

HEC-RAS Mapper Results Visualization

USACE, Institute for Water Resources, Hydrologic Engineering Center

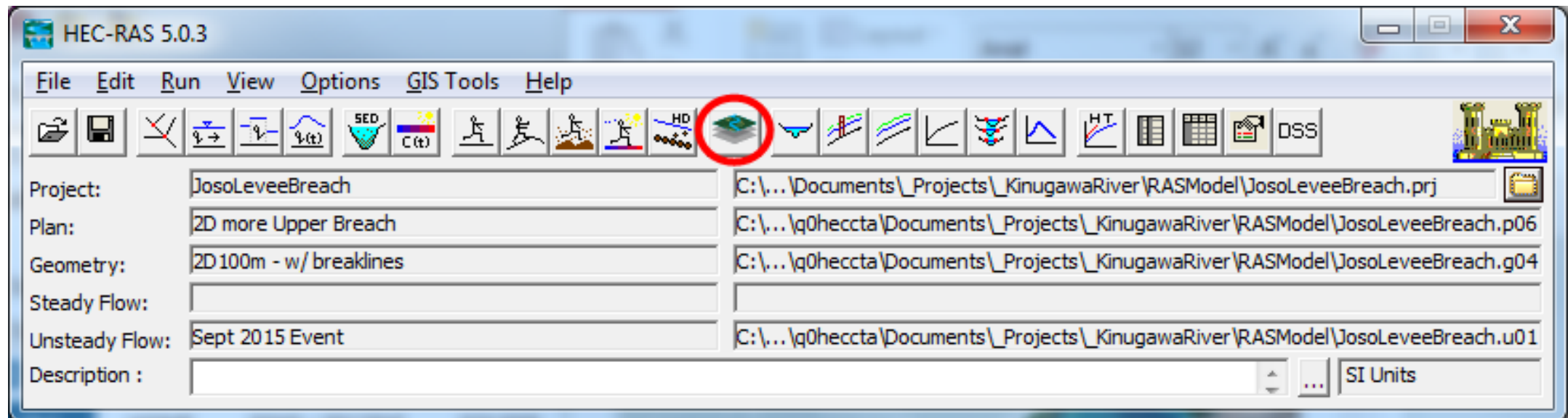




Overview



- How do we visualize RAS results?
- How do we debug our model?
- How do we compare different plans?
- How do we produce maps for publication?





HEC-RAS Mapper Overview



The screenshot displays the HEC-RAS Mapper software interface. The main window is titled "RAS-Mapper" and contains several key components:

- Menu System:** Located at the top left, it includes a "File" menu and a "Selected Layer: Depth" indicator.
- Layers List (the Tree):** A hierarchical tree view on the left side, listing various layers such as "Features", "Geometries", "Plans", "Event Conditions", "Results", "Map Layers", and "Terrains". The "Depth" layer is currently selected and highlighted in pink.
- View Tools:** A toolbar at the top center with icons for navigation and zooming, including "Max" and "Min" buttons.
- Animation Controls:** A toolbar at the top right with play and stop icons.
- Mapping Window:** The central area showing a 2D depth map of a river channel. The map is overlaid on a Google Satellite image. The depth is represented by a color gradient from blue (shallow) to red (deep). A grid is visible over the map, and several numerical values are displayed at various points along the channel. A scale bar at the bottom right indicates 500 feet.
- Status Area:** A panel at the bottom left showing "Profile Line 1" and "FlowLine1". It includes a "Plot Tick Marks" checkbox and a status bar with "Messages", "Views", "Profile Lines", "Active Features", and "Layer Values" tabs. The status bar also displays coordinates: "(410271.56, 1804554.79 1 pixel = 5.11 ft)".



Menu System



RAS-Mapper

File **Menu System**

Selected Layer: Depth

Selected: '2D 50ft Grid - Depth' 02JAN1900 11:20:00

Features

- Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geometry - 2D 50ft Grid
 - Muncie Geometry - 50ft User n Value Regi
- Plans
 - Unsteady Multi 9-SA run
 - Unsteady Run with 2D 50ft Grid
 - Unsteady Run with 2D 50ft User n Value R
- Event Conditions
 - Flow Boundary Conditions
- Results
 - 50ft User n Regions
 - 2D 50ft Grid
 - Event Conditions
 - Geometry
 - Plan
 - Depth (02JAN1900 11:20:00)
 - Velocity (02JAN1900 12:15:00)
 - WSE (Max)
- Map Layers
 - Land Cover
 - LandCoverUSGSGrid
 - LandCoverCombined
 - channel_over_overbank
 - Google Satellite
- Terrains
 - Terrain
 - TerrainWithChannel

Profile Line 1
FlowLine1

Plot Tick Marks

Messages Views **Profile Lines** Active Features Layer Values

(410271.56, 1804554.79 1 pixel = 5.11 ft)

RAS Mapper Options

Project Settings

Projection

General

Render Mode

Global Settings

General

RAS Layers

Map Surface Fill

Editing Tools

Coordinate Reference System

Projection File: [C:\Work_RAS_ExampleProjects\Example_Projects\2D Unsteady F

Definition:

```
PROJCS["NAD_1983_StatePlane_Indiana_East_FIPS_1301_Feet",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",328083.3333333333],PARAMETER["False_Northing",820208.3333333333],PARAMETER["Central_Meridian",-85.66666666666667],PARAMETER["Scale_Factor",0.9999666666666667],PARAMETER["Latitude_Of_Origin",37.5],UNIT["Foot_US",0.3048006096012192]]
```

Warping Method

- Default Method (GDAL Warp)
- Alternate HEC-RAS Raster Warping Method

Help me find a coordinate reference system: spatialreference.org

RAS Project Units: US Customary

OK Cancel Apply



Mapping Window



RAS Mapper

File Project Tools Help

Selected: '2D 50ft Grid - Depth' 02JAN1900 11:20:00

Results

- 50ft User n Regions
- 2D 50ft Grid
- Event Conditions
- Geometry
- Plan
- Depth (02JAN1900 11:20:00)
- Velocity (02JAN1900 12:15:00)
- WSE (Max)

Map Layers

- Land Cover
- LandCoverUSGSGrid
- LandCoverCombined
- channel_over_overbank
- Google Satellite

Terrains

- Terrain
- TerrainWithChannel

Plot Tick Marks

Messages Views Profile Lines Active Features Layer Values

(410271.56, 1804554.79 1 pixel = 5.11 ft)

Max Min

500 ft

15 (ft)

149 0

14697. 14787 14535.6 14443.72 14305.48 14166.05 14039.64 13859.04 13490.47 13214.8 12817.3 12492.0 12227.69 12117.14 11958.11 11781.69 11628.65 11188.16 10672.75 10216.27 9854.3 9548.851 9334.877 9081.195

Mapping Window



Layers List



RAS Mapper

File Project Tools Help

Selected Layer: Depth

Selected: '2D 50ft Grid - Depth' 02JAN1900 11:20:00

Layers List (the Tree)

- [-] Features
 - [x] Geometries
 - [] Muncie Base Geometry - 9 SAs
 - [x] Muncie Geometry - 2D 50ft Grid
 - [] Muncie Geometry - 50ft User n Value Regi
 - [] Plans
 - [] Unsteady Multi 9-SA run
 - [] Unsteady Run with 2D 50ft Grid
 - [] Unsteady Run with 2D 50ft User n Value R
 - [] Event Conditions
 - [] Flow Boundary Conditions
 - [x] Results
 - [] 50ft User n Regions
 - [x] 2D 50ft
 - [] Event Conditions
 - [] Geom
 - [] Plan
 - [x] Dep (02JAN1900 11:20:00)
 - [] Velocity (02JAN1900 12:15:00)
 - [] WSE (Max)
 - [x] Map Layers
 - [] Land Cover
 - [] LandCoverUSGSGrid
 - [] LandCoverCombined
 - [] channel_over_overbank
 - [x] Google Satellite
 - [x] Terrains
 - [] Terrain
 - [] TerrainWithChannel

Profile Line 1
FlowLine1

Plot Tick Marks

Messages Views Profile Lines Active Features Layer Values

(410271.56, 1804554.79 1 pixel = 5.11 ft)



Layers List

Layer Order Dictates Visualization

- Features
 - Profile Lines
 - Custom User Layers (vector)
- Geometries
- Plans
- Event Conditions
- Results
- Map Layers
 - Land Cover/Soils/Infiltration and more
 - Web Imagery
 - Custom User Layers (vector and raster)
- Terrains

Selected Layer: Depth

The screenshot shows a hierarchical list of layers in HEC-HMS. The 'Depth' layer is selected and highlighted in magenta. To the right of the list, symbology is shown for several layers. A red dashed oval highlights the symbology for the 'Muncie Geometry - 2D 50ft Grid' layer, which includes a blue line, a green line, and a grid pattern. The 'Depth' layer has a blue-to-magenta color gradient symbology.

Symbology is shown to the right of any checked layers

The selected layer is highlighted in magenta



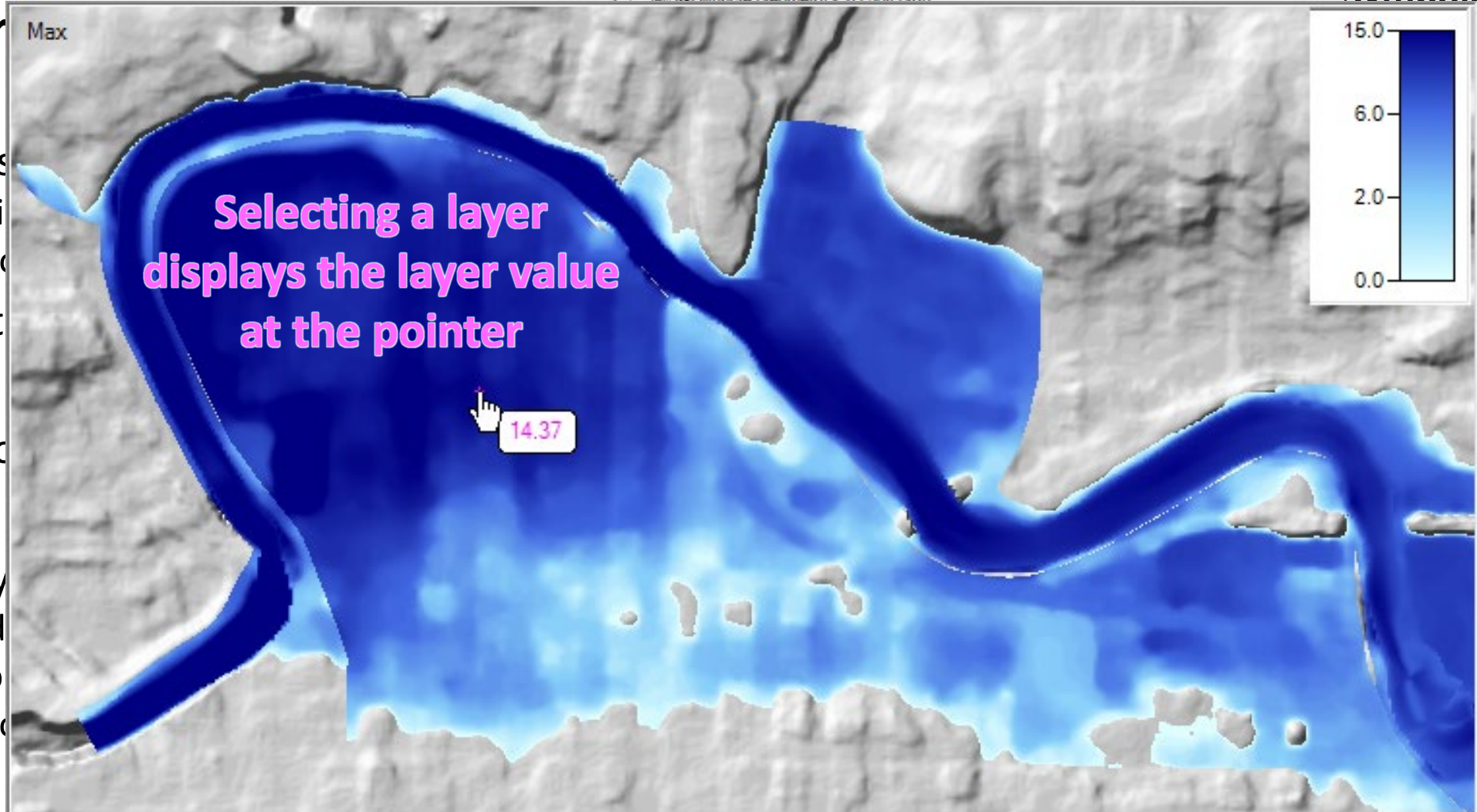
Layers List

Selected Layer: Depth

- Features
 - Profile Lines
 - Polygon Layer
- Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geometry - 2D 50ft Grid

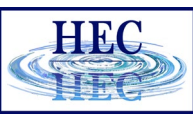
Layer Order

- Features
 - Profile Lines
 - Custom
- Geometries
- Plans
- Event Calculations
- Results
- Map Layers
 - Land Use
 - Web
 - Custom
- Terrains





Layer List: Map Layer | Web Imagery



Add Web Imagery...

- Reference Layers
- Create a New RAS Layer
- Add an Existing RAS Layer
- Manage Geometry Associations ...

GDALWMS

Select WMS image server

- ArcGIS NatGeo World Map**
- ArcGIS Ocean Basemap
- ArcGIS USA Topo Maps
- ArcGIS World Imagery
- ArcGIS World Physical Map
- ArcGIS World Shaded Relief
- ArcGIS World Street Map
- ArcGIS World Terrain Base
- ArcGIS World Topo Map
- Bing Satellite
- Google Hybrid
- Google Map
- Google Satellite
- Google Terrain Streets Water
- Google Terrain
- OpenStreetMaps
- USGS Imagery
- USGS Topo

Reprojection Resample Method: near

OK Close

RAS Mapper

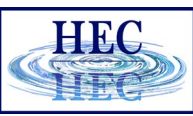
File Tools Help

Selected Layer: Depth

- Modified Channel Geometry
- Results**
 - 500 Yr Dam Break**
 - Geometry
 - Depth (01SEP2020 12:00:00)**
 - WSE (03SEP2020 00:30:00)
 - Velocity (Max)
 - Arrival Time (0.1ft hrs)
 - Sunny Day Dam Break
 - Geometry
 - Depth (None)
 - Velocity (None)
 - WSE (None)
 - Montecello DamBreak Run 100Yr Event
 - Geometry
 - Depth (None)
 - Velocity (None)
 - WSE (None)
 - Map Layers**
 - Google Hybrid
 - Google Map
 - Google Satellite

Creating Post Process completed [109927 ms]
Stored map 'Arrival Time (0.1ft hrs)' created.

