

SRH-1D Version History

GSTAR-1D Version 1.0.1 – August 1, 2005

1. Fixed bug in interpolation of D03 record.
2. Changed bank stability routine so that sediment eroded due to angle of repose conditions is added to the sediment continuity equation as a lateral sediment input.

GSTAR-1D Version 1.0.2 – October 14, 2005

1. Changed record FIM and FIW to include minimum and maximum horizontal locations of erosion and deposition.
2. Ensured water surface does not become adverse when the energy balance cannot be satisfied in steady flow solver.
3. Added the ability to change the weight given to the bed load during transfer of material to the sub-layer. See record SAT.

GSTAR-1D Version 1.1 – April, 2006

1. Changed subroutine “repose” so that fixed points are not adjusted by angle of repose conditions. For example, if point was set fixed from erosion in FIM or FIW record then angle of repose condition does not apply.
2. Added XRX record to account for riprap in section.
3. Fixed bug when using US1. The sediment load for the first size fraction was incorrectly assigned.
4. Increased number of digits output in mass balance file.
5. Added bed load adaptation length.
6. Required that bed gradation for all layers (including active layer) be entered.
7. Prevented the bed from exceeding the minimum bottom elevation.
8. Added ability to enter multiple GIS referenced locations within the cross section in record XLS.
9. Fixed bug in weir subroutine. Submergence ratio was not initialized properly.
10. Fixed initialization of bottom elevation.
11. Added expansion and contraction coefficients to the steady flow equations. These replace the local energy loss coefficient.
12. Changed many subroutines so all variables were passed through the subroutine call.
13. Created error file to which errors are written.
14. Added adaptive time step for sediment computations.

GSTAR-1D Version 1.1.1 – August, 2006

1. Improved convergence of unsteady flow routing
2. Changed unsteady sediment transport routing to be consistent with Greimann et al. 2006 (submitted to J of Hydr. Engr in Aug 2006).
3. Added output file “*_OUT_TimeSeries.DAT” which contains times series data at select cross sections.

4. Added output file “*_ERR.DAT” which contains run time error messages. Please check this file if program terminates before simulation is finished.
5. Changed output file naming convention so that multiple simulations can be performed in same directory.

GSTAR-1D Version 1.1.3 – September, 2006

1. Fixed bug that moved channel endpoints when performing angle of repose routine.
2. Fixed error in friction slope for first cross section when using unsteady flow.
3. Fixed error in method used to compute equilibrium sediment inflow for ISOLVES = 2.
4. Fixed error in computation of material volume exiting reach, reported in mass balance output.
5. Prevented angle of repose subroutine from eroding points below minimum bottom elevation.
6. Made unsteady flow routing stable for “waterfall” conditions if ISOLVE = 2 or 3. Upstream weighting of friction slope for supercritical flow.
7. The reading of variables during a ‘Hotstart’ was debugged.

GSTAR-1D Version 1.1.4 – October, 2006

1. Check for negative concentrations and ensure mass balance in subroutine steady_routing.
2. Automatically adjusted vertical points in cross section before simulation is performed.
3. Allowed user to modify specific gravity of particles with record YSP.

GSTAR-1D Version 2.0 – April, 2007

1. Updated Manual for latest features.
2. Eliminated transport functions of limited usefulness.
3. Allowed user to modify sediment transport coefficients.
4. Revised unsteady flow solutions. Added ability to simulate transcritical flow with unsteady flow equations.
5. Included Wu et al. (2000) and Wilcock and Crowe (2003) transport functions.
6. Added base level change field to record XSP.
7. Changed SMN record. User can set minimization option and bank adjustment parameters.
8. Eliminated YFP and STU records
9. Fixed bugs so that the distinction between bulk volume bed material fraction and mass volume bed material fraction is correctly made. Input and output of bed material was changed so that it is in mass fraction.
10. Added base level change option in record XST
11. Changed structure of output files.
12. Updated error messaging.
13. Changed SEQ records from integer input to string input to designate sediment transport capacity equation.

GSTAR-1D Version 2.0.1 – April, 2007

1. Fixed computation of maximum array bounds for temperature records.
2. Fixed bug in computing permanently dead areas.
3. Fixed bug in “Translate” program, so that levee elevations are correctly read in from HEC-RAS

GSTAR-1D Version 2.0.2 – May, 2007

1. Fixed bug in steady flow bridge routine.

SRH-1D Version 2.0.3 – June 8, 2007

1. Changed name from GSTAR-1D to SRH-1D

SRH-1D Version 2.0.4 – September 3, 2007

1. Eliminated unsteady flow option 4.
2. Fixed memory allocation error in minimization subroutine.

SRH-1D Version 2.0.5 – November 26, 2007

1. Included variable GISMET in record YSL
2. Included variable TSTART in record YTM
3. Fixed error in Wilcock and Crowe (2003) sediment transport equation
4. Changed to INTEL FORTRAN 10.0 compiler. Fixed several argument passing type mismatches.

