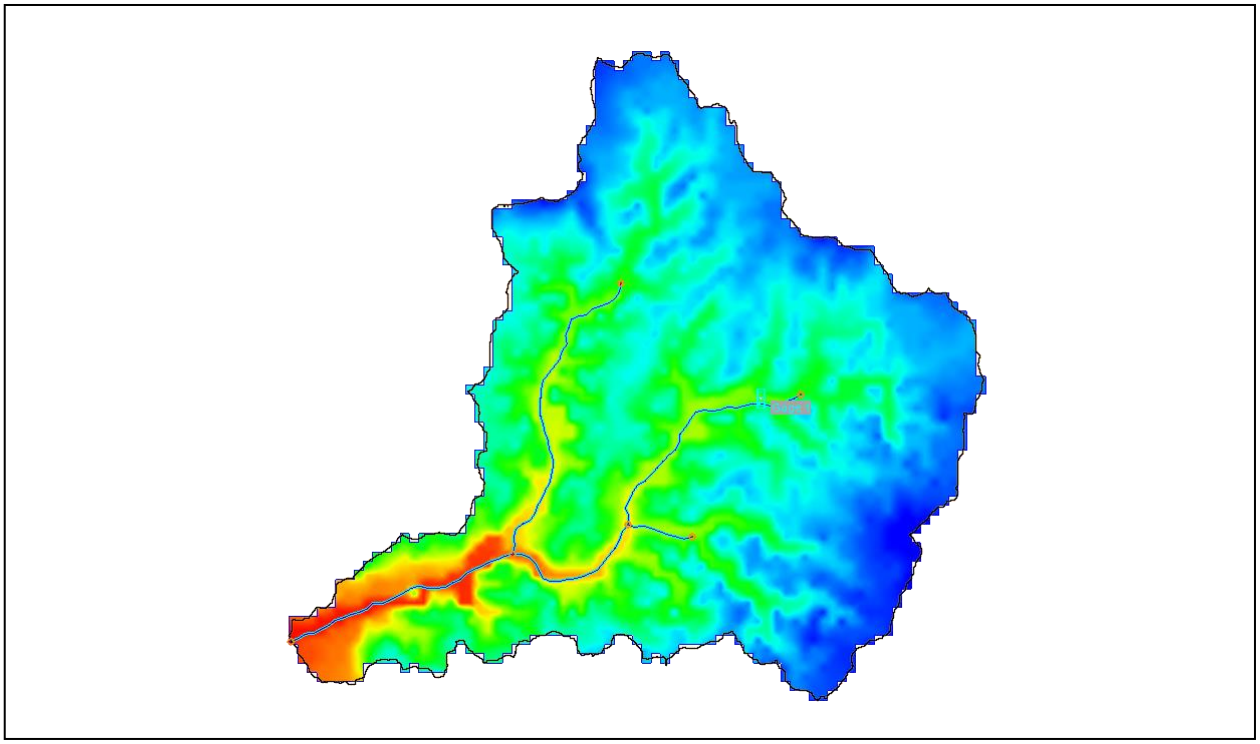
WMS

v. 11.0

WMS 11.0 Tutorial

GSSHA Long-Term Simulations

Set up and run a long-term simulation in GSSHA



Objectives

Learn how to set up a long-term (weeks or months-long) simulation that includes several rainfall events along with an evapotranspiration model.

Prerequisite Tutorials

- Developing a GSSHA Model Using the Hydrologic Modeling Wizard

Required Components

- Data
- Drainage
- Map
- Hydrology
- 2D Grid
- GSSHA

Time

- 10-20 minutes

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1 Introduction

This tutorial demonstrates setting up and running a long-term GSSHA simulation in WMS using an existing project file. Long-term simulations typically involve running several rainfall events along with the evapotranspiration model for a period covering weeks to months.

There are two key parts to running a long-term simulation: setting up the precipitation file to cover multiple events, and setting up the evapotranspiration model with its hydrometeorological (or "hmet") data.

This project uses an existing single-rainfall event model for the Judy's Branch watershed in southern Illinois. The project will be modified and a long-term simulation will be run.

