

# Computational Parameters

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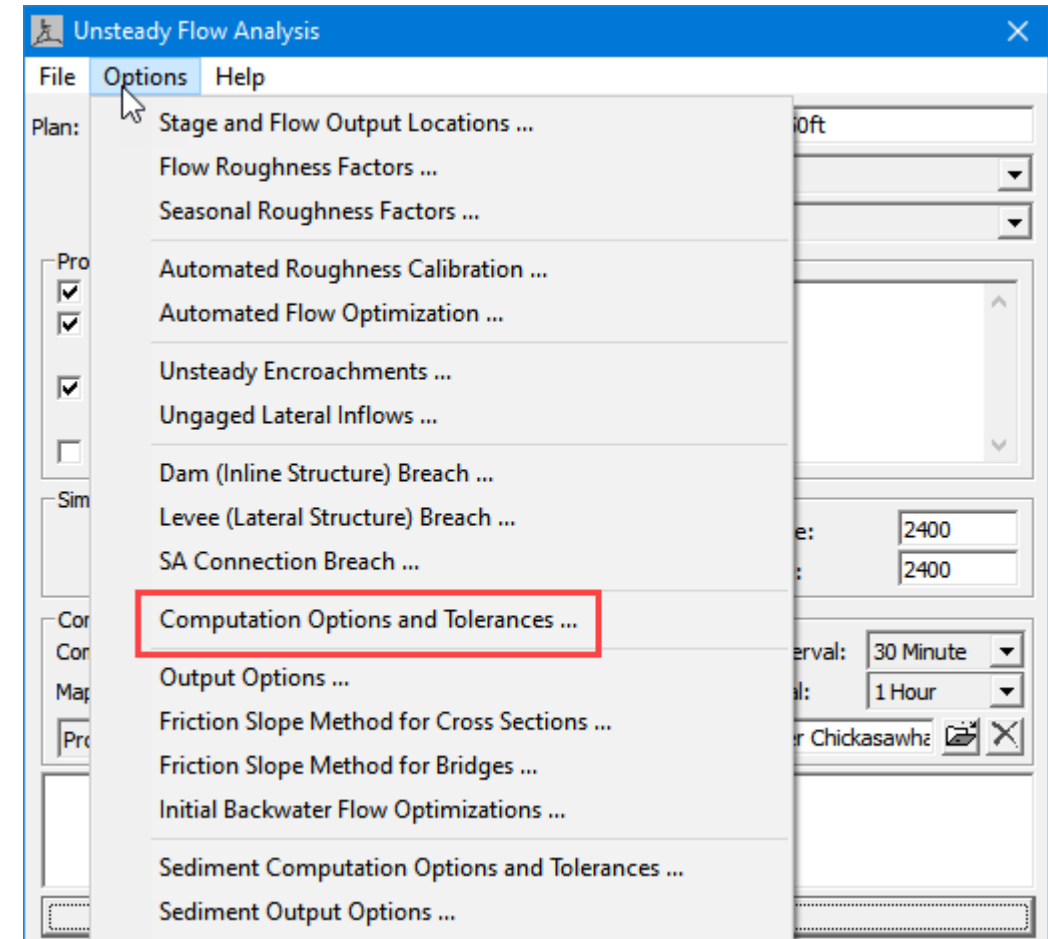
# Overview

- Performing Computations
- Computation Options
  - 2D and 1D/2D
- 2D Cell Size Considerations
- Time Step Selection and Options



# Performing Computations

- Plan Data
- Programs to Run
- Simulation Window
- Computational Settings
  - Computation Timestep
  - Output Intervals
- Computation Options and Tolerances





# Order of Operations

1. Writing 1D Geometry
  - Bank Lines, Edge Lines (1D)
  - Interpolation Surface (1D)
2. 2D Geometry Preprocessor
  - Process 2D Cells and Faces
3. 1D Geometry Preprocessor
  - Hydraulic Tables for Cross Sections
4. Unsteady Flow Simulation
5. Post Processor (1D only)

HEC-RAS Finished Computations

Write Geometry Information  
Layer: Complete

Geometry Processor  
River: MissRiver RS: 29569.19  
Reach: Below\_Grey\_Cloud Node Type: Cross Section  
IB Curve:

Unsteady Flow Simulation  
Simulation:  
Time: 384.0000 18FEB2099 00:00:00 Iteration (1D): 0 Iteration (2D): 0  
Writing Profiles 500

Post Process  
River: MissRiver RS: 151400  
Reach: thru\_St\_Paul Node Type:  
Profile: 17FEB2099 2400  
Simulation: 66/66

Computation Messages

**Plan: 'Fail Middle - 2D Run Modified' (StPaulIES.p03)**  
Simulation started at: 16Jul2014 01:10:38 PM  
Using 64 Bit Computation Engines

Writing Geometry  
Computing Bank Lines  
Bank lines generated in 303 ms  
Computing River Edge Lines  
River Edge Lines generated in 302 ms  
There are no stored interpolation surfaces  
Interpolation Surfaces will be recomputed  
Computing XS Interpolation Surfaces  
XS Interpolation Surfaces generated in 374 ms  
Geometry 'GeomWriter' association was set to the terrain layer (Terrain)  
Computing 2D Flow Area '2DArea' tables  
2D Flow Area '2DArea' tables complete 12.76 sec  
Completed writing geometry

