HEC-RAS 2D Sediment Workshop: Initializing a 2D Sediment Model

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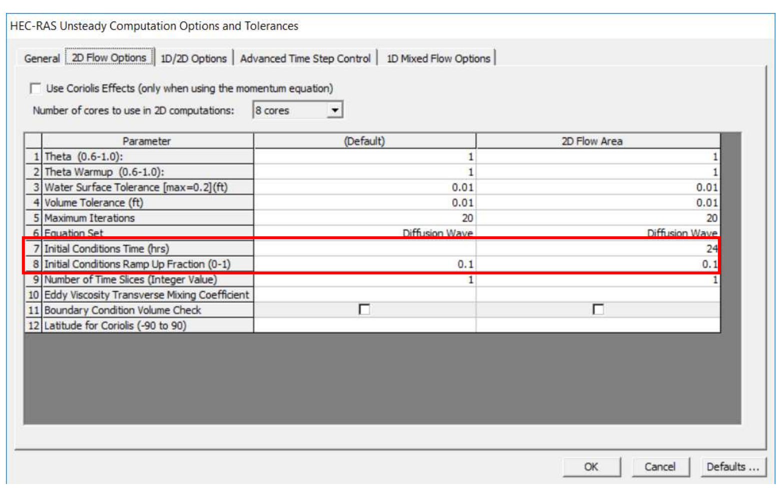
Computation Options (2D)

- Initial Conditions (Warm Up) Time
- Ramp Up Fraction



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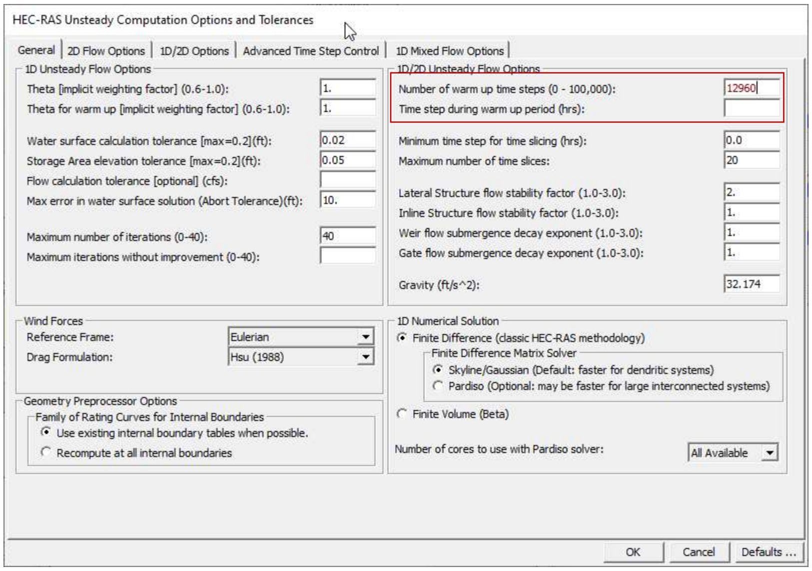
Viewing "Negative" Time



