

Tools list – Toolbar

The tools are presented by their grouping in the user interface (menus and toolbox). The ApUtilities tools are not addressed here, as they are general-purpose utilities not related to the functionality of Arc Hydro tools.

Terrain Preprocessing

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Level DEM	Fill the selected polygons (e.g. lakes) up to the FillElev value.	x		x
DEM Reconditioning	Enforce linear drainage pattern (vector) onto a DEM (grid). Implements AGREE methodology.	x		x
Assign Stream Slope	Assign relative elevation to from nodes and to nodes of input streams. Elevations decrease with the digitized direction.	x		
Burn Stream Slope	Burn linear stream slope into a DEM to force the direction of the flow in the stream.	x		x
Build Walls	Build walls in a DEM (grid) at the boundary of selected input polygons.	x		x
Sink Prescreening	Prescreen the input DEM by filling in the pits that do not match the criterion defining a potential sink.	x		x
Sink Evaluation	Generate and characterize the potential sinks for a DEM.	x		x
Depression Evaluation	Generate and characterize the potential depressions for a DEM.			x
Sink Selection	Select the potential sinks that should be considered as real sinks.	x		
Fill Sinks	Fill sinks for an entire DEM (grid).	x		x
Flow Direction	Create flow direction grid for a DEM grid.	x		x
Flow Direction with Sinks	Create flow direction grid for a DEM with sinks that ensures that each cell within a sink flows toward a sink point. Also create Sink Link grid defining the links for deranged areas.	x		x
Adjust Flow Direction in Lakes	Modify input flow direction grid within the input lakes with streams to ensure that each cell within a lake flows toward the closest stream within the lake.	x		x
Flow Accumulation	Create flow accumulation grid from a flow direction grid.	x		x
Stream Definition	Create stream grid with cells from a flow accumulation grid that exceed user-defined threshold.	x		x
Stream Segmentation	Create a stream link grid from the stream grid (every link between two stream junctions gets a unique identifier).	x		x
Flow Direction with Streams	Update the input flow direction grid based on the input stream feature class to create an output flow direction grid, drainage line feature class and stream link grid that match as closely as possible the input streams, ensuring that the water flows downstream once it reaches a stream and respecting flow splits.	x		x

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Combine Stream Link and Sink Link	Create a link grid combining the stream link grid representing dendritic areas and the sink link grid representing deranged areas (i.e. areas with sinks).	x		x
Catchment Grid Delineation	Create a catchment grid for segments in the stream link grid or sinks in the sink link grid. It identifies areas draining into each link.	x		x
Catchment Polygon Processing	Create catchment polygon feature class out of the catchment grid.	x		x
Drainage Line Processing	Create streamline line feature class out of the stream link grid.	x		x
Adjoint Catchment Processing	Create adjoint catchment polygon for each catchment in the catchment polygon feature class. An adjoint catchment is the total upstream area (if any) draining into a single catchment.	x		
Drainage Point Processing	Create a drainage point at the most downstream point in the catchment (center of a grid cell with the largest value in the flow accumulation grid for that catchment).	x		x
Longest Flow Path for Catchments	Create longest flow path segments for each catchment and populates field LengthDown with the length to the most downstream point.	x		x
Longest Flow Path for Adjoint Catchments	Create longest flow path for each adjoint catchment.	x		x
Slope	Generates surface slope grid in percent or degree.	x		x

Terrain Morphology

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Drainage Area Characterization	Generate elevation, area, and volume curves for a set of selected drainage areas.	x		x
Drainage Boundary Definition	Generate 3D boundary lines for selected drainage areas.	x	ArcInfo	
Drainage Boundary Characterization	Compute width, perimeter, and cross-section area associated with slices of 3D boundary lines. Named Elevation-Width-Area Characterization in toolbox.	x		
Drainage Connectivity Characterization	Generate information about the connectivity between drainage areas.	x	x	x