SRH-1D Version 2.1 – September 3, 2008

1. Added bedrock scour capability. Added data group 15.
2. Eliminated record YNR, added number of bed layer input to optional record YST
3. Changed method of inputting internal boundary conditions. The location of the internal boundary condition is now input by station location in distance rather than by cross section number in record IFB.
4. Changed to INTEL FORTRAN 10.1 compiler.
5. Fixed bug when using weir as internal boundary conditions. Downstream b.c. was previously affected.
6. Eliminated several minimization options.
7. Added left and right floodplain distances to record XST. Now floodplains can have different flow path distances from main channel.
8. Replaced multiple arrays with derived type data structures.
9. Debugged unsteady flow routing for river networks.
10. Improved handling of low flows for unsteady flow.

SRH-1D version 2.1.1 – December 10, 2008

1. Corrected bug in the fixed bed elevation routines

SRH-1D version 2.2 – February 10, 2009

1. Add upstream sediment boundary condition US5 for time-sediment load for each size class
2. Fixed bug in output for main channel and floodplain deposition volumes

3. Fixed bug in computing bedrock erosion. Required that all points are wet before rock erosion occurs at them.
4. Changed record TDT to include output time step to screen.
5. Added record XSK to include the capability to modeled skewed cross sections.
6. Fixed bug in the computation of floodplain flow distances for interpolated sections.

SRH-1D version 2.2.1 – September 19, 2009

1. Fixed error in reporting sediment loads at cross sections for Exner routing.

SRH-1D version 2.3 – December 1, 2009

1. Fixed bug when merging layers when total number of layers is greater than 3.
2. Added user parameter controlling the minimum and maximum bed layer thickness to record YSP.
3. Added data structures for upstream and downstream boundary conditions.
4. Changed the maximum number of sediment size fractions to 30.
5. Changed the methods to compute combined suspended and bed load in PARKERS and WILCOCKS.
6. Added a bedload transport formula by Gaeuman et al. 2009.

SRH-1D version 2.4 – May 12, 2010

1. Fixed bugs in Laursen and Ackers and White formulas.
2. Included ability to simulate hiding and exposures with Laursen and Ackers-White Formulas. Critical shear stress and hiding coefficient are entered in record SE1.
3. Fixed bug in the computation of the erosion limits when record FIW is used.
4. Fixed initialization of bed layers and improved merging of bed layers.
5. Changed method to enter bed layer thickness so that active layer thickness is not taken from layer 2.
6. Added options to combining Engelund-Hansen with bed load formulas
7. Fixed bug in fixed stage boundary condition for unsteady flow
8. Switched to INTEL FORTRAN V11.1 compiler

SRH-1D version 2.5 – July 12, 2010

1. Corrected capacity concentration computation in the case of negative flow.
2. Altered angle of repose calculations when the above water angle of repose is less than then below water

SRH-1D version 2.6 – October 13, 2010

1. Fixed bank erosion mass balance in steady sediment routing
2. Fixed unsteady sediment routing mass balance
3. Added ability to limit cross section output in record YTM

SRH-1D version 2.7 – July, 2011

1. Altered output header format to improve import into excel
2. Fixed error code when there are only 2 layers
3. Fixed output of bed elevation to Time Series output file

4. Improved stability of unsteady flow at low flows

SRH-1D version 2.8 – November, 2011

1. Fixed bug in bed mixing algorithm when there is a “fixed” bed elevation
2. Altered methods used to compute combined sand and gravel transport (Wilcock, Parker, Gaeuman equations)

SRH-1D version 3.0 – September, 2012

1. Recompiled program to run under Windows 7 64-bit operating system
2. Added additional examples

SRH-1D version 3.0.1 – October, 2013

1. Fixed bug related to multiple rivers with internal boundary conditions
2. Added multiple windows for the plotting of multiple river profiles during simulations
3. Added another option to simulate mixed sand-gravel systems. Option 4 is now available to combine Engelund-Hansen formula with a bedload formula. This option will use Engelund-Hansen formula for sand sized material and use bedload formula for sediment larger than sand. This is the recommended method in most situations.

SRH-1D version 3.1 – April, 2014

1. Improved accuracy of mass balance of individual grain sizes in the bed sorting algorithms
2. Corrected mass balance when there is bank erosion
3. Allowed channel end points to move
4. Ensured erosion depth does not exceed depth of second layer
5. Improved stability of super critical unsteady flow solution
6. Changed permanent ineffective flow areas cannot erode if they are below top of permanent ineffective elevation
7. Altered cohesive mass balance when there are lateral outflows to ensure non-negative concentrations

SRH-1D version 3.1.1 – June, 2014

1. Fixed output of numbers when the exponent is larger than 100
2. Updated translate program to convert HEC-RAS files to SRH-1D

SRH-1D version 4.0 – February, 2018

1. Modified unsteady flow to handle trans-critical flows more accurately
2. Created dam breach routines
3. Major rewrite of the sediment sorting routines
4. Fix bug in method used to limit erosion of non-cohesive by cohesive
5. Added ability to interpolate bedrock sections
6. All bed layer thicknesses, including active layer are now entered in record BTT
7. Added start time and date to record YTM
8. Added number of layers to record YST

9. Added different methods to combine sand transport with bedload transport
10. Fixed bug that caused stack overflow for large problems.

SRH-1D version 4.0.1 – November, 2018

1. Fixed bug in computing sediment velocity for unsteady flow, may affect cohesive sediment simulations.
2. Debugged some of the dam breach routines