CHARACTERIZATION OF STREAMS AND SPRINGS IN THE SNAKE VALLEY AREA, UTAH AND NEVADA

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ABSTRACT

This paper characterizes the streams and springs within the Great Salt Lake Desert regional ground-water flow system in and near Snake Valley, Utah and Nevada. This is done by documenting the natural hydrologic variation and evaluating hydrogeologic controls influencing streamflow and spring discharge in the region. All perennial streams that drain into Snake Valley originate along the Deep Creek and Snake Ranges. Based on gaged and ungaged streamflow, estimates of mean annual perennial stream runoff range from 38,000 to 43,000 acre-feet per year (afy) to Snake Valley. Of the streams, the greatest streamflow occurs in the area drained by Lehman, Baker, and Snake Creeks, which originate in Great Basin National Park, in the south-central Snake Range. Trout Creek in the southern Deep Creek Range and Silver Creek in the central Snake Range also have significant discharges. Streamflow volumes in individual stream basins in the Snake Valley area depend on a combination of the area of drainage, altitude of the drainage basin, and rock lithology. Although size and altitude of the drainage basin are obvious contributors to discharge volume, the percent of low-hydraulic-conductivity bedrock that underlies the drainage area influences discharge. Many hydrogeologic factors influence ground-water–surface-water interactions, including high-angle normal faults and relative hydraulic conductivity of the streambed. Streams gain flow primarily from local ground-water influx and lose flow from leakage through the streambed. Both of these processes are influenced by the degree of streambed cementation, relative hydraulic conductivity of the streambed and underlying material, degree of saturation, and continuity of saturation between surface water and ground-water aquifers. At their downstream reaches, streams cross range-front faults and pass from bedrock to permeable basin-fill sediments on the valley floor that may be thousands of feet thick. The streams become losing streams, and many then become intermittent or ephemeral streams. Lehman, Baker, and Snake Creeks, however, have sufficient volume to overcome losses incurred over permeable reaches between the range-front fault and their places of use on the valley floor.

Large springs are present in Snake Valley. All occur, or can be inferred to occur, along generally northerly striking, high-angle, basin-range faults. These faults include not only the large range-front faults but also small faults in Snake Valley, many of which had Quaternary movement and some of which are still active. Total discharge from the major springs in Snake Valley is estimated to be at least 40 cubic feet per second (cfs) (29,000 afy). Some springs in the area have a relatively warm temperature, such as Warm Springs. These springs are interpreted to represent discharge from deep ground-water flow paths, where the faults have allowed rapid water migration to the surface. Relatively cold-temperature springs, such as Big, Rowland, Spring Creek, and Cave Springs, have source water derived locally from precipitation recharge in the adjacent mountains.

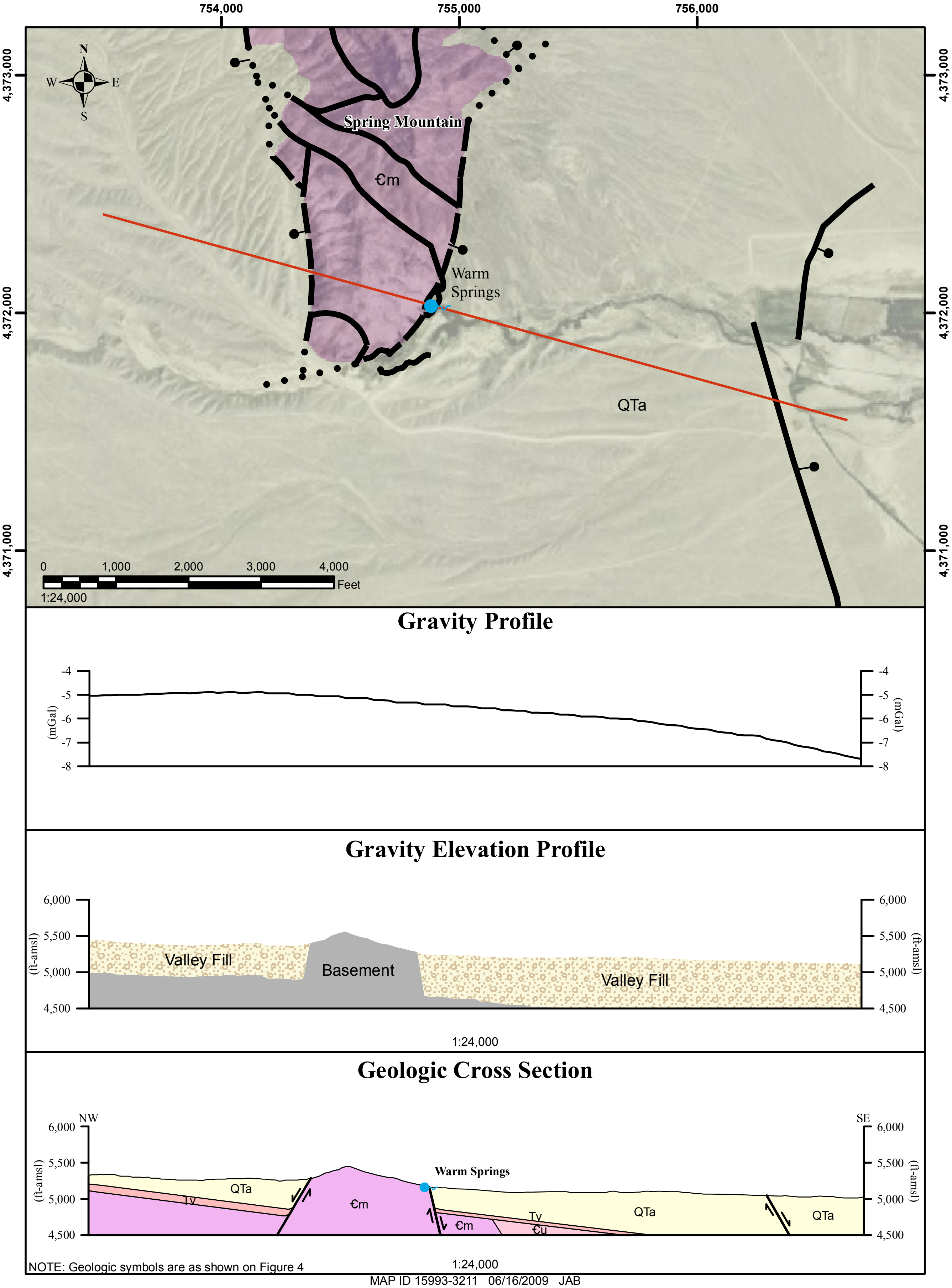

Figure 9. *Warm Springs geologic setting.*

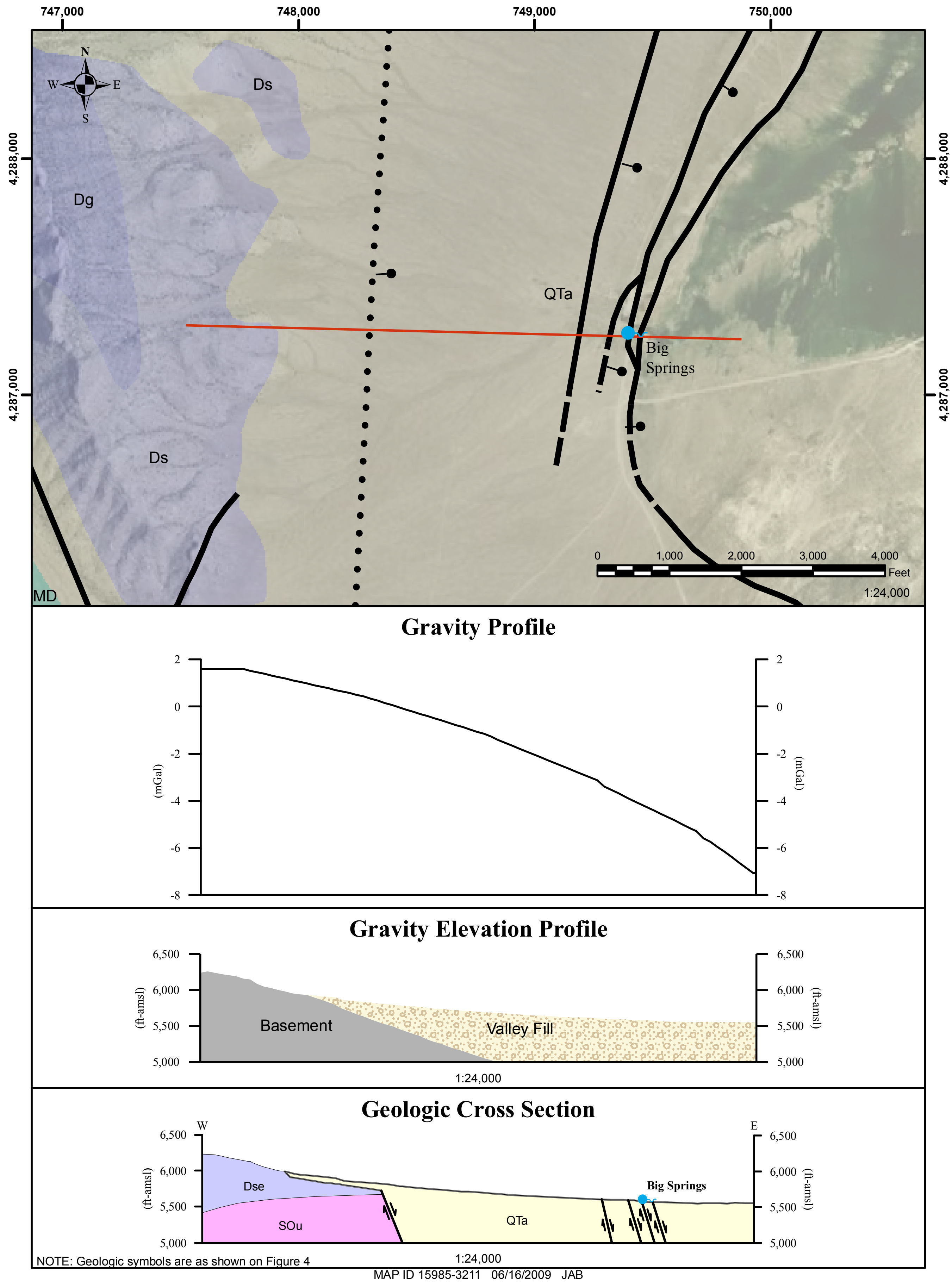

Figure 11. *Big Springs geologic setting.*