Watershed Processing

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Batch Watershed Delineation	Create a watershed for every point in the batch point feature class. Results are stored in a watershed polygon feature class. Watersheds are overlapping if points are on the same stream.	x		x
Batch Subwatershed Delineation	Create a subwatershed for every point in the batch point feature class. Results are stored in a subwatershed polygon feature class. Subwatersheds are non-overlapping if points are on the same stream.	x		x
Batch Global Watershed Delineation	Create a global watershed and compute selected characteristics for each point in the batch point feature class.	x		x
Batch Watershed Delineation for Polygons	Create a watershed for every selected polygon feature in the batch polygon feature class. Results are stored in a watershed (polygon) feature class	x		x
Delineate from Multiple Inlets and Outlets	Create a watershed for input inlet and outlet points. Result is stored in a watershed (polygon) feature class and source points in a watershed point feature class.	x		x
Drainage Area Centroid	Create a point at the centroid of each polygon in a drainage area feature class and store it in a point feature class.	x		
Longest Flow Path	Create a line following the longest flow path in a drainage area based on steepest descent as defined by the flow direction grid.	x		x
Longest Flow Path for Watersheds	Create a line following the longest flow path in a watershed based on steepest descent. More efficient implementation of Longest Flow Path based on preprocessed data.	x		x
Longest Flow Path for Subwatersheds	Create a line following the longest flow path in a subwatershed based on steepest descent. More efficient implementation of Longest Flow Path based on preprocessed data.	x		x
Main Flow Path	Create the main flow path line for a watershed by “walking” up the drainage lines with the biggest drainage area and extending to the boundary to minimize curvature-weighted flow length.	x		x
Construct 3D Line	Build 3D lines from a selected set of 2D lines by extracting elevations from a DEM.	x		
Smooth 3D Line	Smooth 3D lines linearly along the downstream direction of the line.	x		
Flow Path Parameters from 2D Line	Compute the length, slope and 10-85 slope of a longest flow path by extracting elevations from a DEM.	x		
Flow Path Parameters from 3D Line	Compute the length, slope and 10-85 slope of a 3D longest flow path by extracting elevations from the line.	x		
Basin Length Points	Generate inlet and outlet points for a drainage area based on associated longest flow path. Used as input by Basin Length.			x

Basin Length	Create a cost path line from the inlet point to the outlet point of a basin traveling through a cost surface that has minimum values toward the center and maximum values at the boundary.			x
--------------	--	--	--	---

Attribute Tools

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Assign HydroID	Assign a unique identifier (HydroID) to a feature. HydroID is unique across an Arc Hydro geodatabase.	x		
Generate From/To Node for Lines	Generate from-node/to-node topology based on physical line connectivity for a line feature class. Nodes are defined as ends of lines. They are not created as a separate feature class, but rather just identified and accounted for internally. This tool does not require a hydro network.	x		
Find Next Downstream Line	Find the HydroID of the next downstream linear feature and store it in the NextDownID field of the feature. The directionality is based on the digitized direction. Connectivity is established by the physical connection of the linear features (does not require hydro network).	x		
Populate DrainArea for Drainage Line	Populate the contributing drainage area for each drainage line as the sum of the areas of the associated catchment and adjoint catchment features.			
Calculate Length Downstream for Edges	Calculate length from the downstream end of a hydro edge to the outlet of the hydro network (requires hydro network). The length is stored in the LengthDown field.	x	x	
Calculate Length Downstream for Junctions	Calculate the length from a hydro junction to the outlet of the hydro network. The length is stored in the LengthDown field. This tool requires a hydro network.	x	x	
Find Next Downstream Junction	Find the HydroID of the next downstream junction and store it in the NextDownID field of the junction feature. This tool requires a hydro network.	x	x	
Store Area Outlets – Junction Intersect Method	Identify the most likely hydro junction that drains an area. The HydroID of that junction is stored in the JunctionID field for the area feature class.	x		
Store Area Outlets – Drainage Point ProximityMethod	Identify the most likely hydro junction that drains an area. The HydroID of that junction is stored in the JunctionID field for the area feature class.	x		
Store Area Outlets – Next Downstream Area Method	Identify the most likely hydro junction that drains an area. The HydroID of that junction is stored in the JunctionID field for the area feature class.	x		