Messages Views Profile Lines



Results Visualization: Layer Properties

Selected Layer: Depth

Depth - Layer Properties

Visualization and Information | Features | Source Files

Vector

Point: Line: Fill:

Symbology By Attribute Column

Label Features by Attribute Column(s)

Surface

Plot Surface Update Legend with View

Stretched

Opacity: 73%

Contours / Hillshade

Plot Contours Interval: 5 Color:

Plot Hillshade Z Factor: 3

Select Surface Fill

Surface Symbol Settings

Available Color Ramps: RAS Defaults User Defined

Color Ramp: Depth

Surface Symbol

Max: 15.00 Use Dataset Min/Max

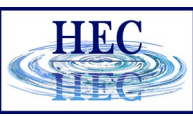
Min: 0.00 No. Values: 2

Keep user Values with color ramp change

	Value	Color	Red (0-255)	Green (0-255)	Blue (0-255)	Alpha (0-255)
1	0.00		0	255	255	255
2	15.00		0	0	139	255



Results Visualization: Layer Properties



Selected Layer: Arrival Time

Features

- Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geometry - 2D 50ft Grid
 - Rivers
 - Cross Sections
 - 2D Flow Areas
 - Lateral Structures
 - Reference Areas
 - Manning's n
 - (13 Empty Layers)
- Plans
- Event Conditions
- Results
 - 50ft User n Regions
 - 2D 50ft Grid
 - Layer Properties
 - Edit Map Parameters
 - Zoom to Layer
 - Add Watch to Layer Values
 - Remove Layer
 - Move Layer
 - Export Layer
 - Export RAS Tiles for Web Mapping
 - View Map in 3D Viewer
- Map Layer
 - Land Co
 - LandCo
 - LandCo
 - channel
 - Google Satellite
- Terrains

Arrival Time - Layer Properties

Visualization and Information | Features | Source Files

Vector

Point: Line: Fill:

Symbology By Attribute Column

Label Features by Attribute Column(s)

Surface

Plot Surface Update Legend with View

Discrete

Opacity: 100%

Contours / Hillshade

Plot Contours Interval: 5 Color:

Plot Hillshade Z Factor: 3

Select Surface Fill

Surface Symbol Settings

Available Color Ramps: RAS Defaults User Defined

Color Ramp:

Surface Symbol

Max: 8.00 Use Dataset Min/Max

Min: 0.00 No. Values: 6

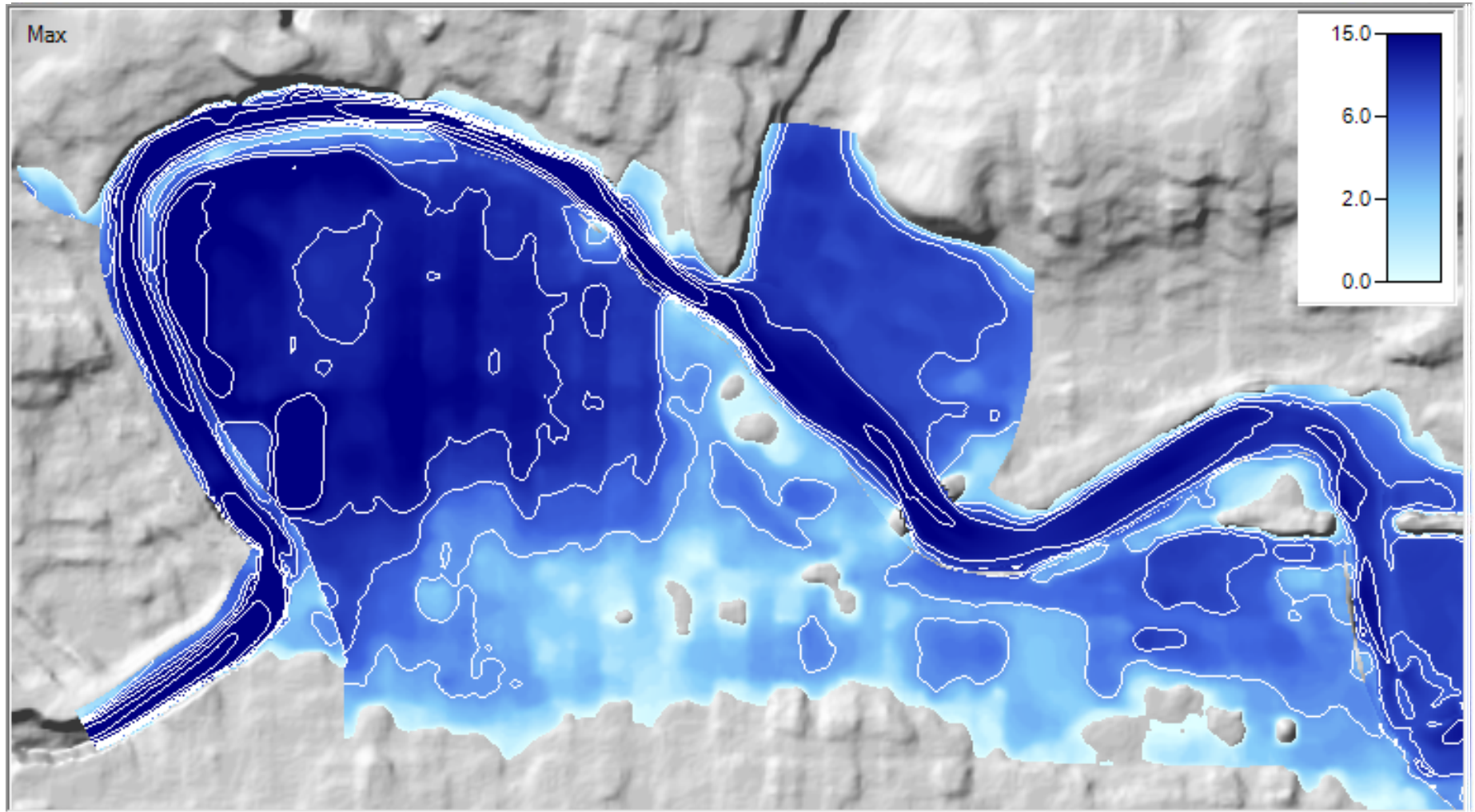
Keep user Values with color ramp change

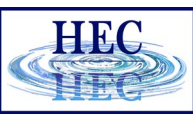
	Value	Color	Red (0-255)	Green (0-255)	Blue (0-255)	Alpha (0-255)
1	0.00	Red	255	0	0	255
2	1.00	Red-Orange	205	92	92	255
3	2.00	Orange	255	165	0	255
4	4.00	Yellow	255	255	0	255
5	6.00	Light Green	144	238	144	255
6	8.00	Dark Green	0	128	0	255

Results Visualization: Example



Stretched with Contours





Results Mapping: Adding a New Result Layer

The screenshot shows the RAS Mapper interface. The left sidebar contains a tree view with the following structure:

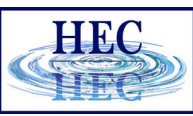
- Features
 - Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geometry - 2D 50ft Grid
 - Muncie Geometry - 50ft User n Value Regi
 - Plans
 - Event Conditions
 - Results
 - 50ft User n Regions
 - 2D 50ft Grid (highlighted)
 - Event Conditions
 - Geometry
 - Plan
 - Depth (02JAN1900 12:50:00)
 - Velocity (02JAN1900 12:15:00)
 - WSE (02JAN1900 12:10:00)
 - Map Layers
 - Terrains
 - Terrain
 - TerrainWithChannel

The main map area displays a 2D 50ft Grid over a river channel. A context menu is open, listing the following options:

- RAS Results Information
- Plot Results Profile
- Show Results Table
- Zoom to Layer
- Remove Layer
- Remove Layer and Delete Source Files
- Move Layer
- Open Folder in File Explorer
- Show Compute Messages ...
- Create a New Results Map Layer... (highlighted)
- Create a New Calculated Layer...
- Manage Results Map Layers...
- View Result in 3D

The map shows a river channel with a grid overlay. The grid cells are colored in shades of blue and green, representing different elevation values. The river channel is highlighted in a darker blue. The map also shows a profile line and a section line. The status bar at the bottom indicates the coordinates (409181.30, 1805852.72) and a scale of 1 pixel = 8.55 ft.

Default Maps: Depth, Velocity, and Water Surface Elevation



Results Mapping: Adding a New Result Layer

Map Type

Profile/
Parameter

Output Mode

Results Map Parameters

Map Type

- [-] Hydraulics
 - ... Water Surface Elevation
 - ... Velocity
 - ... Flow (1D Only)
 - ... Inundation Boundary
 - ... Depth
 - ... Courant (Velocity/Length)
 - ... Courant (Residence Time, 2D Only)
 - ... Froude
 - ... Shear Stress
 - ... Depth * Velocity
 - ... Depth * Velocity²
 - ... Energy (Depth)
 - ... Energy (Elevation)
 - ... Arrival Time
 - ... Arrival Time (Max)
 - ... Recession
 - ... Duration

Parameters

Start Time at: 02JAN1900 00:00:00

Start of simulation

Offset from start of simulation

d h m

Fixed date/time (08JUL1995 17:00:00)

Unsteady Profile

Hours

Days

Parameters

Threshold Depth:

Map Output Mode

Generated for Current View (in memory)

Raster (with Associated Terrain)

Point Feature Layer:

Stored (saved to disk)

Raster based on Terrain:

Point Feature Layer:

Polygon Boundary at Value:

	Map Type	Layer Name
▶	Arrival Time	Arrival Time

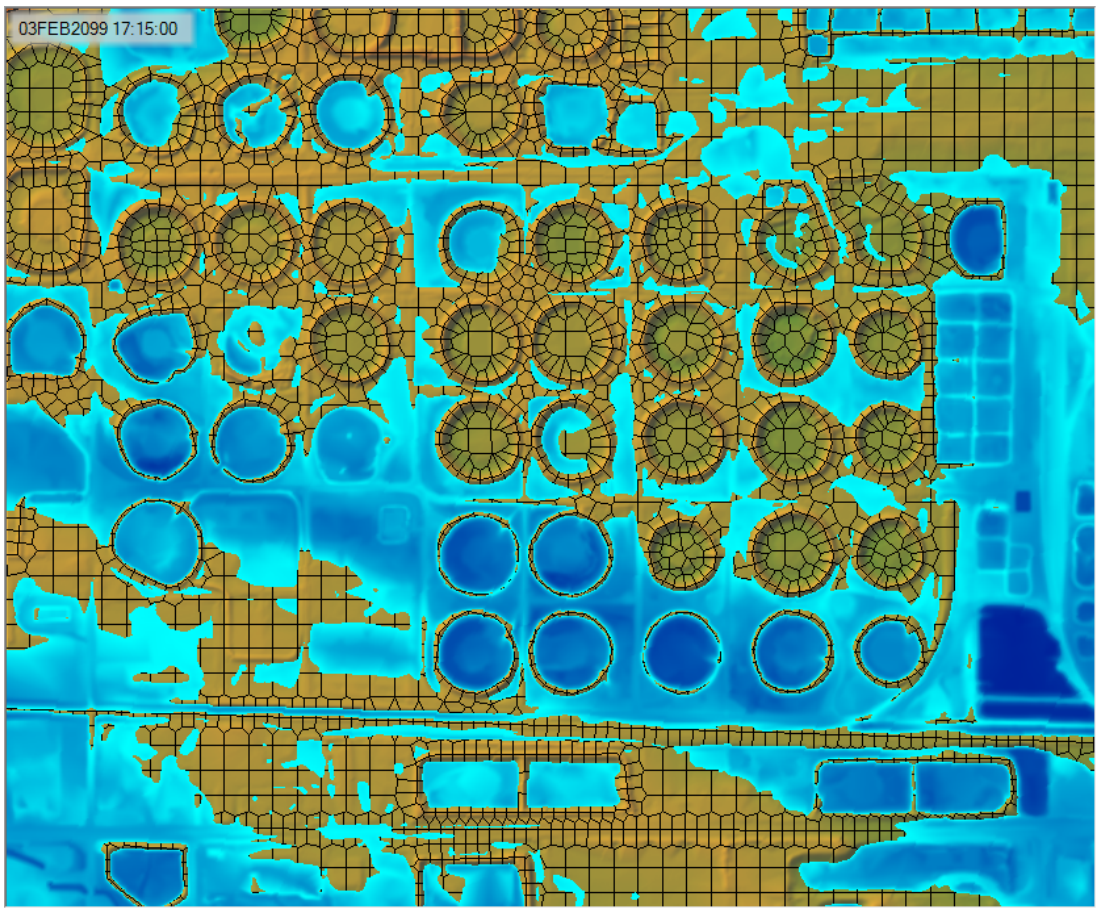
Map Type: A Map layer will be created for The time (from a specified Start Time) for water to reach a specified flood depth.
 Map Mode: Map results are generated on-the-fly for the current view.

