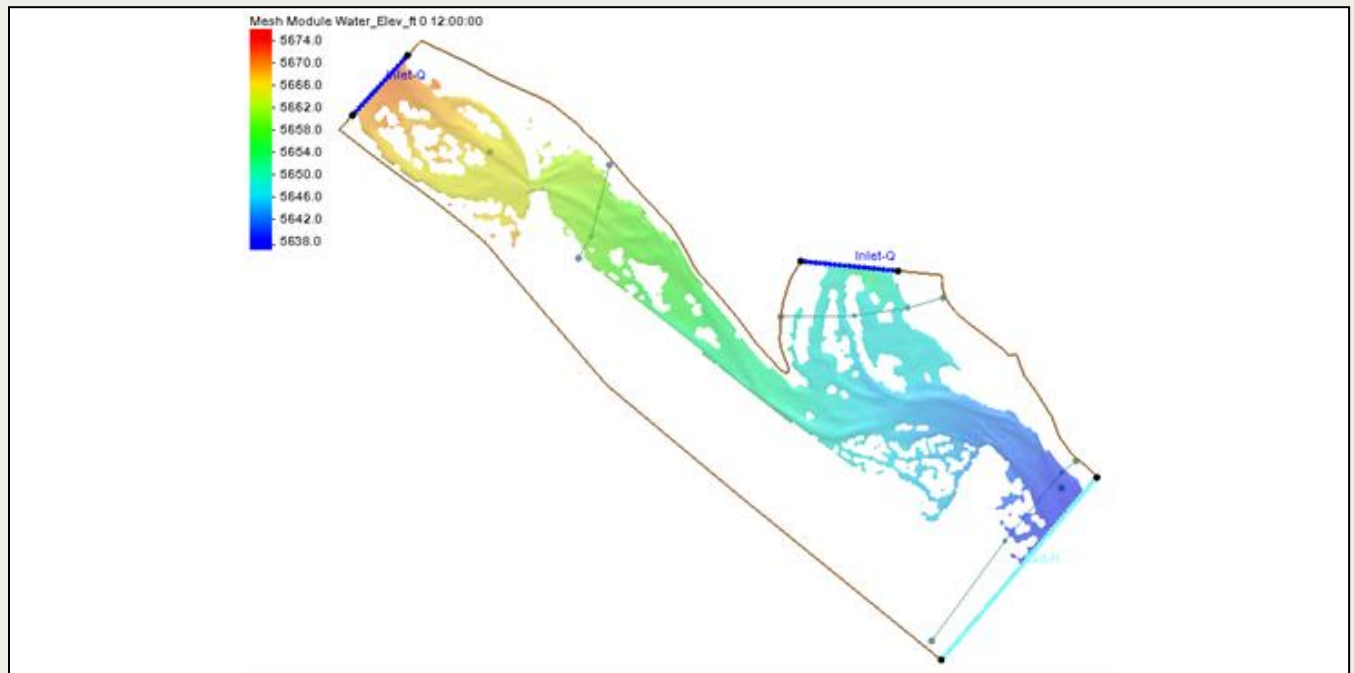




SMS 14.0 Tutorial

SRH-2D – Variable Water Surface Initial Condition

Using a Variable Water Surface Initial Condition with SRH-2D



Objectives

This tutorial demonstrates how to use a water surface elevation dataset on a mesh in SMS as the initial condition for an SRH-2D simulation using the same mesh.

Prerequisite Tutorials

- Overview
- Map Module
- SRH-2D
- SRH-2D Simulations

Required Components

- SMS Core
- SRH-2D Model & Interface

Time

- 10–20 minutes

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1 Introduction

This tutorial demonstrates using a variable water surface elevation dataset as the initial condition for an SRH-2D simulation.

The data used in this tutorial is from the Gila River in the state of New Mexico in the United States. The projection for the project has been preset.

This tutorial uses a project that contains two SRH-2D simulations. One simulation is the base simulation that was run previously using a dry starting condition. The solution set from this simulation run has been included in the project. The second simulation can be thought of as a continuation of the first simulation.

2 Getting Started

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

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 "VWSE.sms."
5. Click **Open** to import the project and exit the *Open* dialog.

The project should appear similar to Figure 1. The contours represent the water surface elevation from the base simulation model run.