1.1 Getting Started

To begin, do the following:

1. Open a new instance of WMS, or click **New** to clear any existing data from WMS.
2. Switch to the **2D Grid** module.
3. Select *GSSHA* | **Open Project File…** to bring up the *Open* dialog.
4. Browse to the *GSSHALongTerm* folder for this tutorial.
5. Select "GSSHA Project Files (*.prj)" from the *Files of type* drop-down.
6. Select "Judys_longterm.prj" and click **Open** to exit the *Open* dialog and import the project.
7. Select *GSSHA* | **Save Project File…** to bring up the *Save GSSHA Project File* dialog.
8. Select "GSSHA Project File (*.prj)" from the *Save as type* drop-down.
9. Enter "Judys_longterm_working.prj" as the *File name* and click **Save** to save the project under the new name and exit the *Save GSSHA Project File* dialog.

The project should appear similar to Figure 1.

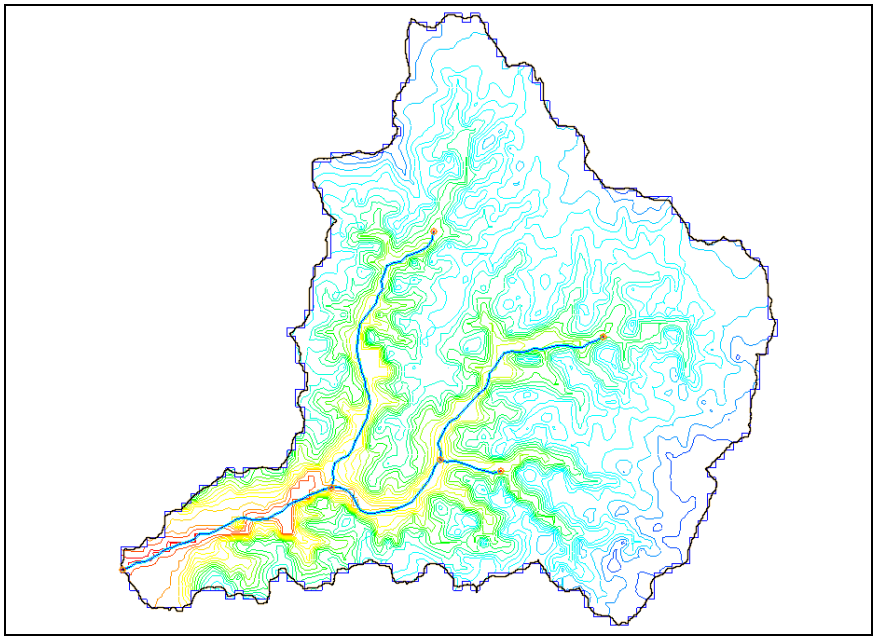

Figure 1 Initial project

2 The Long-Term Simulation

A long-term event typically consists of multiple rainfall events, often with several rain gages. For convenience in this tutorial, this data has already been created and formatted as needed. For more information on formatting the data to be imported into a long-term simulation, please see the "GSSHA Long-Term Simulation Data Formatting" tutorial.

2.1 Setting up the Long-Term Simulation

Now to set up the long-term modeling data by updating the job control options to turn on long-term mode.

1. Select *GSSHA* | **Job Control…** to bring up the *GSSHA Job Control Parameters* dialog.
2. In the *Evapotranspiration* section, turn on "Penman Method".
3. In the *Infiltration* section, turn on *Soil moisture depth* and enter "0.5".
4. In the list below the *Channel routing computation scheme* section, turn on *Long term simulation*.
5. Click the **Edit parameter...** button to the right to bring up the *Long Term* Simulation dialog.
6. In the *General* section, enter "38.7696" as the *Latitude*.
7. Enter "270.05" as the *Longitude*.
8. Enter "-6.00" as the *GMT*.
9. Enter "0.10" as the *Minimum event discharge*.