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Consolidate Attributes	Summarize the values of a numerical attribute of a feature class and store them in a field in another (or same) feature class. Relationship between the from and the to feature class is established through related IDs. Operators include sum, min, max, average, median, mode, standard deviation, and count. User specifies the from and the to feature classes, what field to summarize and in what field to store the summarized values. The tool can use the same feature class as both from and to objects to operate on.			
Accumulate Attributes	Summarize the values of a numerical attribute of a feature class and store them in a field in another (or same) feature class. The tool selects the upstream objects by tracing either using the geometric network or a NextDownID relationship, and summarizes the selected objects. Operators include sum, min, max, average, median, mode, standard deviation, and count. The selectable objects are either the traceable objects, or can be in an ID-related feature class (using existing relationship classes). User specifies the from and the to feature classes, what field to summarize, and in what field to store the summarized values			
Display Time Series	Display the values of the selected parameter as a function of time.			
Transfer ID	Establish relationship between a source feature class with an existing Time Series table and a target feature class that needs to be linked to Time Series data.			
Transfer Value	Generate a Time Series table for a polygon feature class based on an existing polygon feature class and its associated Time Series table.			
Export to DSS	Export time series data in Arc Hydro format to DSS.	In H&H Modeling		
Import from DSS	Import time series from DSS file into an Arc Hydro time series table.	In H&H Modeling		
Scale Design SCurve	Scale a unit hydrograph SCurve using design values stored in the selected Design Value Field in the attributes table of the Drainage feature class.			
Accumulate SCurve	Add up values of input time series to create accumulated time series.			
Export SCurve to RAI	Export SCurve time series into RAI files.			
Compute Local Parameters	Compute parameters for local watersheds (e.g. area, average elevation, maximum elevation, minimum elevation, relief, slope, land cover, precipitation, etc.). All data needed to compute the parameters need to be available in the map. User can configure additional parameters in the XML.			x
Compute Global Parameters	Compute parameters for global watersheds.	x		x
Compute Point Parameters	Compute parameters for selected points (e.g. latitude, longitude, attribute in underlying feature, etc.). The parameters are stored in the Attributes table of the input Point layer.			
Generate Report	Generate a preconfigured report for the selected feature of interest.			
Export Data	Export predefined data related to the selected feature of interest.			

Network Tools

Tool	Description	Available in Toolbox	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Hydro Network Generation	Generate a hydro network (hydro edges and hydro junctions) from drainage lines, catchments, and drainage points. The function updates all the connectivity fields in input feature classes.	x	x	
Node/Link Schema Generation	Generate schematic (node-link) network by connecting centers of catchments/drainage areas and junctions, and connecting junctions and junctions. Connectivity is established through connectivity fields (attributes), not physical connectivity.	x		
Store Flow Direction	Store information about hydro (geometric) network element's directionality into an attribute of the feature matching the element.	x	x	
Set Flow Direction	Define flow direction for a geometric network based on digitized direction or an attribute for the feature.	x	x	

Buttons and Tools

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Flow Path Tracing	Trace the downstream path, based on the steepest descent, from a user specified point to the edge of the DEM by using a flow direction grid.		x
Interactive Flow Path Tracing	Generate flow path feature, based on the steepest descent, from a user specified point to the boundary of the drainage area by using a flow direction grid.		x
Point Delineation	Interactively delineate a watershed for a user specified point based on the preprocessed DEM.		x
Delineate using EPA Web Service	Generate a watershed by using EPA Delineation Web Services.		
Batch Point Generation	Add user specified point to a batch point feature class. This point feature class can be used as an input to the batch watershed and subwatershed delineation functions.		
Assign Related Identifier	Interactively assign a value of a field in a source feature to a field in the target feature. User specifies both the source and target feature classes and fields.		
Global Point Delineation	Interactively delineate a watershed for a user specified point based on a set of preprocessed geographic units tied together by a geometric network. Compute global parameters.		x
Trace By NextDownID Attribute	Trace upstream, downstream, or in both directions from a selected location using the attribute relationship established through NextDownID field. The final selected features can include the objects selected through the trace, and/or ID-related objects by using the existing relationship classes.		
Main Flow Path Tracing	Trace the upstream path from a specified line feature by finding the path that maximizes the drainage area (i.e. flow) for each line feature.		

Tools list – Toolbox

The following functions are only available in the Arc Hydro toolbox (i.e. in the geoprocessing environment).

Arc Hydro Setup

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Set Batch Target Locations	Create the target vector and raster locations based on the location of an input raster and update the Arc Hydro configuration in ArcMap.		
Set Target Locations	Create the target vector and raster locations specified by the user and update the Arc Hydro configuration.		

