



# OpenSWAT

#### Development of an Open Source GIS Interface and Analysis Tools for the Soil and Water Assessment Tool

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### Introduction

- The Soil and Water Assessment Tool (SWAT) is a physically-based watershed and landscape simulation process model developed by the USDA-ARS and particularly suited to non-point source pollutant analysis.
- ArcSWAT was developed at Texas A&M to fulfill the GIS needs of SWAT, which uses ArcGIS as a base GIS platform
   \*<sub>By Dr. Srinivasan Raghavan et al.</sub>
- OpenSWAT is a similar software tool but uses an open source GIS platform – MapWindow GIS developed by ISU and USU
- The next major update of BASINS will include OpenSWAT as one of its major modeling components





## Why OpenSWAT

An open source software tool focused on a broad spectrum of US and international water resource personnel



- Interoperability with EPA's BASINS and Texas A&M's SWAT Editor
- As open source software tool, can be customized according to user needs
- Developed using well established software development tools
   Windows compliant ie., Vista, XP





## Potential developers / users

- Most of the development has been conducted at Idaho State University's Geospatial Software Laboratory, but it will be continued by the Open Source community
- Many functional /developmental requirements were obtained from Texas A&M
- Numerous GUI development tips and feedbacks were gathered from AQUA TERRA Consultants.
- The majority of the local/international hydrologists, watershed managers, decision makers and academics may use this product





# **OpenSWAT - A big picture**



## **Major Components**

- Project Definition
- Watershed Delineation
- LU/Soil/Slope Reclassification
- Sub basin/LU/Soil/Slope Overlay
- HRU Definition
- Weather Data input
- Write the output into Microsoft Access output database





#### **Use Case Diagram**



Primarily consists of *actors* and *use cases*. Use Case Diagrams help to capture the functional requirement of any system. This diagram useful to start a project



## Sequence Diagram



Sequence diagrams depict the order of invocations in the system as well as the creation of the different objects.





## **Component Diagram**



Primarily consists of *major system components* and their *relationships*. This is meant to be a high-level overview diagram of any complicated system. This diagram is mandatory for every Object Oriented Software Development projects.





## **Deployment Diagram**



Primarily consists of *deployment elements*, such as servers, and their *relationships*. This is a logical topography of a system.





#### **Virtual Tour of OpenSWAT**







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#### **Project Setup**





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#### **Watershed Delineation**

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#### **LU/Soil/Slope Reclassification**

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Texas A&M System

#### **HRU Definition**

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## **Weather Data Definition**



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## Writing Output Tables

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🔽 Stream Water Quality Data	Watershed General Data
Watershed Water Quality Data	Master Watershed Data File
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## **Call SWAT Editor**

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SWAT Executable Folder	-
C:\Program Files\Swat\ArcSWAT\	
Exit	_





## **SWAT Editor Functionalities**

SWAT Editor	Rewrite SWAT Input Files
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#### **View Output**

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Idaho State University		AgriLIFE <b>RESEARCH</b>
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- MWSWAT Vs. OpenSWAT
- BASINS & OpenSWAT
- Shape file/ Grid Compatibility of OpenSWAT
- Other Questions ???







MUNITED STAR



#### spatial sciences laboratory







#### http://svn.mapwindow.org/svnroot/MapWindow4Plugins/OpenSWAT



AGENCY





Open Source Programmable Geographic Information System Too





