U.S. DEPARTMENT OF THE INTERIOR
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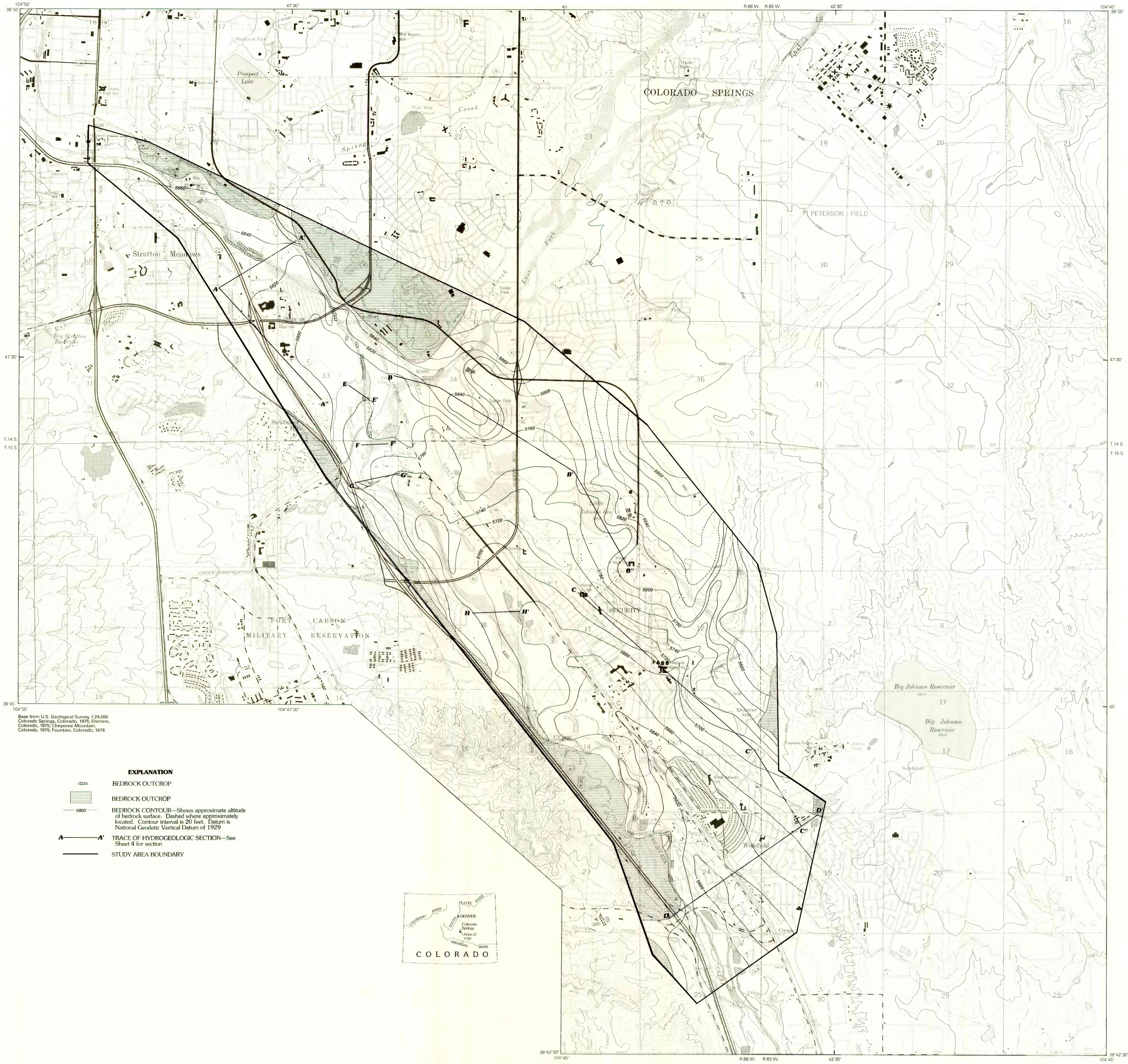
Radell, M.J., Lewis, M.E., and Watts, K.R., 1995, Hydrogeologic characteristics of the alluvial aquifer and adjacent deposits of the Fountain Creek Valley, El Paso County, Colorado



Base from U.S. Geological Survey 1:24,000 Colorado Springs, Colorado, 1975; Elsmere, Colorado, 1975; Cheyenne Mountain, Colorado, 1975; Fountain, Colorado, 1976

(GEOLOGY MODIFIED FROM SCOTT AND WOBUS, 1973)

EXPLANATION

- BEDROCK OUTCROP
- BEDROCK OUTCROP
- 5800 BEDROCK CONTOUR—Shows approximate altitude of bedrock surface. Dashed where approximately located. Contour interval is 20 feet. Datum is National Geodetic Vertical Datum of 1929
- A—A' TRACE OF HYDROGEOLOGIC SECTION—See Sheet 4 for section
- STUDY AREA BOUNDARY

