

Texas A&M University Hydrologic Modeling Inventory Model Description Form

Name of Model: Soil and Water Assessment Tool (SWAT)

Model Type: Watershed, River Basin Scale Hydrology of Water Quality Model

Model Objective(s) : Provide a tool for determining impacts of climate and land management on Water supply and water quality on Watersheds and river basins

Agency and Office:

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Model Structure or Mathematical Basis: Soil and Water Assessment Tool

**Theoretical Documentation Version 2005 S. L. Neitsch,
J. G. Arnold, J. R. Kiniry, J. R. Williams.
<http://www.brc.tamus.edu/swat/doc.html>**

Model Parameters:

Spatial Scale Employed in the Model: Several square kilometers to large river basin (ie. Mississippi Basin)

Temporal Scale Employed in the Model: Rainfall/Runoff and channel routing at

hourly (or less) timestep while all other processes (ie. Water balance, plant growth, etc) are all daily time step

Input Data Requirements: SWAT requires topographic, climate, soil, land use and management input parameters.

Computer Requirements:

ArcGIS software, code is written in FORTRAN and arrays are dynamically allocated, runs in Windows and UNIX environments.

Soil and Water Assessment Input/Output File

Documentation Version 2005 S. L. Neitsch, J. G. Arnold, J. R. Kiniry, J. R. Williams

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Model Output: Each subbasin and land use has daily surface runoff, ET, groundwater, sediment yield, nitrogen, phosphorus, pesticide and pathogen loadings.

Soil and Water Assessment Input/Output File

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<http://www.brc.tamus.edu/swat/doc.html>

Parameter Estimation / Model Calibration: Shuffled complex evolution technique for autocalibration is available in SWAT

Model Testing and Verification: Moriasi, D.N., J.G. Arnold, M.W. Van Liew, R.L.

Binger, R.D. Harmel, and T. Veith. 2006. Model evaluation guidelines for systematic quantification of accuracy in watershed simulations. *Trans. ASABE* (submitted).

Gassman, P. W., M. R. Reyes, C. H. Green, J. G. Arnold
The Soil and Water Assessment Tool: Historical Development, Applications, and Future Research Directions. *Trans. ASABE* (50(4):1-40.

Model Sensitivity: An automated sensitivity analysis tool is embedded in SWAT.

Model Reliability:

Model Application / Case Studies: Used by EPA for TMDL environmental studies and NRCS in National Conservation assessments. All current applications are documented in Gassman, P. W., M. R. Reyes, C. H. Green, J. G. Arnold

The Soil and Water Assessment Tool: Historical Development, Applications, and Future Research Directions. *Trans. ASABE* (50(4):1-40.

Documentation: **Soil and Water Assessment Tool Theoretical Documentation
Version 2005 S. L. Neitsch, J. G. Arnold, J. R. Kiniry, J. R.
Williams. <http://www.brc.tamus.edu/swat/doc.html>
Soil and Water Assessment Input/Output File
Documentation Version 2005 S. L. Neitsch, J. G.
Arnold, J. R. Kiniry, J. R. Williams
<http://www.brc.tamus.edu/swat/doc.html>**

Other Comments: