

HEC-RAS 6.0 Mapper Tools What's New!

Cameron Ackerman, PE, D.WRE

USACE, Institute for Water Resources, Hydrologic Engineering Center





Overview

- Editing Tools
- Terrain Modification Tools
- RASter Calculator



Before I Go Any Farther ...

- Alex Kennedy



- Anton Rotter-Seiren

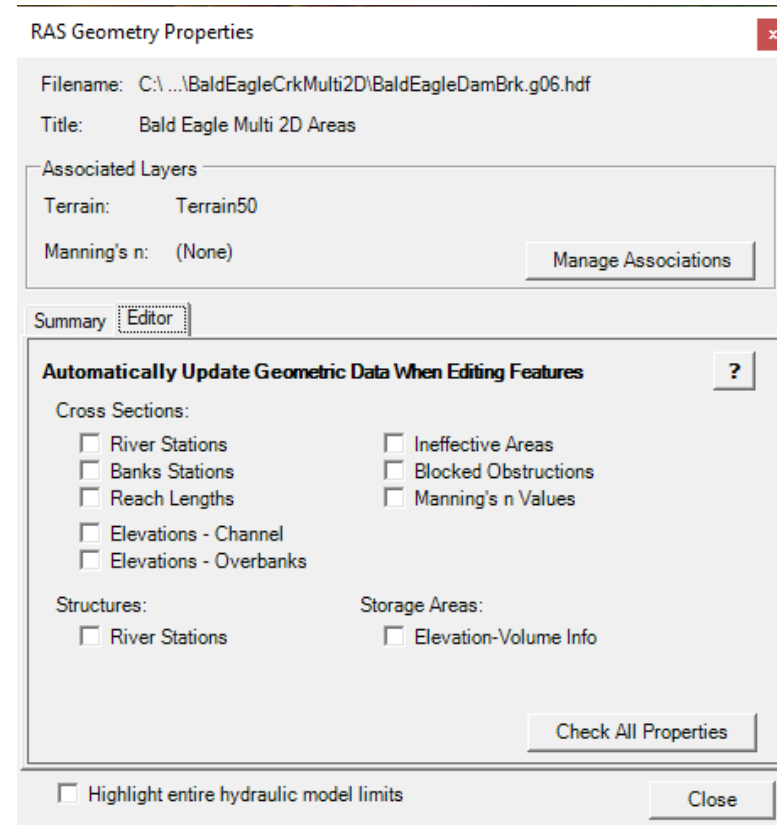


- **Key roles in the design and development of the tools!**



Editing Tools

- More User Feedback
 - New Highlighting
 - Greyed out layers
- Geometry Management
 - Add New Geometry
 - Save Geometry As
 - Delete Geometry
- Auto Update of Features





Structure Layers

- Bridges/Culverts
- Inline Structures
- Lateral Structures
- SA/2D Connections

- Pump Stations

Editing Culvert Barrel

Structure:

Culvert Group
Name:

Width (ft): Inlet Elev (ft): (556.02)
Length (ft): Outlet Elev (ft): (551.19)

Barrels
Barrels: 2

	Name	X, Y Coords
▶ 1	Barrel #2	
2	Barrel #3	
* 3		

OK Cancel Apply



Classification Layers

- Manning's n values
- Percent Impervious
- Infiltration

Classification Parameters

Selected Area Edits: [Icons for selection and editing]

Parameter: All Parameters

ID	Name	ManningsN	Percent Impervious
0	NoData	0.035	0
1	Main Channel	0.035	100
11	Open Water	0.035	100
21	Developed, Open Space	0.035	0
22	Developed, Low Intensity	0.08	20
23	Developed, Medium Intensity	0.12	40
24	Developed, High Intensity	0.15	60
31	Baren Land Rock/Sand/Clay	0.03	0
41	Deciduous Forest	0.1	0
42	Evergreen Forest	0.15	0
43	Mixed Forest	0.12	0
52	Shrub/Scrub	0.05	0
71	Grassland/Herbaceous	0.04	0
81	Pasture/Hay	0.045	0
82	Cultivated Crops	0.05	0
90	Woody Wetlands	0.07	50
95	Emergent Herbaceous Wetlan...	0.045	75

