INTRODUCTION

Mapping of shallow aquifers in the northern Front Range area of Colorado has been completed as part of the U.S. Geological Survey Front Range Infrastructure Resources Project. The aquifer mapping was undertaken as part of a comprehensive effort to better define the mineral, energy, cartographic, biological, and water resources that are critical to the support and development of the area's infrastructure, such as streets, highways, airports, and buildings. The aquifer mapping was undertaken in cooperation with the Colorado Division of Water Resources and the Colorado Water Conservation Board.

The shallow aquifers have been mapped in a 2,450-square-mile area extending as an approximately 30-mile-wide band from north of Fort Collins to the Arapahoe-Douglas County line south of Denver (fig. 1). The shallow aquifer mapping in the Denver metropolitan area was published in 1996 as Hydrologic Investigations Atlas HA-736 (Robson, 1996). Shallow aquifer mapping in the Greeley-Nunn area was published as HA-746A (Robson, Arnold, and Heiny, 2000a); mapping in the Fort Collins-Loveland area was published as HA-746B (Robson, Arnold, and Heiny, 2000b); mapping in the Fort Lupton-Gilcrest area was published as HA-746C (Robson, Heiny, and Arnold, 2000c); and mapping in the Boulder-Longmont area was published as HA-746D (Robson, Heiny, and Arnold, 2000d).

Each of the five atlases contains five map sheets at 1:50,000 scale showing:
1. The thickness and extent of the unconsolidated sediments (loose gravel, sand, silt, and clay) that overlie the bedrock formations in the area (fig. 2).
2. The altitude and configuration of the bedrock surface.
3. The altitude of the water table and direction of groundwater movement.
4. The saturated thickness of the shallow aquifers.
5. The depth to the water table in the shallow aquifers.

THICKNESS AND EXTENT OF THE UNCONSOLIDATED SEDIMENTS

Unconsolidated sediments consist of alluvium (loose sediments transported primarily by flowing water), colluvium (loose sediments on hillsides transported primarily by gravity), and colluvial materials (loose sediments transported primarily by wind). The maps of the thickness of the unconsolidated sediments are contoured at 20-foot intervals and provide information about the potential thickness of the shallow aquifers in the area, the thickness of sediments that might be mined as a source of sand and gravel, and the depth to bedrock needed for construction of highway and building foundations or for hazardous waste cleanup activities.
SATURATED THICKNESS OF THE SHALLOW AQUIFERS

Saturated thickness is the distance from the water table to the top of the bedrock. These maps define the thickness of the shallow aquifers and are contoured at 20-foot intervals. Areas of large saturated thickness typically yield more water to wells than areas of small thickness. The maps indicate that the areas of greatest saturated thickness are in the more downstream parts of the larger stream valleys, such as the South Platte River and Cache La Poudre River. Other thick areas are in the larger paleovalleys, such as Beebe Draw and an unnamed paleovalley near Wellington. The maps also can be used to estimate how much water level could decline in a shallow well before the well runs dry, or to estimate the volume of ground water in storage in the aquifer.

DEPTH TO THE WATER TABLE IN THE SHALLOW AQUIFERS

The depth to water-table maps are contoured at 20-foot intervals and show the distance from the land surface to the water table. The maps provide information on the depth to water that might be expected in shallow wells in the area and can help define areas where a shallow water table might preclude urban development and favor wetland land use.

SOURCES OF DIGITAL DATA

Each of the five mapsheets for the five reports are available as ArcINFO coverages; metadata and the text for each report also are available. This digital data can be examined and downloaded from the project Web site at http://rockyweb.cr.usgs.gov/frontrange/index.html.

REFERENCES CITED


Information on technical reports and hydrologic data may be obtained from:
U.S. Geological Survey
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