

Mapping HEC-RAS Dam Breach Results Workshop

1 Objective

In this workshop, you will perform a floodplain delineation using an HEC-RAS model created from GIS data. You will then simulate a dam breach, examine output, and perform floodplain mapping using HEC-RAS Mapper.

NOTE: While this data is from an actual river system, the model and results of this workshop do not represent current or future conditions of the river. The United States Army Corps of Engineers has granted access to the information in this model for instructional purposes only. Do not copy, forward, or release the information without United States Army Corps of Engineers approval.

2 Background

You will be working on Bald Eagle Creek near Lock Haven, PA and mapping the inundation due to a dam failure scenario.

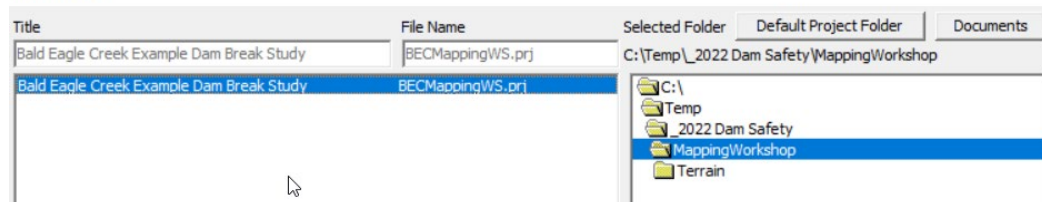
3 Floodplain Mapping using HEC-RAS Results

You will map dam break results of a PMF event for an existing HEC-RAS model for Bald Eagle Creek, PA. You may need to run the unsteady flow simulation before getting started.

3.1 Model Review

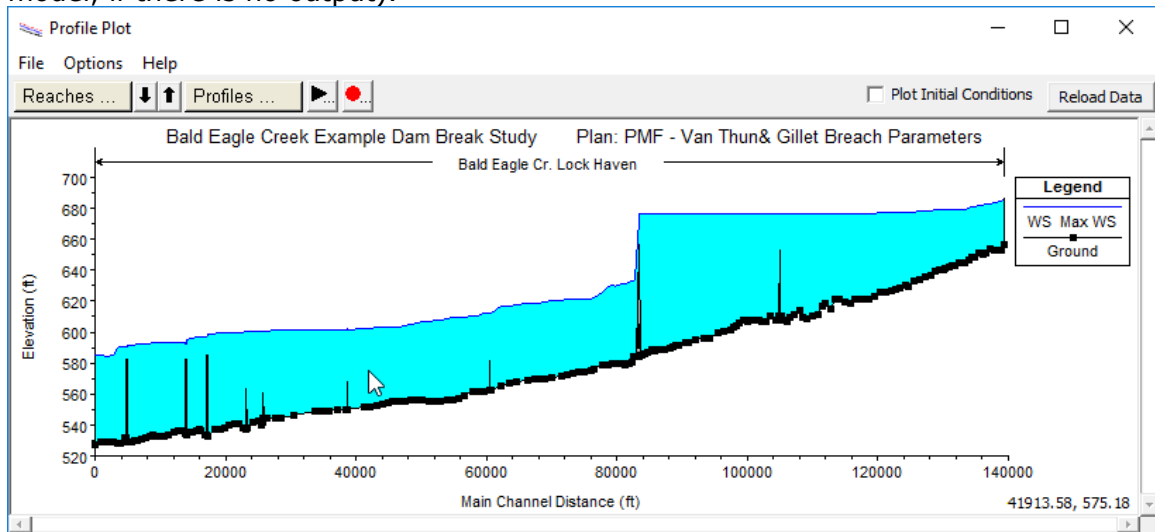
1. Open the "Bald Eagle Creek Example Dam Break Study" HEC-RAS project (**BECMappingWS.prj**).

Open Project



2. **Compute** the Unsteady Flow run.
3. Look at the breach hydrograph by clicking on the **Breach Hydrograph** button.
 - a. What is the Breach **Peak Flow**?
 - b. **When** did the breach occur?