OK Cancel



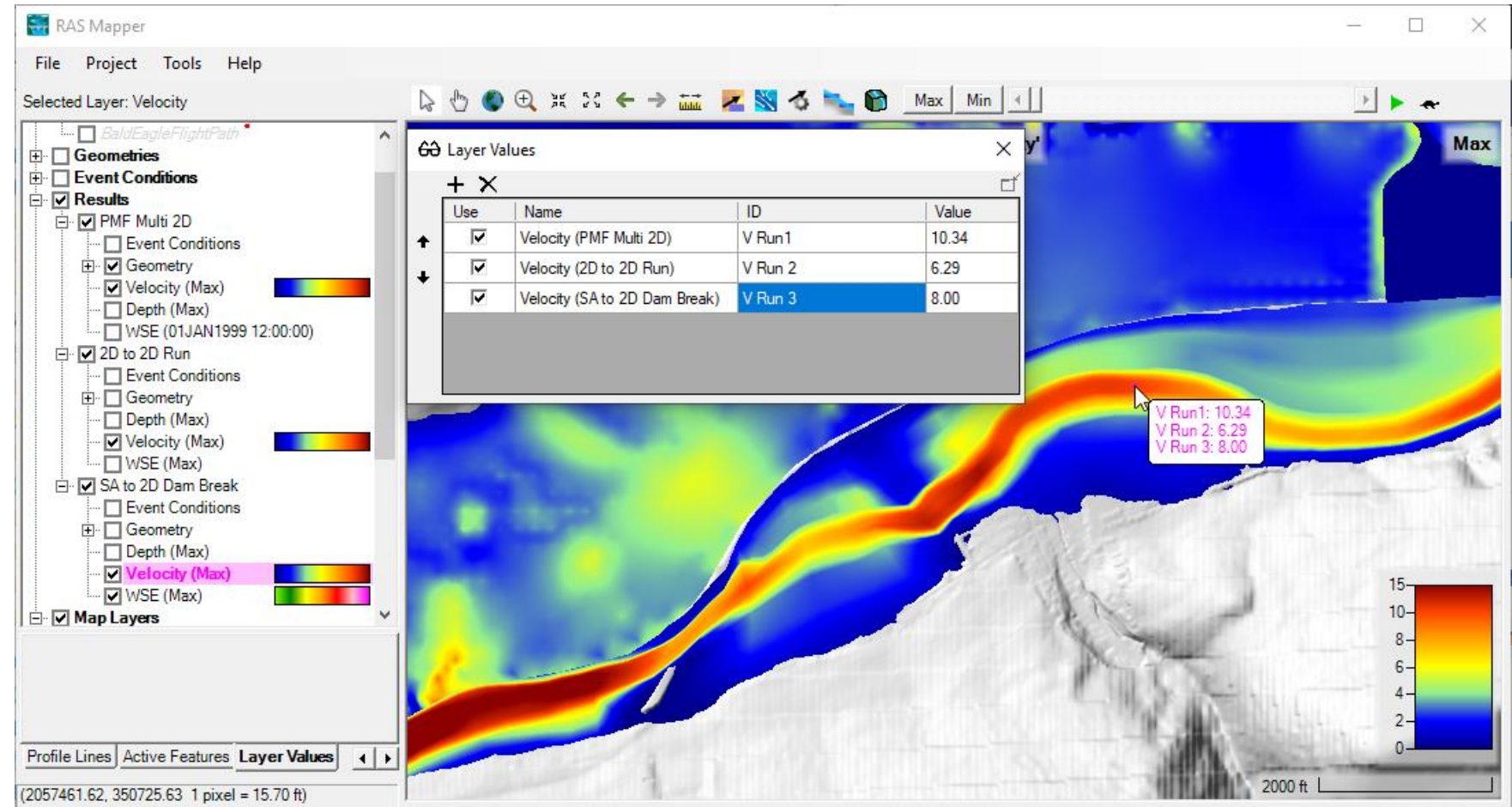
Edge Line Editing

The screenshot displays the HEC-RAS software interface during an edge line editing session. On the left, the project tree shows the 'Geometry' layer selected. A context menu is open over the 'Geometry' layer, with the option 'Import Edge Lines and Recompute Interpolation Surface' highlighted. A 'Select A Geometry' dialog box is open, showing 'Bald Eagle Multi 2D Areas' selected. The main map area shows a river channel with a black edge line and cyan water area. The status bar at the bottom indicates the coordinates (2051394.46, 349721.08) and a scale of 1 pixel = 4.75 ft.



User Interaction

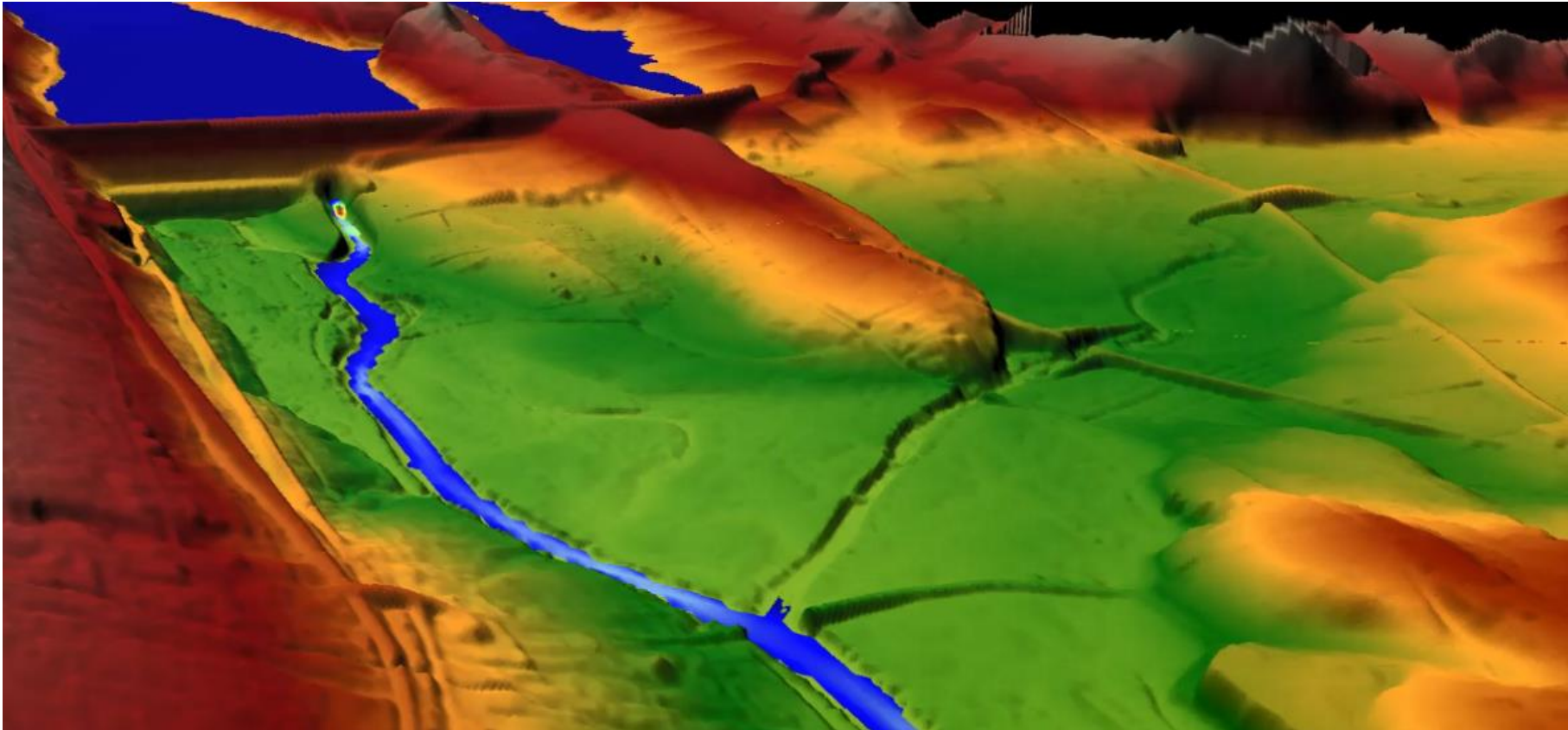
- Profile Lines
- Active Features
- Layer Values





Terrain

- Development of a good 1D or 2D river hydraulics model starts with a GOOD terrain model representative of the ground surface elevations...