Default Maps: Depth, Velocity, and Water Surface Elevation

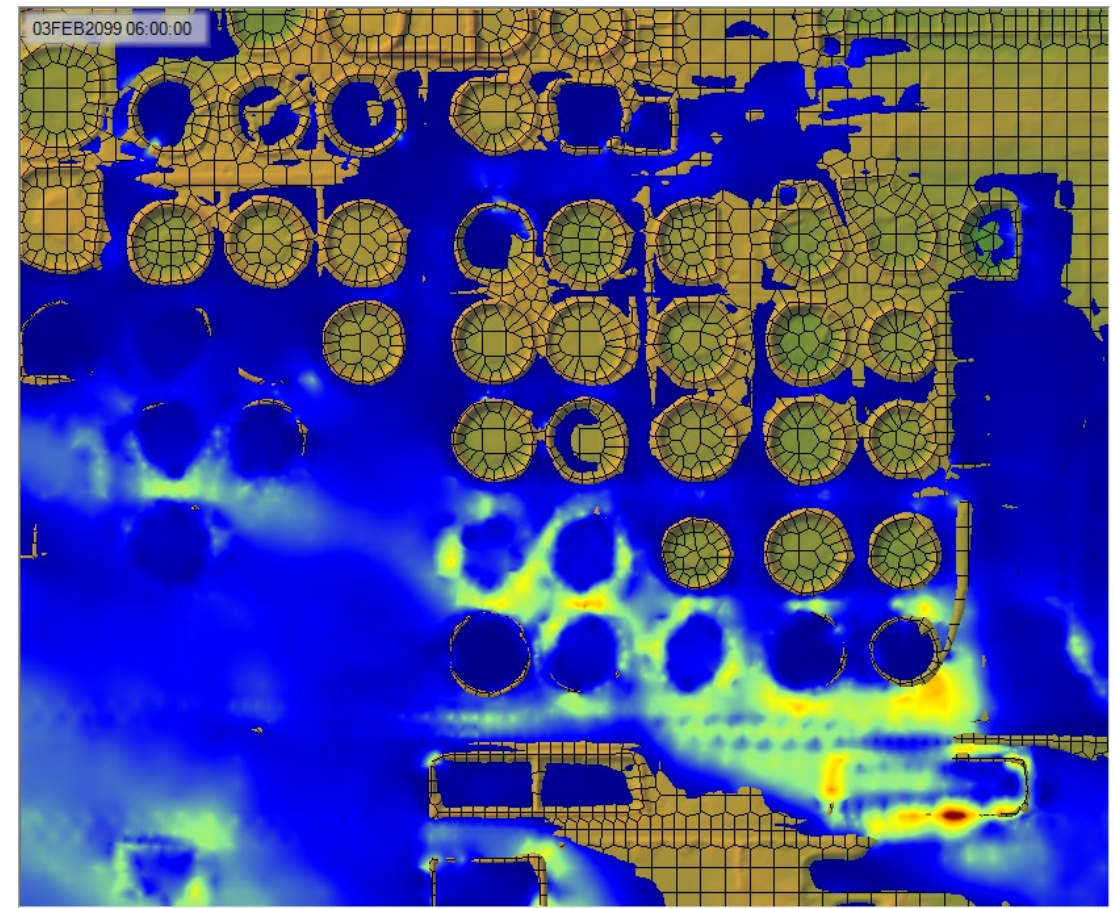


Example Maps: Depth and Velocity

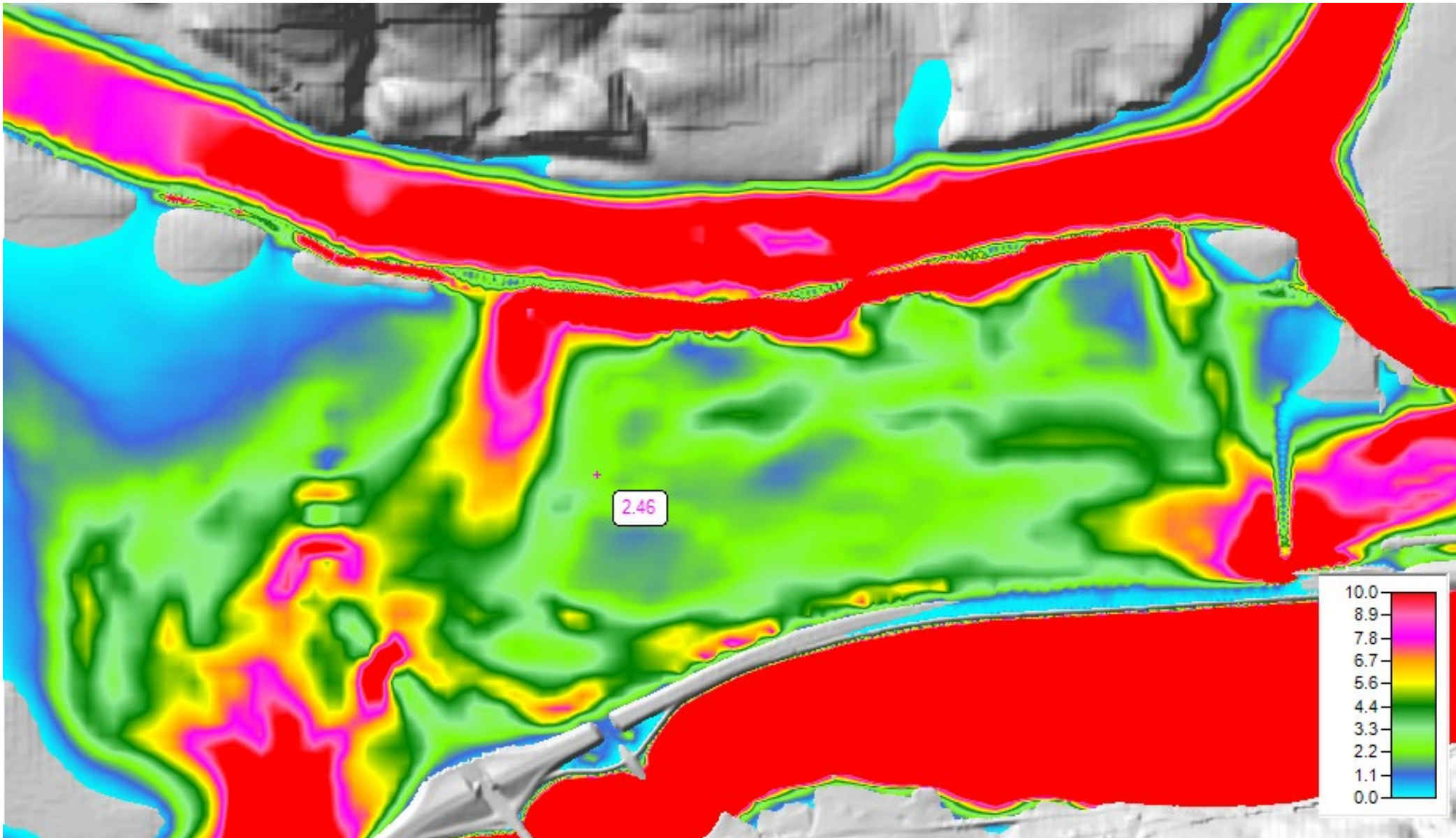
- Depth



- Velocity

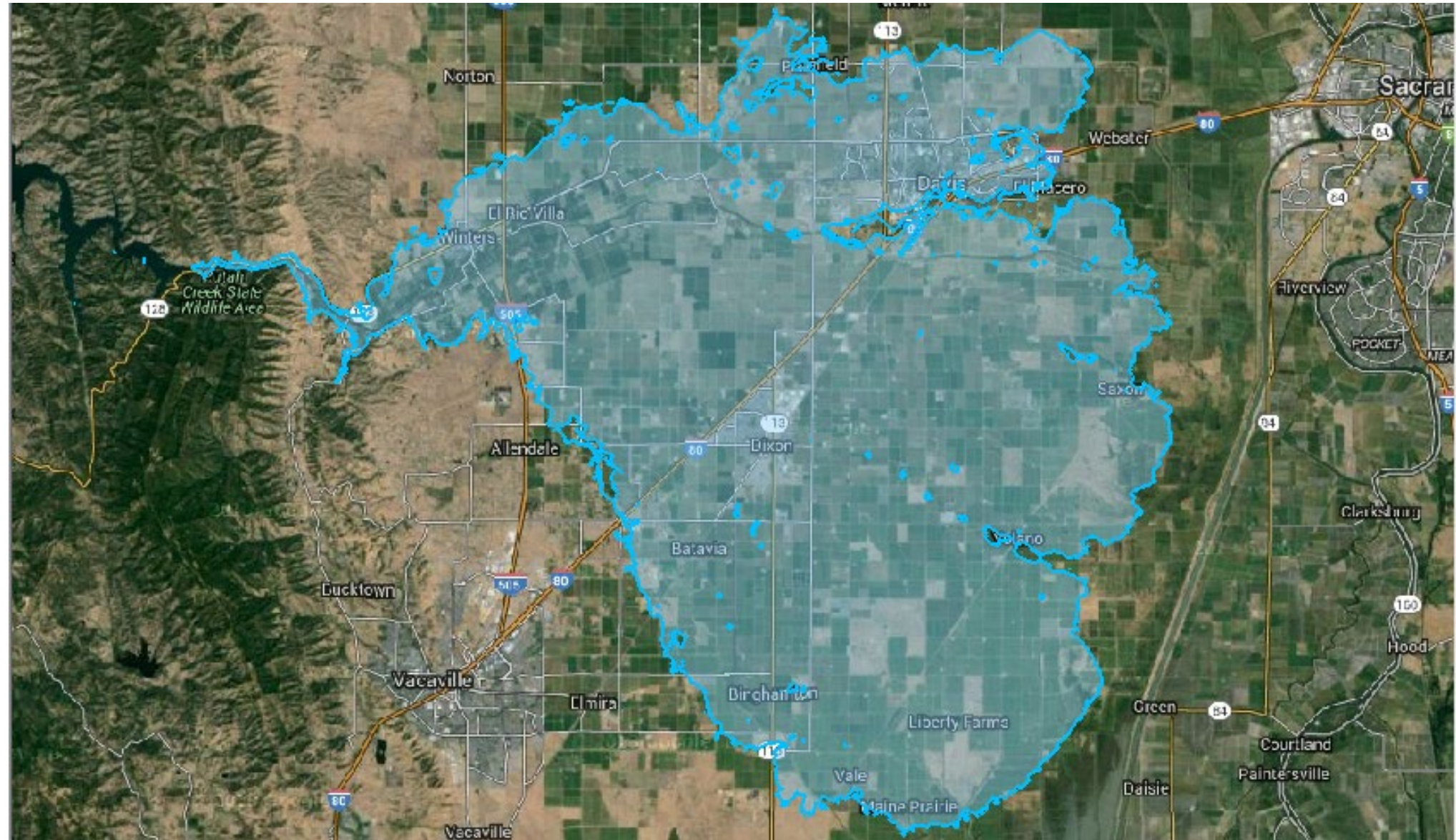


Example Maps: Hazard Mapping



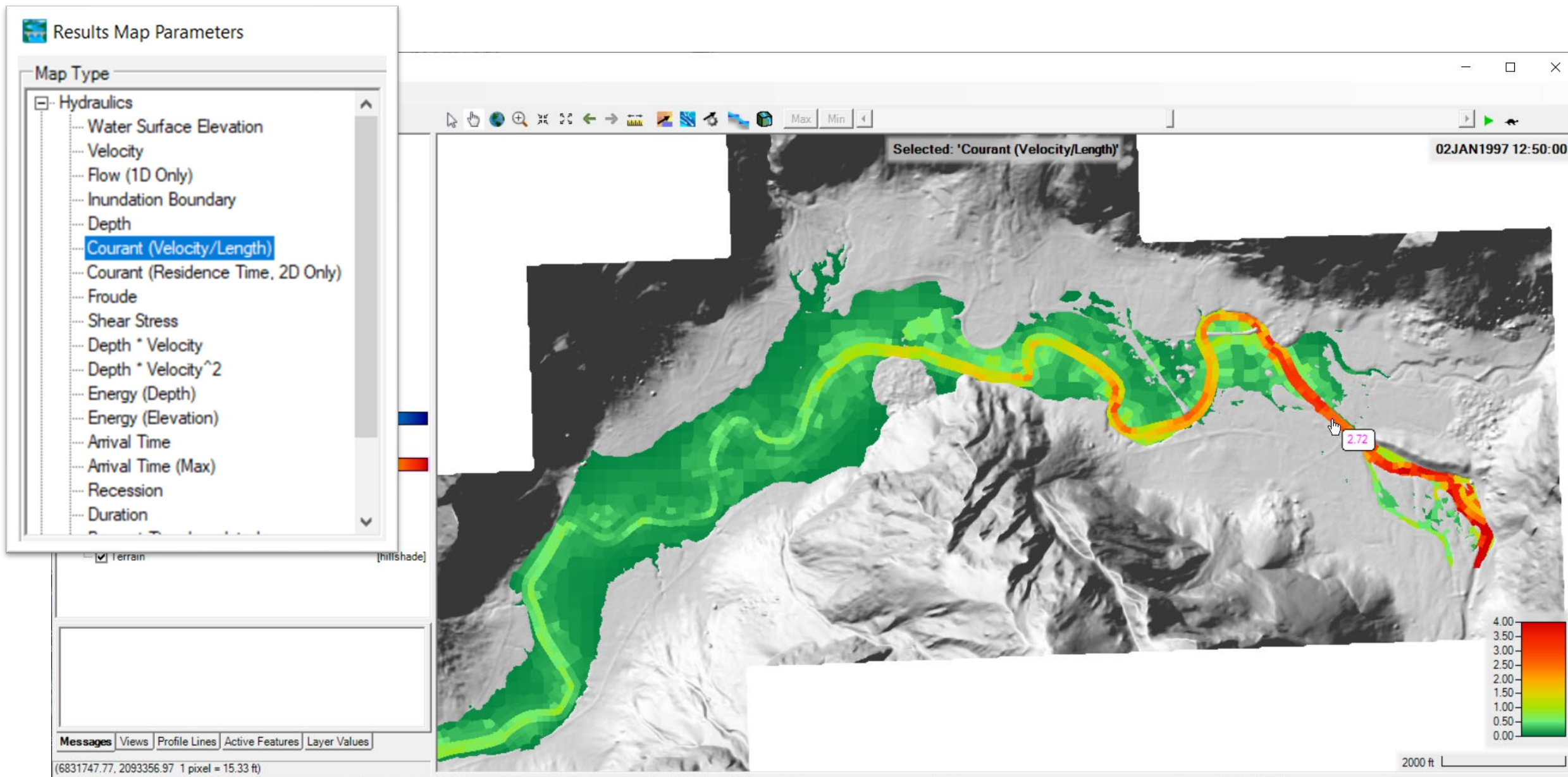


Example Maps: Inundation Boundary



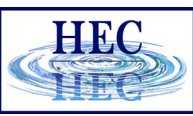


Example Maps: Courant Number Map





Additional Options



• Terrain

Terrain - Layer Properties

Visualization and Information | Source Files

Vector

Point: Line: Fill:

Symbology By Attribute Column

Label Features by Attribute Column(s)

Surface

Plot Surface Update Legend with View

Opacity: 50%

Contours / Hillshade

Plot Contours Interval: Color:

Plot Hillshade Z Factor:

Additional Options

- Plot Contour At Cursor
- Plot raster file outlines
- Plot raster file names
- Plot tile outlines
- Plot cell outlines (when zoomed in)
- Plot cell values (when zoomed in)
- Plot stitch TIN edges
- Plot Level0 stitch TIN edges
- Remove Stitch Rendering

• Depth, WSE

Additional Options

- Plot Contour At Cursor
- Plot 2D Hydraulic Connectivity
- Plot 2D Water Surface Gradient (Arrow: WSEL High->Low)
- Draw Map Values
- Draw Perpendicular Face Values
- Draw True Face Values (interpolated)
- Face Low-Elevation Centroid
- Display Arrival Times as Dates
- Plot Model Boundary Deficiencies

• River, Cross Sections

Additional Options

- Bank Stations
- Manning's n Values
- Reach Lengths
- Ineffective Areas
- Blocked Obstructions
- Ratio of Cut Line to XS Line
- Directional Arrows
- Stationing Tick Marks
- Draw Points
- Label Points
- Label Segment Indexes



Animation Controls

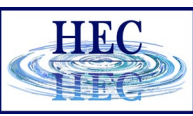


The screenshot displays the RAS Mapper interface with several key components:

- Animation Controls Panel:** Located at the top right, it includes a 'Max' button, a 'Min' button, a slider, and a play button. A red dashed circle highlights the play button.
- Animation Delay Dialog:** A smaller dialog box with a play button and a '0.00s' display.
- Computation Settings Dialog:** A dialog box with the following settings:
 - Computation Interval: 20 Second
 - Hydrograph Output Interval: 1 Hour
 - Mapping Output Interval: 1 Hour (highlighted with a red box)
 - Detailed Output Interval: 1 Hour
- Main Interface:** Shows a map with a 2D 50ft grid overlay. The selected layer is '2D 50ft Grid - Depth'. The time displayed is '02JAN1900 11:20:00'. A color scale on the right indicates depth values from 145 to 155 feet.
- Left Panel:** Contains a tree view for 'Features', 'Map Layers', and 'Terrains'. The 'Results' section is expanded to show 'Depth (02JAN1900 11:20:00)' selected.



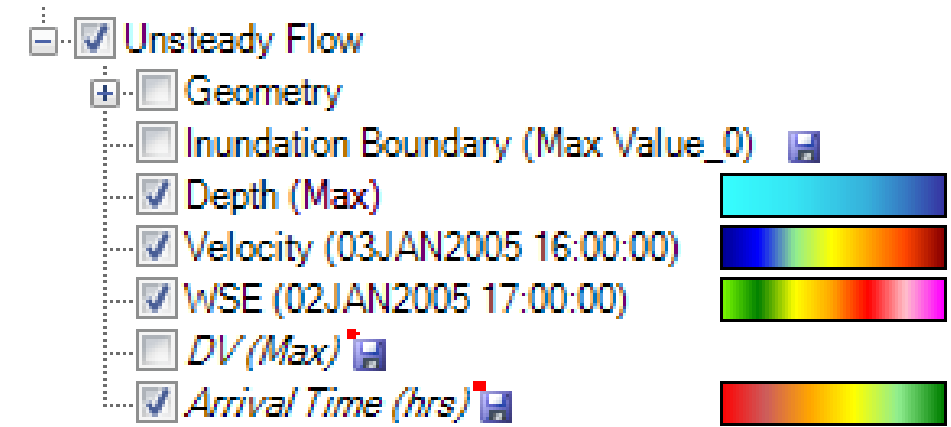
Animation: Dynamic Mapping Example



Map Types: Dynamic vs Stored



- Dynamic: Computed On-The-Fly
 - Animation of results without waiting
 - Smooth: Computes to screen-resolution
 - Doesn't use disk space
- Stored: Computed to Terrain Resolution
 - Stored to disk
 - These maps can be exported and shared
 - Faster rendering for slow map types



* = There was a problem reading data



Map Types: Dynamic vs Stored

Map Type

Profile/
Parameter

Output Mode

Results Map Parameters

Map Type

- Hydraulics
 - Water Surface Elevation**
 - Velocity
 - Flow (1D Only)
 - Inundation Boundary
 - Depth
 - Courant (Velocity/Length)
 - Courant (Residence Time, 2D Only)
 - Froude
 - Shear Stress
 - Depth * Velocity
 - Depth * Velocity²
 - Energy (Depth)
 - Energy (Elevation)
 - Arrival Time
 - Arrival Time (Max)
 - Recession
 - Duration

Unsteady Profile

- Maximum
- Minimum
- Profile

02JAN1900 00:00:00
 02JAN1900 00:05:00
 02JAN1900 00:10:00
 02JAN1900 00:15:00
 02JAN1900 00:20:00
 02JAN1900 00:25:00
 02JAN1900 00:30:00
 02JAN1900 00:35:00
 02JAN1900 00:40:00
 02JAN1900 00:45:00
 02JAN1900 00:50:00

Map Output Mode

Generated for Current View (in memory)

- Raster (with Associated Terrain)
- Point Feature Layer:

Stored (saved to disk)

- Raster based on Terrain: TerrainWithChannel
- Point Feature Layer:
- Polygon Boundary at Value: 0

Map Type	Layer Name
Water Surface Elevation	Water Surface Elevation

Map Type: A Map layer will be created for Water Surface Elevations.
 Map Mode: Map results are generated on-the-fly for the current view.