**Geometric Preprocessor HEC-RAS 5.0.0 Beta June 2014**  
10 Internal Boundary curve(s) have been read in

Finished Processing Geometry

Writing event conditions  
Event conditions complete

**Performing Unsteady Flow Simulation HEC-RAS 5.0.0 Beta June 2014**

**Finished Unsteady Flow Simulation**

Writing Results to DSS  
Finished Writing Results to DSS

Reading Data for Post Process

**Running Post Processor HEC-RAS 5.0.0 Beta June 2014**

Finished Post Processing

**Computations Summary**

Computation Task	Time(hh:mm:ss)
Completing Geometry	15
Preprocessing Geometry(64)	1
Unsteady Flow Computations(64)	1:11
Writing to DSS(64)	7
Post-Processing(64)	30
Complete Process	2:06

Pause Take Snapshot of Results Close



# 2D Computation Options Tab

- Defaults
- Column Per 2D Flow Area

HEC-RAS Unsteady Computation Options and Tolerances

General | **2D Flow Options** | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

	Parameter	(Default)	BaldEagleCr
1	Theta (0.6-1.0)	1	1
2	Theta Warmup (0.6-1.0)	1	1
3	Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4	Volume Tolerance (ft)	0.01	0.01
5	Maximum Iterations	20	20
6	Equation Set	Diffusion Wave	Diffusion Wave
7	Initial Conditions Time (hrs)		4
8	Initial Conditions Ramp Up Fraction (0-1)	0.5	0.5
9	Number of Time Slices (Integer Value)	1	1
10	Turbulence Model	<i>Non-Conservative (original)</i>	<i>Non-Conservative (original)</i>
11	Longitudinal Mixing Coefficient		
12	Transverse Mixing Coefficient		
13	Smagorinsky Coefficient	0	0
14	Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15	Latitude for Coriolis (-90 to 90)		
16	Solver Cores	6 Cores	6 Cores
17	Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18	Convergence Tolerance		
19	Minimum Iterations		
20	Maximum Iterations		
21	Restart Iteration	10	10
22	Relaxation Factor	1.3	1.3
23	SOR Preconditioner Iterations	10	10

OK Cancel Defaults ...



# General 2D Computation Options

- Theta
- Theta Warmup
- Water Surface Tol
- Volume Tolerance
- Max Iterations

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

Parameter	Default	Value
1 Theta (0.6-1.0)		1
2 Theta Warmup (0.6-1.0)		1
3 Water Surface Tolerance [max=0.2](ft)		0.01
4 Volume Tolerance (ft)		0.01
5 Maximum Iterations		20
6 Equation Set	Diffusion Wave	Diffusion Wave
7 Initial Conditions Time (hrs)		4
8 Initial Conditions Ramp Up Fraction (0-1)		0.5
9 Number of Time Slices (Integer Value)		1
10 Turbulence Model	Non-Conservative (original)	Non-Conservative (original)
11 Longitudinal Mixing Coefficient		
12 Transverse Mixing Coefficient		
13 Smagorinsky Coefficient		0
14 Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15 Latitude for Coriolis (-90 to 90)		
16 Solver Cores	6 Cores	6 Cores
17 Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18 Convergence Tolerance		
19 Minimum Iterations		
20 Maximum Iterations		
21 Restart Iteration		10
22 Relaxation Factor		1.3
23 SOR Preconditioner Iterations		10

OK Cancel Defaults ...



# 2D Equation Set

- Diffusion Wave
- Shallow Water Eqn (faster)
- Shallow Water Eqn (conservative)
- Local Inertial Approx (LIA)

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

	Parameter	(Default)	BaldEagleCr
1	Theta (0.6-1.0)	1	1
2	Theta Warmup (0.6-1.0)	1	1
3	Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4	Volume Tolerance (ft)	0.01	0.01
5	Minimum Iterations	20	20
6	Equation Set	Diffusion Wave	Diffusion Wave
7	Initial Conditions Time (hrs)		
8	Initial Conditions Ramp Up Fraction (0-1)	0.5	Diffusion Wave SWE-ELM (original/faster) SWE-EM (stricter momentum)
9	Number of Time Slices (Integer Value)	1	
10	Turbulence Model	Non-Conservative (original)	Non-Conservative (original)
11	Longitudinal Mixing Coefficient		
12	Transverse Mixing Coefficient		
13	Smagorinsky Coefficient	0	0
14	Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15	Latitude for Coriolis (-90 to 90)		
16	Solver Cores	6 Cores	6 Cores
17	Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18	Convergence Tolerance		
19	Minimum Iterations		
20	Maximum Iterations		
21	Restart Iteration	10	10
22	Relaxation Factor	1.3	1.3
23	SOR Preconditioner Iterations	10	10

OK Cancel Defaults ...



# 2D Initial Conditions

- Time allowed for each 2D area to compute an initial water surface
- Initial flows and stages can be ramped up during initial conditions

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | Pipe Systems | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