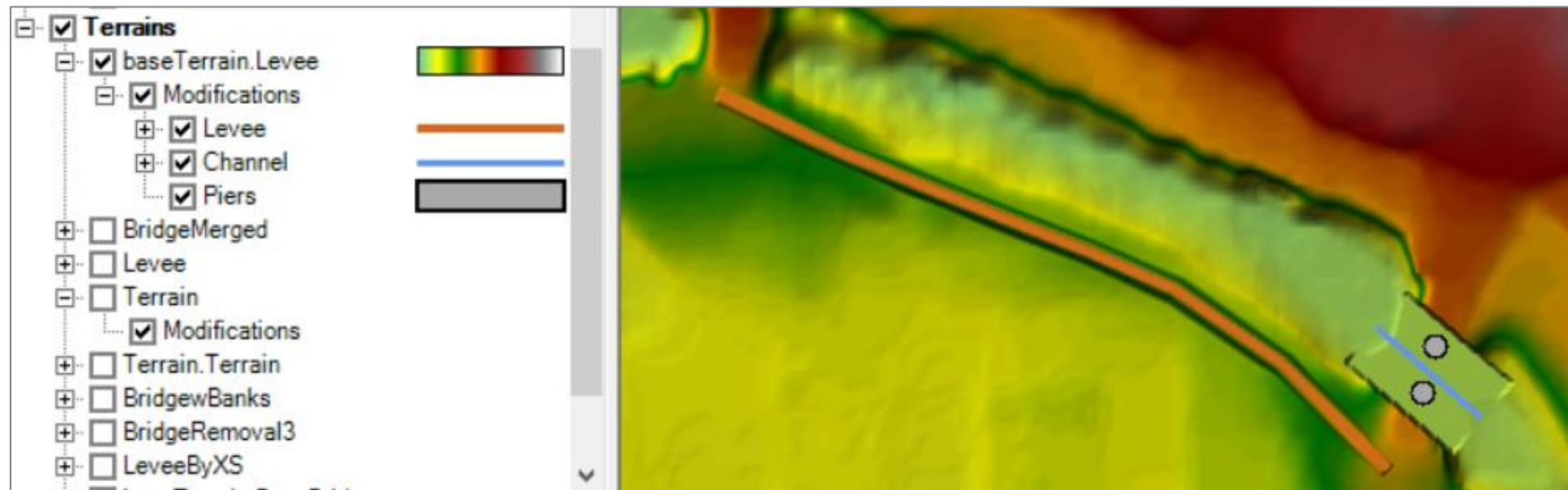
Terrain Modification

- Terrain Replacement Using RAS Cross Sections
- **NEW** Vector Overrides to Terrain Layer
 - Simple Shapes (Piers)
 - Circle, Rectangle, Ellipse, and Piers
 - Line (Channel, Roads, Levees)
 - Polygon (Areas, Buildings)
- Copy Modifications between Terrain Layers
- Use existing Editing Tools! Copy/Paste/Import ...



Vector Modifications

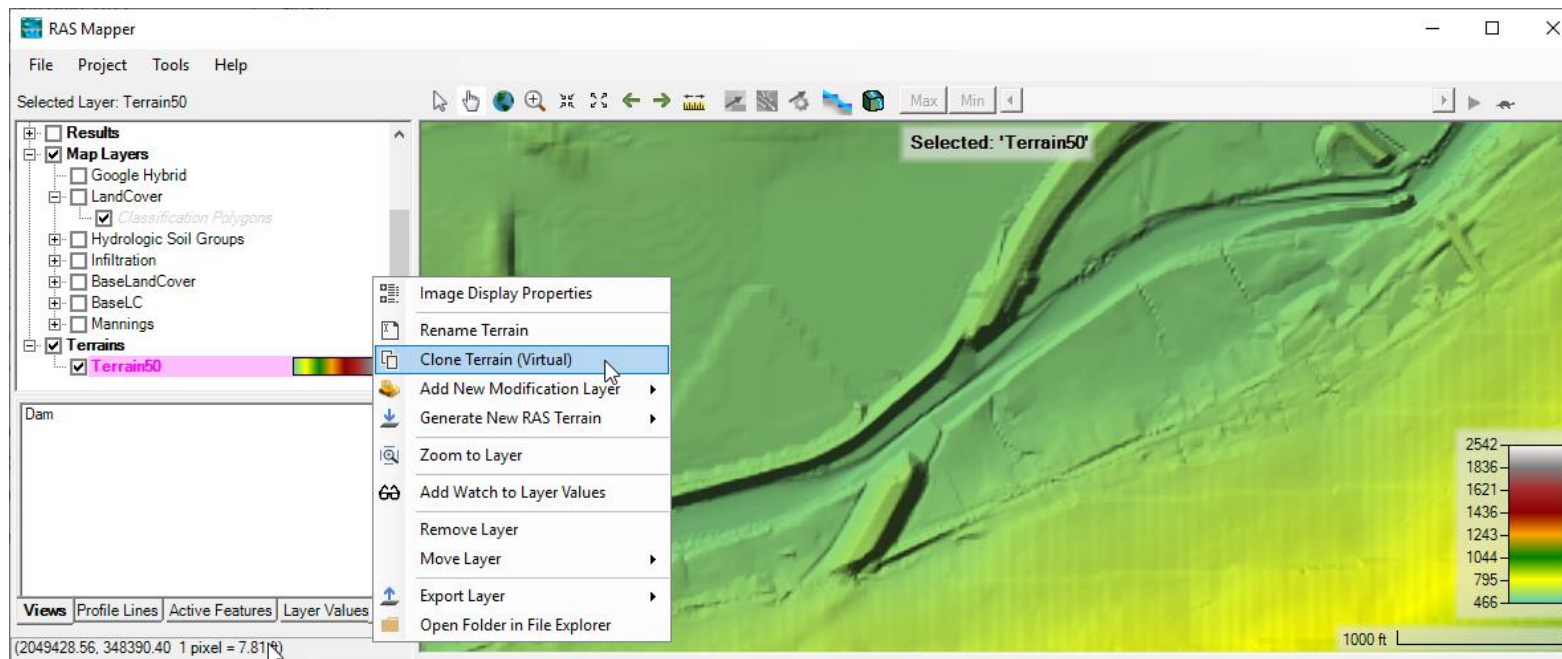
- Multiple Vector additions with a Terrain Layer
- Modifications are used for visualization and for all computations.
- Re-use Vector Features in other Layers





Terrain Clone

- *Virtual* copy of the Terrain
- No duplication of elevation dataset (large)
- Vector additions stored in a separate file (the terrain clone)





Vector Modifications

The screenshot displays the RAS Mapper interface with the 'Terrain50.Clone' layer selected. A context menu is open over the terrain, showing the following options:

- Image Display Properties
- Rename Terrain
- Clone Terrain (Virtual)
- Add New Modification Layer
- Generate New RAS Terrain
- Zoom to Layer
- Add Watch to Layer Values
- Remove Layer
- Move Layer
- Export Layer
- Open Folder in File Explorer

A secondary menu is open for the 'Polygons' option, listing the following shapes:

- Circle/Ellipse
- Rectangle
- Triangle
- Elongated Pier
- High Ground
- Channel
- Multipoint
- Rectangle

The map shows a terrain with a 'Building' polygon, a 'Pond' polygon, and 'Piers' points. A 'Road' is also visible. A legend on the right indicates elevation values from 0 to 1153. The status bar at the bottom shows coordinates (2049405.13, 349132.30) and a scale of 1 pixel = 7.81 ft.