Add Map Close

← Dynamic Maps

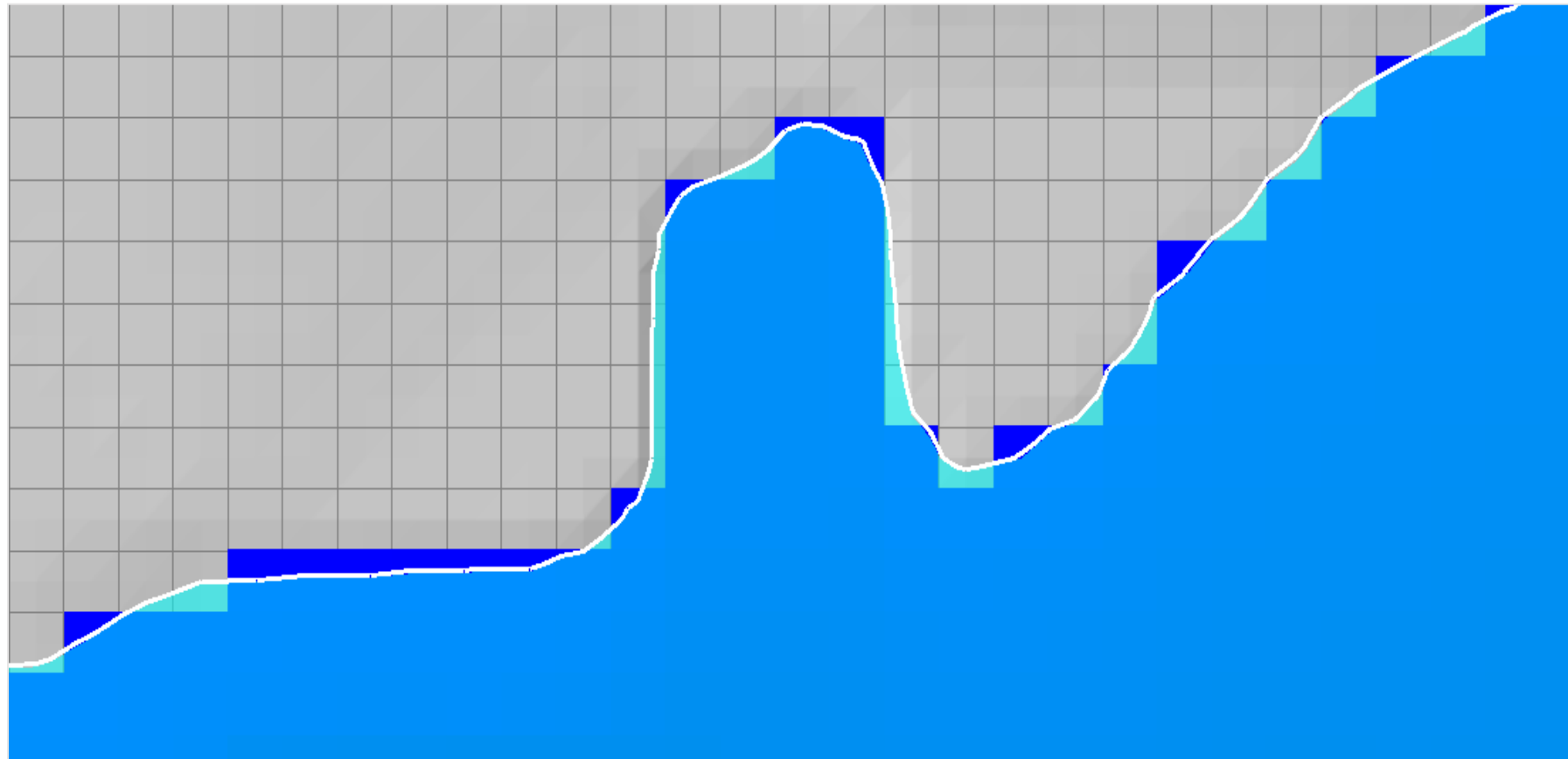
← Stored Maps

Default maps: Depth, Water Surface Elevation, Velocity ← Default Maps are Dynamic Maps



Map Types: Dynamic vs Stored

- Dynamic results plot values for the current pyramid level. Boundaries are defined based on interpolation.
- Stored results have a single value per cell.

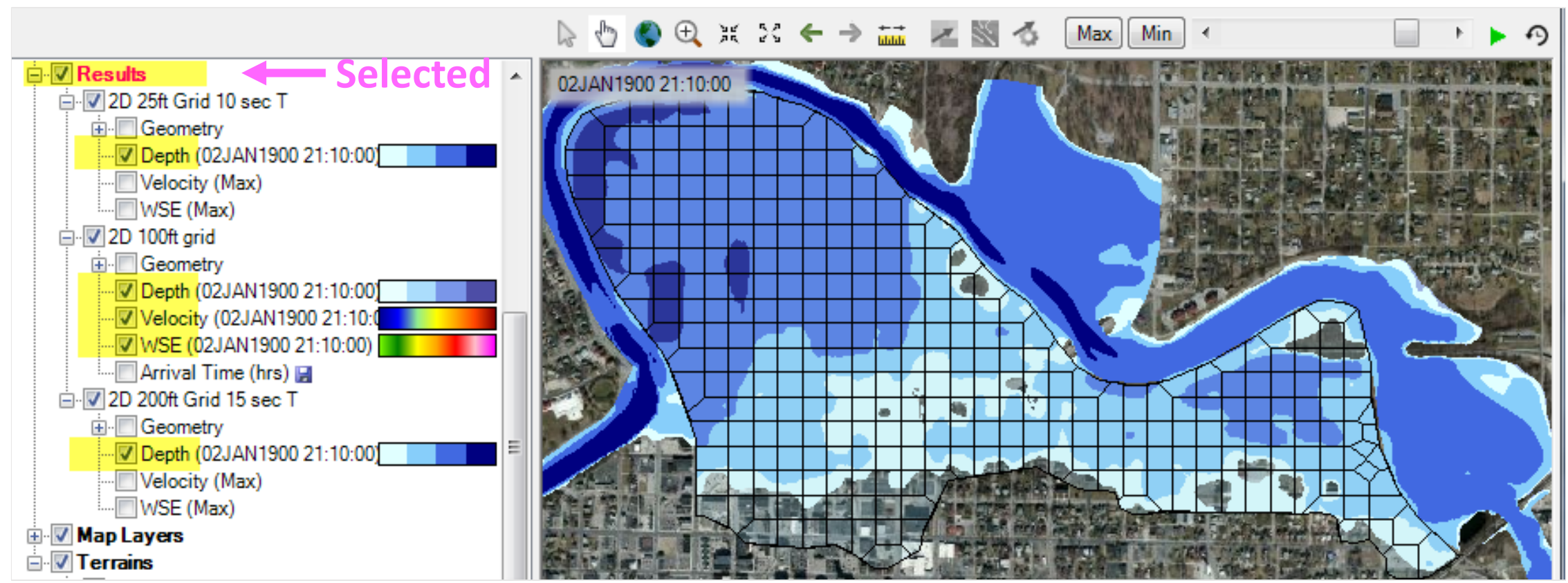




Map Types: Dynamic Maps

Animation Toolbar works on a selected layer

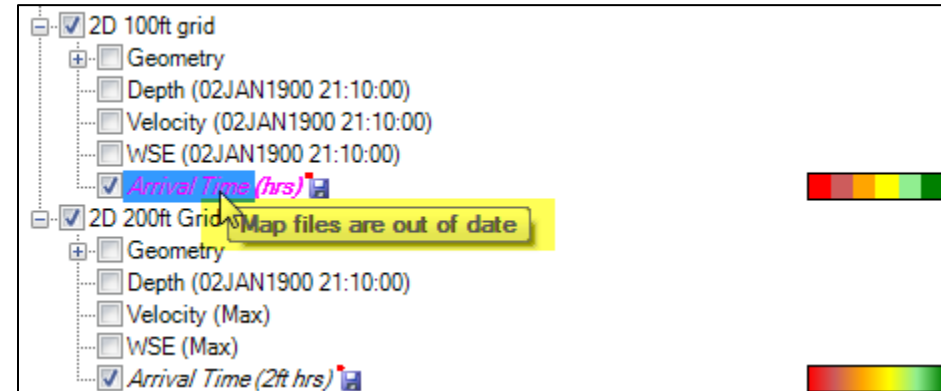
... or group layers and sync the timestep





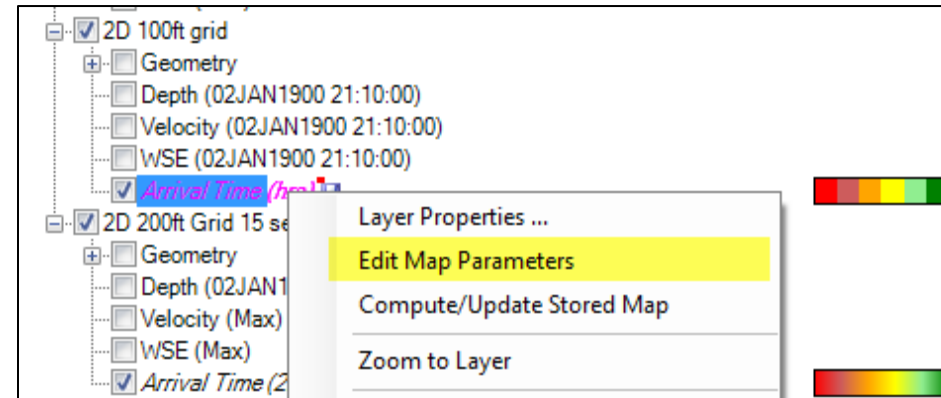
Map Types: Stored Maps

- Map status message on cursor tool tip

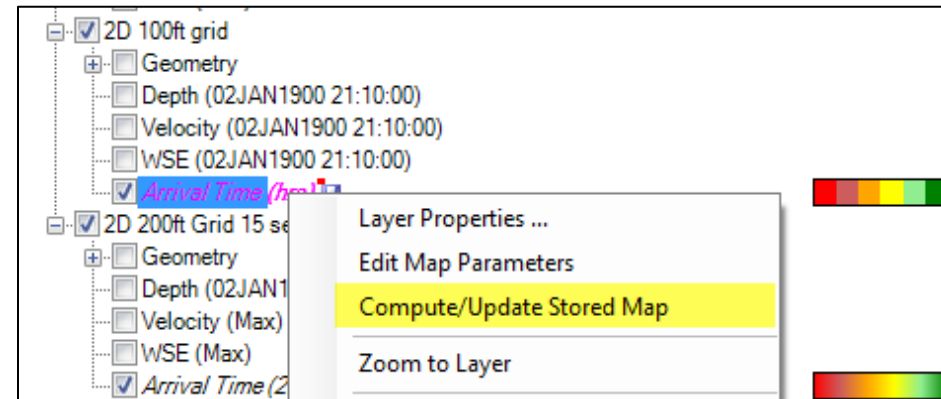


Right-click options:

- Edit Map Parameters



- Compute Map



* = *There was a problem reading data*



Map Types: Manage Results Maps



Manage Results Maps

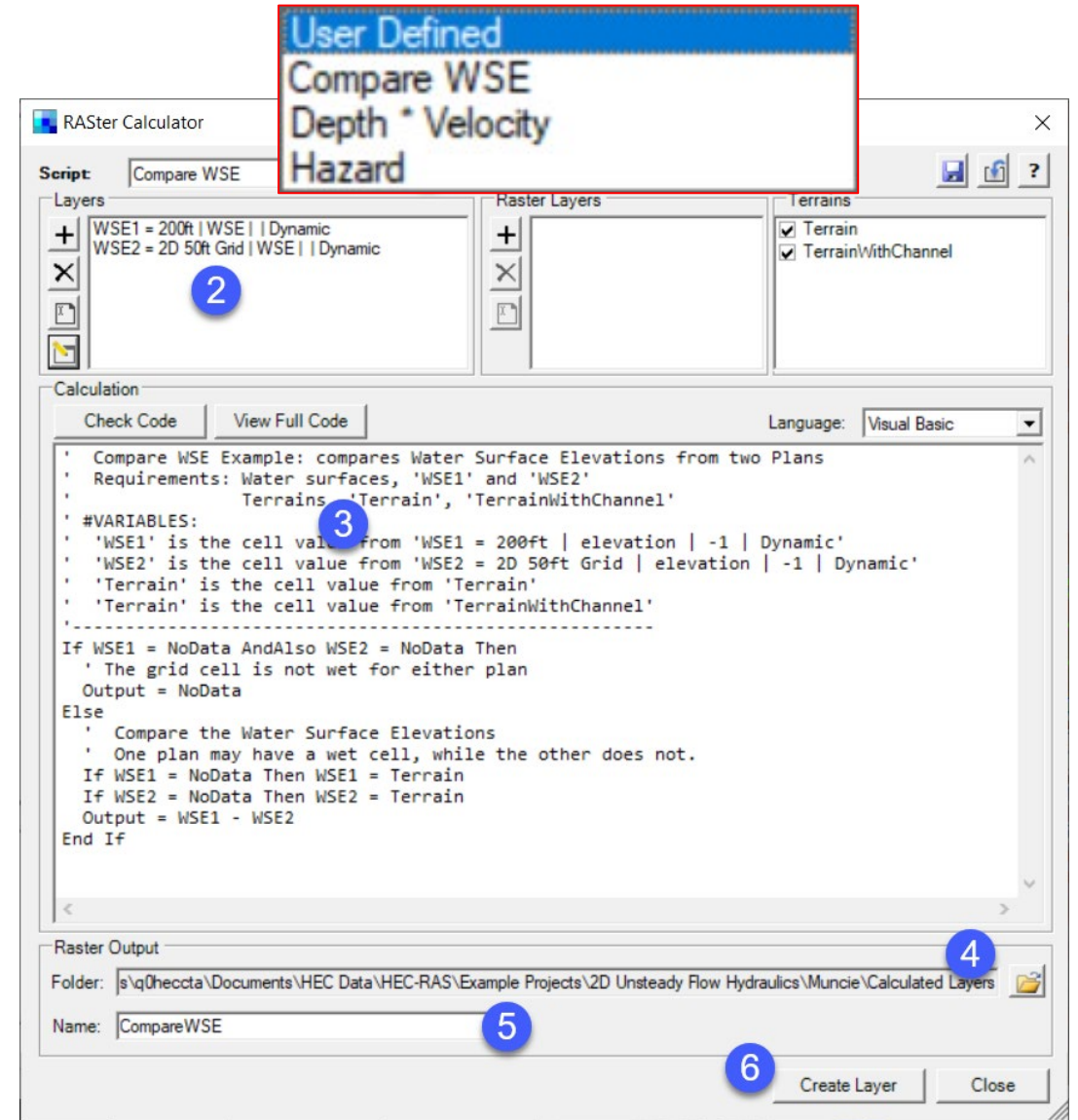
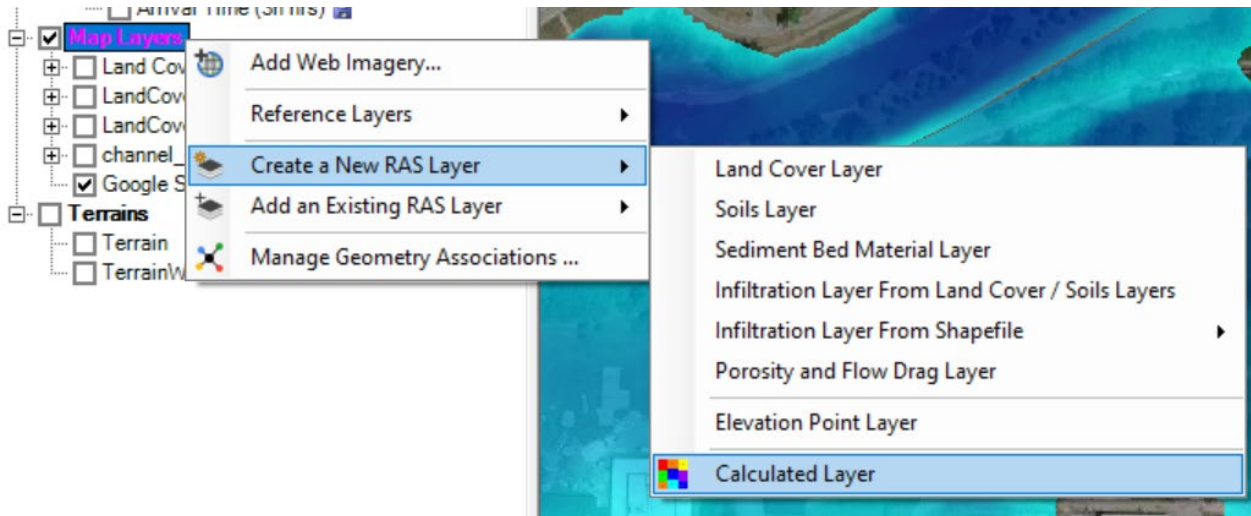
View Result Maps for:

Results and Maps	Store Status	
2D 25ft Grid 10 sec T		<input type="button" value="Add New Map"/>
Depth (03JAN1900 00:00:00)	N/A	<input type="button" value="Edit Map"/>
Velocity (Max)	N/A	<input type="button" value="Edit Map"/>
WSE (Max)	N/A	<input type="button" value="Edit Map"/>
2D 100ft grid		<input type="button" value="Add New Map"/>
Depth (02JAN1900 21:10:00)	N/A	<input type="button" value="Edit Map"/>
Velocity (02JAN1900 21:10:00)	N/A	<input type="button" value="Edit Map"/>
WSE (02JAN1900 21:10:00)	N/A	<input type="button" value="Edit Map"/>
Arrival Time (hrs) <input type="checkbox"/>	Map files are out of date	<input type="button" value="Edit Map"/>
2D 200ft Grid 15 sec T		<input type="button" value="Add New Map"/>
Depth (02JAN1900 21:10:00)	N/A	<input type="button" value="Edit Map"/>
Velocity (Max)	N/A	<input type="button" value="Edit Map"/>
WSE (Max)	N/A	<input type="button" value="Edit Map"/>
Arrival Time (2ft hrs) <input type="checkbox"/>	Map not created	<input type="button" value="Edit Map"/>



Calculated Layer: User Defined Dynamic or Static

- RASter Calculator
- Custom scripting code to use multiple results
- Works with RAS Results and Terrains
- Works with Rasters on disk





View Tools



RAS Mapper

File Project Tools Help

Selected Layer: Depth

View Tools

Max Min

Selected: '2D 50ft Grid - Depth' 02JAN1900 11:20:00

Features

- Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geome
 - Muncie Geome
- Plans
 - Unsteady Multi
 - Unsteady Run v
 - Unsteady Run v
- Event Conditions
 - Flow Boundary Conditions
- Results
 - 50ft User n Regions
 - 2D 50ft Grid
 - Event Conditions
 - Geometry
 - Plan
 - Depth (02JAN1900 11:20:00)
 - Velocity (02JAN1900 12:15:00)
 - WSE (Max)
- Map Layers
 - Land Cover
 - LandCoverUSGSGrid
 - LandCoverCombined
 - channel_over_overbank
 - Google Satellite
- Terrains
 - Terrain
 - TerrainWithChannel

Profile Line 1
FlowLine1

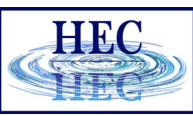
Plot Tick Marks

Messages Views **Profile Lines** Active Features Layer Values

(410271.56, 1804554.79 1 pixel = 5.11 ft)



View Tools: Velocity Map Static Arrows



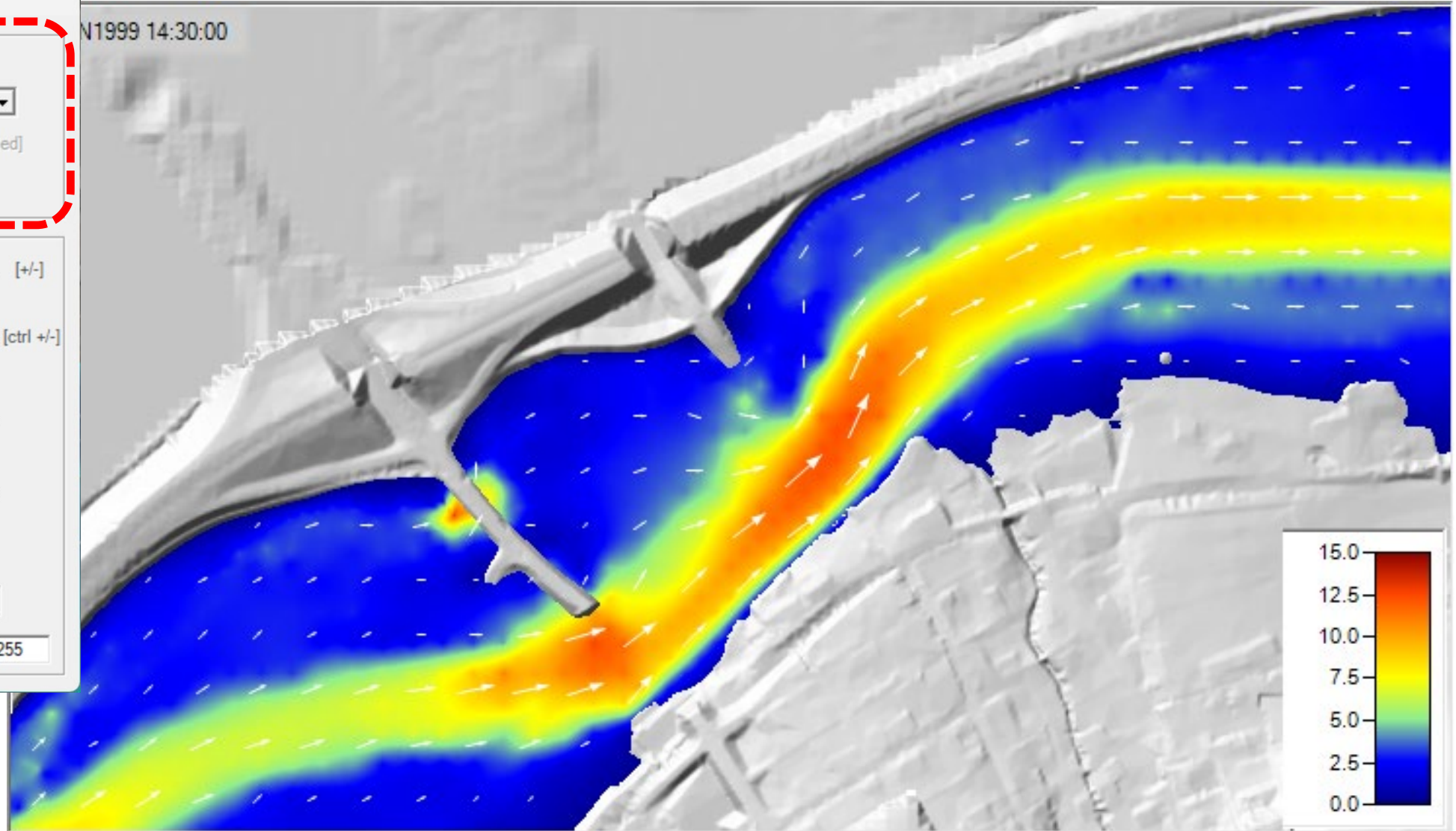
Velocity Map Parameters

Static Arrows

- Regular Interval
- Spacing: 32
- Computation Points [Disabled]
- Color: Black

Particle Tracing

- Speed: 1 [+/-]
- Density: 1.5 [ctrl +/-]
- Width: 0.8
- Lifetime: 100
- Speed Relative To Zoom [?]
- Anti-Aliasing: Yes
- R 255 G 255 B 255





View Tools: Velocity Map Particle Tracing

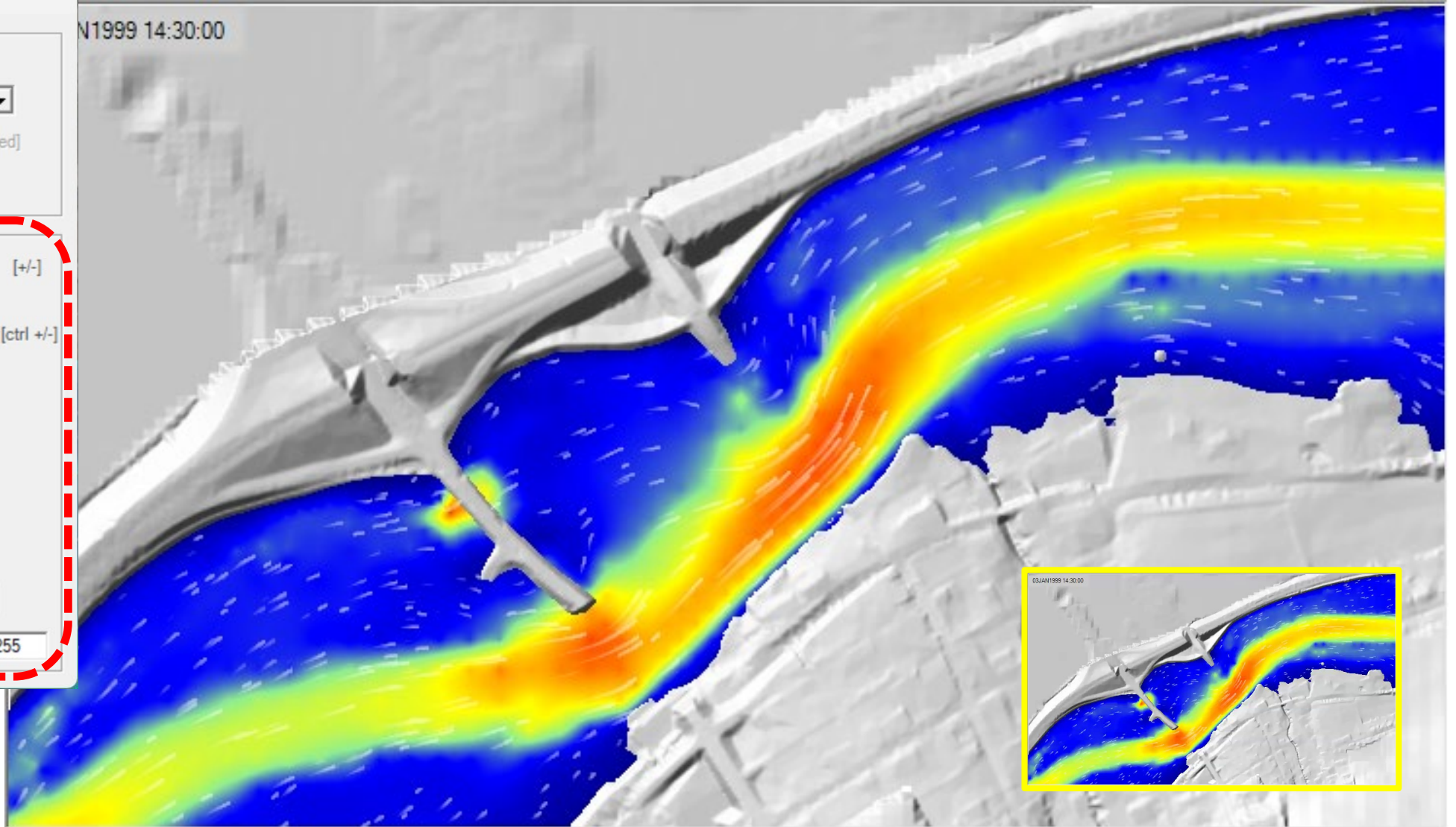
Velocity Map Parameters

Static Arrows

- Regular Interval
- Spacing: 32
- Computation Points [Disabled]
- Color: Black

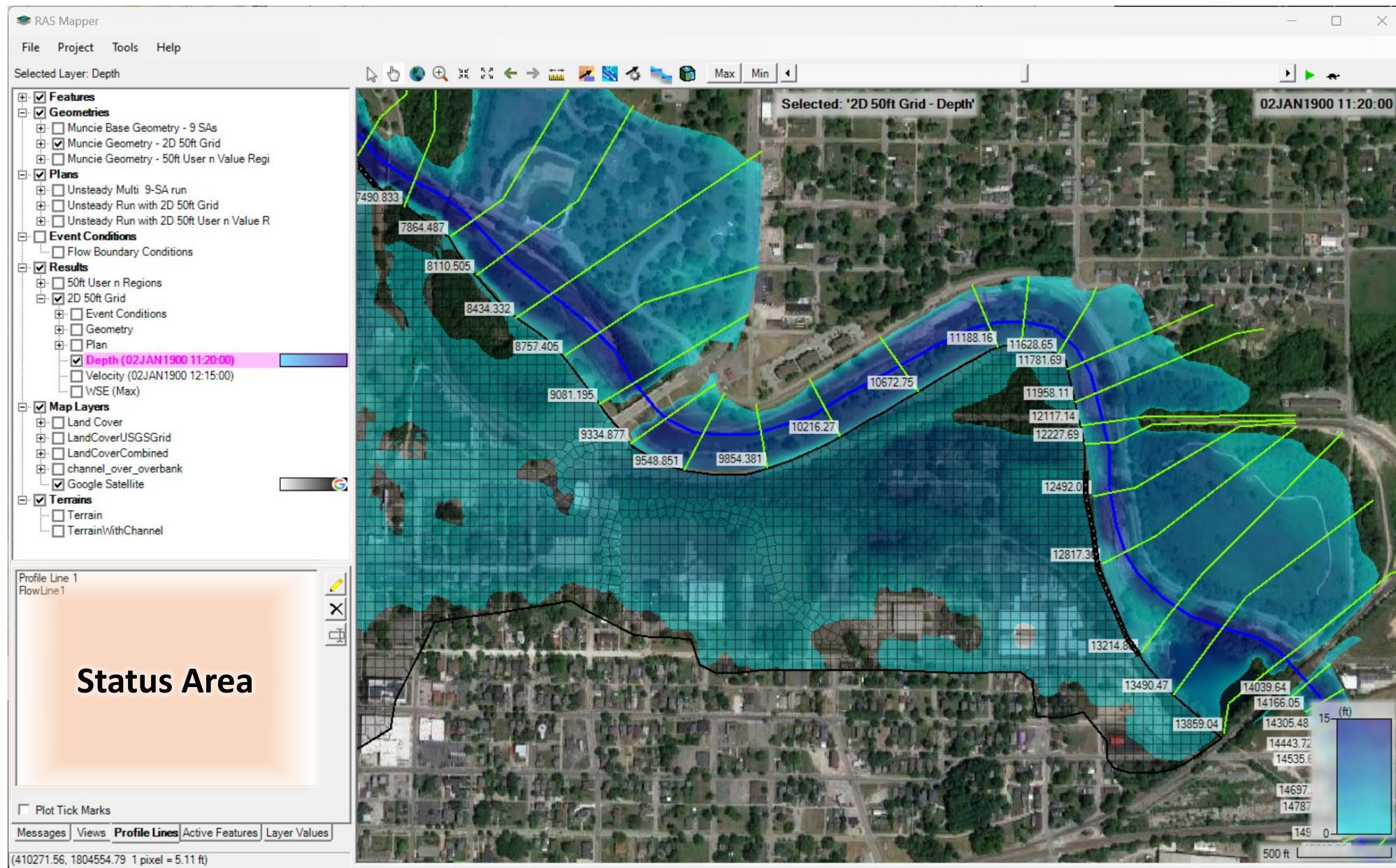
Particle Tracing

- Speed: 1 [+/-]
- Density: 1.5 [ctrl +/-]
- Width: 0.8
- Lifetime: 100
- Speed Relative To Zoom [?]
- Anti-Aliasing: Yes
- R 255 G 255 B 255