4. Take a look at the profile plot to verify that the output is valid (re-run the model, if there is no output).



3.2 Dynamic Map Results

Dynamic map results layers are computed on the fly and allow you to quickly take a look at computed RAS results. None of the data are stored to disk, values are generated as you need them only for the current map view.

5. Turn on the **Depth** Layer under the Results node.
6. Use the Layer Properties to change the Plot Surface. Consider varying the colors, color values, transparency, and whether the values are "Stretched" or "Discrete".

❖ *What is the maximum water surface elevation at the Lock Haven levee?*

❖ *When does the flood peak reach the Lock Haven levee?*

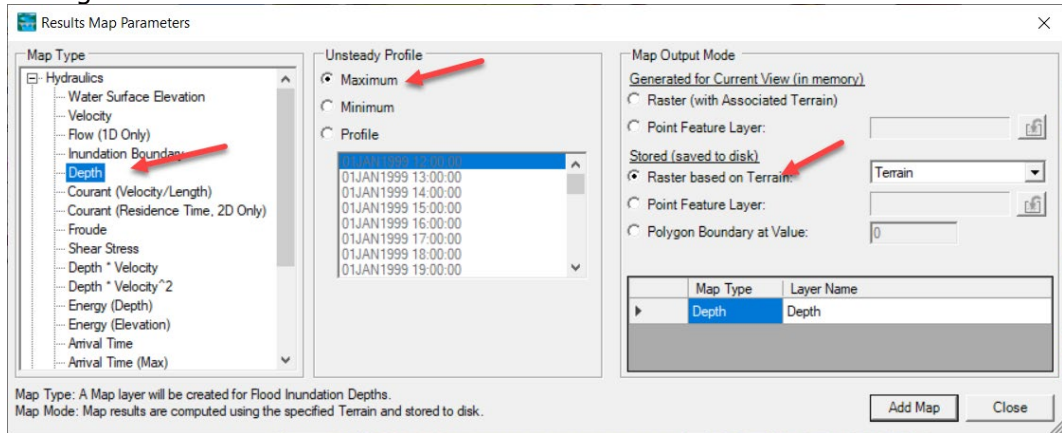
❖ *How long does it take for the flood wave to reach this location?*

❖ *What are the approximate channel velocity near the Lock Haven levee?*

3.3 Stored Map Results

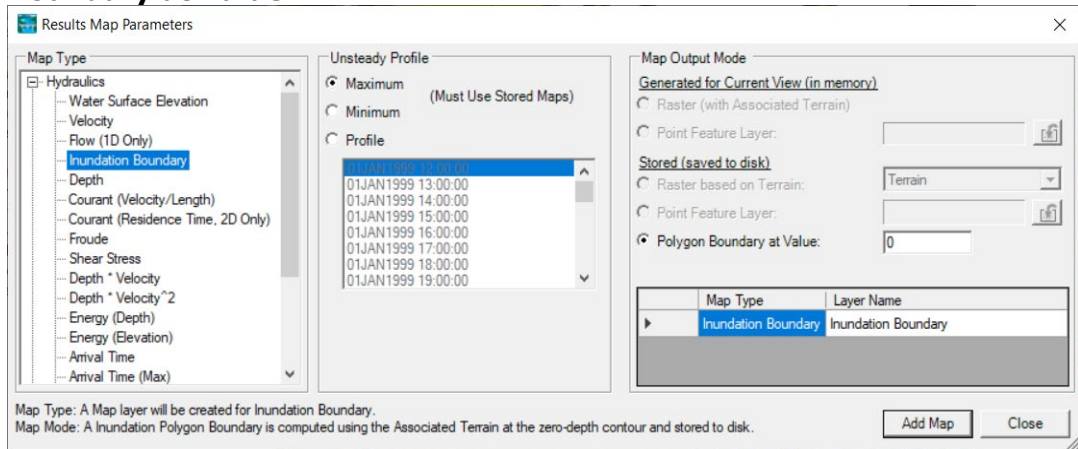
Stored map results are data that are written to disk. Generating this data takes more time than for dynamic results because the entire dataset must be evaluated and then saved to disk.