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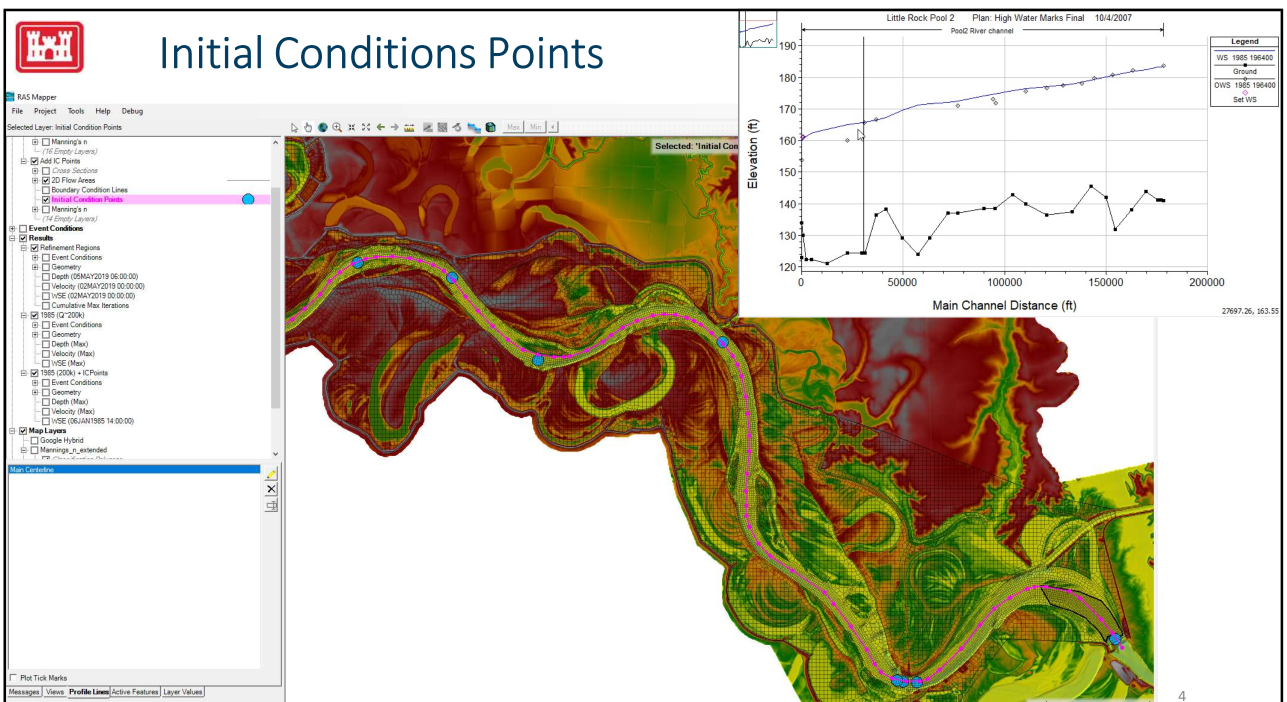
Initial Conditions Points



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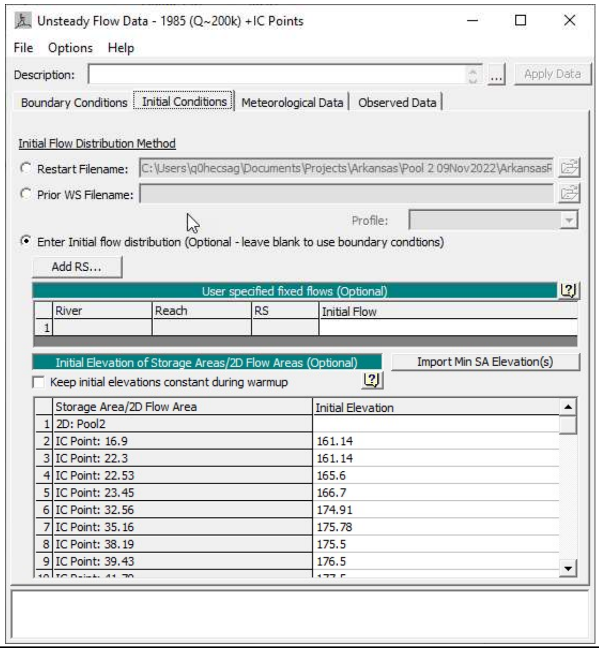
Initial Conditions Points