Note that the project contains a "BaseFlow" simulation and a "Hydrograph_VWSE" simulation. Also, notice that the "Hydrograph_VWSE" simulation uses a different boundary condition coverage than the "BaseFlow" simulation. For the "Hydrograph_VWSE" simulation, a change was made to the boundary conditions so that the inflow boundary condition uses a time series hydrograph for the discharge.

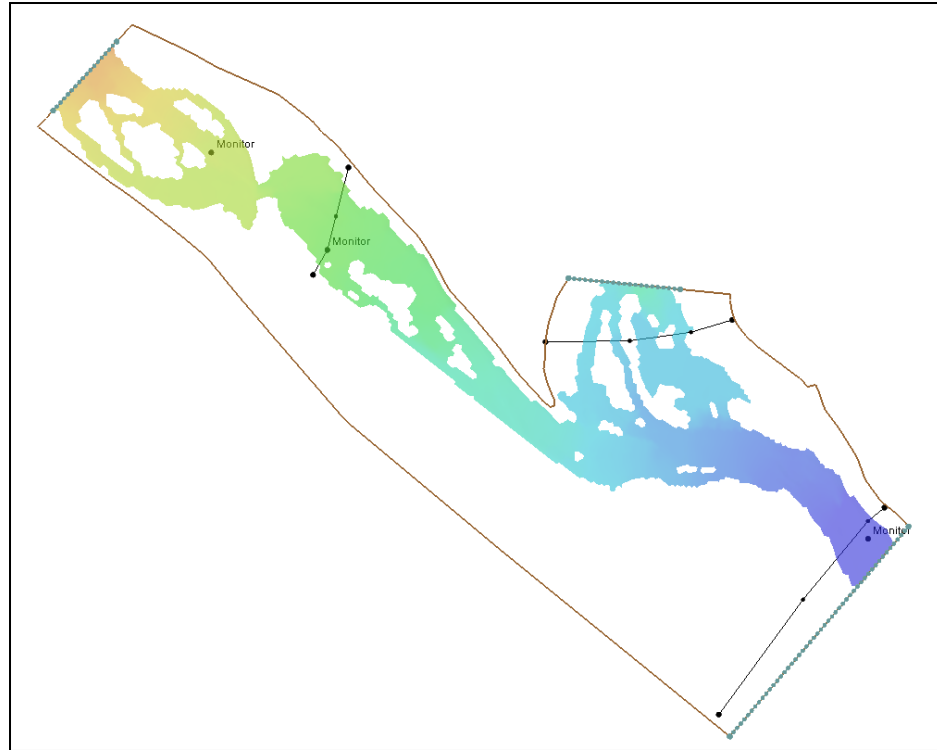


Figure 1 Initial project

3 Reviewing the Existing Project

Most of what is needed has already been set up in the project. Review the initial setup by doing the following:

1. Right-click on the “BaseFlow” simulation and select **Model Control...** to bring up the *SRH2D Model Control* dialog.

Note the *Time step* value that was used and that the initial condition is set to “Dry”. The “Hydrograph_VWSE” simulation has a slightly different setup.

2. Click **Cancel** to exit the *SRH2D Model Control* dialog.
3. Right-click on the “Hydrograph_VWSE” simulation and select **Model Control...** to bring up the *SRH2D Model Control* dialog.

Notice the *End time* is set to “12.0” hours. This time range matches the hydrograph being used for the boundary inflow for the “Hydrograph_VWSE” simulation. A hydrograph was not used in the “BaseFlow” simulation.

4. Set the *Time step* value to “8.0” seconds.
5. Click **OK** to save the change and exit the *SRH2D Model Control* dialog.

To see the hydrograph being used in the “Hydrograph_VWSE” simulation, do the following:

6. Select the “VWSE_BC” coverage to make it active.

7. Using the **Select Feature Arc**  tool, double-click on the inlet boundary arc at the top of the model to bring up the *SRH2D Assign BC* dialog.

The hydrograph can be viewed in this dialog by clicking the **XY Series** button.

8. When done, click **Cancel** to close the *SRH2D Assign BC* dialog.

If desired, the other boundary conditions can be reviewed using the same process.

4 Setting the Initial Condition

The “ Hydrograph_ VWSE” simulation can now be set to use the water surface elevation dataset simulation as the initial condition. To do this:

1. Right-click on the “ Hydrograph_ VWSE” simulation and select **Model Control...** to open an *SRH2D Model Control* dialog.
2. Change the *Initial condition* to “Water Surface Elevation Dataset.”
3. Under *Water Surface Elevation Dataset*, click the **Select Dataset...** button to bring up a *Select Dataset* dialog.
4. Select the “ Base Flow WSE” dataset and click **OK** to close the *Select Dataset* dialog.
5. Click **OK** to close the *SRH2D Model Control* dialog.

