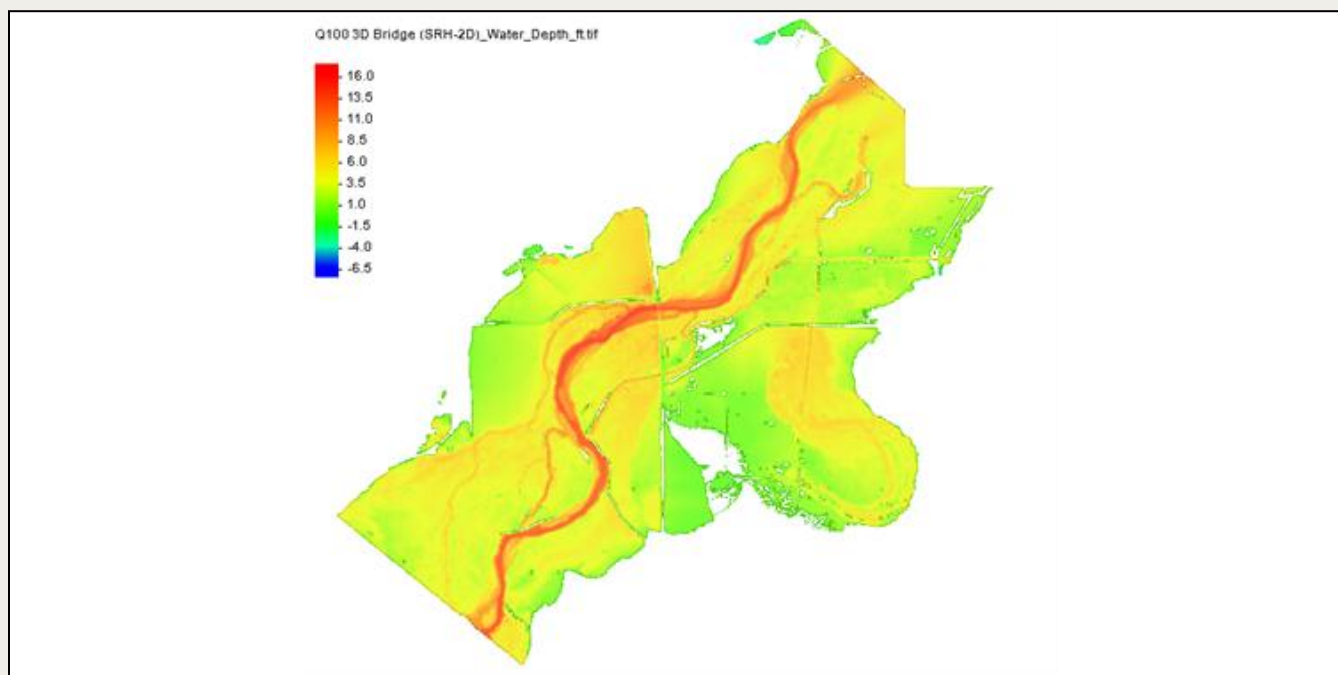




SMS 14.0 Tutorial

Converting Dataset to Rasters

Create a raster from a dataset



Objectives

This tutorial demonstrates how to convert datasets into rasters.

Prerequisite Tutorials

- SMS Overview
- Data Visualization
- GIS

Required Components

- SMS Core

Time

- 10–20 minutes

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1 Introduction

Raster data models (rasters) are the tessellation of a plane. In this case, the plane is a projection of the Earth's surface with a fixed-sized grid of pixels.

This tutorial demonstrates creating rasters from datasets located in a mesh or unstructured grid. These datasets may include geometry elevation or solution data.

Rasters can be used as an alternate format for visualizing spatial data and may have specific applications in GIS operations.

SMS contains a tool to convert datasets computed by SRH-2D into rasters that can be used in GIS applications. To create a raster from a dataset, SMS requires a mesh with at least one dataset. The tool can make use of an elevation raster to define the target raster size and resolution.

The data used in this tutorial is from the South Platte River in the state of Colorado in the United States. The water surface elevation dataset was generated using SRH-2D. The tutorial begins with a completed SRH-2D simulation.

2 Getting Started

Start by importing a project file containing the data for this site:

1. Launch the SMS application.
2. Select *File* | **Open...** to bring up the *Open* dialog.
3. Select “Project Files (*.sms)” from the *Files of type* drop-down.
4. Browse to the *data files* folder for this tutorial and select “SouthPlatte.sms”.
5. Click **Open** to import the project and exit the *Open* dialog.

The project should appear similar to Figure 1.

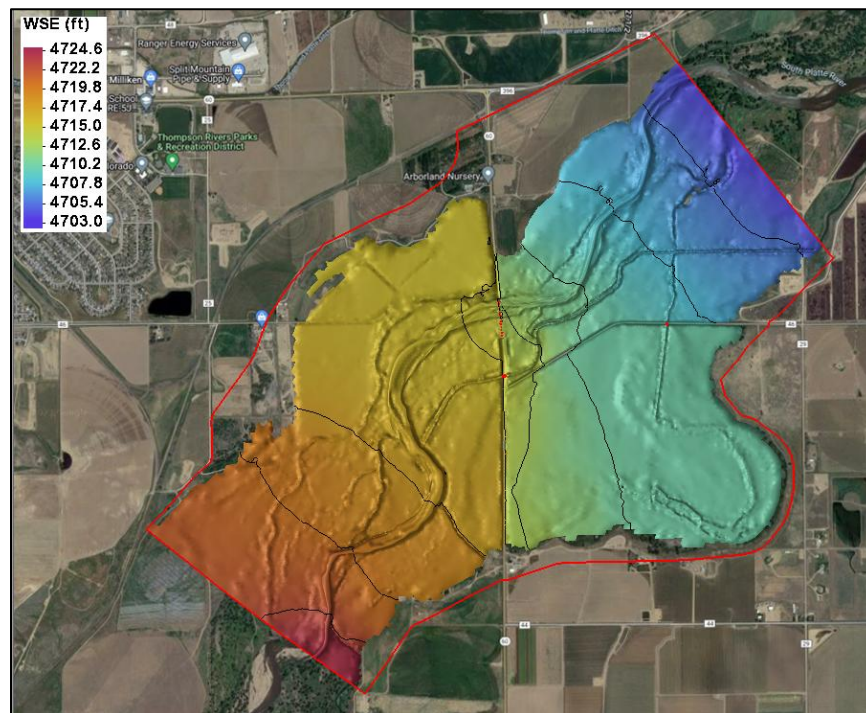


Figure 1 Initial project

3 Reviewing the Existing Project

Take a minute or two to examine the data in this project. It includes:

- A 2D mesh of the region. If interested, turn on the display of mesh elements and note the increased resolution along the hydraulic features.
- An SRH-2D simulation of the flow in the domain representing a flow with a return interval of 500 years. This includes the standard output datasets from an SRH-2D hydraulic simulation.
- An elevation raster of the terrain including both topography and a representation of bathymetry in the low flow channel.
- Display themes associated with the SRH-2D solution datasets. These can be used for reviewing the solution data, but are not set up for the raster files.

4 Creating a Velocity Magnitude Raster

With the SRH-2D simulation and solution, the *Raster from Dataset* tool can be used. To use the tool to create a raster from a velocity magnitude dataset, do the following:

1. Click the **Toolbox**  macro to open the *Toolbox* dialog.
2. On the *Tools* tab, expand the “ Rasters” folder and select the *Raster from Dataset* tool.
3. Click **Run Tool** to bring up the *Raster from Dataset* dialog.
4. For the *Dataset* dropdown, select “Mesh Data/MeshEC/Q500 3D Bridge (SRH-2D)/Vel_Mag_ft_p_s”.
5. For the *Pixel size*, enter “2.0”.

This sets the resolution size for the generated raster file.

6. In the *Output raster* field, enter “Q500_Vel_Mag_ft_p_s”.
7. Click **OK** to run the tool.

The *Raster from Datasets* tool will begin processing. It may take a minute or two for the tool to finish running. When the process is complete the progress dialog will state that the process finished successfully, or, if it failed to complete, it will show any error messages. In this case, the process should complete successfully.

8. When the tool finishes, click **OK** to exit the *Raster from Dataset* tool.

The new raster will be loaded into SMS as “ Q500_Vel_Mag_ft_p_s.tif”.

4.1 Viewing the Velocity Magnitude Raster

Now, review the new velocity magnitude raster by doing the following:

1. In the Project Explorer, right-click in an empty space and select **Uncheck All**.

This turns off the mesh and all other objects, clearing the display.

2. Check on the “ Q500_Vel_Mag_ft_p_s.tif” raster and review the information in the raster.

The velocity magnitude raster should appear similar to Figure 2.

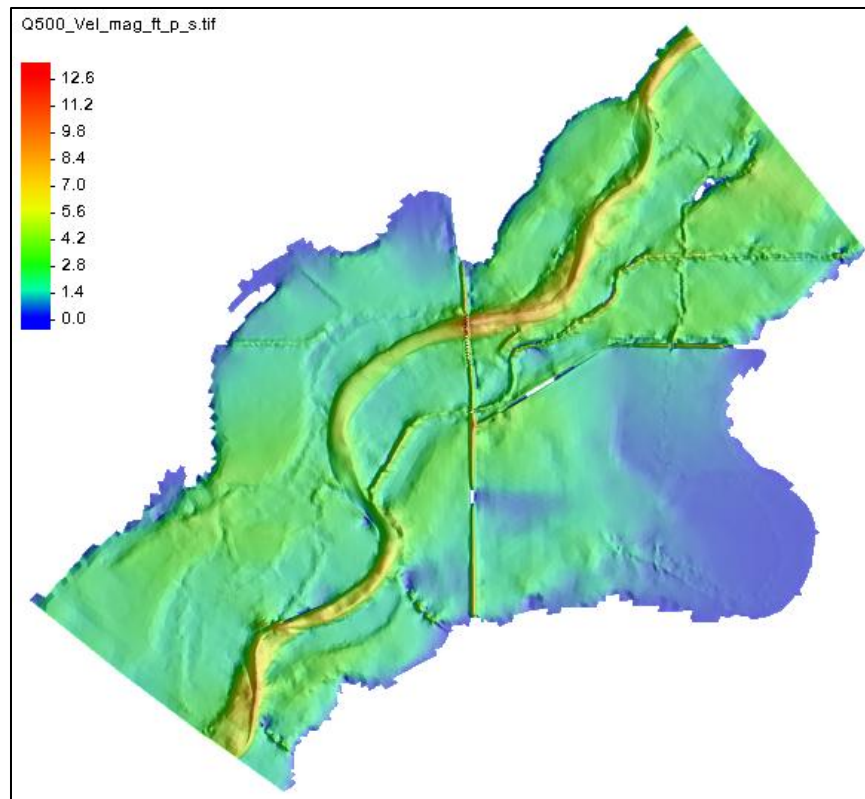


Figure 2 The velocity magnitude raster

If desired, compare the mesh and the raster by turning either on and off in the Project Tree.

5 Creating a WSE Raster

The *Raster from Dataset* tool allows using an existing raster to set the resolution for the generated raster. This is done by doing the following:

1. Return to the *Toolbox* dialog or, if it has been closed, click the **Toolbox**  macro to open the *Toolbox* dialog.
2. On the *Tools* tab, expand the  *Rasters* folder and select the *Raster from Dataset* tool.
3. Click **Run Tool** to bring up the *Raster from Dataset* dialog.
4. For the *Dataset* dropdown, select “Mesh Data/MeshEC/Q500 3D Bridge (SRH-2D)/Water_Elev+Pressure_ft”.
5. Set the *Optional template raster* to “GIS Data/Terrain+Stamp.tif”.
6. Set the *Raster template resolution option* to “Use template raster native resolution”.