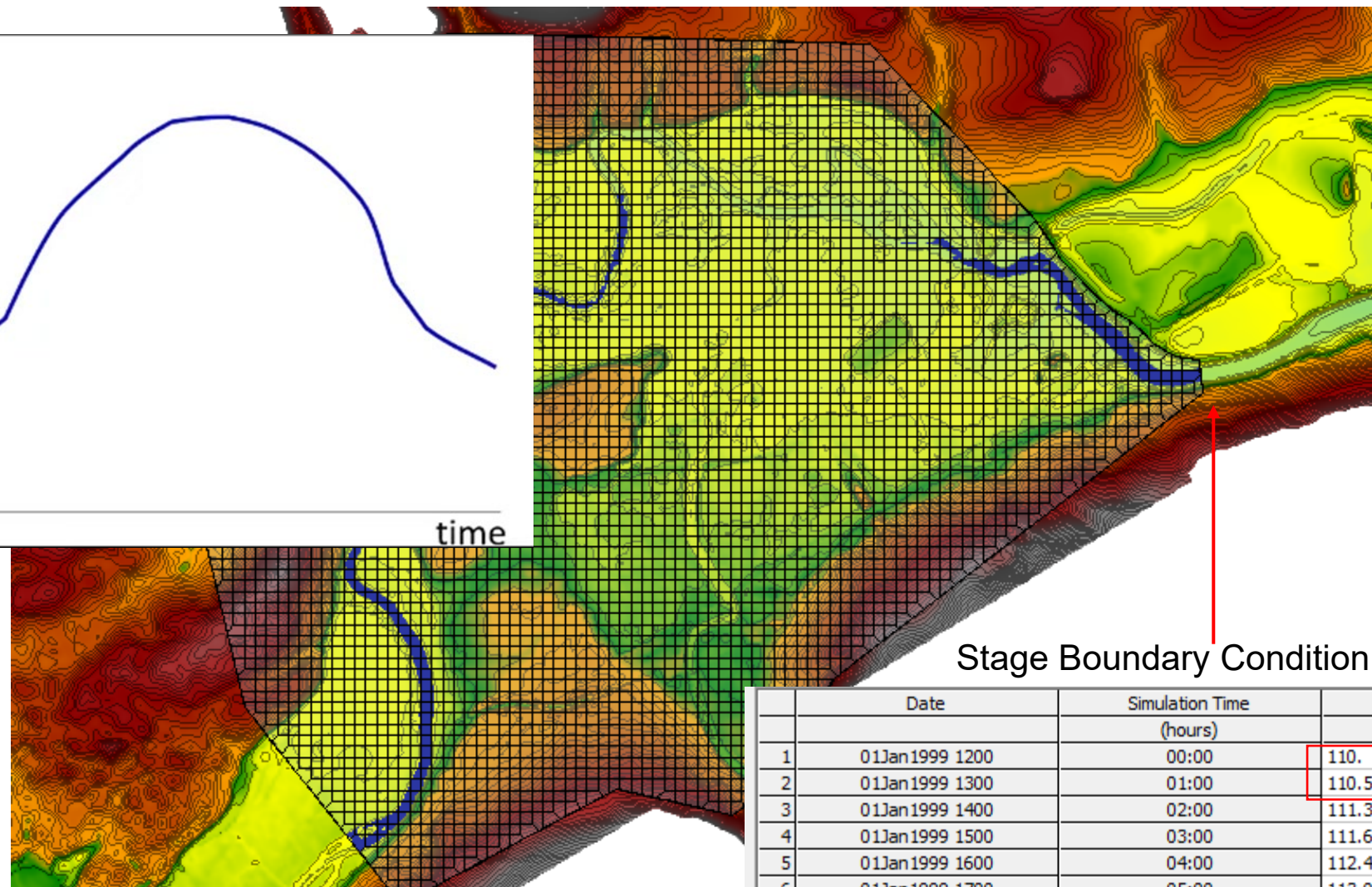
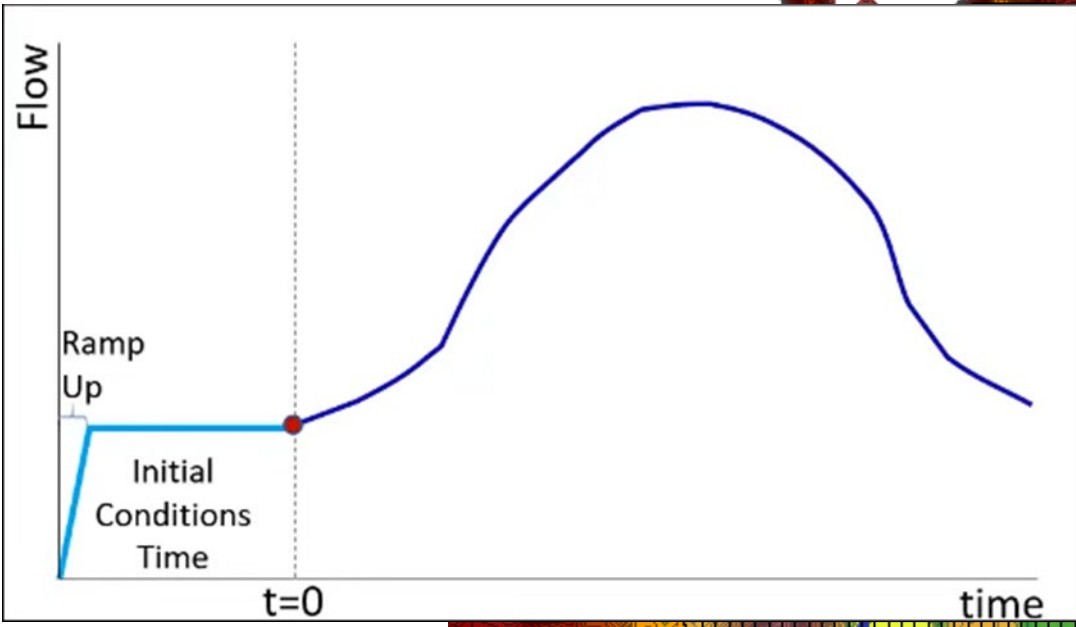
	Parameter	(Default)	OkaToEnterprise
1	Theta (0.5-1.0)	1	1
2	Theta Warmup (0.5-1.0)	1	1
3	Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4	Volume Tolerance (ft)	0.01	0.01
5	Maximum Iterations	20	20
6	Equation Set	Diffusion Wave	Diffusion Wave
7	Initial Conditions Time (hrs)	0	0
8	Initial Conditions Ramp Up Fraction (0-1)	0.1	0.1
9	Number of Time Slices (Integer Value)	1	1
10	Turbulence Model	None	None
11	Longitudinal Mixing Coefficient	0.3	0.3
12	Transverse Mixing Coefficient	0.1	0.1
13	Smagorinsky Coefficient	0.05	0.05
14	Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15	Latitude for Coriolis (-90 to 90)		
16	Solver Cores	All Available	All Available
17	Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18	Convergence Tolerance	0.00001	0.00001
19	Minimum Iterations	3	3
20	Maximum Iterations	30	30
21	Restart Iteration	10	10
22	Relaxation Factor	1.3	1.3
23	SOR Preconditioner Iterations	10	10
24	ILUT Maximum Fill	8	8
25	ILUT Fill Tolerance	1E-08	1E-08