The “ Hydrograph_ VWSE” simulation has now been set to use the “ Base Flow WSE” dataset as the initial condition for the model run. This dataset contains a single time step and is equivalent to the last time step in the “ BaseFlow” simulation. The dataset toolbox can be used to sample any single time step from a transient dataset to a steady-state dataset for use as an initial condition.

5 Running the Model

With the initial condition set, the model is ready to run.

1. Right-click on the “ Hydrograph_ VWSE” simulation and select **Save Project, Simulation and Run**.
2. If a warning dialog appears stating one or more coverages needs to be renumbered, click **Yes**.

When using a variable water surface dataset as the initial condition, an additional file will be exported to the simulation folder. This file has the *.srhdset extension.

3. When the simulation finishes, click the **Load Solution** button in the *Simulation Run Queue* dialog.
4. Click **Close** to exit the *Simulation Run Queue*.

The solution datasets will now be listed in the Project Explorer under “ Gila_Mesh” under the “ Hydrograph VWSE” folder.

6 Viewing the Results

Now review results by doing the following:

1. Below the “ Hydrograph VWSE (SRH-2D)” folder, select the “ Water_Elev_ft” solution dataset to make it active.
2. Select the first time step (“0 01:00:00”) and note that the water surface already fills the domain. There was no initialization or “spin up” time as the water flowed into the domain.
3. Step through the time steps of the “ Water_Elev_ft” solution dataset in the “ Hydrograph VWSE (SRH-2D)” folder from “0 01:00:00” to “0 12:00:00”. Watch the water level rise and fall as the flow rate specified in the hydrograph varies. The Graphics Window should appear as in Figure 2 for the last time step (“0 12:00:00”).

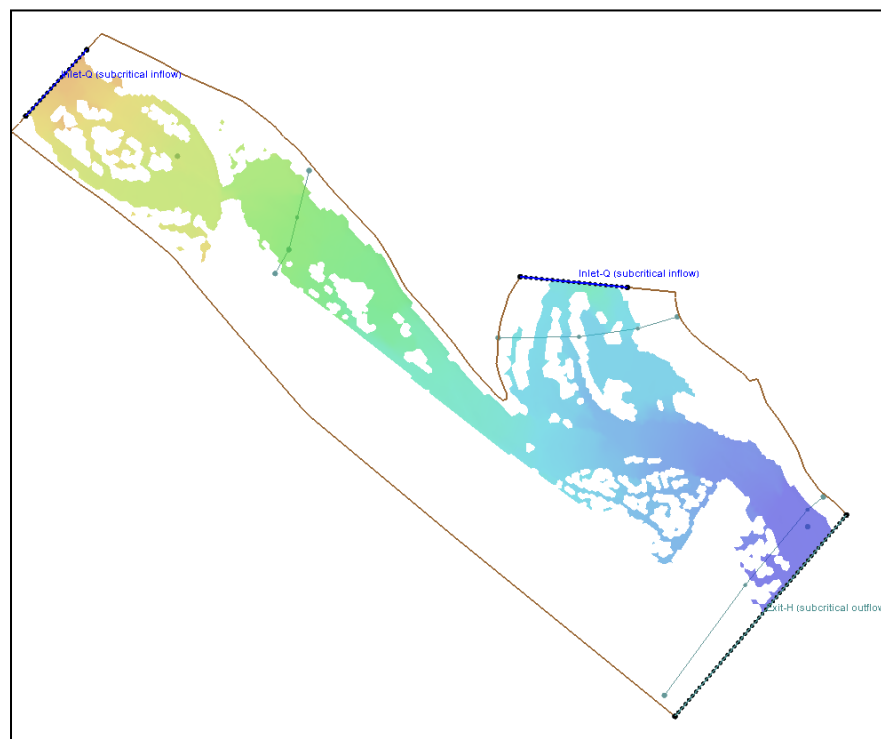


Figure 2 Water surface elevation dataset from the Hydrograph_VWSE simulation

7 Conclusion

This concludes the “SRH-2D – Variable Water Surface Initial Conditions” tutorial. Feel free to continue experimenting with SMS or exit the program.