DEMONSTRATION OF THE CAPABILITIES OF THE KINEROS2 – AGWA 3.0 SUITE OF MODELING TOOLS

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Abstract: The Automated Geospatial Watershed Assessment tool (AGWA) is a watershed modeling tool that supports the parameterization and execution of several distributed hydrologic models, KINEROS2, RHEM (Rangeland Hydrology and Erosion Model), and SWAT (Soil & Water Assessment Tool version 2000 and version 2005) in the following GIS environments: ESRI ArcView 3.x, ESRI ArcMap 9.x, and ESRI ArcMap 10.x. KINEROS2 is an event-based rainfall-runoff model that is physically-based, representing interception, infiltration, surface runoff, sediment detachment, sediment transport, and sediment deposition processes for overland and channel flow. For a more detailed description of AGWA and KINEROS2, including their histories, see Goodrich et al. (2015; these proceedings) and their respective websites (www.tucson.ars.ag.gov/agwa and www.tucson.ars.ag.gov/kineros). This demonstration will showcase the capabilities of both AGWA and KINEROS2 in a variety of applications, scenarios, and use-cases.

AGWA supports the parameterization and execution of hydrologic models for watershed modeling efforts by performing the following tasks: watershed delineation; watershed discretization into discrete model elements; watershed parameterization; precipitation definition; model simulation creation; model execution; and model results visualization (Figure 1). Watershed delineation uses a filled, hydrologically correct DEM and derived flow direction and flow accumulation with a user-defined outlet to create a watershed boundary. Watershed discretization subdivides the watershed into model specific elements based on the user's model selection and stream network definition choice. Watershed parameterization assigns area-weighted topographic, soils, and land cover parameter estimates to the model elements. Precipitation definition creates individual storm event files for KINEROS2 or continuous, daily precipitation aggregates for SWAT that drive the models. Model simulation creation creates the model input files required to execute a simulation. Model execution runs the model in a command prompt window. Finally, model results visualization imports the model results into tabular format that can be associated with and displayed on the model elements in the GIS.

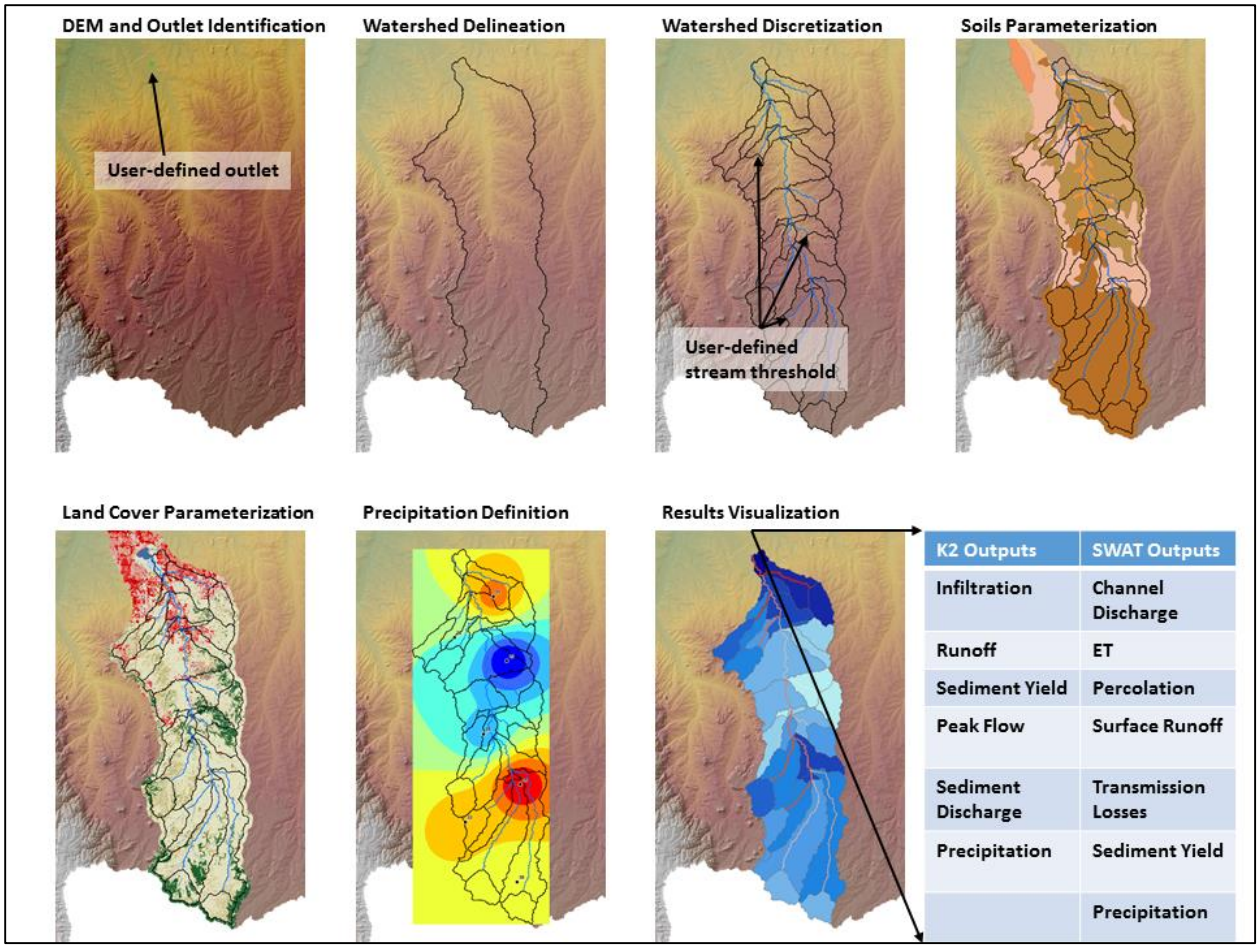

Figure 1 The required steps in AGWA to perform a watershed assessment. A DEM is used to delineate the watershed, subdivide it into model elements, and parameterize the elements in conjunction with the soils and land cover layers. Precipitation drives the model and model results are imported and visualized in the GIS.

The AGWA demonstration will feature the seven general AGWA steps. In addition, it will highlight some advanced features/functionality recently added to AGWA, including: an area-of-interest group delineation tool for delineating watersheds within a defined boundary (political, management, administrative, etc.); batch simulations; batch parameterizations; hillslope sub-discretizations; additional stream network definition methodologies utilizing a flow length threshold, flow accumulation threshold, or an existing stream network; rapid-post fire watershed assessments and report generation; use of dynamic erosion formulations in the RHEM (Rangeland Hydrology and Erosion Model) model; and incorporation of Low Impact Development (LID) features in the KINEROS2 model.