OK Cancel





# 2D Initial Conditions Warm Up in Progress



Stage Boundary Condition

	Date	Simulation Time (hours)	
1	01Jan1999 1200	00:00	110.
2	01Jan1999 1300	01:00	110.53
3	01Jan1999 1400	02:00	111.35
4	01Jan1999 1500	03:00	111.68
5	01Jan1999 1600	04:00	112.42
6	01Jan1999 1700	05:00	113.05

Use Initial Stage (recommended)    ? Data    OK



# 1D/2D Warm Up Period

- Hold all the BC's constant, allow the model to stabilize
- Runs after 2D Initial Conditions Period
- Duration specified as number of time steps
- Time step is optional

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

1D Unsteady Flow Options

Theta [implicit weighting factor] (0.6-1.0): 1.

Theta for warm up [implicit weighting factor] (0.6-1.0): 1.

Water surface calculation tolerance [max=0.2](ft): 0.02

Storage Area elevation tolerance [max=0.2](ft): 0.02

Flow calculation tolerance [optional] (cfs):

Max error in water surface solution (Abort Tolerance)(ft): 100.

Maximum number of iterations (0-40): 20

Maximum iterations without improvement (0-40):

1D/2D Unsteady Flow Options

Number of warm up time steps (0 - 100,000): 20

Time step during warm up period (hrs): 0

Minimum time step for time slicing (hrs): 0

Maximum number of time slices: 20

Lateral Structure flow stability factor (1.0-3.0): 2.

Inline Structure flow stability factor (1.0-3.0): 1.

Weir flow submergence decay exponent (1.0-3.0): 1.

Gate flow submergence decay exponent (1.0-3.0): 1.

Gravity (ft/s<sup>2</sup>): 32.174

Wind Forces

Reference Frame: Eulerian

Drag Formulation: Hsu (1988)

Geometry Preprocessor Options

Family of Rating Curves for Internal Boundaries

Use existing internal boundary tables when possible.

Recompute at all internal boundaries

1D Numerical Solution

Finite Difference (classic HEC-RAS methodology)

Finite Difference Matrix Solver

Skyline/Gaussian (Default: faster for dendritic systems)

Pardiso (Optional: may be faster for large interconnected systems)

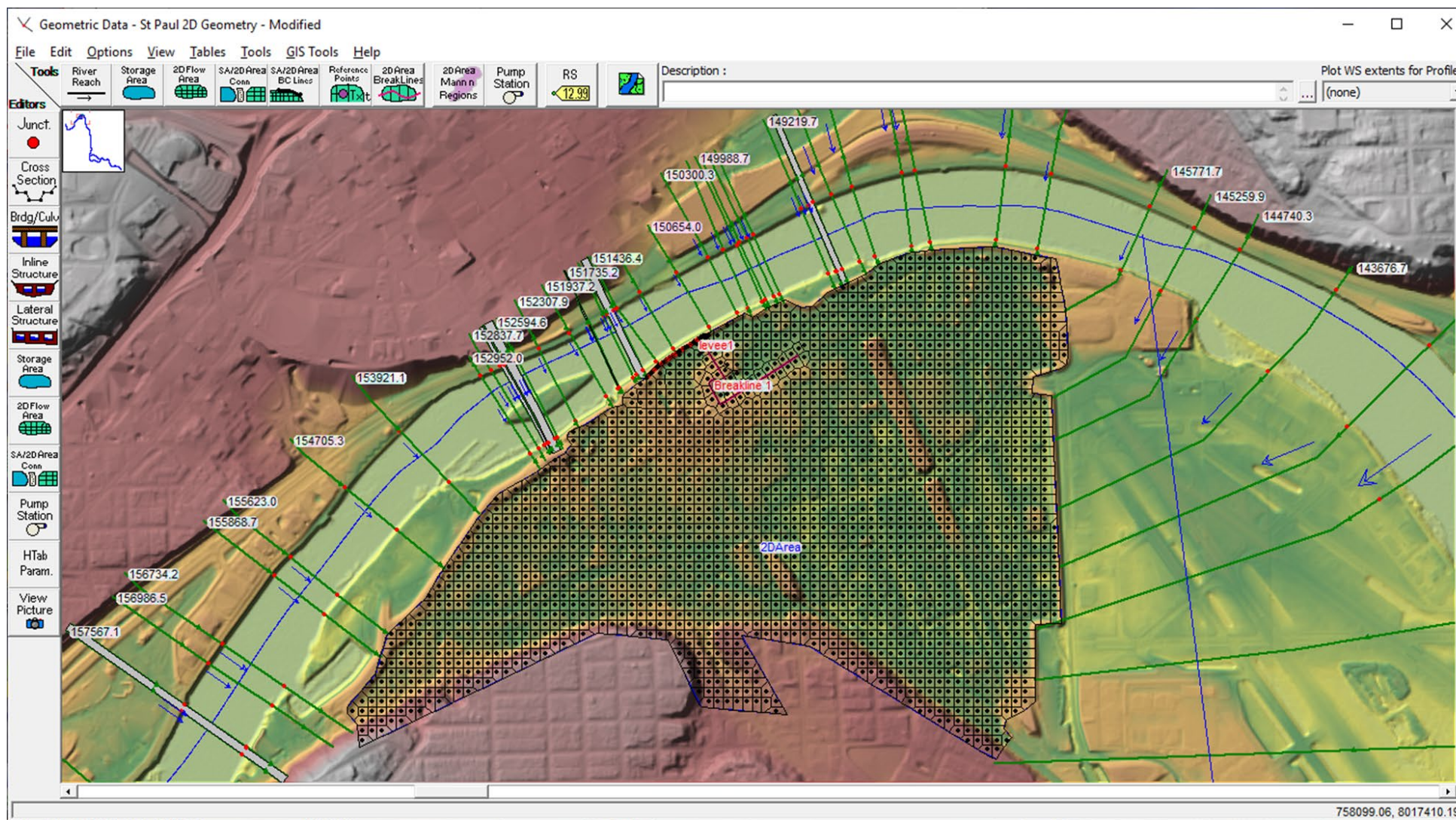
Finite Volume (new approach)