10. In the *HMET* section, click **Browse** next to *HMET data file* to bring up the *Open* dialog.
11. Select "hmet.hmt" and click **Open** to exit the Open dialog.
12. Select *WES* as the *Format*.
13. Click **OK** to close the *Long Term Simulation* dialog.
14. In the *Overland Flow* section, select "ADE" from the *Computation method* drop-down.
15. Click **OK** to close the *GSSHA Job Control Parameters* dialog.

2.2 Setting Up the Evapotranspiration Parameters

Next, set up the evapotranspiration parameters by doing the following:

1. Select *GSSHA* | **Map Tables…** to bring up the *GSSHA Map Table Editor* dialog.
2. On the *Evapotranspiration* tab, select "Land use" from the *Using index map* drop-down.
3. Click **Generate IDs** to add several rows and columns to the spreadsheet below the button.
4. Using the table below, enter the values required for evapotranspiration:

ID	11	14	16	21	41
Land-surface albedo	0.15	0.22	0.22	0.22	0.2
Vegetation height (m)	0.08	0.1	0.5	1	17
Vegetation radiation coeff	0.7	0.5	0.35	0.2	0.15
Canopy stomatal resistance (s/m)	20	20	50	86	100

5. Click **Done** to close the *GSSHA Map Table Editor* dialog.

2.3 Importing the Gage File

The precipitation gage file needs to be set up next by doing the following:

1. Select *GSSHA* | **Precipitation…** to bring up the *GSSHA Precipitation* dialog.
2. In the *Rainfall event(s)* section, select "Gage" from the drop-down.
3. Click **Import Gage File…** to bring up the *Open* dialog.
4. Select "Judys_precipitation.gag" and click **Open** to exit the *Open* dialog.

Notice the three GSSHA event entries in the list.

Since there is only one gage in this tutorial model, the rainfall data is spread out uniformly over the watershed. If there was more than one gage, the options in the *Multi-gage interpolation method* section would be available.

5. Click **OK** to close the *GSSHA Precipitation* dialog.

Notice that three coverages representing the three storm events were added in the Project Explorer (Figure 2).

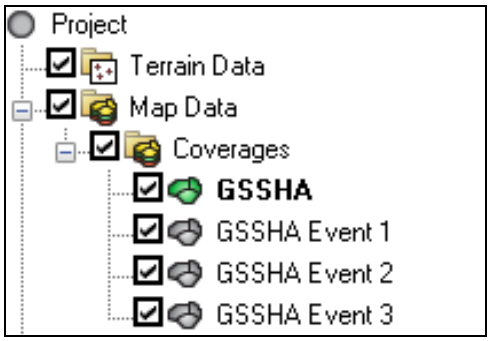

Figure 2 Three new coverages

3 Changing the Output Control

The model run is ready to be executed. Before running the model, change the output options to create smaller datasets.

1. Select *GSSHA* | **Job Control...** to bring up the *GSSHA Job Control Parameters* dialog.
2. At the bottom of the dialog, click **Output Control...** to bring up the *GSSHA Output Control* dialog.
3. In the *Write frequency* section, enter "60" as the *Write frequency*.
4. Leave all other values at the defaults and click **OK** to close the *GSSHA Output Control* dialog.
5. Click **OK** to close the *GSSHA Job Control Parameters* dialog.

4 Saving and Running the Model

Before running the GSSHA model, the project should be saved:

1. Select *GSSHA* | **Save Project File…** to bring up the *Save GSSHA Project File* dialog.
2. Select "GSSHA Project File (*.prj)" from the *Save as type* drop-down.
3. Enter "Judys_longterm_final.prj" as the *File name*.
4. Click **Save** to exit the *Save GSSHA Project File* dialog and save the project under the new name.
5. Select *GSSHA* | **Run GSSHA…** to bring up the *GSSHA Run Options* dialog.
6. Click **OK** to close the *GSSHA Run Options* dialog and bring up the *Model Wrapper* dialog.
7. When GSSHA finishes running, turn on *Read solution on exit* and click **Close** to exit the *Model Wrapper* dialog.

At this point, various visualization techniques and display options can be used to review different aspects of the solution datasets.

5 Conclusion

This concludes the "GSSHA Long-Term Simulations" tutorial. Feel free to continue experimenting, or exit the program.