Shapes - Piers

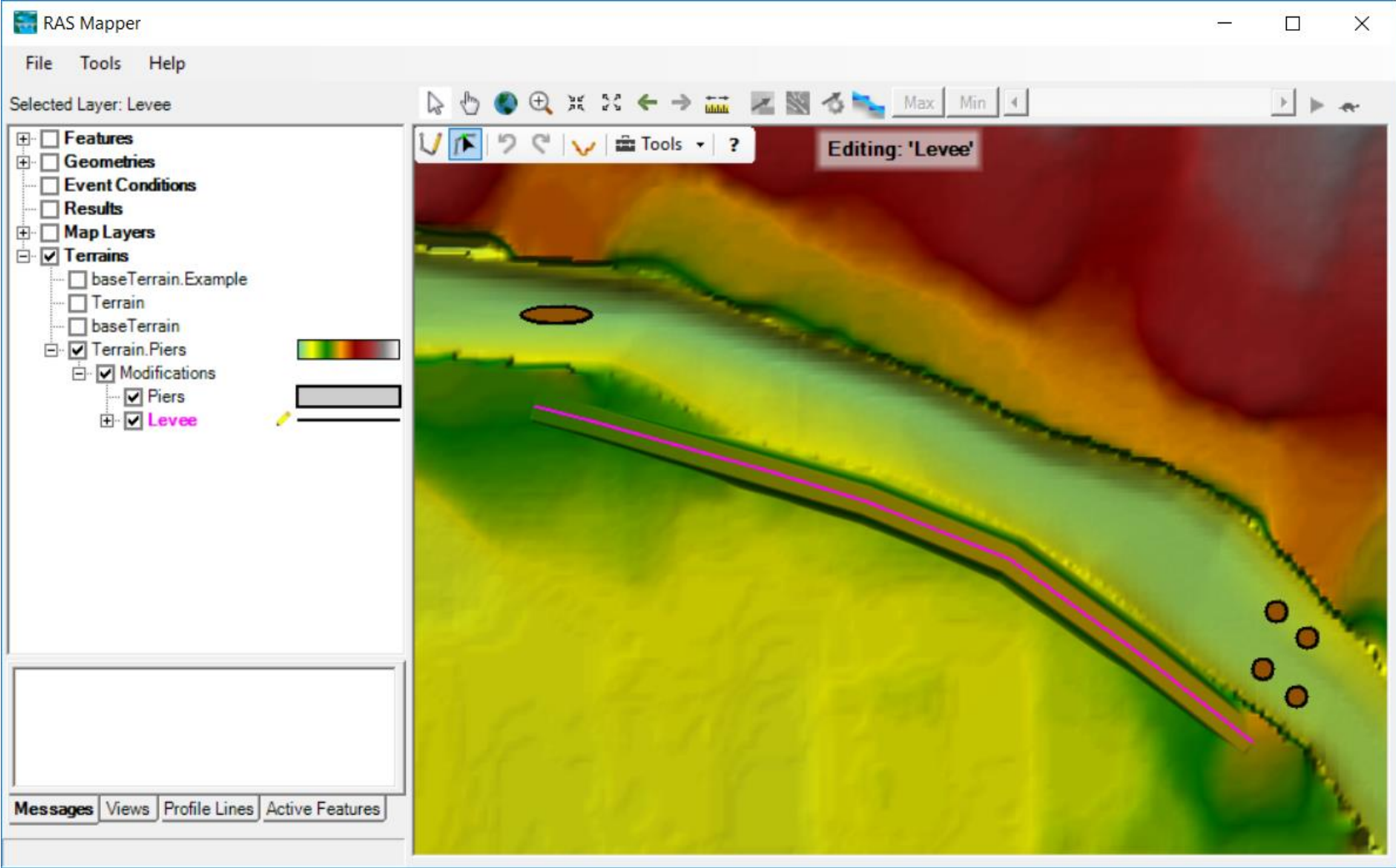
The screenshot displays the RAS Mapper interface with the 'Pier Editor' dialog box open. The dialog box is titled 'Pier Editor' and contains the following settings:

- Name: Pier 1
- Modification Method: Replace Terrain Value
- Elevation (ft): 575
- Rotation Angle (Degrees): 44.7337
- Width (ft): 20
- Pier Shape:
 - Use Rectangular Body
 - Use Pier Nose (Round)
 - Use Pier Nose (Sharp)
- Length (ft): 100
- Radius (ft): 10
- Length (ft): 10

The background shows a terrain map with a red pencil icon indicating the location of the pier. The map is color-coded by elevation, with green representing lower elevations and red representing higher elevations. A scale bar at the bottom right indicates 500 ft. The status bar at the bottom left shows coordinates (2062826.51, 351720.64) and a scale of 1 pixel = 2.45 ft.