Number of cores to use with Pardiso solver: All Available

OK Cancel Defaults ...



# 1D/2D Modeling Computational Time Step





# 2D Time Slicing

- Use fraction of computation interval

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

Parameter	(Default)	BaldEagleCr
1 Theta (0.6-1.0)	1	1
2 Theta Warmup (0.6-1.0)	1	1
3 Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4 Volume Tolerance (ft)	0.01	0.01
5 Maximum Iterations	20	20
6 Equation Set	Diffusion Wave	Diffusion Wave
7 Initial Conditions Time (hrs)		4
8 Initial Conditions Ramp Up Equation (0-1)	0.5	0.5
9 Number of Time Slices (Integer Value)	1	1
10 Turbulence Model	Non-Conservative (original)	Non-Conservative (original)
11 Longitudinal Mixing Coefficient		
12 Transverse Mixing Coefficient		
13 Smagorinsky Coefficient	0	0
19 Minimum Iterations		10
20 Maximum Iterations		10
21 Restart Iteration	10	10
22 Relaxation Factor	1.5	1.5
23 SOR Preconditioner Iterations	10	10

Computation Settings

Computation Interval: 30 Second ... Hydrograph Output Interval: 30 Minute

Mapping Output Interval: 30 Minute Detailed Output Interval: 1 Hour

Project DSS Filename: C:\Computational Investigations\Testing\Upper Chickasawh...

6 Cores PARDISO (Direct) 6 Cores PARDISO (Direct)

OK Cancel Defaults ...