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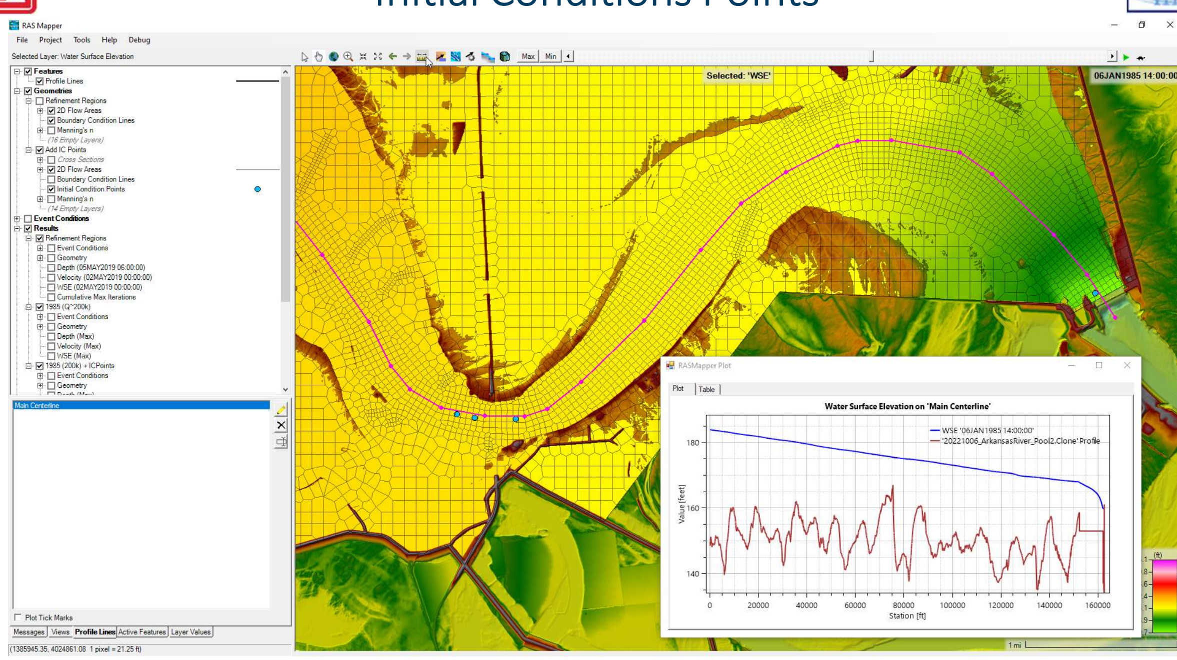
Initial Conditions Points



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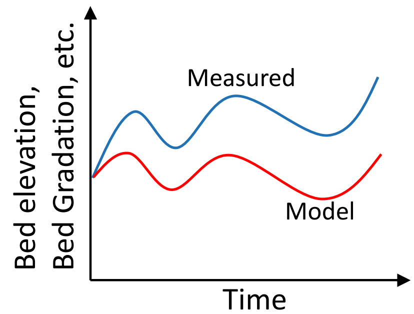
Initializing 2D Sediment Models

- Model dynamic equilibrium different from real-life dynamic equilibrium
  - Leads rapid changes in the beginning of the simulation
- Initial bed gradation data usually very lacking
- Bathymetry often contains interpolation errors and large bedforms which need to be smoothed out
- Preconditioning
  - Adjusting initial bed gradations and bathymetry to be closer to model dynamic equilibrium
- Hotstart models from Use Simulation Components to precondition input by hotstarting simulations with models



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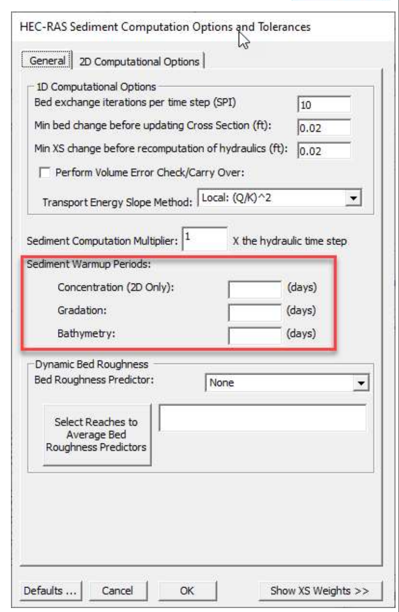
Sediment Warmup Periods

- Three types of Sediment Warmup Periods
  - Concentration
  - Gradation
  - Bathymetry
- Mostly there for backwards compatibility
- No output during this time period

Time Period	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Initial Conditions				
Concentration Warmup Period				
Gradation Warmup Period				
Bathymetry Warmup Period				



