



Watershed and Groundwater
Modeling Solutions

Developing a Basic GSSHA Model





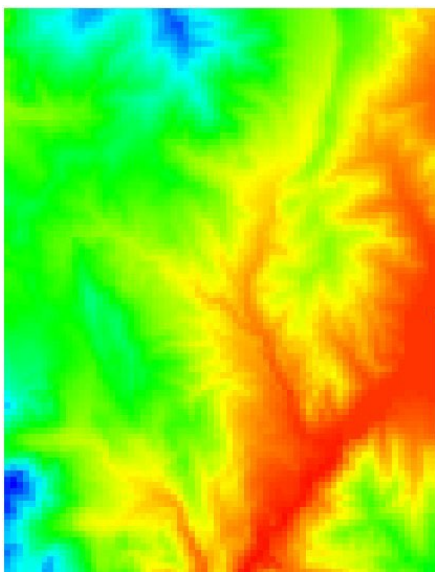
Workflow

Watershed and Groundwater Modeling Solutions

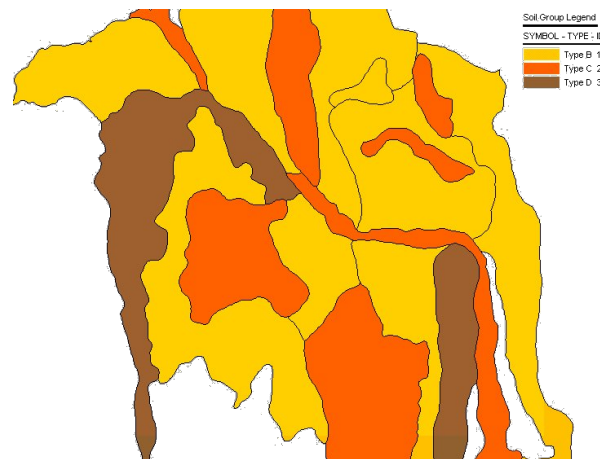
- Obtain Your Data
 - DEM, Land Use, Soils, Mapping Table, Precipitation
- Delineate the watershed
- Generate a GSSHA grid
- Job Control
 - Time step
 - Determine processes to simulate
 - Output Control
- Generate Index Map and Mapping Table for roughness
 - Uniform to begin with
- Define roughness in Mapping Table parameters
- Define rainfall
- Save and run
- Visualize results to determine and fix surface runoff problems



Obtain Your Data



DEM



Soils

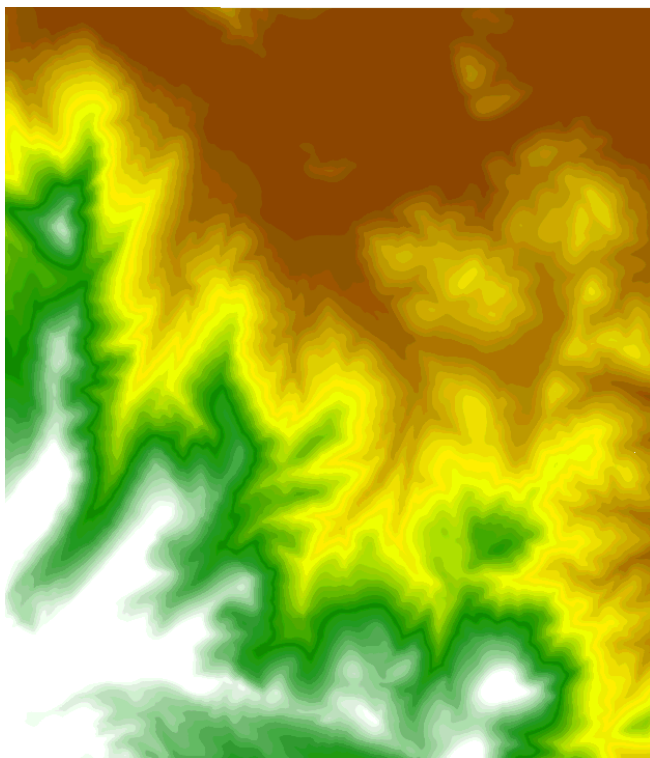


Land Use





Delineate the Watershed



Compute Flow Directions and Accumulations

Project Filename
Define Project Bounds
Watershed Data
Download Data (Web Service)
Read Data (Catalog)
Compute Flow Directions and
Choose Outlet Locations
Delineate Watershed
Select Model
Create 2D Grid
Job Control
Define Land Use and Soil Data
Hydrologic Computations
Define Precipitation
CleanUp Model

Compute TOPAZ flow data and...