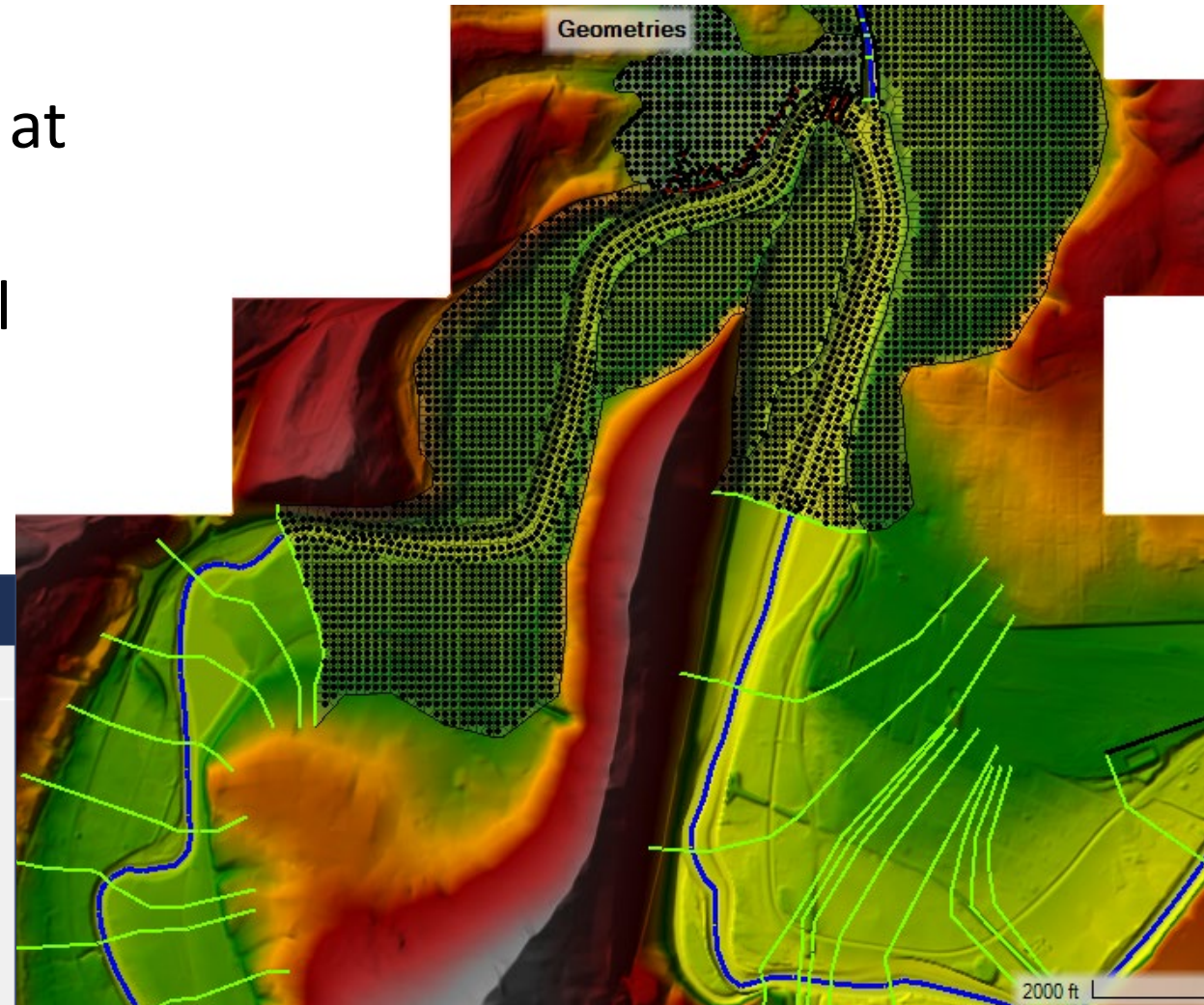
# 1D/2D Iterations Option

- Monitors WSEL and Flow Tolerance at boundaries
- Iterates the 1D and 2D domain until tolerances are met
- Off by default (0 iterations)

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | **1D/2D Options** | Advanced Time Step Control | 1D Mixed Flow Options

Maximum iterations between 1D and 2D (0=off, 1 to 20):	<input type="text" value="0"/>
Water surface tolerance (ft):	<input type="text" value="0.01"/>
Flow Tolerance (%)	<input type="text" value="0.1"/>
Minimum flow tolerance (cfs):	<input type="text" value="1."/>





# 2D Boundary Condition Volume Check

- Boundary Condition Volume Check
- Checks if enough volume is available to satisfy flow rate leaving

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Use Coriolis Effects (not used with Diffusion Wave equation)

	Parameter	(Default)	BaldEagleCr
1	Theta (0.6-1.0)	1	1
2	Theta Warmup (0.6-1.0)	1	1
3	Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4	Volume Tolerance (ft)	0.01	0.01
5	Maximum Iterations	20	20
6	Equation Set	Diffusion Wave	Diffusion Wave
7	Initial Conditions Time (hrs)		4
8	Initial Conditions Ramp Up Fraction (0-1)	0.5	0.5
9	Number of Time Slices (Integer Value)	1	1
10	Turbulence Model	<i>Non-Conservative (original)</i>	<i>Non-Conservative (original)</i>
11	Longitudinal Mixing Coefficient		
12	Transverse Mixing Coefficient		
13	Dispersion Coefficient		
14	Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15	Latitude for Coriolis (-90 to 90)		
16	Solver Cores	6 Cores	6 Cores
17	Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18	Convergence Tolerance		
19	Minimum Iterations		
20	Maximum Iterations		
21	Restart Iteration	10	10
22	Relaxation Factor	1.5	1.5
23	SOR Preconditioner Iterations	10	10

OK Cancel Defaults ...



# 2D Solver Cores

- Number of Cores

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

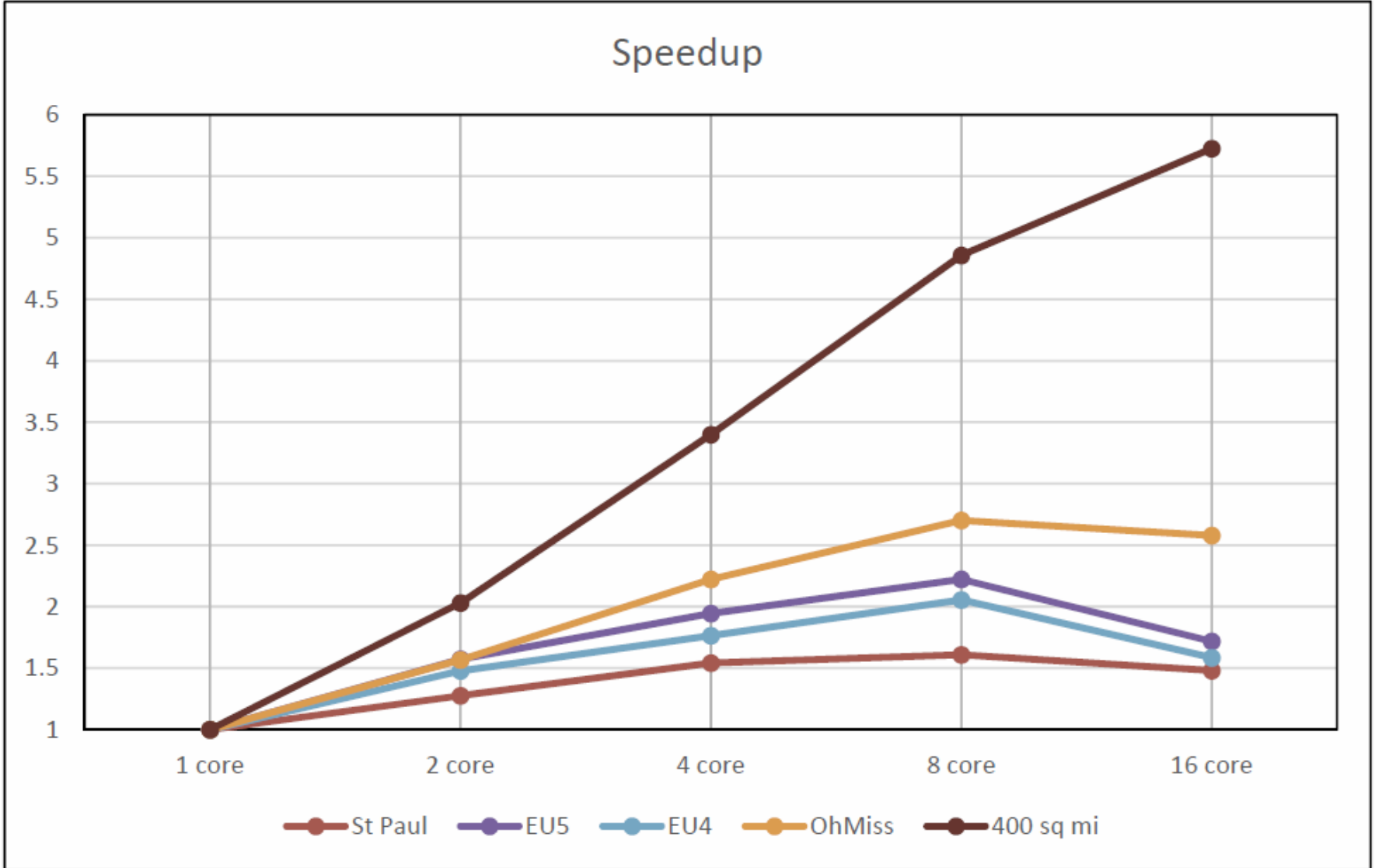
Use Coriolis Effects (not used with Diffusion Wave equation)