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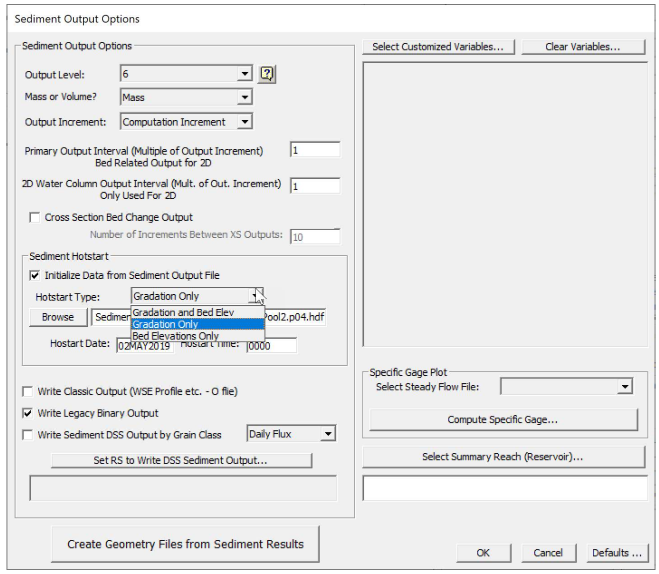
2D Sediment Initialization from Prior Solution

- Result file specified independently from hydraulic file
- Not Restart file
- Concentrations always initialized with this option



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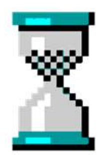
Hotstart/Restart File

Avoid Ramp Up / Warm Up Compute Time!



1. Run initial conditions once
2. Write **Restart File** out
3. Create a new **Unsteady Flow Plan**
4. Select **Use a Restart File**
5. Adjust starting date, and any hydrographs, if needed (if you start model later than previous run).

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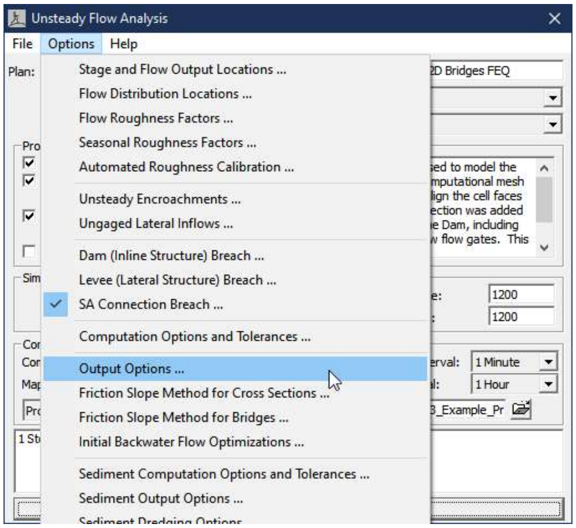
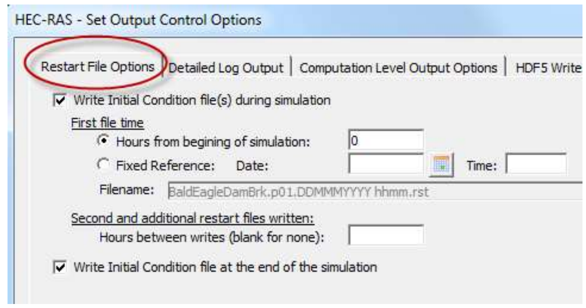
Write Restart File





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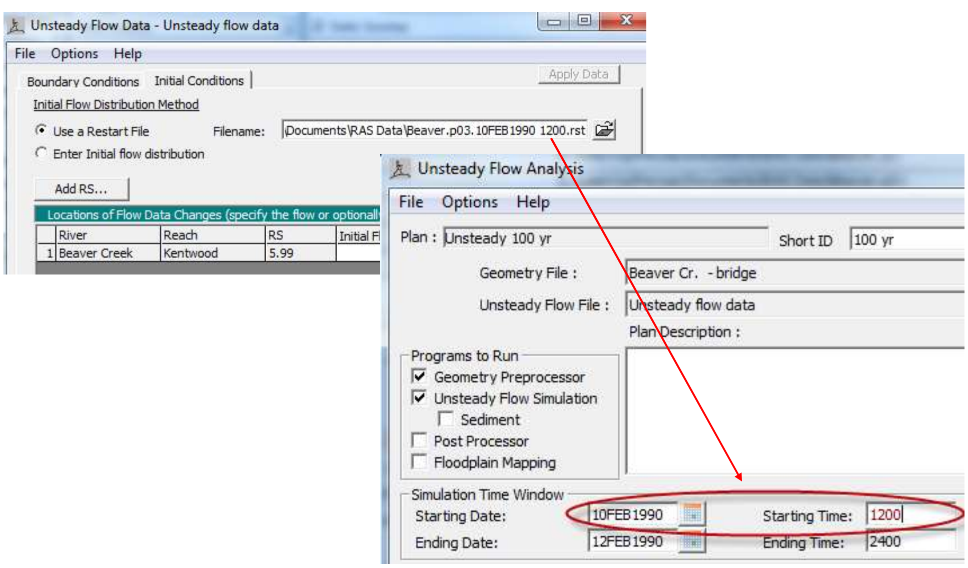
Select Restart



