



## The Automated Geospatial Watershed Assessment Tool

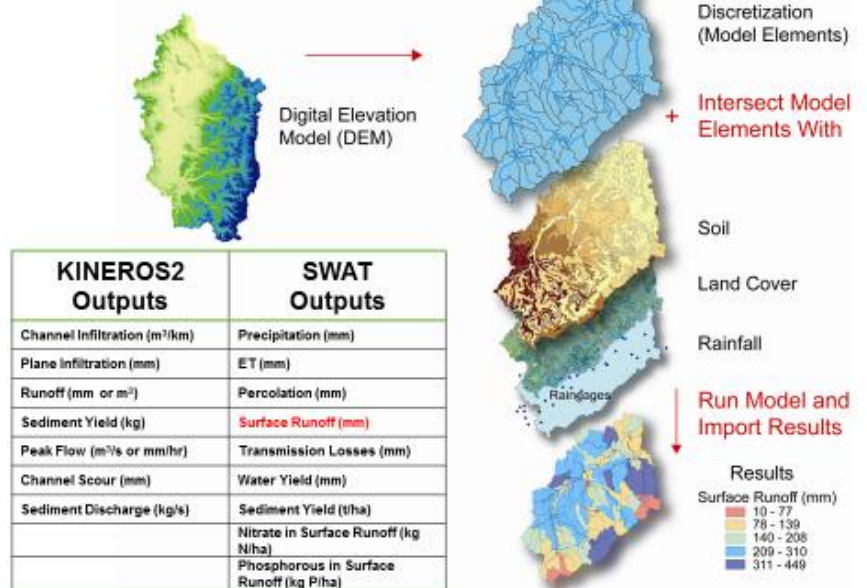
### A GIS-Based Hydrologic Modeling Tool

#### Model System Description:

The Automated Geospatial Watershed Assessment (AGWA) tool is a geographic information systems (GIS) tool jointly developed by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA) Agricultural Research Service, and the University of Arizona to automate the parameterization and execution of several hydrologic models, including the Soil and Water Assessment Tool (SWAT) and KINematic Runoff and EROsion (KINEROS2) models. The application of these models allows AGWA to conduct hydrologic modeling and watershed assessments at multiple temporal and spatial scales. AGWA's current outputs are runoff (volumes and peaks) and sediment yield, plus nitrogen and phosphorus with the SWAT model.

AGWA uses commonly available GIS data layers to fully parameterize, execute, and spatially visualize results from both SWAT and KINEROS2. Through an intuitive interface, users select an outlet from which AGWA delineates and discretizes the watershed using a Digital Elevation Model (DEM). The watershed model elements are then intersected with soils and land cover data layers to derive the requisite model input parameters (attached figure). AGWA can currently use STATSGO, SSURGO and FAO soils and nationally available land-cover/use data such as the National Land Cover Data (NLCD) datasets.

#### AGWA Inputs and Outputs



Users are also provided the functionality to easily customize AGWA for use with any classified land-cover/use data. The chosen hydrologic model is then executed, and the results are imported back into AGWA for visual display. This allows decision-makers to identify potential problem areas where additional monitoring can be undertaken or mitigation activities can be focused. AGWA can differentiate results from multiple simulations to examine and compare changes predicted for each alternative input scenario (e.g., climate/storm change, land-cover change, present conditions, and scenario analysis).

In addition, a variety of new capabilities have been incorporated into AGWA, including pre- and post-fire watershed assessment, watershed group simulations to cover all watersheds within a political or management boundary, implementation of stream buffer zones, and installation of retention and detention

structures. A land-cover modification tool is provided for the development of prescribed land-cover change scenarios, with a number of options for uniform, spatially random, and patchy change to single or multiple land-cover classes.

Three versions of AGWA are available:

- AGWA 1.5 for users with Environmental Systems Research Institute (ESRI) ArcView 3.x GIS software (ESRI, 2002)
- AGWA 2.0 for users with ESRI 9.x (2009)
- AGWA 3.x for users with ESRI ArcGIS 10.x (ESRI, 2014).

AGWA 3.x utilizes new features in ArcGIS 10.x that are not available in ArcView 3.x to make the tool more powerful, flexible, and easier to use than AGWA 1.5. All AGWA versions have been retained to reach the widest available audience.

### **Model linkage, use and integration to EPA research:**

- AGWA has completed several external peer-reviews since its inception (the AGWA 1.0 peer review first was completed in 2002, AGWA 2.0 was completed in 2007, and AGWA 3.x was completed in 2013). Peer review has been conducted through both EPA and USDA/ARS clearance processes and thus assigned separate report numbers, e.g. **EPA/600/C-13/148** and **ARS/29605**, respectively.
- Several peer-review journal articles, proceedings, and agency reports have been published and posters presented at national science meetings (see: <http://www.tucson.ars.ag.gov/agwa/publications-overview/publications/> and <http://www.tucson.ars.ag.gov/agwa/publications-overview/posters/>).
- AGWA is included in the Registry of EPA Applications, Models and Databases (READ; [http://ofmpub.epa.gov/sor\\_internet/registry/systmreg/resourcedetail/general/description/description.do?infoResourcePkId=11982](http://ofmpub.epa.gov/sor_internet/registry/systmreg/resourcedetail/general/description/description.do?infoResourcePkId=11982)).
- All versions of AGWA have been included in the Downloadable GIS Tools section of the EPA EnviroAtlas <http://enviroatlas.epa.gov/enviroatlas/tools/agwa.html> (EPA/600/C-14/372).
- All versions of AGWA are completely supported with fact sheets, brochures, product releases, user manuals, quality assurance plans, design documentation, tutorials, publications, and posters (<http://www.tucson.ars.ag.gov/agwa/>).
- AGWA is provided free to users and is popular worldwide with downloads from 6 continents. EPA has used AGWA for Green Infrastructure assessment, TMDL planning, and Clean Water Act 402/404 analyses relative to enforcement. EPA and academia use AGWA for basic research and watershed assessment. Universities have used AGWA as a GIS educational tool. International institutions, e.g. NATO, have used AGWA for environmental assessment. AGWA is continually being refined, and the AGWA websites are revised whenever significant updates have been made to the software. Registered users are notified of updates via the website or through direct e-mail generated from the user registration list

### **EPA's AGWA Resource Page:**

[www.epa.gov/water-research/automated-geospatial-watershed-assessment-tool](http://www.epa.gov/water-research/automated-geospatial-watershed-assessment-tool)

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