What’s New in SWAT2005?

J.G. Arnold, R. Srinivasan, and M. DiLuzio
ARS, Texas A&M, TAES
New in SWAT2005

FOREST GROWTH in SWAT

• Grow from seedlings to maturity
• Litter layer and wetlands – Ruth McKeown

RELATED RESEARCH

• Link with ALMANAC plant growth – ALMANAC simulates plant competition – Jim Kiniry and Doug McDonald
• Incorporate 3PG forest growth into SWAT – Brett Watson
• SWIM forest growth improvements – Fred Hattermann and Valentina Krysanova
New in SWAT2005

BACTERIA UPDATE

• Documented in new manual
• In-stream losses
• Additional Testing – Claire Baffaut
• Still need a better understanding of processes and sources
New in SWAT2005

SUBSURFACE TILES & POTHOLES

• Tile flow is function of water table depth – similar to DRAINMOD
• Testing and refinement in South Fork, Iowa – Cole Green
• Need a GIS interface to automate inputs
New in SWAT2005

AUTOCALIBRATION – UNCERTAINTY ANALYSIS

• AVSWAT Interface – Ann van Griensven and Mauro DiLuzio

• Documentation is not complete

• Testing is ongoing – Mike Van Liew testing on ARS watersheds in U.S.
New in SWAT2005

DOCUMENTATION

• Theoretical documentation is complete
• Input/Output documentation is complete
• Operational manual is not complete – describing sensitivity, autocalibration and uncertainty analysis
### Delivery Table

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Model Sensitivity Analysis
Model Autocalibration and Uncertainty
Soil Data - USDA-NRCS

STATSGO: Produced at 1:250,000 scale for entire US. Minimum mapping unit is 625 hectares.

SSURGO: County level data. Scale varies from 1:15,000 to 1:63,360. Availability varies around the country.
UNIX Workstation and X-Win

ArcView SWAT-X
Measuring the Environmental Benefits of Conservation

The Conservation Effects Assessment Project (CEAP)
CEAP National Assessment

- SWAT used to simulate non-cultivated lands and routing through rivers and reservoirs
- EPIC-APEX used on cultivated lands and for management scenarios
- Estimation of reduction in in-stream concentrations of sediment and nutrients due to implementation of conservation practices at the outlet of each 8-digit watershed
Validation of Flow and Sediment

Observed (USGS)

SWAT Simulated
HUMUS Results
Point and Non Point Sources

Simulated Total P Delivered to Streams by HCU

Simulated Sediment Delivered to Streams by HCU

Simulated Total P Delivered to Streams by HCU
New Developments

Landscape Characterization and Positioning

• Martin Volk’s Research on Characterizing Landscape Units and Their Response is Critical for Improving Watershed Simulations

• Modifying SWAT to Simulate Landscape Units with Subbasins
Landscape Positions

Terrain conditions of the study site in Riesel

Elevations (10 m DEM)

Relief and 1 m -Elevation- Contours

Slope (from 10 m DEM)

Soils

Landscape Positions

Ridge Top
Hill slope
Valley floor

M. Volk 2004
Landscape Positions

Landscape Positions Riesel

2 ft contours

- Valley
- Slope
- Ridgetop

Martin Volk, 2005
UFZ Leipzig-Halle
SWAT 2005 Current Research

- Landscape Positions
  (New HRUs: Valley floors, Hillslopes, Ridgetops)
- Riparian Zones
MANURE LAYER

• Separate storage on soil surface – not immediately mixed into soil – release of N and P to soil and runoff - Cole Green and ARS scientists in Pennsylvania
Future Plans

• Developers Conference – Valentina Krysanova
• National Assessment Conference
• Future SWAT Conferences