

Impact of 1998-2002 Drought on the Karst Aquifers of Clarke County in the Shenandoah Valley of Virginia

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Abstract

The prolonged drought between 1998 and 2002 focused attention on the quantity and sustainability of the ground-water resources of Clarke County, Virginia. The County is underlain by complexly folded and faulted Paleozoic and Precambrian rocks with a majority of the area characterized by karst aquifers. During this drought, over 20 wells and numerous springs and stream segments went dry. Above normal precipitation in the fall of 2002 and winter of 2003 brought an end to this drought. The magnitude of the recovery varied between the Opequon Creek and Shenandoah River watersheds. Ground-water levels in the Opequon Creek watershed recovered between 30 and 50 feet within a 6-month period; whereas levels in the Shenandoah River watershed generally recovered less than 10 feet. During this same period, flow in streams and springs returned after several dry years. In one case, spring 46XS 8 that had been dry for several years began to flow at a rate of 1,000 gallons per minute. Results from hydrograph separation indicate that the ground-water component accounts for more than 80 percent of the streamflow during both dry and wet periods. Generally, the majority of this ground-water component is derived from the discrete discharge of springs.