

Developing a $\hat{G}\hat{I}\hat{S}$ Database for Watershed Assessment

Automated Geospatial Watershed Assessment
Tool





Basic Data Requirements



- ▶ Digital Elevation Model (DEM – any raster format)
- ▶ Soils (SSURGO, STATSGO, FAO)
- ▶ Land Use – Land Cover (National Land Cover Dataset – NLCD)
- ▶ Location of Outlet (Pour point)
- ▶ Climatic Data
- ▶ Hydrologic Unit Maps (HUC)
 - ▶ NRCS – <http://www.usda.gov/wps/portal/nrcs/main/national/water/watersheds>

Steps to Create an AGWA Database

- ▶ Locate your watershed (Google)
- ▶ Gather Data
 - ▶ DEM and NLCD
 - ▶ <https://viewer.nationalmap.gov/basic/>
 - ▶ Soils
 - ▶ Web Soil Survey
 - ▶ Climate
 - ▶ Various sources – depends on which model you use
 - ▶ NOAA National Centers for Environmental Information (www.ncdc.noaa.gov)
 - ▶ Daymet – <http://daymet.ornl.gov>
 - ▶ Stochastic Weather Generator – In SWAT
 - ▶ Doppler Weather Radar Maps

Steps to Create an AGWA Database

- ▶ Convert all the data to the same Coordinate System
 - ▶ Same Reference Ellipsoid (Datum)
 - ▶ Same Projection
 - ▶ e.g. Universal Transverse Mercator (UTM)
 - ▶ **UNITS must be in METERS**
 - ▶ Use the *Project* tool in ArcGIS – Batch mode
 - ▶ Different tool for features vs rasters

Steps to Create an AGWA Database

- ▶ Clip Data to Watershed Area
 - ▶ The Smaller the Data Extent the Faster the Processing Time
 - ▶ Use other information to locate the watershed
 - ▶ HUC watersheds
 - ▶ Pour points
 - ▶ In tutorial we will use a disturbance (fire) area
 - ▶ Select the HUC Watershed(s) you are interested in
 - ▶ If more than one HUC watershed *Merge* the watersheds together
 - ▶ *Buffer* the merged HUC Watershed(s)
 - ▶ 1 km (1000 m) usually is enough
 - ▶ Use the buffered HUC Watershed(s) to *Clip* the data layers
 - ▶ Different *Clip* tools for features and rasters

HUCs - Hydrologic Unit Code

- ▶ Consisting of two to twelve digits based on the four levels of classification in the hydrologic unit system.

Name	Level	Digits	Average size (square miles)	Number of HUs (approximate)	Example name	Example code (HUC)
Region	1	2	177,560	21	Pacific Northwest	17
Subregion	2	4	16,800	222	Lower Snake	1706
Basin	3	6	10,596	370	Lower Snake	170601
Subbasin	4	8	700	2,200	Imnaha River	17060102
Watershed	5	10	227 (40,000–250,000 acres)	22,000	Upper Imnaha River	1706010201
Subwatershed	6	12	40 (10,000–40,000 acres)	160,000	South Fork Imnaha River	170601020101



Steps to Create an AGWA Database



- ▶ Soil Data
 - ▶ Two parts – Soil polygon layer and the soil Access database
 - ▶ Need to import tabular data into Access database
 - ▶ AGWA queries tabular data based on intersection of discretization and soil polygon layer

Input Data versus Output Data

- ▶ Good idea to keep input data and output data
- ▶ AGWA creates a personal geodatabase containing the watershed delineation and discretization in the user-specified workspace
- ▶ AGWA creates precipitation and simulation input files in subdirectories of the workspace where the delineation/discretization geodatabase is located
- ▶ Saving your map document (MXD) in the workspace where the delineation/discretization geodatabase is located allows for using the home button in the ArcMap Catalog window to quickly navigate to your workspace