Lines - High Ground





Lines – High Ground

Ground Line Editor

Name (Optional):

Modification Type:

Top Width:

Left Side Slope (H:V):

Right Side Slope (H:V):

Lateral Extent Limits:

Snapping Tolerance:

Polyline Length: 1161.64 (ft)

Station-Elevation

	X	Y
▶ 1	407417.38768188...	1804497.9113489...
2	407251.73357862...	1804628.6909041...
3	407065.73598900...	1804762.3766717...
4	406859.39491302...	1804846.65682952
5	406722.80293314...	1804887.3438022...
6	406469.962459758	1804959.9991106...
7	406379.86987728...	1804983.2488093...
*		

Plot

XS View

Plot **Table**

Profile Plot

OK Cancel



Lines – Elevation Control Points

The screenshot shows the RAS Mapper application window. The title bar reads "RAS Mapper". The menu bar includes "File", "Tools", and "Help". The status bar at the top indicates "Selected Layer: Control Points". The left-hand side contains a tree view of layers:

- Features
- Geometries
- Event Conditions
- Results
- Map Layers
- Terrains
 - baseTerrain.Example
 - Terrain
 - baseTerrain
 - Terrain.Piers
 - Modifications
 - Piers
 - Levee
 - Control Points

Below the tree view is a color scale legend. The main map area shows a terrain elevation map with a brown line representing a control point. A mouse cursor is positioned over one of the purple dots on the line. A dialog box titled "Elevation Needed" is open in the foreground, containing the text "Enter the elevation for this elevation point" and a text input field with the value "941". The dialog has "OK" and "Cancel" buttons. At the bottom of the window, there are tabs for "Messages", "Views", "Profile Lines", and "Active Features". The status bar at the very bottom displays the coordinates "(406823.17, 1804841.66 1 pixel = 2.12 feet)".



Lines – Elevation Control Point

- Elevation control points shown in grey

Ground Line Editor

Name (Optional):

Modification Type:

Top Width:

Left Side Slope (H:V):

Right Side Slope (H:V):

Lateral Extent Limits:

Snapping Tolerance:

Polyline Length: 1161.64 (ft)

Station-Elevation | X,Y Data

	Station	Elevation
	1 0	943
	2 143.51341941785...	944
	3 269.12608846422...	944
▶	4 400	942.5
	5 800	942.5
	6 823.32691655262...	941
	7 970.59058152351...	941
	8 1161.6400146484...	941
*		

Plot

XS View

Elevation

Station [feet]

Plot

Profile Plot

Elevation [feet]

Station [feet]