Attribute Tools

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Assign UniqueID	Assign a unique identifier to the specified field.		
Percent by Zone	Model computing percentage of categories from an input grid for each input zone. Used by the functions computing local and global parameters.		x

GIS Data Exchange/Export to Excel

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Excel to Map	Execute geoprocessing model in ArcMap using parameters values from Excel and update map data with data from an Excel spreadsheet.		
Export Tool Parameters	Store tool name and parameters into a table.		
Map to Excel	Export data (including geoprocessing model name and parameters) from map into Excel spreadsheet.		

GIS Data Exchange/GWIS to FEMA

Tool	Description	Requires ArcInfo or ArcEditor	Requires Data Interoperability
GWIS to FEMA DCS Hydraulic	Data operability tool allowing exporting GWIS data (geodatabase) into FEMA DCS Hydraulic data. Data Interoperability Extension must be activated for this tool to be visible.		x
GWIS to FEMA DCS Hydrologic	Data operability tool allowing exporting GWIS data (geodatabase) into FEMA DCS Hydrologic data. Data Interoperability Extension must be activated for this tool to be visible.		x

GIS Data Exchange/XML Exchange

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Export GIS Data to XML	Export preconfigured data from a geodatabase into an XML file.		
Import from XML	Export preconfigured data from an XML file into a geodatabase.		
Transform XML	Transform an XML using an XSL file.		

H&H Modeling/GeoICPR

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Generate ICPR Basin	Generate ICPR Basin features based ICPR Links and Nodes to prepare for export to ICPR model.		x
Generate ICPR Link	Generate ICPR Link features to prepare for export to ICPR model.		
Generate ICPR Node	Generate ICPR Node features to prepare for export to ICPR model.		
Import from ICPR	Import result of ICPR modeling run into GWIS geodatabase.		

H&H Modeling/Green and Ampt

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Accumulate Incremental TimeSeries	Accumulate the time series steps from the input incremental times series associated to each input subwatershed feature.		
Compute Green and Ampt Excess Rainfall	Compute the Green and Ampt Excess Rainfall time series for an input subwatershed feature class using an associated Soil Landuse Precipitation polygon feature class (i.e. SLURP) and Soil and Landuse lookup tables.		
Compute Green and Ampt Parameters	Compute the Green and Ampt parameters for an input polygon feature class using the grids generated with the tool Create Green and Ampt Parameter Rasters for example.		x
Create Green and Ampt Parameter Rasters	Create parameter rasters based on an input Soil Landuse polygon created by intersecting a soil feature class with a landuse feature, and the associated Soil and Landuse lookup tables.		x
Export to ICPR Green and Ampt Parameters	Create the ICPR XML file used as input to run ICPR with the Green and Ampt option. Require as input a Basin feature class with Green and Ampt parameters populated. This tool works in ArcMap only, it does not work in ArcCatalog.		
Export to ICPR Green and Ampt Rainfall Excess	Create the ICPR XML file used as input to run ICPR with the Impervious SCS option. This tool works in ArcMap only, it does not work in ArcCatalog.		

H&H Modeling/Map to Map

Tool	Description	Available in Toolbar	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Export to DSS	Export time series data in Arc Hydro format to DSS.	x		
Flood From Stream WSE	Model creating flood plain based on water elevation raster.			x
Import from DSS	Import time series from DSS file into an Arc Hydro time series table.	x		
Run HMS	Run HEC-HMS.			
Run RAS	Run HEC-RAS.			
SDF to XML	Convert a SDF file into XML.			
Stream WSE From Point WSE Measurements	Model creating water elevation raster along a stream.			x
Update RAS Flow	Update RAS Flow			

H&H Modeling/Time of Concentration

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial
------	-------------	-------------------------------	------------------

		ArcEditor	Analyst
Compute Time of Concentration	Compute Time of Concentration and associated Longest Flow Path for each input Drainage Area feature. The time of concentration (Tc) is defined as the time for runoff to travel from the hydraulically most distant point of the drainage area to the outlet of the drainage area.		x
Compute Time of Concentration for Group Basin	Compute Time of Concentration and associated Group Longest Flow Path for each input Group Basin feature.		
Compute Travel Time for Preferential Link	Compute Travel Time for each selected input Preferential Link.		
Generate TR55 Zone Grid	Create a new TR55 Zone grid that identifies 3 TR55 zones within the extent of the Drainage Area feature class. Each zone defines a way for the water to move across that zone.		x

