

Merging Hydrology and Water Quality – The Mahantango Creek Watershed

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Abstract

The Pasture Systems and Watershed Management Research Unit, USDA-ARS, University Park, PA, has as part of its mission, “conduct research leading to development of land, water, and plant management systems which insure the profitability and sustainability of northeastern agricultural enterprises while maintaining the quality of ground and surface waters.” Watershed-related research in support of this mission is conducted within WE-38, a 7.3 sq-km subwatershed of Mahantango Creek within the Susquehanna River Basin about 40 km north of Harrisburg, PA. ARS began collecting data within WE-38 in 1967; since then, streamflow at the watershed outlet with supporting rainfall and climate data have been continuously recorded. In 1972, twelve ground water observation wells were installed within WE-38; water levels have been continuously recorded since then. Several specialized data sets have also been compiled, including: tri-weekly water quality sampling at the outlet of WE-38; geologic and hydraulic properties of the aquifer underlying WE-38 via rock cores, borehole testing, and geophysical sampling; annual land use surveys since 1990, including nutrient and pesticide application rates, land use and management, and crop yields; and ground water recharge over a seven-year period via monolith lysimeters and observation wells. Finally, specialized field sites and subwatersheds with specific research objectives have been established within WE-38. Results from a number of our studies illustrate how the wealth of data make WE-38 an ideal “outdoor laboratory” for exploration of surface and subsurface flow systems in the humid-climate upland watershed environment and the related transport of agricultural contaminants.

Keywords: watersheds, water quality, surface water, ground water