# Refining an HEC-RAS Model for Dam Breach Analysis
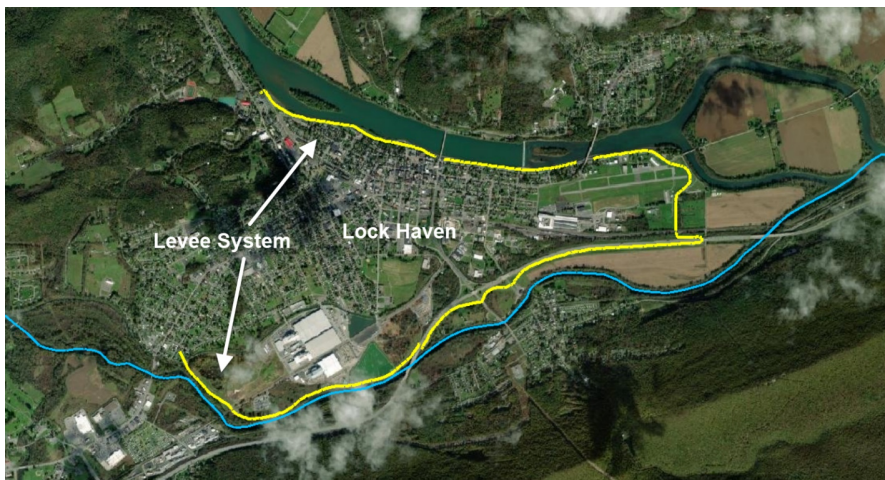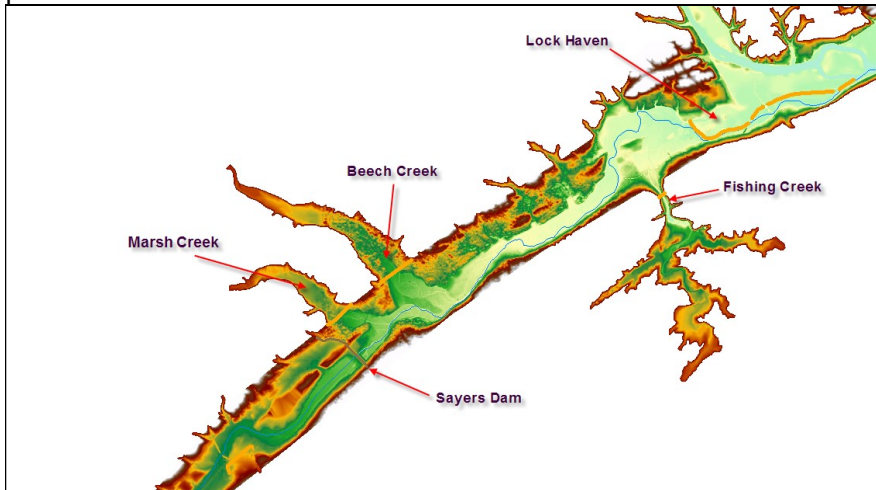Workshop

## Objective

This workshop will guide students on using HEC-RAS to:

- Reinforce the modeling process of analyze, refine, run
- Learn how to use the NLD download tool
- Understand using Terrain Modifications

## Background

The town of Lock Haven is situated on the north bank of Bald Eagle Creek in central Pennsylvania. Lock Haven sits behind a levee system that was designed to provide protection. You will simulating a Sunny Day failure event. Will the Levee System protect Lock Haven?

# 1   Open the HEC-RAS Project

1. **Open RAS**

2. **Open** the "**BreachRefinementWorkshop**.prj" RAS project file.

3. Open the **Unsteady Flow Analysis** window and press **Compute** the existing plan.
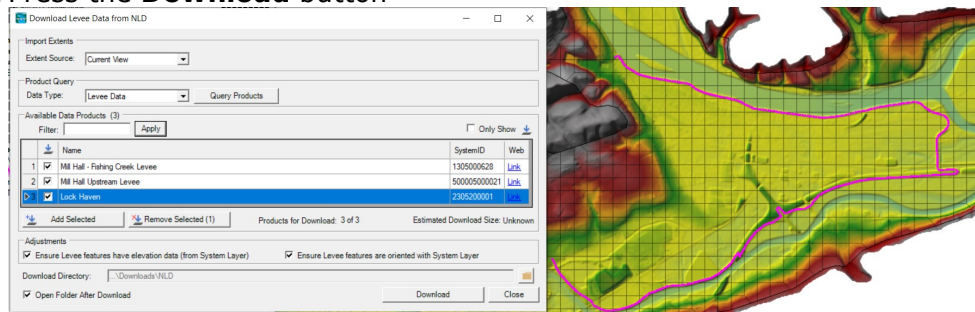
4. Open **RAS Mapper**

5. Investigate the results

*Question:  When does the town of Lock Have get inundated?*

# 2   Download NLD data

6. **Zoom to Lock Haven**

7. Download NLD data

8. Select **Project | Download Data | National Levee Database Features (NLD)** menu item
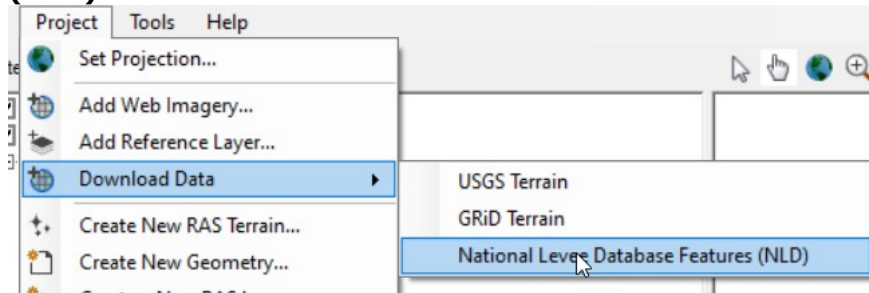