Status Area





Status Area Tabs

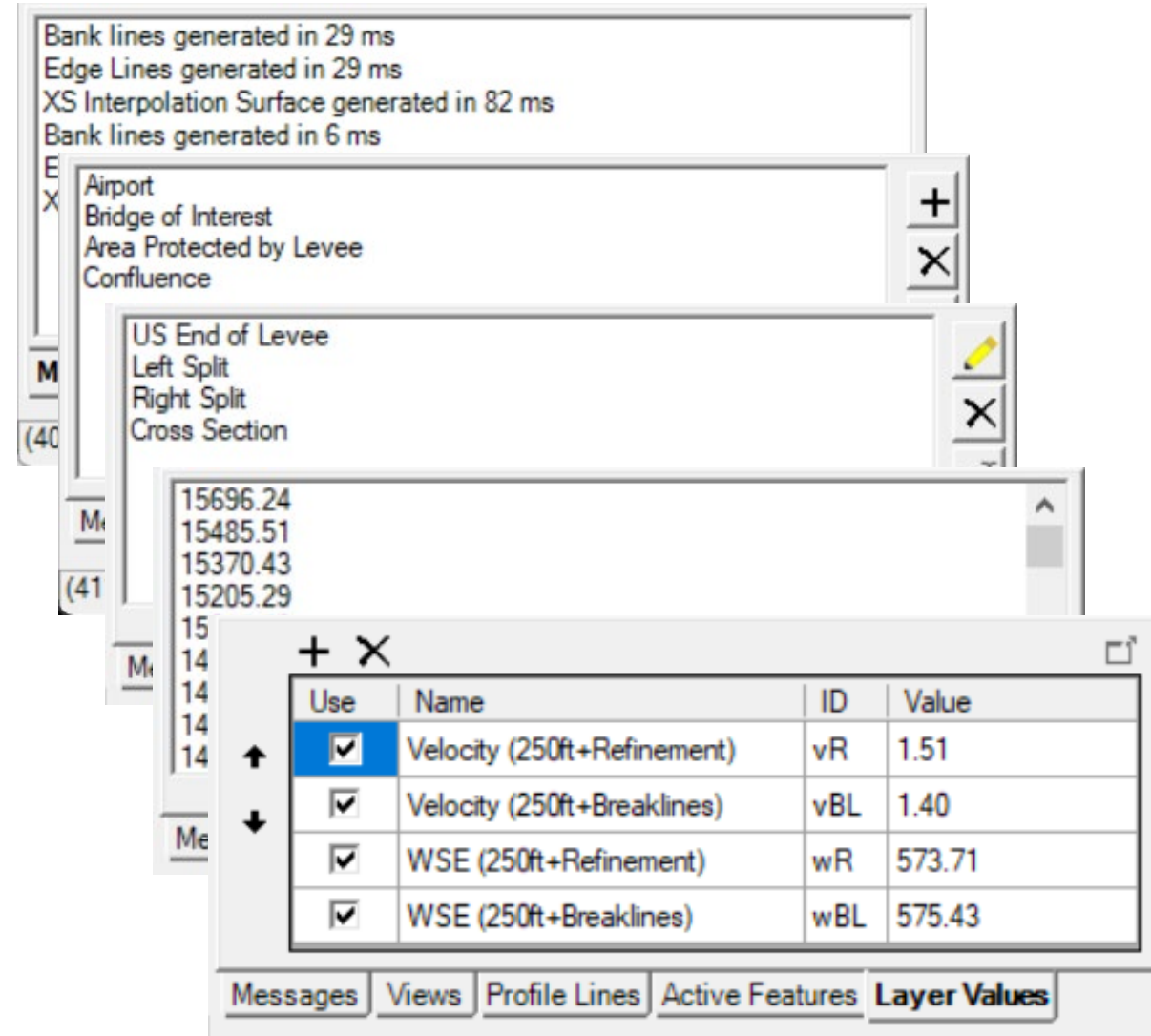
Messages: What just happened

Views: Quickly zoom to predefined areas

Profile Lines: Access results at specific locations

Active Features: Quick access to features in layer

Layer Values: Watch values for multiple results



Bank lines generated in 29 ms
Edge Lines generated in 29 ms
XS Interpolation Surface generated in 82 ms
Bank lines generated in 6 ms

Airport
Bridge of Interest
Area Protected by Levee
Confluence

US End of Levee
Left Split
Right Split
Cross Section

15696.24
15485.51
15370.43
15205.29

Use	Name	ID	Value
<input checked="" type="checkbox"/>	Velocity (250ft+Refinement)	vR	1.51
<input checked="" type="checkbox"/>	Velocity (250ft+Breaklines)	vBL	1.40
<input checked="" type="checkbox"/>	WSE (250ft+Refinement)	wR	573.71
<input checked="" type="checkbox"/>	WSE (250ft+Breaklines)	wBL	575.43

Messages Views Profile Lines Active Features **Layer Values**



Status Area: Profile Lines

User-defined/editable linear features

2 plotting options, **Profiles** and **Time Series**

Features

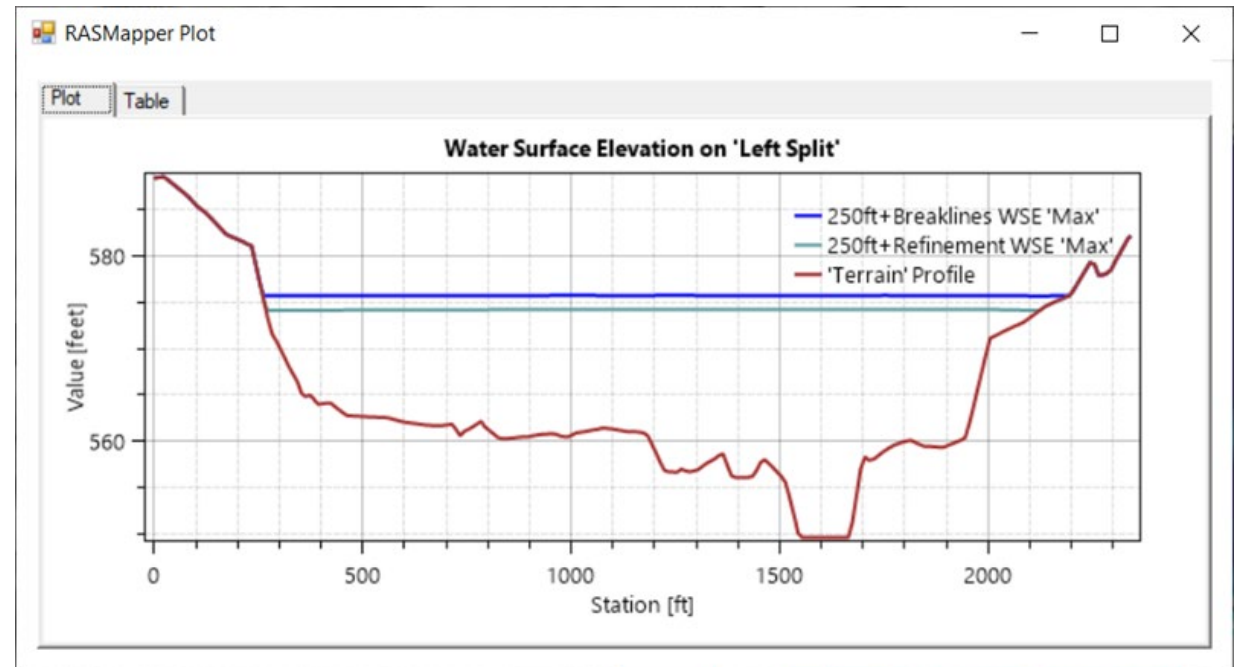
- Profile Lines
- Geometries
 - Simple Geometry
 - 250ft
 - 250ft+Breaklines
 - 250ft+Refinement
- Event Conditions
- Results
- Map Layers
 - CompareCellSize
 - Google Satellite
- Terrains
 - Terrain

US End of Levee
Left Split
Right Split
Cross Section

Messages Views **Profile Lines** Active Features Layer Values

Left Split
Right Split
Cross Section

- Plot Profile
 - Terrain
 - WSE**
 - Depth
 - Velocity against Terrain
 - Sediment
- Plot Time Series
- Rename
- Delete
- Import Polylines from Shapefile
- Export Polylines to Shapefile

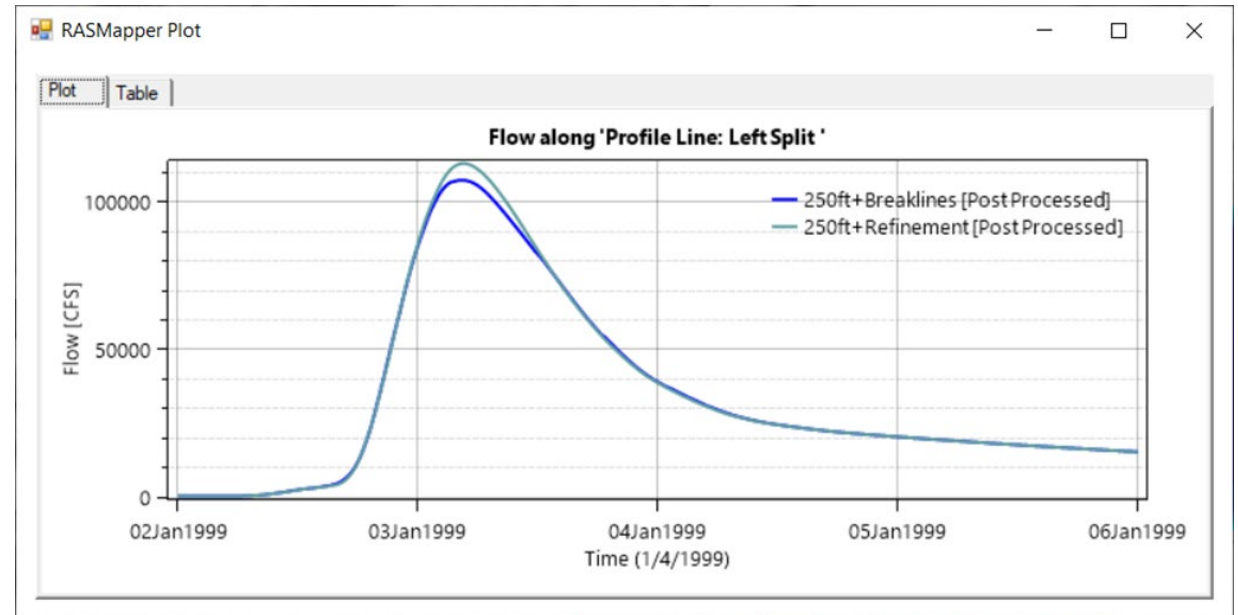




Status Area: Profile Lines

User-defined/editable linear features

Direction of **flow** depends on how the profile line was drawn. Left to right, looking downstream is positive flow





Status Area: Active Features



RAS Mapper

File Project Tools Help

Selected Layer: Cross Sections

Selected: 'Cross Sections'

Features

- Geometries
 - Muncie Base Geometry - 9 SAs
 - Muncie Geometry - 2D 50ft Grid
 - Rivers
 - Cross Sections
 - 2D Flow Areas
 - Lateral Structures
 - Reference Areas
 - Manning's n
 - (13 Empty Layers)
 - Muncie Geometry - 50ft User n Value Regi
- Plans
 - Unsteady Multi 9-SA run
 - Unsteady Run with 2D 50ft Grid
 - Unsteady Run with 2D 50ft User n Value R
- Event Conditions

6295.048
5925.654
5688.906
5382.517
5124.979
4850.811
4570.628
4185.719
3952.406
3690.809
3268.276
2920.440
2582.948
2290.221
1980.776
1743.103
1469.294

Cross Section: 5688.906 (Muncie Geometry - 2D 50ft Grid)

Selected Features (5 of 61)

Find... Ctrl+F

- Copy Selected Ctrl+C
- Zoom to Selected
- Select All Ctrl+A
- Invert Selection
- Plot Terrain Profile
- Save Selected as Profile Lines
- Buffer Selected Lines Into Clipboard Polygon

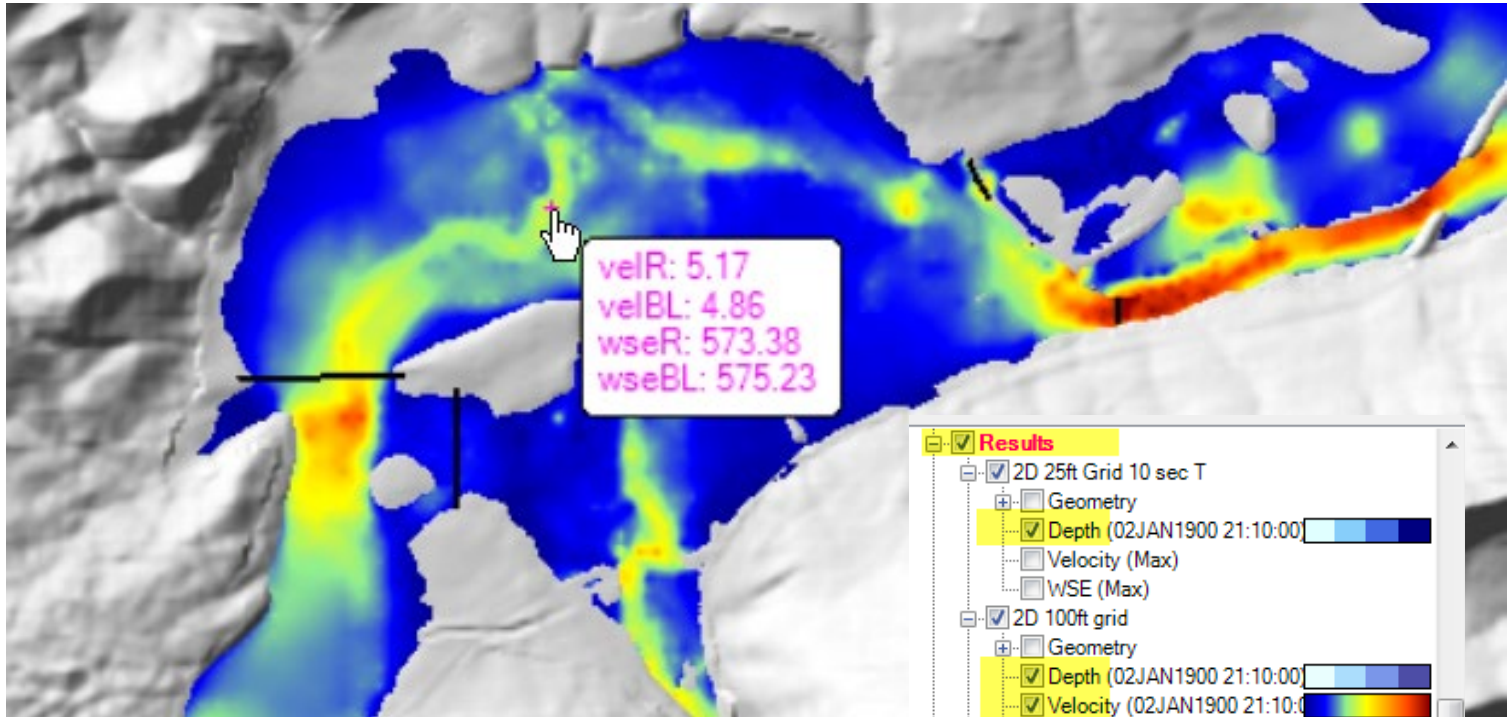
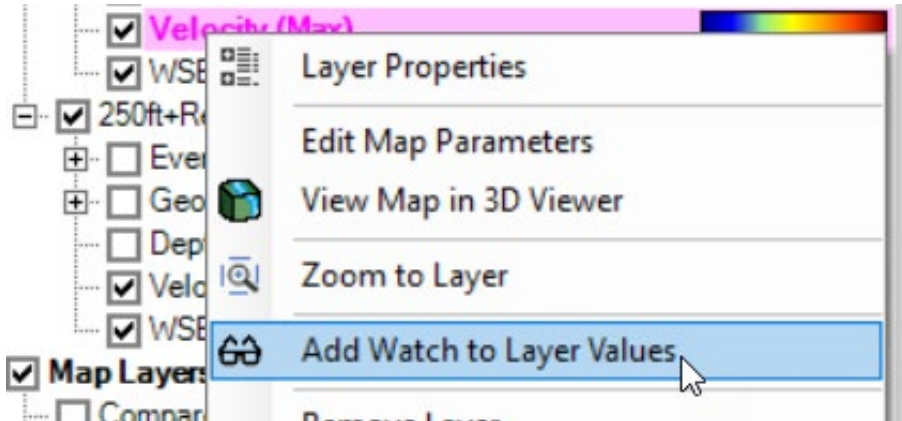
Messages Views Profile Lines **Active Features** Layer Values

