

Comparison of Arc Hydro and SWAT models used in watershed analysis.

Deborah Bryan, co-principal investigator, Department of Geography
Joanna Curran, co-principal investigator, Department of Geography

This project examined the applicability of two of the most common models used in hydrological modeling today: ArcHydro (ArcGIS Hydro Data Model) and SWAT (Soil and Water Assessment Tool) model. The models are similar in that each advertises itself as a watershed model with an interface to GIS. The models differ in their choice of governing equations and the way each deals with actual data that may be collected in the watershed. The purpose of the proposed research was to determine which model provided the best representation of a watershed. Data was collected for the Blanco and Guadalupe watersheds and imported into each model. Once the models were run, the results were compared to actual field data to test the accuracy of the models and ease of use. Both models permitted us to simultaneously study various parameters acting on the watersheds. The SWAT model allowed the researchers to incorporate more physical data than the ArcHydro model, resulting in a more accurate depiction of the watershed, especially for smaller watersheds like the Blanco. ArcHydro excels at data management, making it a better choice when large amounts of data need to be collected and included in the model (such as with larger watersheds like the Guadalupe). We found that SWAT better replicates field information. In addition, it allows the researcher more control over the physical processes being modeled. SWAT is easier to use for researchers with little GIS experience. However, for those researchers with GIS programming capabilities, ArcHydro is more flexible.

Presentations:

2004. Bryan, D. and J. Curran. "SWAT Modeling of the Blanco River Basin, "
presented at the Annual Meeting of the Association of American Geographers,
Philadelphia, Pennsylvania.

Other:

Students have become more interested in the model, and one master's student is planning to use one of the models in his research. The project has become an excellent class presentation to encourage students to pursue water related studies.