Changes to River1D since July 21, 2021

- Maximum number of iterations used when calculating t_{le} using narrow jam /equilibrium jam theory) for the ice cover progression is now a global parameter (in the **input file** and in editable in the Global Settings dialog box).
- There is now both α_{wi} ($T_w > 0$) and α_{iw} ($T_w \leq 0$) for the coefficient of turbulent heat exchange (in the **input file** and in editable in the Global Settings dialog box).
- Albedos for ice (α_i) and water (α_w) are now global parameters (in the **input file** and in editable in the Global Settings dialog box).
- Snow thickness, t_s, thermal conductivity of water, K_w, thermal conductivity of ice, K_i, and thermal conductivity of snow, K_s, are now global parameters (in the **input file** and in editable in the Global Settings dialog box).
- Diffusion coefficients for water and ice have been removed from the **input file**.
- Actual datetime now included. Start datetime is now a global parameter (in the **input file** and in editable in the Global Settings dialog box). Start datetime is used with model time to calculate the current datetime.
- ϕ_{wa} now includes the albedo of the water ($\phi_{wa} = h_{wa}\left(T_w - T_a\right) - (1-\alpha_w)\phi_s$).
- ϕ_{ia} now calculated as ($\phi_{ia} = \dfrac{h_{ia}\left(T_w - T_a\right) - (1-\alpha_i)\phi_s}{\left(1 + h_{ia}t_i/K_i + h_{ia}t_s/K_s\right)}$).
- $\phi_{ia\_surface}$ now calculated as ($\phi_{ia\_surface} = h_{ia}\left(T_{i\_surface} - T_a\right) - (1-\alpha_i)\phi_s$).
- Atmospheric Zones now require incoming solar NOT net incoming solar.
- New linear interpolation algorithm that uses binary search (to optimize for speed when interpolations are being done on large arrays (i.e. n > 10^4 entries).
- Fix to code so that surface ice concentration is updated correctly when undercover moving ice rises to the surface downstream of a bridging location.
- A new parameter called T_{wmin} has been added (in the input file and in editable in the Global Settings dialog box). Water temperature prevented from going below T_{wmin}. This was added to maintain model stability when modelling supercooling.
- D_{wmin} is now being used to trigger erosion from A_{fs} to A_{ui} when the distance between the bottom of the ice and the bed becomes less than D_{wmin}. Previously it was only being used to calculate A_{wmin} for use in the e_{wi} and C_f equations if $A_w < A_{wmin}$.
- Bridging 'reaches' are now called bridging 'events'.
- Maximum number of bridging events changed from 10 to 100.
- Model can now handle bridging events from different years. Code assumes that ice will advance and retreat with an 8 month period.
- Maximum number of atmospheric zones changes from 10 to 20.
- Current datetime can now be displayed in Profile View and Plan View and is output to time series and ice front location files.
- Downstream boundary can now be specified with a rating curve, which can be edited in the Edit Outflow Boundary Condition dialog box.
- Ice jam stability equation has been updated to use the width of the underside of the ice, B_{ui}. It was previous using the width of the water, B_{ws}.

- Ice jam stability equation has been updated to use energy slope of the main channel, S_{fc}, instead of the total energy slope (for main channel and overbanks), S_f.
- Water surface slope across a junction (used in ice jam stability solution) is now calculated across the junction. Old method took average of the slope of the two elements in the junction. Old method only correct when elements in the junction are of equal length.
- When calculating the wetted perimeter due to the ice cover for natural channels for the case when there is no border ice, the calculation is $C_i * B_{ui}$. Previously the calculation was $C_i * B_o$. This was done so that when solving the ice jam stability equation, the underside of the ice is used when calculated the wetted perimeter.
- Maximum stage in the cross section properties table has been increased. Previously the maximum stage was obtained by finding the maximum elevation on either side of the invert and using the minimum of these values as the maximum stage. Maximum stage is the elevation at twice the height of the cross section where the height is set as the maximum elevation minus the minimum elevation. This was done to improve the table resolution at higher stages
- Maximum number of entries for cross section properties table was 100 now 300.
- When editing an atmospheric zone (Edit Atmospheric Zone Dialog) or when editing a flow boundary condition (Edit Inflow/Outflow Boundary Condition Dialog), the number of entries is now updated using the "Update # of Entries" button. This was done to prevent loss of data when adjusting the number of entries.
- The HEC-RAS file converter no longer requires the user to input the number of stages. It now defaults to 100 but this can be changed easily for any cross section in the Node Table once the file is converted.
- The default background image file type is now JPG instead of BMP.
- New River1D file generator accessible under File menu. New file builds River1D with a simple trapezoidal channel that can be edited to include more complex geometry in River1D interface. New file is generated based on inputs from the user in the New File Dialog.
- New option to output results to an SQLITE database in Transient Output Options Dialog
- Nodes and boundaries in plan view are now scaled to the size of the domain.
- Default values for various nodal and global parameters have been changed. These are applicable when creating a new file or when changing the file type:
    - Nodal - Bed roughness for rectangular channels was 0.0, now 0.025
    - Nodal - User defined ice roughness was 0.0, now 0.020
    - Nodal - Hydrocode was 0, now 1
    - Nodal - hwa was 0.0, now 20.0
    - Nodal - hia was 0.0, now 20.0
    - Nodal - Frmax was 0.158, now 0.09
    - Global - UIceRE (re-entrainment velocity threshold) was 1.5, now 1.0
    - Global - pj (jam porosity for jam stability equation) was 0.0, now 0.4
- Default nodal ice roughness mode was 1, now 0.
- Mass Flux renamed Volume Flux in documentation and referred to as Qflux in model interface.