OK Cancel



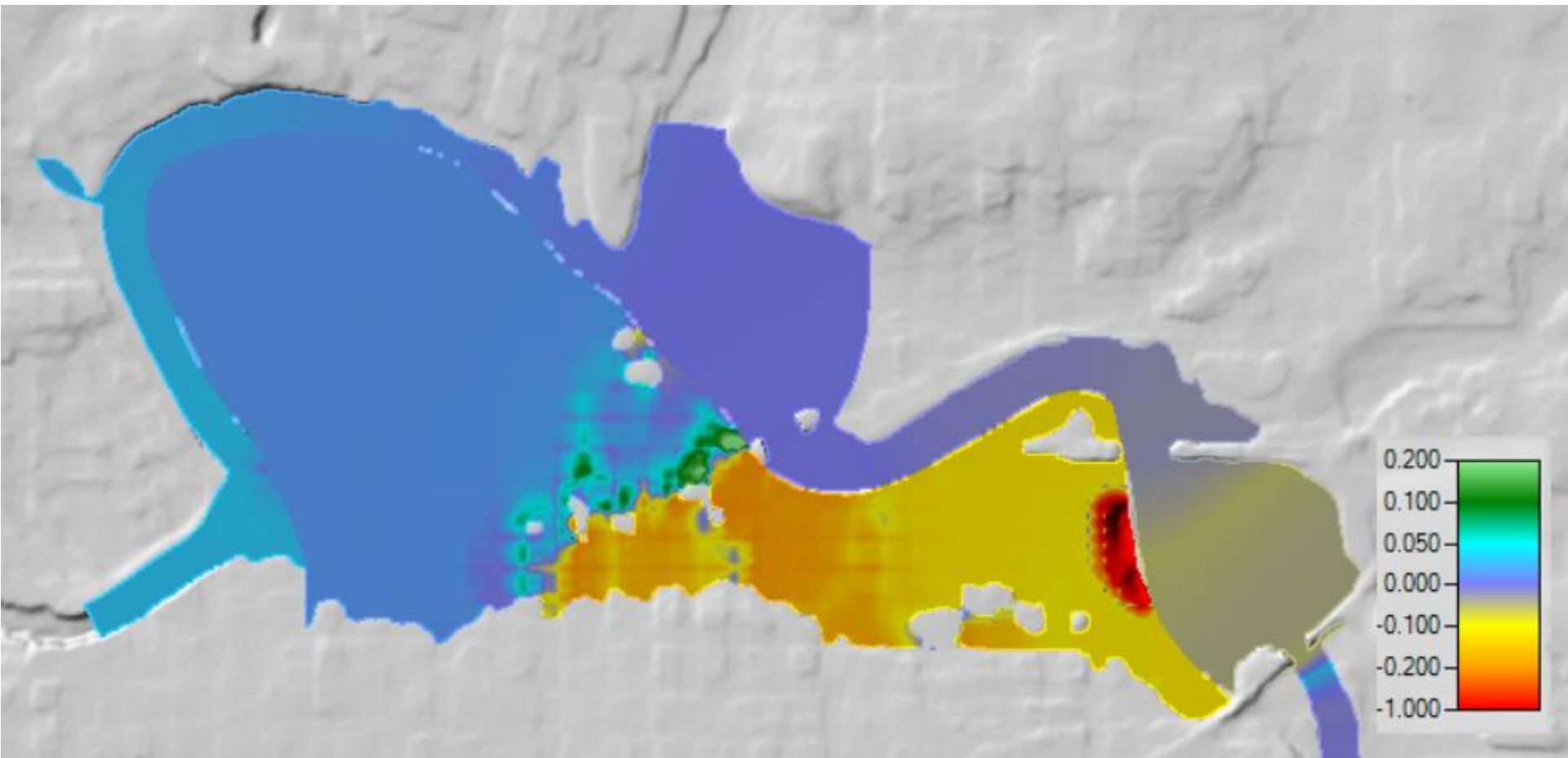
RAStEr Calculator

- The RAStEr Calculator is intended to allow users to perform mathematical and logical operations on HEC-RAS spatial results.
- These are Calculated Layers using existing RAS Results and Terrain Layers.
- User-defined variables are used in scripts to evaluate raster data.
 - Plan, Map Type, Animation Behavior, Profile
- Scripts can be saved/loaded and shared with friends!