(404246.37, 1804120.38 1 pixel = 7.45 ft)

1000 ft

Status Area: Watch Layer Values

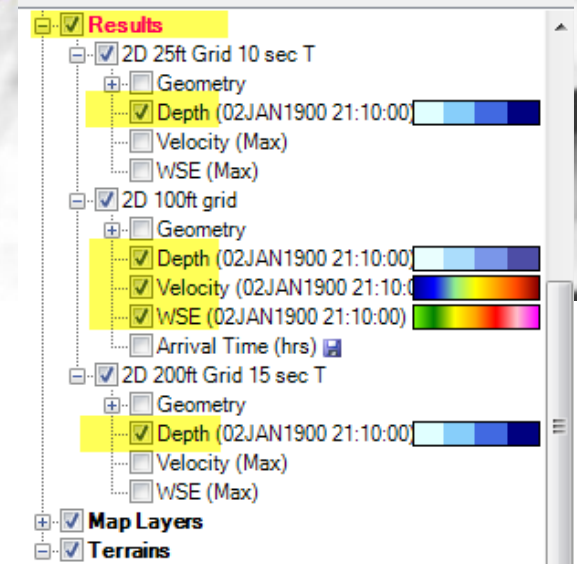
View Values from multiple layers simultaneously



Use	Name	ID	Value
<input checked="" type="checkbox"/>	Velocity (250ft+Refinement)	velR	5.14
<input checked="" type="checkbox"/>	Velocity (250ft+Breaklines)	velBL	5.00
<input checked="" type="checkbox"/>	WSE (250ft+Refinement)	wseR	573.78
<input checked="" type="checkbox"/>	WSE (250ft+Breaklines)	wseBL	575.47

Messages Views Profile Lines Active Features **Layer Values**

(2037649.22, 346306.26 1 pixel = 42.29 ft)



Remember that you can sync datasets!



Profiles and Tabular Data



There are multiple ways to extract charts and tabular data from RAS

- Compute Engine Data (generally)
 - Reference Locations (points, lines and areas)
 - 2D Flow Area Queries (points, cells and cell faces)
- Rendered Data (generally)
 - Profile Lines
 - Polygon and Polyline Features

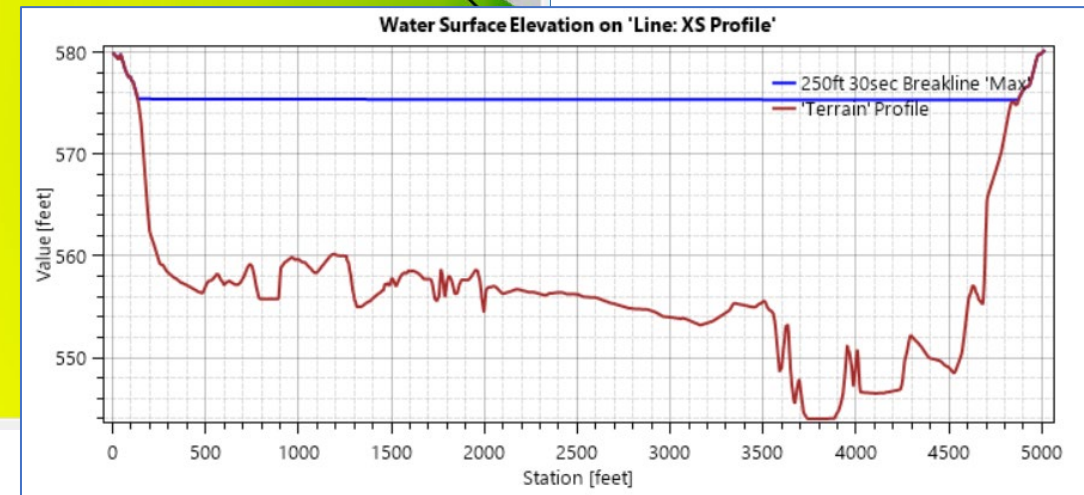


Profile Lines



The screenshot shows the RAS Mapper software interface. The main window displays a map with a yellow and orange shaded area representing a river channel. A black line labeled 'XS Profile' is drawn across the channel. On the left, the 'Layer List' is visible, showing various layers under categories like 'Features', 'Geometries', 'Results', 'Map Layers', and 'Terrains'. The 'Profile Lines' layer is selected. A context menu is open over the 'XS Profile' line, with options: 'Copy Selected Feature Ctrl+C', 'Plot Profile', and 'Plot Time Series'. The 'Plot Profile' option is expanded, showing sub-options: 'Terrain', 'WSE', and 'Velocity against Terrain'. The 'WSE' option is highlighted.

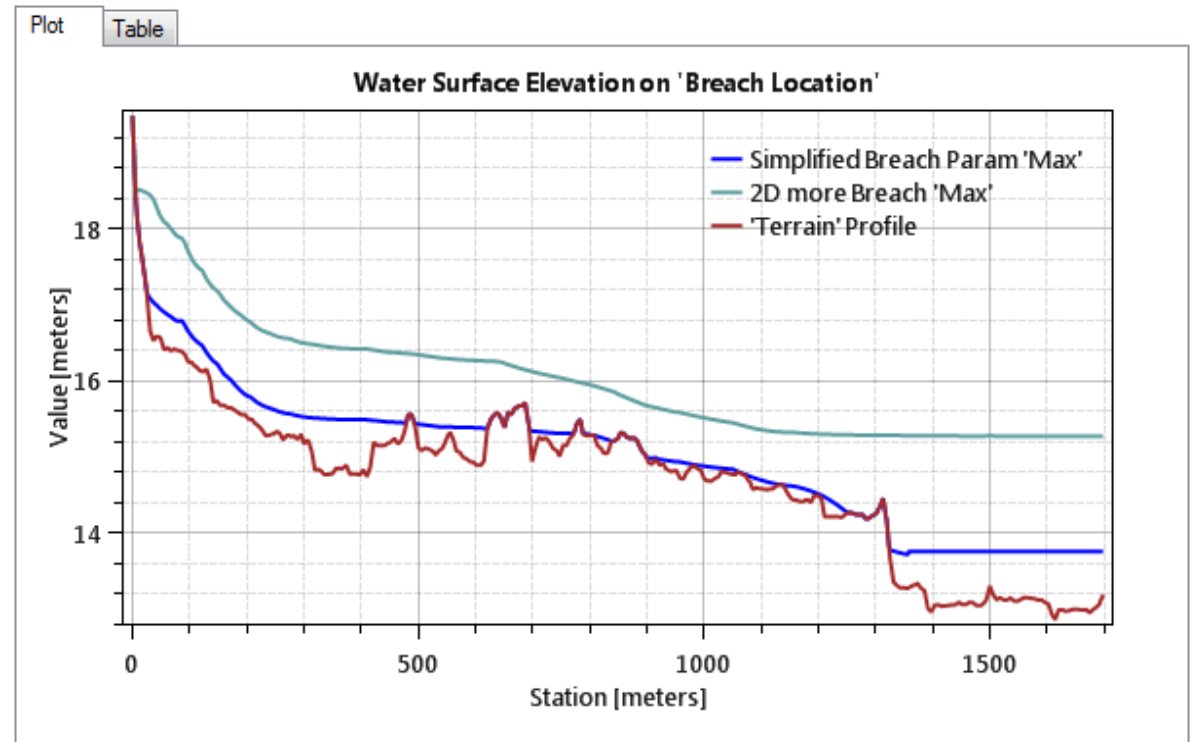
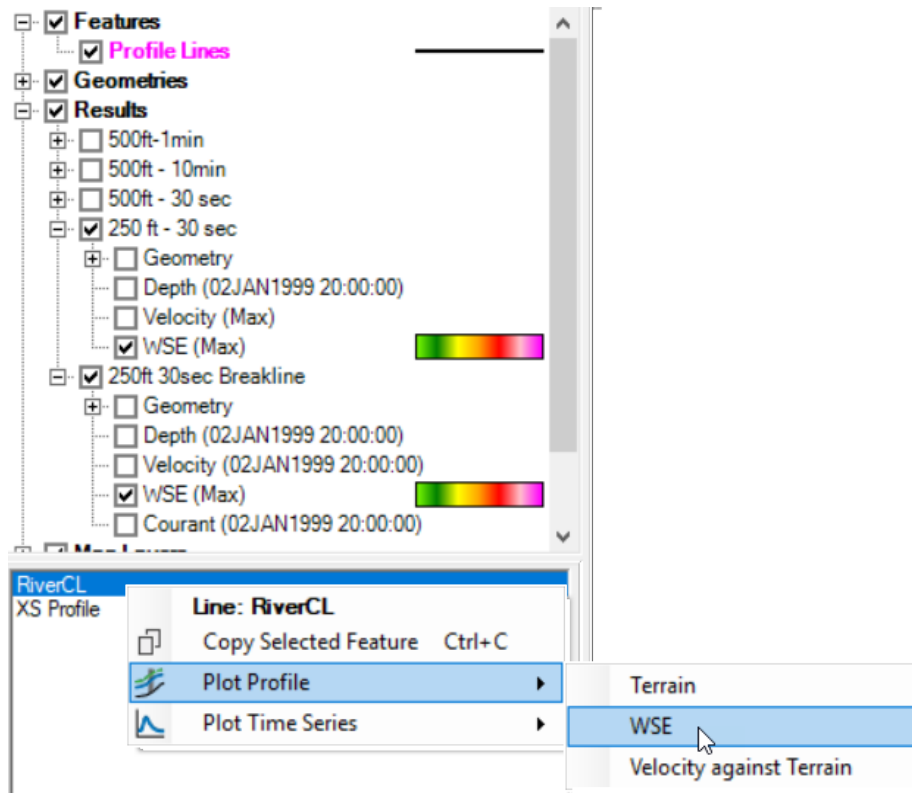
You can only plot data that is turned on in the Layer List





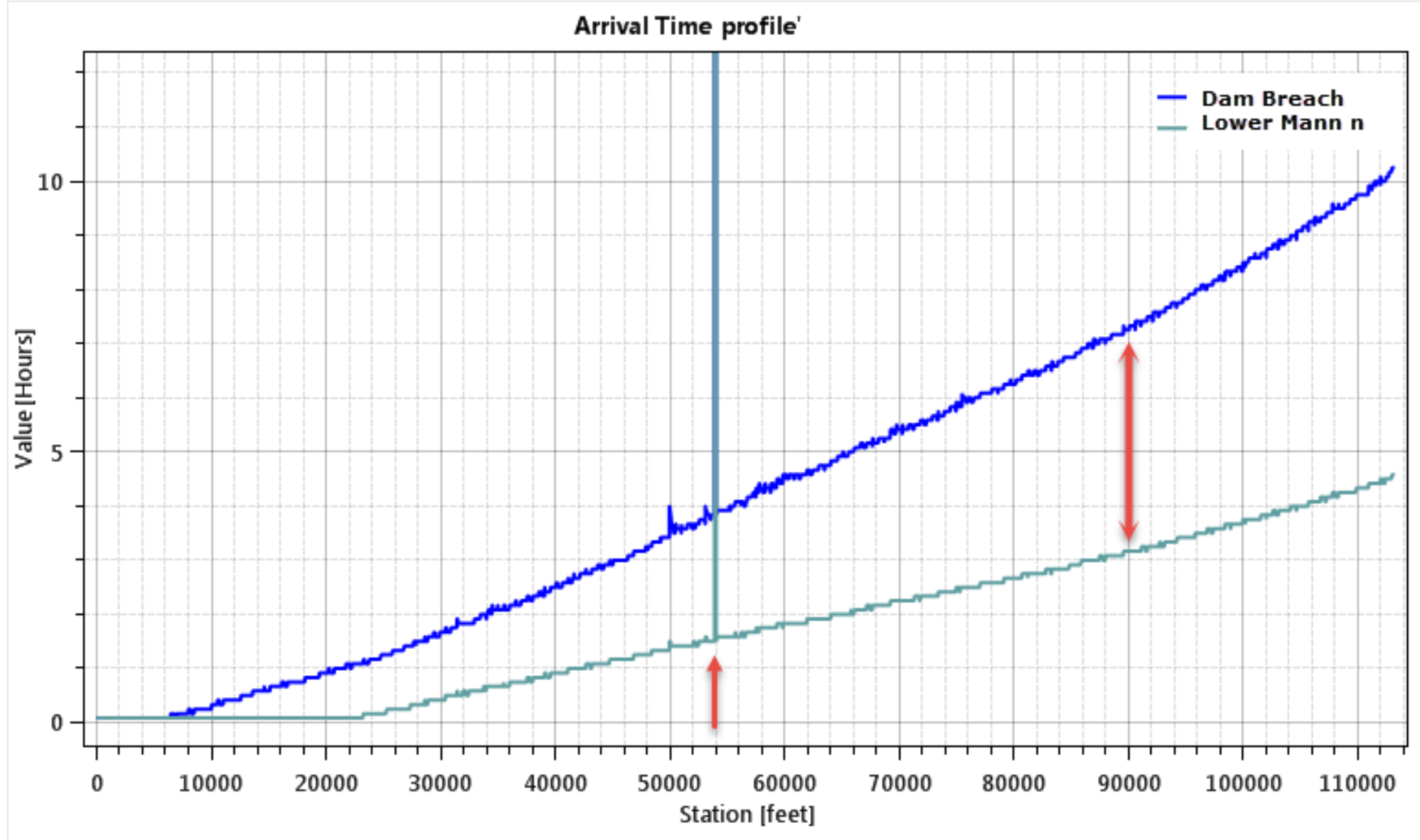
Profile Line: Result Comparison

- Turn on multiple result maps
- Choose a Profile (i.e. 'Max')
- Choose **Plot Time Series** or **Plot Profile**