SCALE 1:24 000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

TOPOGRAPHIC CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Sheet 1.—Altitude and configuration of the bedrock in the Fountain Creek Valley, El Paso County, Colorado

Hydrogeologic characteristics of the alluvial aquifer and adjacent deposits of the Fountain Creek Valley, El Paso County, Colorado

by M.J. Radell, M.E. Lewis, and K.R. Watts

INTRODUCTION

The alluvial aquifer in Fountain Creek Valley between Colorado Springs and Widefield is the source for several public-supply systems. The hydrogeology and water quality of the main part of the alluvial aquifer, a buried channel located approximately parallel to and east of Fountain Creek and locally known as the Widefield aquifer (Livingston and others, 1976a), have been studied extensively (Jenkins, 1961, 1964; Bingham and Klein, 1973; Robinson and Gooldy, 1973; Scott and Wobus, 1973; Klein and Bingham, 1975; Livingston and others, 1975, 1976a, b; Schneider and Turk, 1983; Edelmann and Cain, 1985). However, aquifer boundaries, areas where underflow occurs, and areas hydraulically connected with Fountain Creek, have not been described in detail. Definition and description of the characteristics will greatly add to the understanding of the alluvial aquifer and management of the public-supply systems. In 1991, the U.S. Geological Survey, in cooperation with the Colorado Springs Utilities, Wastewater Department, began a study to: (1) Define the geometry and hydrologic boundaries of the alluvial aquifer; (2) identify reaches of Fountain Creek that are hydraulically connected with the alluvial aquifer; (3) estimate flows across aquifer boundaries; and (4) define chemical characteristics and spatial and temporal water-quality trends.

This report presents maps and sections of selected hydrogeologic characteristics of the alluvial aquifer and adjacent deposits in a reach of Fountain Creek Valley between Colorado Springs and Widefield. Chemical characteristics of the ground water also are being evaluated (Lewis, 1994). The study area is about 14 square miles and is underlain by alluvial and eolian deposits. The report consists of four sheets that show: (1) The altitude and configuration of the bedrock surface and traces of hydrogeologic sections; (2) the altitude and configuration of the water table in October 1991 and selected hydrographs; (3) the saturated thickness of the alluvial material and estimates of underflow rates; and (4) hydrogeologic sections.

BEDROCK

Bedrock in the study area is the Pierre Shale of Upper Cretaceous age, which predominately consists of dark gray marine shale and locally contains beds of fine-grained sandstone, clay, and siltstone. The Pierre Shale is characterized by low permeability and poor erosion resistance (Scott and Wobus, 1973). The Pierre Shale crops out along the western edge of the alluvium and in places is exposed along the channels of Fountain and Sand Creeks.

During April–June 1991, 59 test holes were drilled to better define the configuration of the bedrock surface. Twenty seven of these test holes were completed as observation wells. Additional bedrock-altitude information from Jenkins (1964), Robinson and Gooldy (1973), Scott and Wobus (1973), Schneider and Turk (1983), D.T. Chafin (U.S. Geological Survey, written commun., 1988), and John Willian (Schlage Lock Company, written commun., 1990) was used in constructing the map. Results from test drilling and additional information indicate that the bedrock-surface configuration is highly irregular and that several ridges and buried channels are present beneath the alluvial aquifer and the adjacent alluvial and eolian deposits on the eastern boundary of the study area (sheet 1). The presence of a shale ridge between the buried channel of saturated alluvial material and Fountain Creek, described by Jenkins (1964), was confirmed; however, the ridge is discontinuous. Hydrogeologic sections presented by Jenkins (1964), by Edelmann and Cain (1985), and in this report (sheet 1 and hydrogeologic section A-A′, sheet 4) provide evidence of this shale ridge that restricts flow between the aquifer and Fountain Creek along some reaches within the study area. In areas where Fountain Creek is incised into the bedrock, there is no connection between the aquifer and the creek (sheets 1 through 3 and hydrogeologic section G-G′, sheet 4).

CONVERSION FACTORS

Multiply	By	To obtain
acre	4,047	square meter
acre-foot per day	1,233	cubic meter per day
acre-foot per year	1,233	cubic meter per year
cubic foot per second	0.02832	cubic meter per second
foot	0.3048	meter
foot per day	0.3048	meter per day
foot per mile	0.1894	meter per kilometer
mile	1.609	kilometer
square foot	0.0929	square meter
square mile	2.59	square kilometer

HYDROGEOLOGIC CHARACTERISTICS OF THE ALLUVIAL AQUIFER AND ADJACENT DEPOSITS OF THE FOUNTAIN CREEK VALLEY, EL PASO COUNTY, COLORADO

By
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1995