What's New in SWAT2005?

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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

BACTERIA UPDATE

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

- 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

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.

DOCUMENTATION

- Theoretical documentation is complete
- Input/Output documentation is complete
- Operational manual is not complete describing sensitivity, autocalibration and uncertainty analysis

Delivery Table



Model Sensitivity Analysis

🍭 Sensitivity Analysis	Manager: Scenario: Default - Sim	ulation: sim	1		×		
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Model Autocalibration and Uncertainty

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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.



Splitting Land Use Class

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UNIX Workstation and X-Win





USDA OZS



Cooperative State Research, Education, and Extension Service Research, Education, and Economics

Farm Service Agency



JSGS

Agricultural Research Service

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

Observed (USGS)



Average Annual Simulated Runoff by STATSGO Polygon 0-5mm 5-20mm 20-50mm 50-100mm 100-200mm 200-300mm 300-400mm SCALE: 1:25965257 400-500mm 500-600mm 3194000 REGION: -2362214 2254418 294800 600-2100mm 2100-2700mm 2700- + mm

Validation of Flow and Sediment

SWAT Simulated

HUMUS Results Point and Non Point Sources





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



Landscape Positions



SWAT SWAT 2005 Current Research

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



Current Developments

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