9. Press the **Query Products** button (using your Current Zoom Extents)

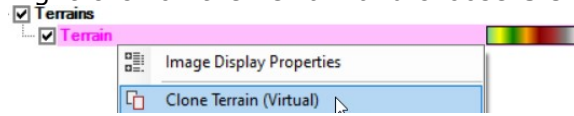10. Press the **Download** button



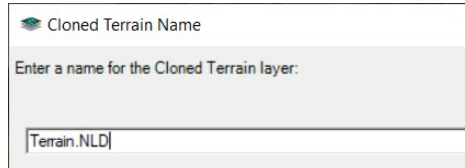The NLD data will be added to RAS Mapper in the Map Layers group

11. Press **Close**

12. **Turn On** the **NLD** group layer and the **RAS Merged Alignments** layer to verify the data were downloaded.

## 3  Use NLD with new Terrain

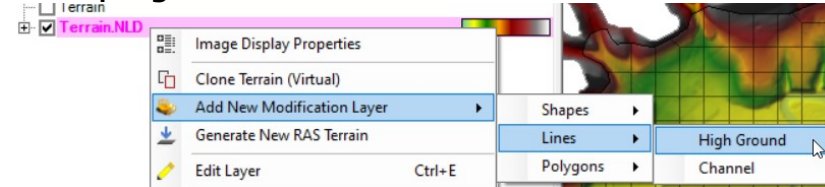13. Right-click on the Terrain and choose **Clone Terrain**



14. Provide a **Name**



15. Turn Off the old terrainn and **Turn On** the new Terrain

16. Right-click on the new Terrain and choose **Add New Modification Layer | Lines | High Ground**
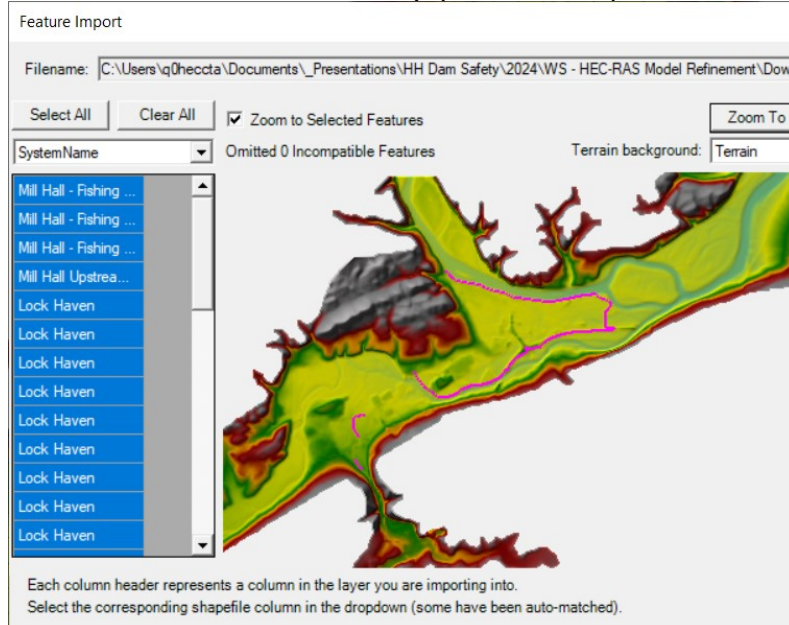


17. Provide a name the **Levees** modification

18. Right-click on the **Levees** modification and choose **Import Features**

19. Navigate to the "./Downloads/NLD" folder and select the **RAS Merged Alignments** shapefile

20. **Select** the Levees of interest (by default they are all selected)



21. Press the **Import** button

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22. **Verify** that the Terrain was updated with the Levee Elevations.

23. **Stop Editing** the Terrain Modifications

## 4  Modify Geometry with Breaklines

24. Right-click on the **Geometry** and choose **Save As**

25. Provide a new Name ("Refined) – this will the Geometry you edit

26. **Associate** the **Refined** Geometry with the **Terrain.NLD** (cloned terrain) and press the **Close** button

27. **Start Editing** the **Refined** Geometry

28. Select the **Breaklines** layer and **Import** the **Levee Alignment**

29. **Improve** (and clean up) the levee lines to that they smoothly transition

30. Right-click on the **Breaklines** layer and **Enforce All Breaklines**

31. Inspect

32. Refine

33. **Stop Editing** when "happy" with your geometry (or you run out of time)

34. **Close RAS Mapper**

## 5  Create a new Plan and Simulate

35. **Open** the **Unsteady Flow Analysis** window

36. **Save Plan As** a new plan named **Refined**

37. **Select** the **Refined** Geometry

38. **Compute**

## 6  Review Results

39. **Open** the **Unsteady Flow Analysis** window

40. **Save Plan As** a new plan named **Refined**

41. **Select** the **Refined** Geometry

## 7  Review Results

After running both plans, review the output and answer some questions (for both plans).

*Question:*    *How long does it take for the floodwave to reach Lock Haven?*

*Question:   When does the town of Lock Haven get wet?*

*Question:  How deep is the water in Lock Haven?*

*Question: How much water goes over the levee?*