studies—a process-oriented effort to characterize vertical variability in water quality and to identify major geochemical processes controlling water quality in the aquifer.