☒ Write TOPAZ files to a temp directory.
☐ Write TOPAZ files to a specific directory.

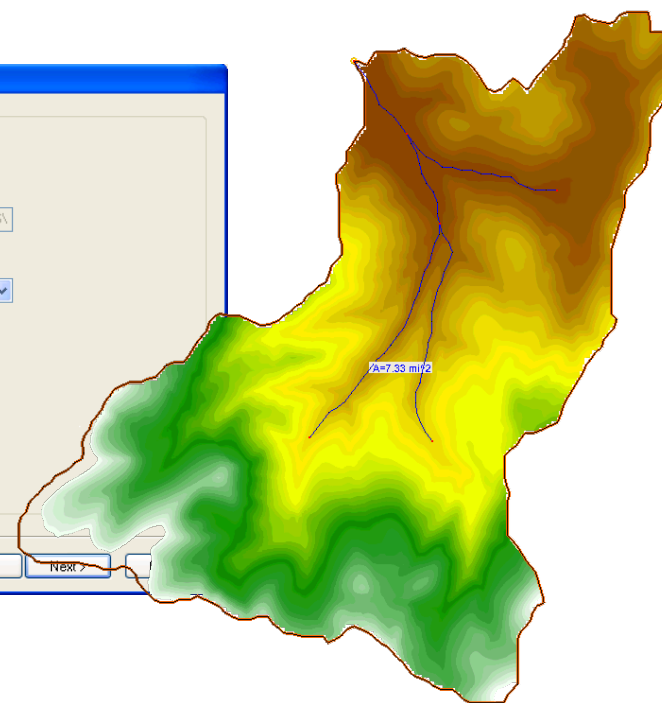
C:\DOCUMENT1\JimN\LOCALS~1\Temp\WMS_6116\

Compute sub-basin areas in: Compute distances in:

Square Miles Feet

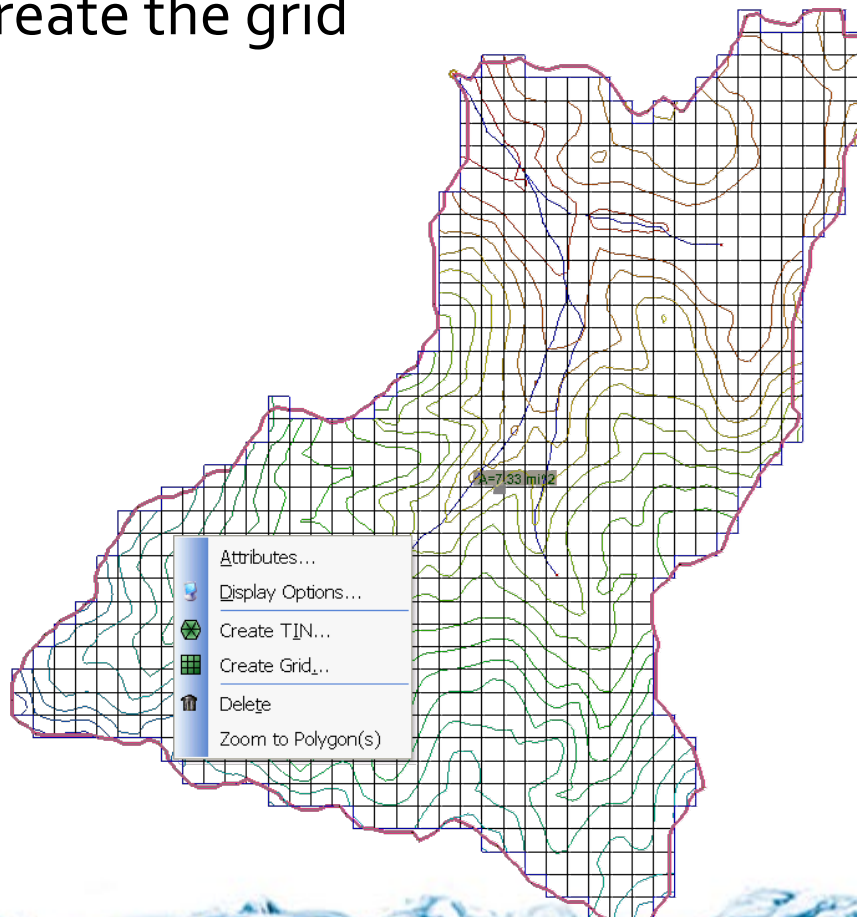
Compute TOPAZ

Help < Back Next



Generate GSSHA Grid

- Use the watershed basin polygon to create the grid





Job Control Setup

GSSHA Job Control Parameters

Computation parameters

Total time (min): 1500

Time step (sec): 10

Overland flow

Computation method: Explicit

☐ Interception

☐ Initial depth

☐ Retention depth

☐ Area reduction depth

Outlet information

Column: 1

Row: 64

Slope: 0.00100

Evapotranspiration

☒ No evaporation

☐ Deardorff method

☐ Penman method

☐ Seasonal resist.

Infiltration

☒ No infiltration

☐ Green + Ampt

☐ Green + Ampt with soil moisture redistribution

Sacramento Model...

☐ Richard's infiltration

Edit Parameters...

Channel routing computation scheme

☒ No routing

☐ Diffusive wave

☐ MESH

Edit Parameters...

<input type="checkbox"/> Groundwater	Edit parameter...
<input type="checkbox"/> Soil erosion	Edit parameter...
<input type="checkbox"/> Long term simulation	Edit parameter...
<input type="checkbox"/> Contaminant transport	Edit parameter...
<input type="checkbox"/> Nutrients	Edit parameter...
<input type="checkbox"/> Storm/tile drain	Edit parameter...
<input type="checkbox"/> Stochastic	Edit parameter...
<input type="checkbox"/> Link CE-QUAL-W2 ...	Edit parameter...
<input type="checkbox"/> Manage files	Edit parameter...

Help

Output Control...