Unlike with the velocity magnitude raster in the previous section, using a template raster will cause the new raster to have resolution that matches the resolution of the template.

7. In the *Output raster* field, enter “Q500_Water_Elev+Pressure_ft”.
8. Click **OK** to run the tool.

9. When the tool finishes, click **OK** to exit the *Raster from Dataset* tool.

5.1 Viewing the WSE Raster

Now, review the new water surface elevation raster by doing the following:

1. In the Project Explorer, uncheck “ Q500_Vel_Mag_ft_p_s.tif”.
2. Check on the “ Q500_Water_Elev+Pressure_ft” raster and review the information in the raster.

The water surface raster should appear similar to Figure 3. If desired, turn the mesh on and off with the dataset corresponding to the raster active to compare the two. Also, it may help to zoom into various sections of the domain to note the different changes.

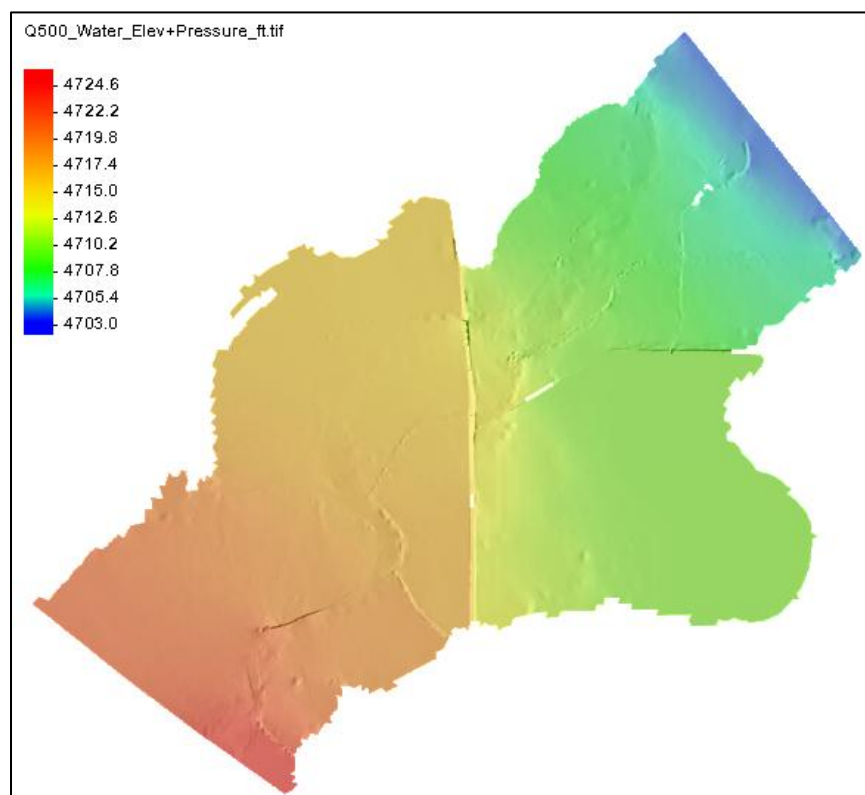


Figure 3 The Water elevation + pressure raster

6 Conclusion

This concludes the “Datasets to Rasters” tutorial. As noted, this tool provides for the creation of rasters (images) that represent the datasets computed on a mesh. The rasters will be saved as separate files when saving the project. The tutorial has demonstrated:

- Using the *Raster from Dataset* tool in the SMS Toolbox.
- Using an existing elevation raster to define the size and resolution of the target rasters.

If desired, experiment with the other raster from dataset options by specifying other target resolution and performing the operation with other datasets.