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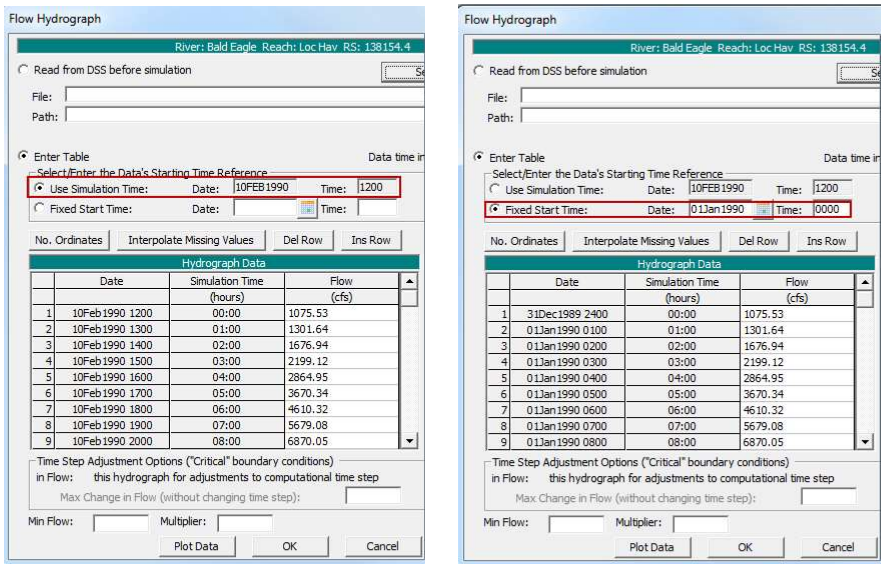
Boundary Condition Starting Times



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Restart File Notes

- Geometry must be the same
- Can switch model parameters such as governing equations, calibration parameters, etc.
- Can change the time step
- Can change the output interval
- Can change flow and plan data
- All state variables are overwritten (good or bad thing)

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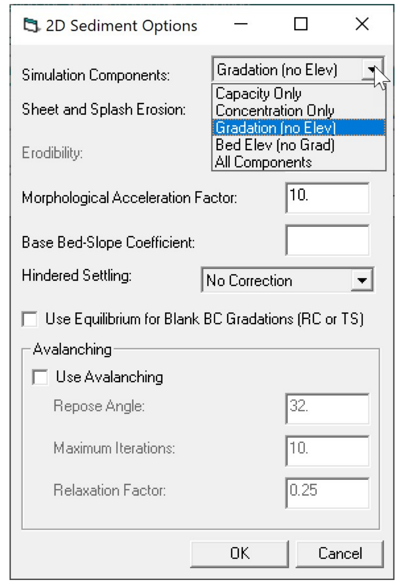
Simulation Components and Restarts/Hotstarts

- Not possible to choose what variables are overwritten when using Restart/Hotstart files
- Use Simulation Components to control what variables are allowed to modify
- Typically used to precondition bed gradations while the bathymetry is user specified
- Ideally would want to precondition bathymetry in certain places while enforcing the bathymetry in other places, but this is difficult
- Best to fix bathymetry issues as much as possible and not rely on preconditioning of bathymetry



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Thank You!

HEC-RAS Website:
https://www.hec.usace.army.mil/software/hec-ras/

Online Documentation:
https://www.hec.usace.army.mil/confluence/rasdocs

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