- Right-click on the plan name and select the **Create New Results Map Layer** menu item.
- Expand the **Hydraulics** group node
- Create a permanent Depth grid by selecting the **Depth** Map type, **Maximum** for the profile, and **Raster Based on Terrain** as the template for data storage.



10. Press **Add Map**.

- Do the same for the Inundation Boundary map layer by selecting the **Inundation Boundary** Map type, **Maximum** for the profile, and **Polygon Boundary at Value**.

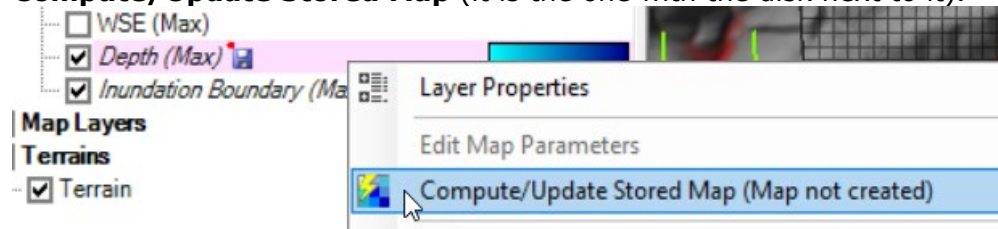


12. Press **Add Map**.

13. **Close** the Results Map generation window.

14. Compute the stored Maps

- a. Right-click on the **Depth (Max)** layer and select the **Compute/Update Stored Map** (it is the one with the disk next to it).

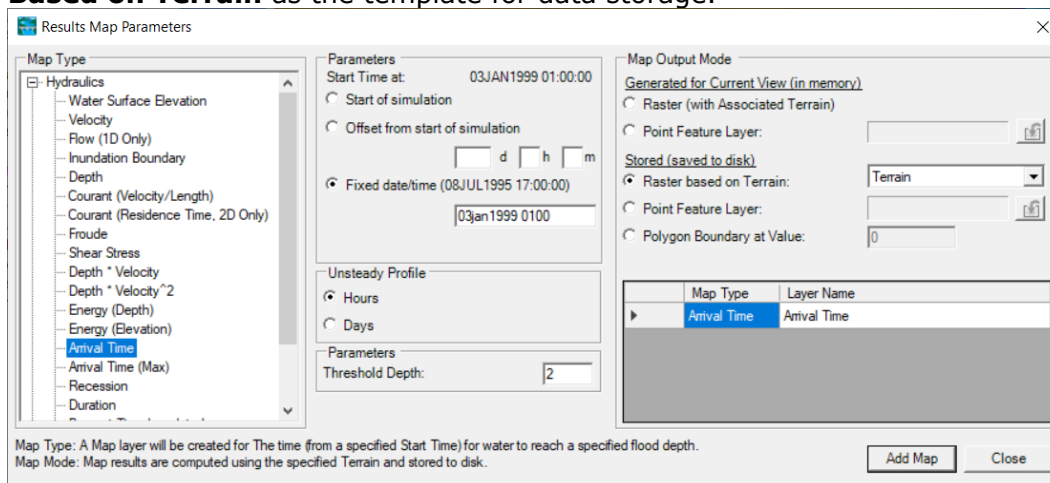


- b. Do the same for the **Inundation Boundary (Max Value_0)** layer.

◇ What differences do you see between the stored Depth grid and the Inundation Boundary map?

15. Right-click on the plan name and select the **Create New Results Map Layer** menu item.

16. Create an Arrival Time grid by selecting the **Arrival Time** Map type using Hours, a Depth Threshold of 2ft, starting at 03JAN1999 @0100, and **Raster Based on Terrain** as the template for data storage.



17. Press **Add Map**.

18. Right-click on the **Arrival Time** layer select the **Compute/Update Stored Map**.

◇ At what time does the Lock Haven area get wet to a depth of 2ft?

◇ Briefly describe the flooding that occurs in Lock Haven. How well does the levee protect the city from the flood event modeled using HEC-RAS.

3.4 Bonus – Evaluate other Events

As time permits, create and evaluate other breach/non-breach scenarios or flows and see how it affects downstream flooding.