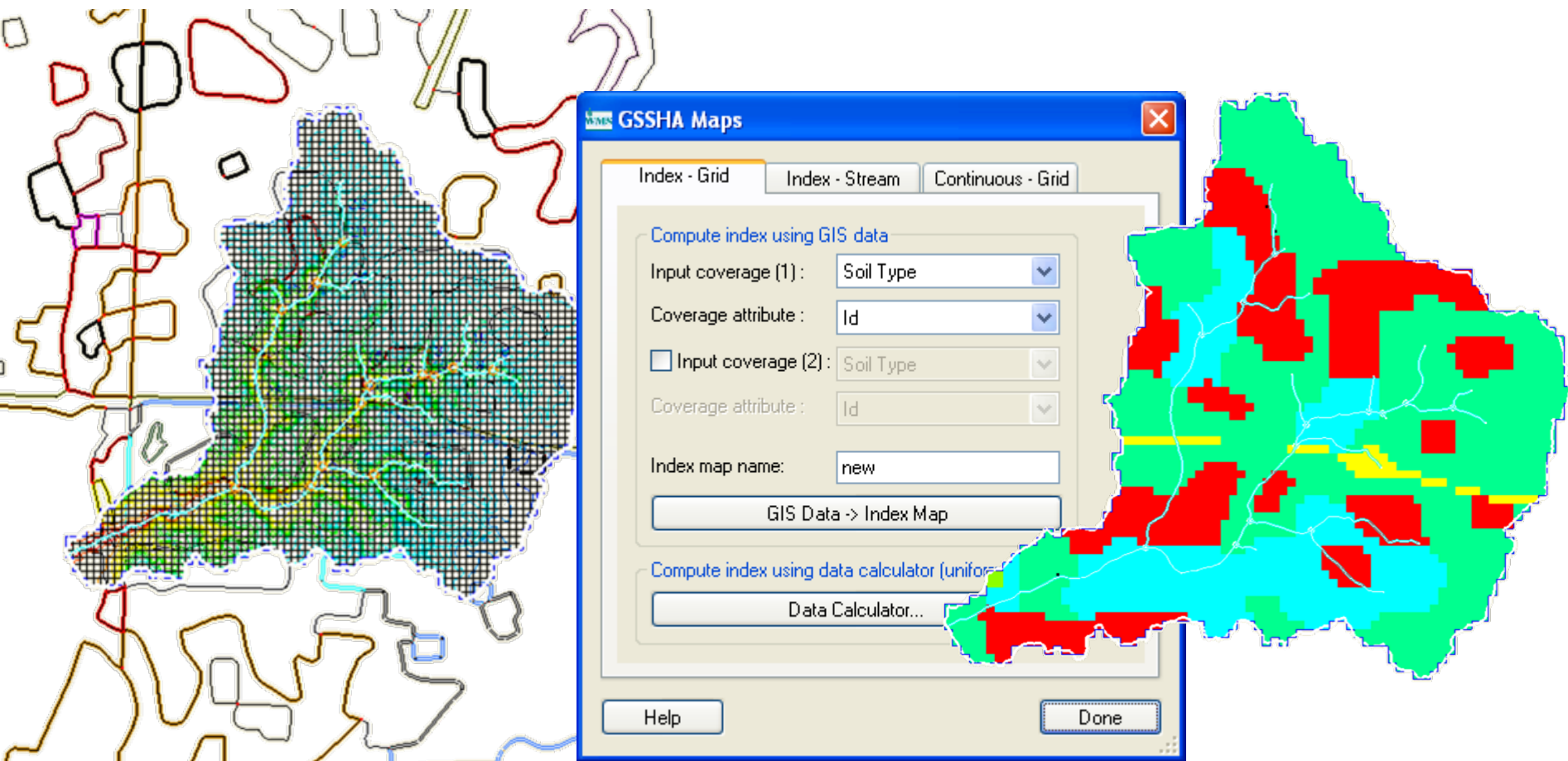
OK

Cancel



Create an Index Map for Roughness

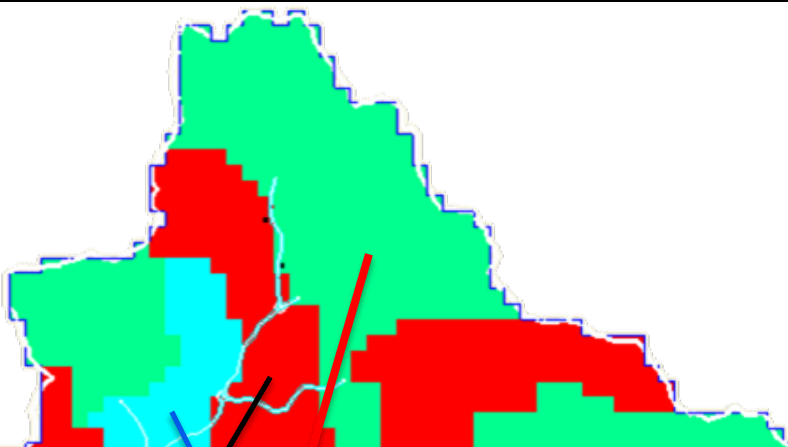
Watershed and Groundwater
Modeling Solutions





Define Roughness in Mapping Table

Watershed and Groundwater
Modeling Solutions



GSSHA Map Table Editor

Initial Moisture Soil Erosion Contaminants Nutrients Continuous Maps
Roughness Interception Retention Evapotranspiration Infiltration

Using index map: Land use Type: Grid

Generate IDs Add ID Delete ID

Roughness					
ID	11	14	16	21	41
Description1	Residential ...	Untitled land...	Untitled land...	Untitled land...	Untitled land...
Description2
Surface roughness	0.080000	0.070000	0.080000	0.350000	0.200000

Help Import Table... Export Table... Job Control Done



Define Rainfall

GSSHA Precipitation [X]

Rainfall event(s)

Uniform [v] Import Gage File...

