

# Water Quality Model Passes Another Test

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ARS researchers tested the SWAT (Soil and Water Assessment Tool) model on the Warner Creek watershed near Frederick, MD, and found it could accurately predict pollutant levels over the long term in the small watershed, which is a mix of farm, forest and urban lands. Photo courtesy of Aisha Sexton, ARS.

(PhysOrg.com) -- A test of the SWAT (Soil and Water Assessment Tool) model on a small watershed with poor water quality in Maryland showed that the model accurately estimated pollutant levels over the long term, according to Agricultural Research Service (ARS) scientists and cooperators.

Water resources engineer Aisha Sexton and soil scientist Ali Sadeghi, at the ARS Hydrology and Remote Sensing Laboratory in Beltsville, Md., worked with Adel Shirmohammadi of the University of Maryland-College Park on an eight-year study of the Warner Creek watershed in Frederick County, Md.

This approximately one-square-mile watershed drains into a tributary of the Monocacy River. High levels of nitrogen and phosphorus flow from the 966-square-mile Monocacy River Basin into the Chesapeake Bay, mostly from cattle manure and crop fertilizers. The Warner Creek watershed is a mix of farm, forest and urban lands.

The researchers found the SWAT model to be accurate in mixed land use watersheds in the Piedmont physiographic region studied, and thus suitable for use in the Total Maximum Daily Load (TMDL) program of the U.S. [Environmental Protection Agency](#) (EPA).

This program sets limits on [water](#) pollutants such as silt, nitrogen, phosphorus, pesticides, mercury and bacteria for about 40,000 bodies of water that EPA has found to have poor [water quality](#). EPA lists the Monocacy River and the [Chesapeake Bay](#) among 501 bodies of water in Maryland that are significantly polluted.

Sexton, Sadeghi and Shirmohammadi found that the model performed best on a yearly and multi-year basis. This indicates that SWAT would work well for TMDL assessments, particularly those estimating the long-term effects of conservation practices and weather variability.

A team of ARS agricultural engineers in Temple, Texas, led by Jeff Arnold, first developed the SWAT model in the early 1990s, using 30 years of ARS research data. The team maintains a website to support model users and continually updates the model. SWAT has users in more than 40 countries.

**More information:** [swatmodel.tamu.edu/](http://swatmodel.tamu.edu/)

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