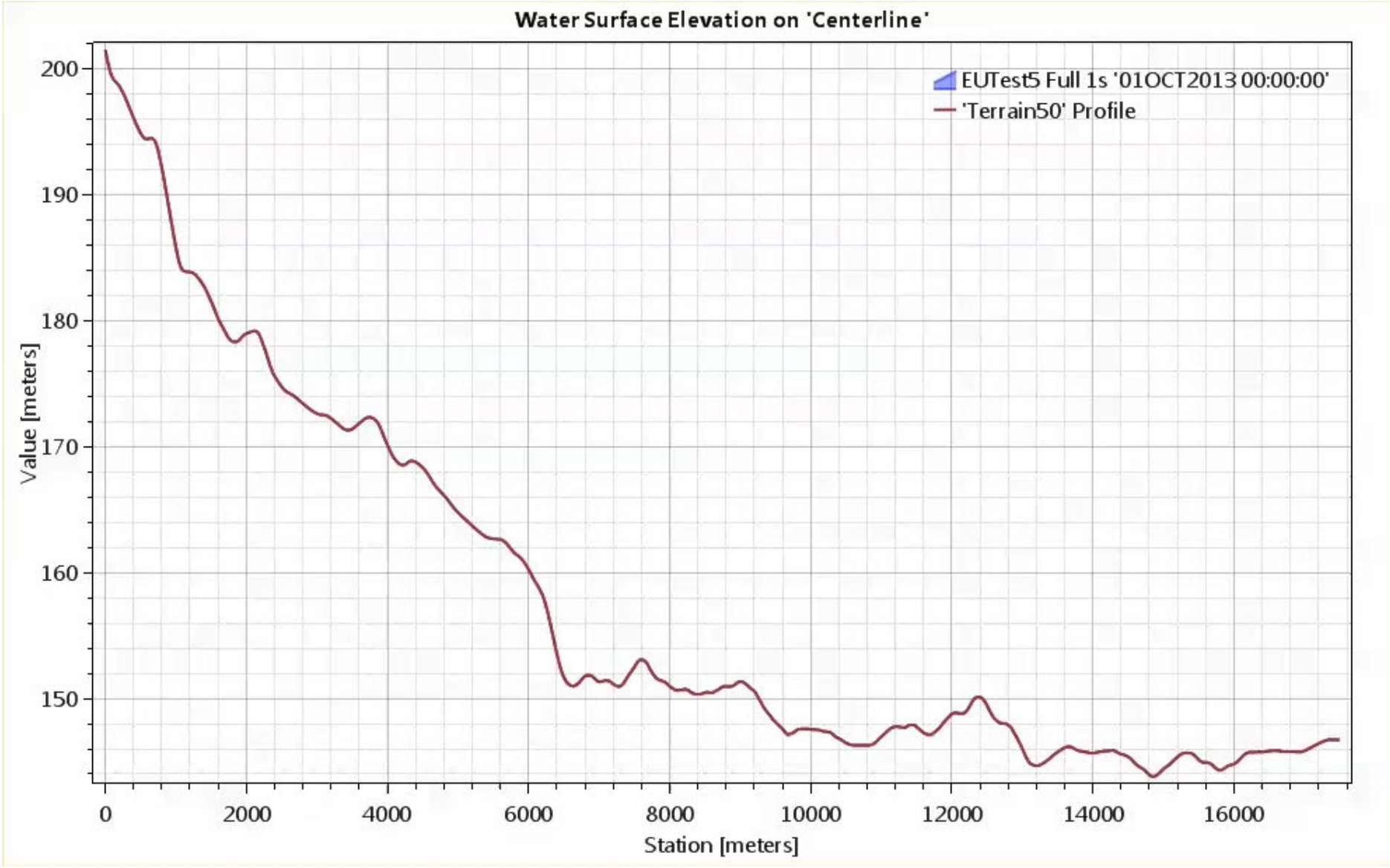


Profile Lines: Comparison of Calculated Data



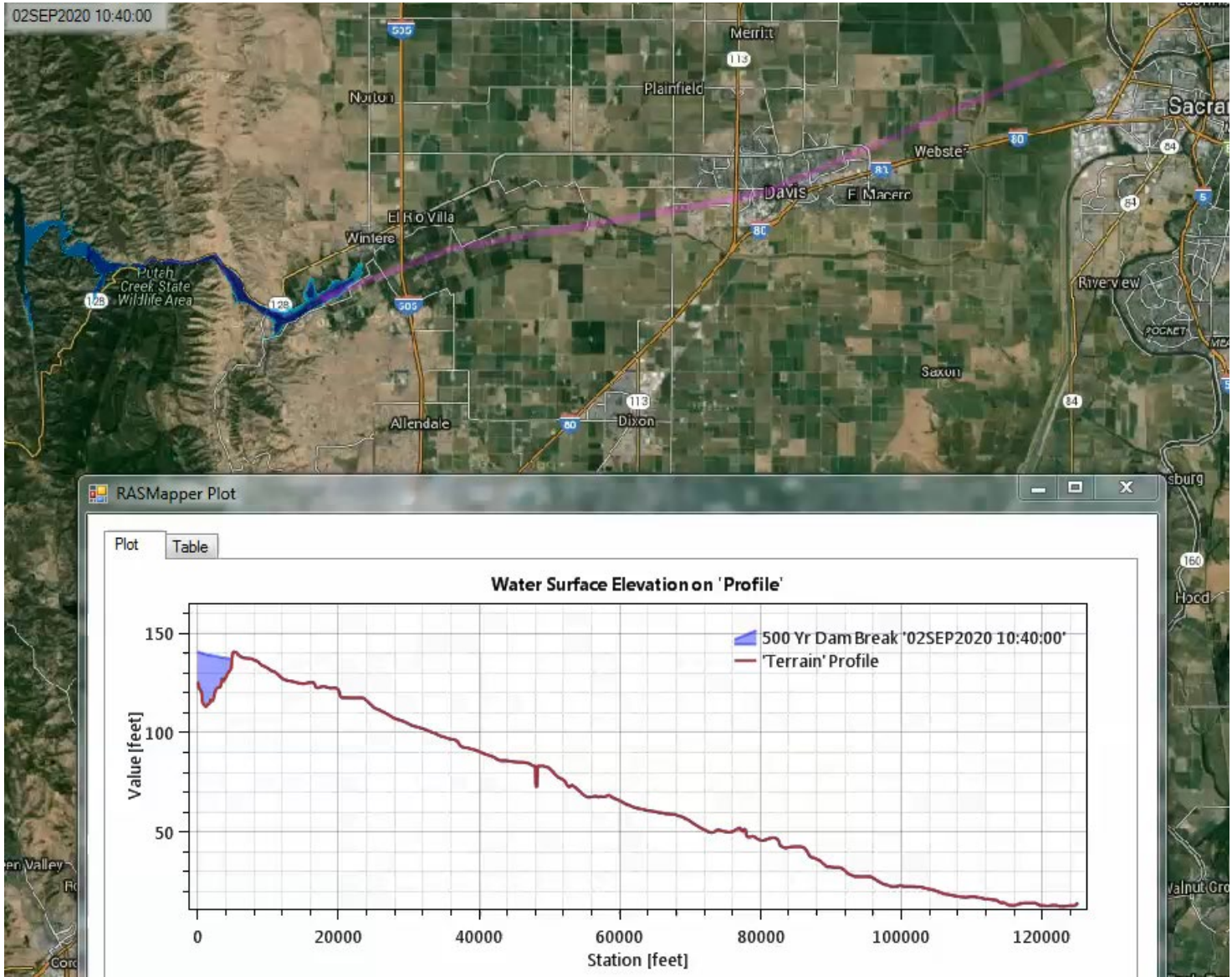


Profile Lines: Animating



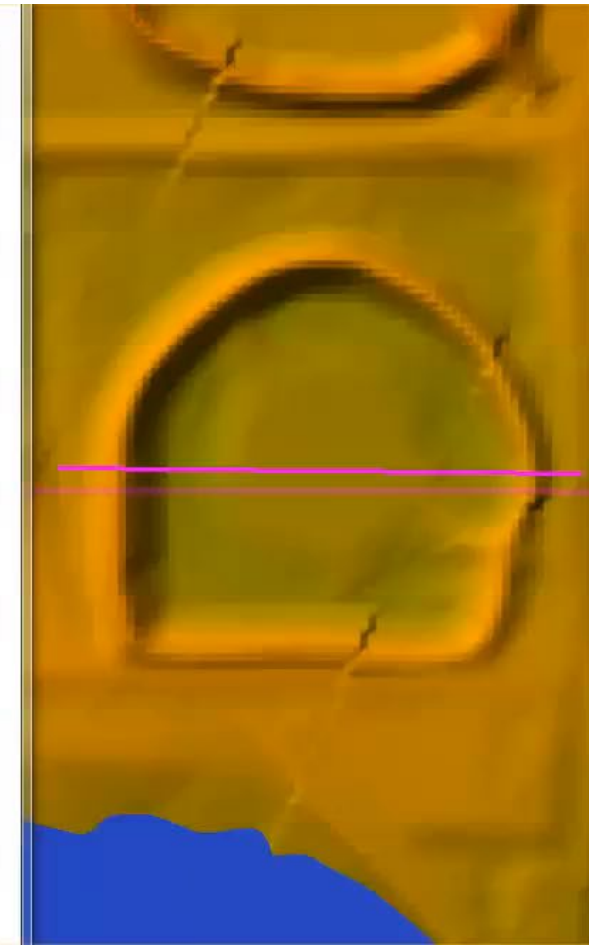
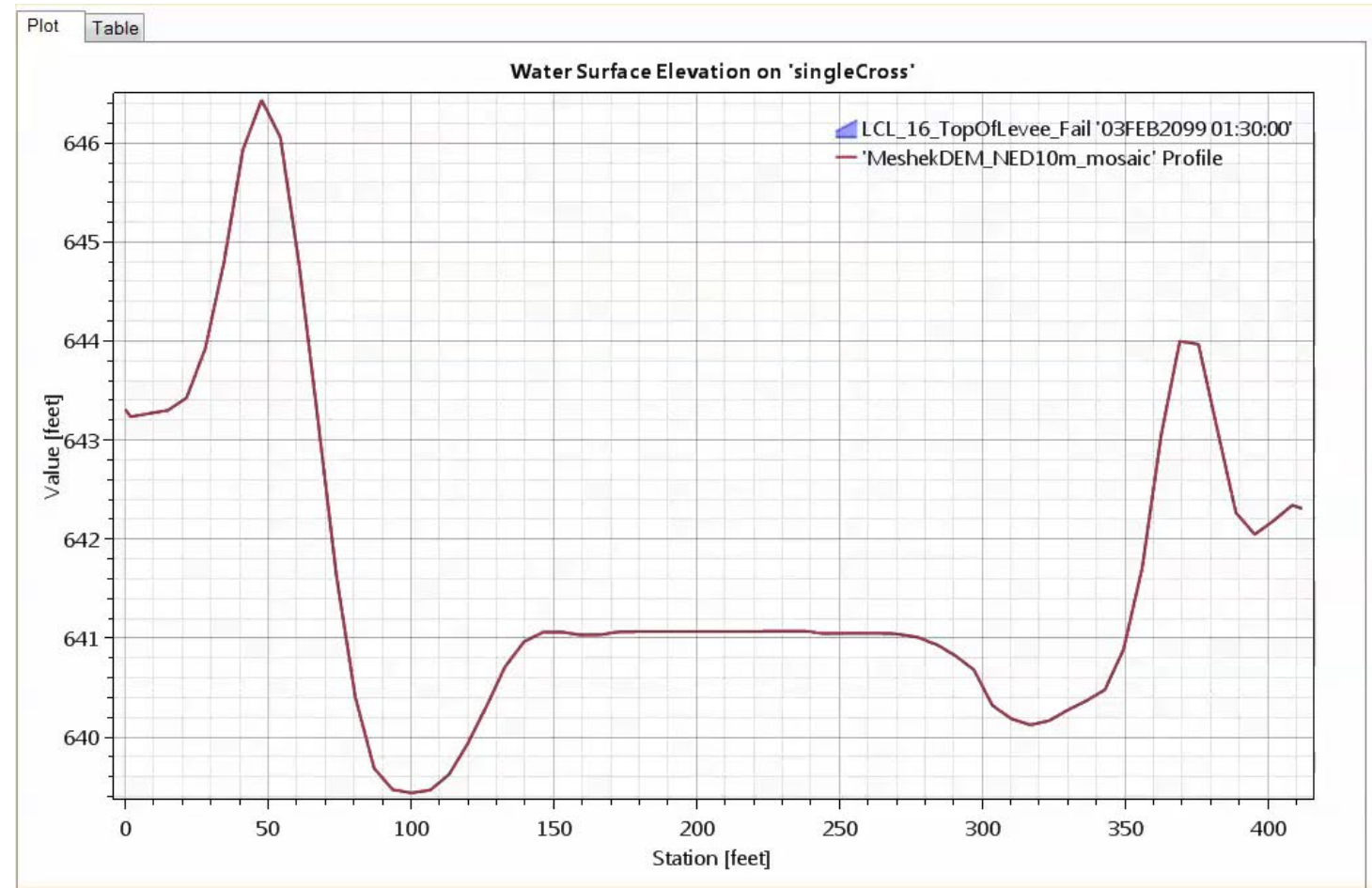


Profile Lines: Sync Animation with Spatial Results

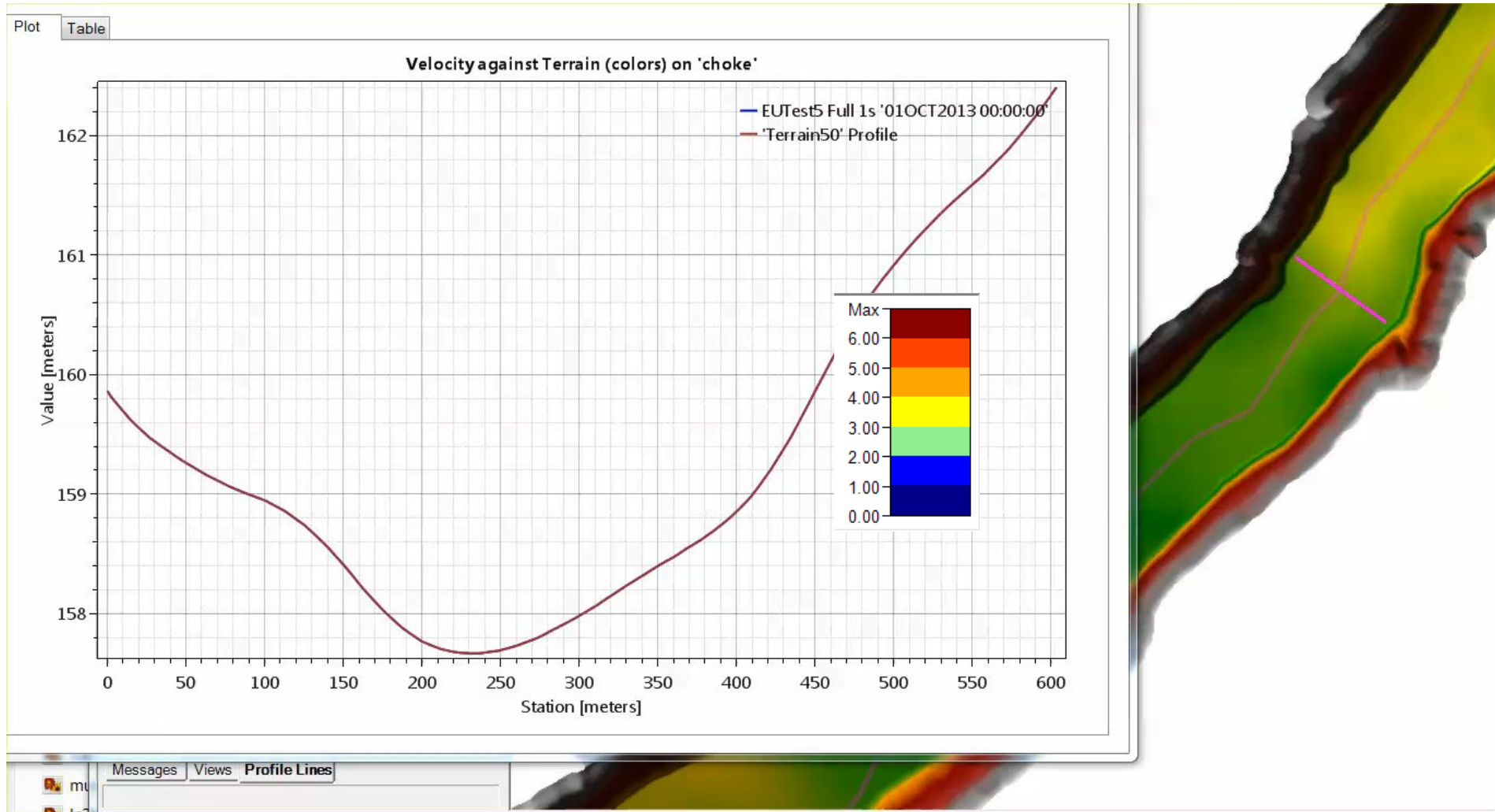




Profile Lines: Sync Animation with Spatial Results



Profile Lines: Velocity Animation



Questions?