Uniform
Gage
Hyetograph
Nexrad Radar

Start date/time 6/6/2008 2:39:00 PM [v]

Multi-gage interpolation method

☒ Inverse distance weighted (IDW)

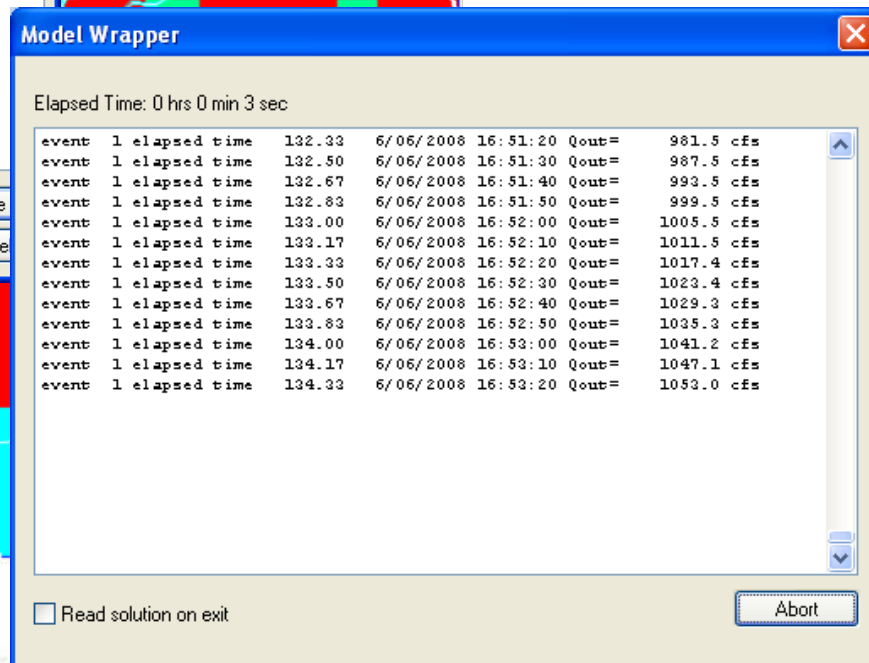
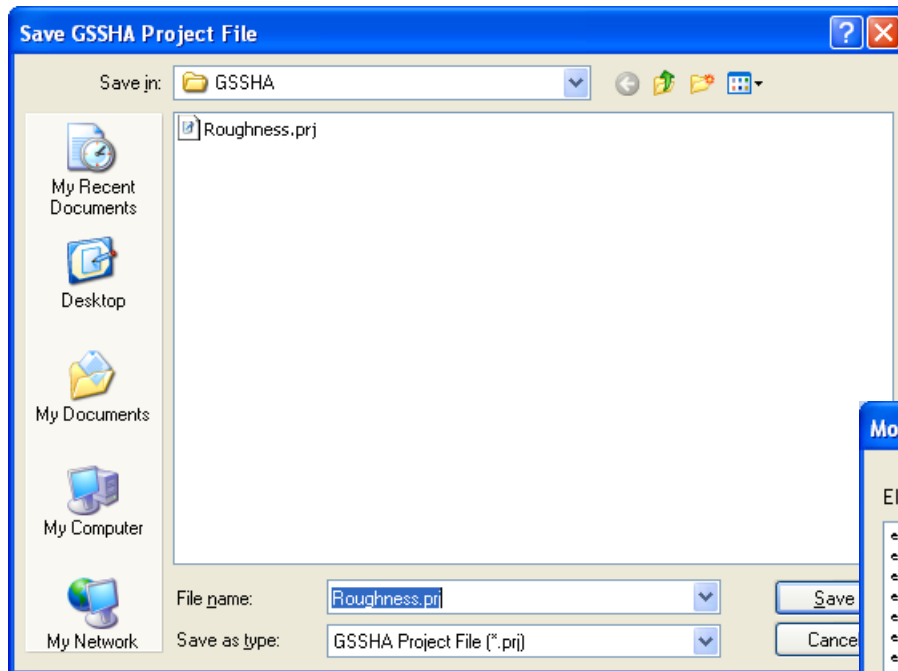
☐ Thiessen polygons