	Parameter	(Default)	BaldEagleCr
1	Theta (0.6-1.0)	1	1
2	Theta Warmup (0.6-1.0)	1	1
3	Water Surface Tolerance [max=0.2](ft)	0.01	0.01
4	Volume Tolerance (ft)	0.01	0.01
5	Maximum Iterations	20	20
6	Equation Set	Diffusion Wave	Diffusion Wave
7	Initial Conditions Time (hrs)		4
8	Initial Conditions Ramp Up Fraction (0-1)	0.5	0.5
9	Number of Time Slices (Integer Value)	1	1
10	Turbulence Model	<i>Non-Conservative (original)</i>	<i>Non-Conservative (original)</i>
11	Longitudinal Mixing Coefficient		
12	Transverse Mixing Coefficient		
13	Smagorinsky Coefficient	0	0
14	Boundary Condition Volume Check	<input type="checkbox"/>	<input type="checkbox"/>
15	Latitude for Coriolis (-90 to 90)		
16	Solver Cores	6 Cores	6 Cores
17	Matrix Solver	PARDISO (Direct)	PARDISO (Direct)
18	Convergence Tolerance		
19	Minimum Iterations		
20	Maximum Iterations		
21	Restart Iteration	10	10
22	Relaxation Factor	1.5	1.5
23	SOR Preconditioner Iterations	10	10

OK Cancel Defaults ...



# Processing Time vs Number of Cores







# Mesh Cell Size

- Mesh Cell size determination is based on
  - Land surface features of the Terrain
    - Faces control water movement
  - Water Surface Slope
    - Capturing localized effects in model requires smaller cell sizes (analogous to cross section spacing for rapidly varied flow).
  - Velocity
- Start with a “large” cell size and refine the model through iteration
- Always test different cell sizes to see what affect they have on water surfaces and velocities



# Time Step Selection

- Time Step selection will be based on the size of the grid cells and velocity of water in the cells.
- Dependent on Equation Set selected
  - Diffusion Wave approximation
  - Full Shallow Water Equations

$$\underbrace{\frac{\partial \mathbf{V}}{\partial t}}_{\text{Temporal}} + \underbrace{(\mathbf{V} \cdot \nabla) \mathbf{V}}_{\text{Advection}} + \underbrace{f_c \mathbf{k} \times \mathbf{V}}_{\text{Coriolis}} = - \underbrace{g \nabla z_s}_{\text{Pressure gradient}} + \underbrace{\frac{1}{h} \nabla \cdot (\mathbf{v}_t h \nabla \mathbf{V})}_{\text{Diffusion}} - \underbrace{\frac{\tau_b}{\rho R}}_{\text{Bottom Friction}} + \underbrace{\frac{\tau_s}{\rho h}}_{\text{Wind Stress}}$$

~~$$\underbrace{\frac{\partial \mathbf{V}}{\partial t}}_{\text{Temporal}} + \underbrace{(\mathbf{V} \cdot \nabla) \mathbf{V}}_{\text{Advection}} + \underbrace{f_c \mathbf{k} \times \mathbf{V}}_{\text{Coriolis}} = - \underbrace{g \nabla z_s}_{\text{Pressure gradient}} + \underbrace{\frac{1}{h} \nabla \cdot (\mathbf{v}_t h \nabla \mathbf{V})}_{\text{Diffusion}} - \underbrace{\frac{\tau_b}{\rho R}}_{\text{Bottom Friction}} + \underbrace{\frac{\tau_s}{\rho h}}_{\text{Wind Stress}}$$~~



# Courant Number and Timestep

- Full Shallow Water Equations
  - Experience shows, max C = 3.0

$$C = \frac{V * \Delta T}{\Delta X} \leq 1.0$$

- Diffusion Wave Approximation
  - Experience shows, max C = 5.0

$$C = \frac{V * \Delta T}{\Delta X} \leq 2.0$$

C = Courant Number

V = Velocity of the Flood Wave (ft/s)

$\Delta T$  = Computational Time Step (seconds)

$\Delta X$  = The average Cell size (ft)



# Variable Time Step

- Reduce time step to improve accuracy
- Increase time step to reduce computation times

HEC-RAS Finished Computations

Write Geometry Information  
Layer: COMPLETE

Geometry Processor  
River: RS:  
Reach: Node Type: Storage Area  
IB Curve:

Unsteady Flow Simulation  
Simulation:  
Time: 0.5000 01OCT2013 00:30:00 Iteration (1D):  
Unsteady Flow Computations

Computation Messages

**Performing Unsteady Flow Simulation HEC-RAS 5.0.4.1 May 2018**

Custom Read/Flags

2D\_X\_WSEL

Maximum adaptive timestep = 04.0 Minimum adaptive timestep = 00.5  
Initial adaptive timestep = 01.0

01OCT2013 00:00:05	timestep =	2	(sec)
01OCT2013 00:00:15	timestep =	1	(sec)
01OCT2013 00:00:16	timestep =	0.5	(sec)
01OCT2013 00:01:08	timestep =	1	(sec)
01OCT2013 00:01:57	timestep =	2	(sec)
01OCT2013 00:07:31	timestep =	4	(sec)

Writing Results to DSS



# Variable Time Step Options

- Fixed Time Step (default)
- Adjust Time Step Based on
  - Courant Number (adaptive)
  - Date/Time and a Time step divisor

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | **Advanced Time Step Control** | 2D M

Fixed Time Step (Basic method) 20 Second

Adjust Time Step Based on Courant

Maximum Courant: 4

Minimum Courant: 1.95

Number of steps below Minimum before doubling: 5

Maximum number of doubling base time step: 2 80.00 sec

Maximum number of halving base time step: 1 10.00 sec

Courant Methodology

Velocity/Length (face velocity \* dt / cell to cell distance)

Residence Time (cell outflow \* dt / cell volume)

Adjust Time Step Based on Time Series of Divisors Verify Dates ...

	Time Step	Date(ddMMMyyyy hhmm)	Divisor
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

# Adaptive Time Step

- Maximum Courant before halving time step
- Minimum Courant before doubling time step
  - **Min < ½ Max !**
- Number of steps before doubling
- Maximum number of doubling
- Maximum number of halving
- Courant (default) or Residence Time

<input type="radio"/> Fixed Time Step (Basic method)	1 Second
<input checked="" type="radio"/> Adjust Time Step Based on Courant	
Maximum Courant:	4.
Minimum Courant:	1.95
Number of steps below Minimum before doubling:	5
Maximum number of doubling base time step:	2 4.00 sec
Maximum number of halving base time step:	1 0.50 sec
Courant Methodology	
<input checked="" type="radio"/> Courant (Velocity * dt / Length)	
<input type="radio"/> Residence Time (flow out * dt / Volume)	



# More Resources

- <https://www.youtube.com/watch?v=kcBrOML3iS0>

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | **Advanced Time Step Control** | 1D Mixed Flow Options

Fixed Time Step (Basic method) 6 Minute

Adjust Time Step Based on Courant

Maximum Courant: 2

Minimum Courant: 0.95

Number of steps below Minimum before doubling: [ ]

Maximum number of doubling base time step: [ ] 6.00 min

Maximum number of halving base time step: [ ] 6.00 min

Courant Methodology

Velocity/Length (face velocity \* dt / cell to cell distance)

Residence Time (cell outflow \* dt / cell volume)

Adjust Time Step Based on Time Series of Divisors Verify Dates ...

	Time Step	Date(ddMMMyyyy hhmm)	Divisor
1			0
2			0
3			0
4			0
5			0

6:49 / 12:24 • Variable Time Step >



# Mapping Output Interval

- Adaptive time step is always integer interval of Mapping Output Interval, so Unsteady may need to adjust base Computation Interval

The screenshot displays the HEC-RAS software interface. On the left, the 'Simulation Time Window' shows 'Starting Date: 01OCT2013' and 'Ending Date: 01OCT2013'. Under 'Computation Settings', 'Computation Interval' is set to '2 Second' (highlighted with a red box) and 'Mapping Output Interval' is set to '10 Second' (circled in purple). The 'DSS Output Filename' is 'C:\Users\q0hecsp\Doc'. A note states 'Time Step is controlled by courant condition.' On the right, the output log shows 'Maximum adaptive timestep = 10.0' and 'Minimum adaptive timestep = 00.625'. The 'Initial adaptive timestep = 01.25' is highlighted with a red box. The log lists timesteps: 2.5 (sec), 1.25 (sec), 0.625 (sec), 1.25 (sec), 2.5 (sec), and 5 (sec). The simulation is labeled 'Writing Results to DSS' and 'Finished Unsteady Flow Simulation'. At the bottom, there are buttons for 'Comp', 'Pause', and 'Take Snapshot of Results'.

Time	timestep =	(sec)
01OCT2013 00:00:06	2.5	(sec)
01OCT2013 00:00:16	1.25	(sec)
01OCT2013 00:00:17	0.625	(sec)
01OCT2013 00:01:22	1.25	(sec)
01OCT2013 00:03:25	2.5	(sec)
01OCT2013 00:11:20	5	(sec)





# Time Series of Divisors

- Control time step length by date
- Enter integer halving divisor to reduce time step

Simulation Time Window

Starting Date: 01JAN1999 Starting Time: 1200

Ending Date: 05JAN1999 Ending Time: 1300

Computation Settings

Computation Interval: 2 Minute Hydrograph Output Interval: 1 Hour

Mapping Output Interval: 1 Hour

Adjust Time Step Based on Time Series of Divisors

	Time Step	Date(ddMMMyyyy hhmm)	Divisor
1	60.00 sec	01JAN19991200	2
2	120.00 sec	02JAN19991200	1
3	60.00 sec	02JAN19991530	2
4	20.00 sec	03JAN19990200	6
5	40.00 sec	03JAN19990730	3

# Questions?