Use RAS Results to Calculate a Layer

- Water surface elevation comparison



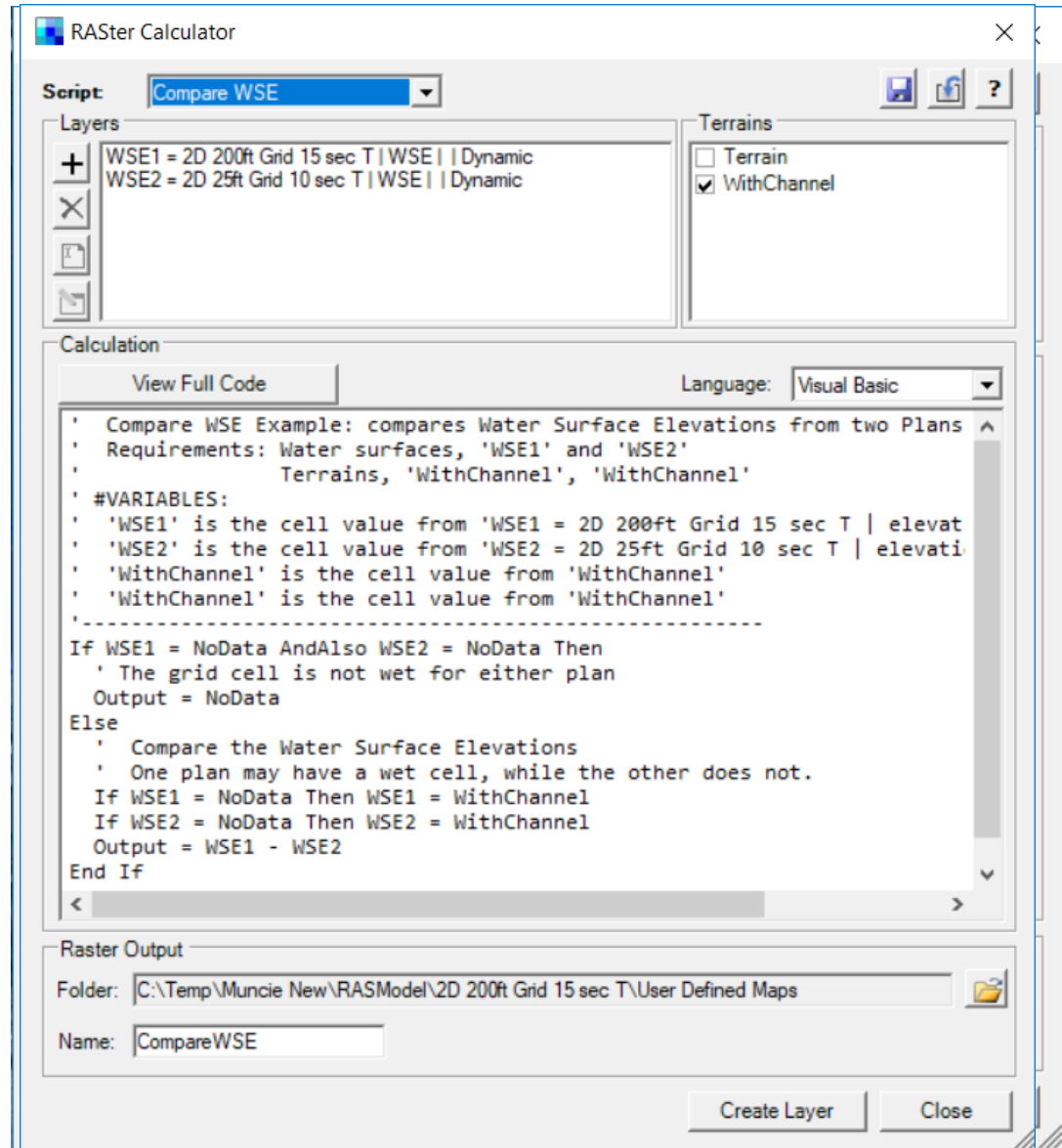


RAStEr Calculator

- Scripts
- Save/Load

- Variable Definition (Layers)

- Code





Example - Velocity Comparison

- Add Layer 1

Create Raster Layer Definition

Plan Map

Definition: 2D 25ft Grid 10 sec T Velocity

V2 = 2D 25ft Grid 10 sec T | Velocity | | Dynamic

- Add Layer 2

RASter Calculator

Script: User Defined

Layers

- V1 = 2D 200ft Grid 15 sec T | Velocity | | Dynamic
- V2 = 2D 25ft Grid 10 sec T | Velocity | | Dynamic

Terrains

- Terrain
- WithChannel

Calculation

View Full Code Language: Visual Basic

```
' #VARIABLES:  
' 'V2' is the cell value from 'V2 = 2D 25ft Grid 10 sec T | velocity |  
' 'V1' is the cell value from 'V1 = 2D 200ft Grid 15 sec T | Velocity |  
' 'Output' is the desired output value.  
***** Write/Modify the code below! *****  
***** Use the View Code button to see the full/compiled code. *****  
-----  
If V1 = NoData AndAlso V2 = NoData Then  
    Output = NoData  
Else  
    If V1 = NoData Then V1 = 0  
    If V2 = NoData Then V2 = 0  
    Output = V1 - V2  
End If
```

Raster Output

Folder: C:\Temp\Muncie New\RASModel\2D 200ft Grid 15 sec T\User Defined Maps

Name: Output

Create Layer Close



Example - Velocity Comparison Script

```
' -----  
' #VARIABLES:  
' 'V2' is the cell value from 'V2 = 2D 25ft Grid 10 sec T | velocity |  
' 'V1' is the cell value from 'V1 = 2D 200ft Grid 15 sec T | Velocity |  
' 'Output' is the desired output value.  
'***** Write/Modify the code below! *****  
'***** Use the View Code button to see the full/compiled code. *****  
' -----  
  
If V1 = NoData AndAlso V2 = NoData Then  
    Output = NoData  
Else  
    If V1 = NoData Then V1 = 0  
    If V2 = NoData Then V2 = 0  
    Output = V1 - V2  
End If
```




Layer Export

RAS Mapper

File Tools Help

Selected Layer: DeltaV

Selected: 'DeltaV' Max

- Features
- Geometries
- Event Conditions
- Results
 - 2D 200ft Grid 15 sec T
 - Event Conditions
 - Geometry
 - Depth (Max)
 - Velocity (02JAN1900 00:00:00)
 - WSE (Max)
 - D * V (02JAN1900 00:00:00)
 - Inundation Boundary (Max Value_0)
 - CompareWSE2
 - DeltaV** 2.00
- Map Layers
 - 2D 25ft C
 - 2D 100ft
 - 2D 100ft
 - 2D 50ft C
 - Map Layers**
 - Google S
 - testfilter
 - mann
- Terrains

Image Display Properties
Image Info ...
Edit Script (DEBUG)
Clone Calculated Layer (DEBUG)
Zoom to Layer
Add Watch to Layer Values
Remove Layer
Move Layer
Export Layer

- Export current image to TIF
- Export current image to JPEG
- Export Values to Point Shapefile (DEBUG)
- Create Contour Polygon Bands (DEBUG)
- Warp (DEBUG)
- Export Raster**
- Export Raster Using Screen Extent

Messages Views Profile Lines Active Features Layer

2.00
0.00
-2.00