Help OK Cancel



Watershed and Groundwater Modeling Solutions

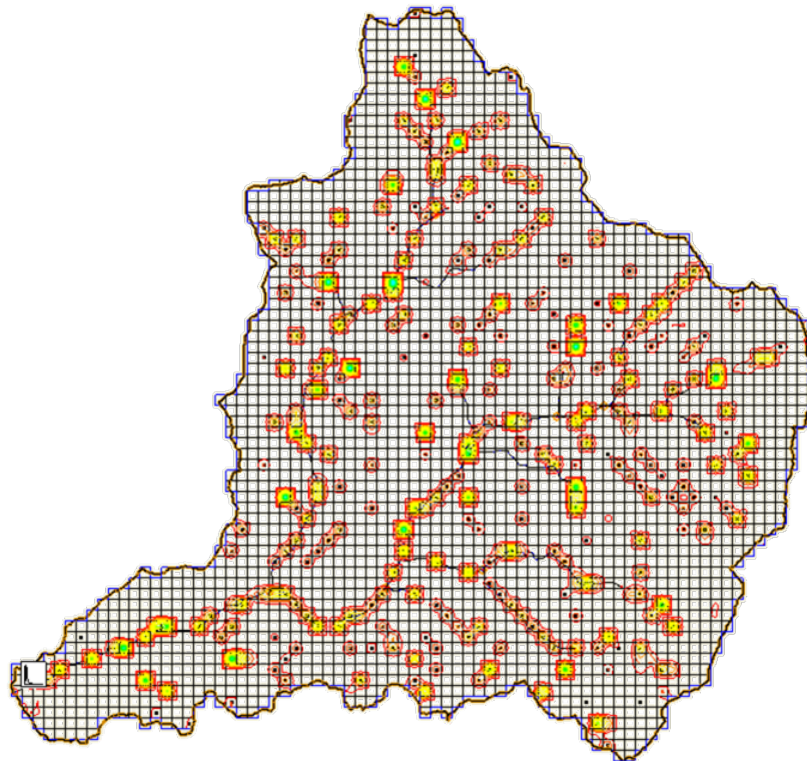
Save and Run





Visualize Results to Determine Surface Runoff Problems

Watershed and Groundwater
Modeling Solutions





Fixing Digital Dams

Model Wrapper

For more information about this program contact

Barbara Parsons

Barbara.A.Parsons@erdc.usace.army.mil

601.634.2344

3909 Halls Ferry Rd.

Vicksburg, MS, 39180

Copyright 2006 USACE

Reading watershed mask file: C:\DOCUME~1\mpaudel\LOCALS~1\Temp\1\

Reading elevation file: C:\DOCUME~1\mpaudel\LOCALS~1\Temp\1\WMS_2\

Not using depression mask or unable to open. Will continue.

Writing output to the file: C:\DOCUME~1\mpaudel\LOCALS~1\Temp\1\

The outlet is at... (64,1)

of active cells: 2764

of digital dams at start (not masked): 280

of masked digital dams (to be skipped): 0

pass: 1, 53 dams left

pass: 2, 42 dams left

pass: 3, 41 dams left

pass: 4, 41 dams left

of digital dams at end of initial passes: 41

Starting fix using patch cut...

Pass: 5, # of dams: 41

☒ Read solution on exit



Fix Surface Runoff Problems

Watershed and Groundwater
Modeling Solutions