Terrain Morphology/AH Connectivity Refinement

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Add Linear Structure HydroEdges to Preferential Link	Create a Preferential Path (Link and Node features) representing a Linear Structure link by merging the geometries of Linear Structures HydroEdges with their connected HydroEdges (i.e. Conduit).		
Add Point Structure HydroEdges to Preferential Link	Create a Preferential Path (Link and Node features) representing a Point Structure link by merging the geometries of the HydroEdges connected to the HydroJunction representing the structure (Culvert, bridge or control structure).		
Connect Control Structure Junctions	Connect HydroJunctions of Hydraulic Type Inlet/Outlet and Control Structure associated to a Conduit or Channel edge and defining a Control Structure Sequence to the spider web geometric network by creating new 'Linear Structure' HydroEdge features.	x	x
Connect HydroJunctions	Connect HydroJunctions of Hydraulic Type Culvert, Bridge, Control Structure, Dam and Levee to the spider web geometric network by creating new 'Structure Link' HydroEdge features. Tool is also available in the SWFWMD – Connectivity Tools toolbar installed with Arc Hydro.	x	x
Define Overland Preferential Node Link Schema	Create a Preferential Node/Link schema that defines the “main” overland flow paths associated to Catchment features.	x	
Flip Preferential Path	Flip preferential links, switch directional attributes and updates FlowDir field in associated HydroEdge features.	x	
Set Flow Direction Using Preferential Link	Update the attribute storing the flow direction (e.g. FLOWDIR) for the selected HydroEdge features to match the direction of their associated Preferential Link.	x	
Sink Identification by HEP	Set the field IsSink to 1 in the input Sink Polygon features containing Hydraulic Element Points features.		
Update Preferential Node Link Schema	Generate Overland Preferential Link and Preferential Node feature classes based on the 'IsPreferred' attribute in the input HydroEdge feature class.		

Terrain Morphology/Drainage Boundary Processing

Tool	Description	Available in Toolbar	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Cross Section Direction	Set the orientation of a cross section from left to right when looking in the digitized direction of the intersecting input Line feature.			
Drainage Area Characterization	Generate elevation, area, and volume curves for a set of selected drainage areas.	x		
Drainage Boundary Definition	Generate 3D boundaries lines for the polygon features in the input Drainage Area feature class.	x	ArcInfo	
Drainage Boundary Direction	Set the digitized direction of the selected Drainage Boundary lines based on user-provided Preferential Link line features.			
Drainage Boundary Smoothing	Create new Smooth Drainage Boundary features with jaggy removed by applying out-of-the-box smoothing algorithms (PEAK) to the input Drainage Boundary feature class.		x	
Elevation-Width-Area Characterization	Available in toolbar as Drainage Boundary Characterization. Compute width, perimeter, and cross-section area associated with slices of 3D boundary lines.	x	x	
Station-Elevation Characterization	Computes Station (Measure)-Elevation for every vertex in the input 3D line.			

Terrain Morphology/Grouping

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Generate Group Basin	Generate Group Basin features by dissolving the input Catchment features based on the field GroupID.		
Generate Group Junction	Create a new Group Junction feature class by reselecting from HydroJunctions that meet one of the grouped junction criteria.	Arc Info	
Generate Group Link	Create a new Group Link feature class that establishes the connectivity between the Group Basins based on Group Junctions and Group Flow Direction.		
Group Selected Catchments	Assign a unique 'GroupID' to selected Catchments.		
Select Upstream Catchments using Preferential Node Link	Trace upstream of user selected catchment(s) based on Preferential Node/Link and returns the upstream catchment features as a selection set.		
Ungroup Selected Catchments	Ungroup selected Catchments by assigning 'GroupID=NULL' to selected Catchments.		

Terrain Preprocessing Workflows

Tool	Description	Requires	Requires
------	-------------	----------	----------

		ArcInfo or ArcEditor	Spatial Analyst
Basic Combined Terrain Processing	Model in the geoprocessing environment performing the basic terrain preprocessing steps for a dendritic and deranged terrain.	Arc Info	
Basic Dendritic Terrain Processing	Model in the geoprocessing environment performing the basic terrain preprocessing steps for a dendritic terrain.		x
Basic Deranged Terrain Processing	Model in the geoprocessing environment performing the basic terrain preprocessing steps for a deranged terrain, i.e. a terrain with sinks.	Arc Info	
Batch Processing	Run a model in batch mode, i.e. for each subdirectory defined under the global directory. Input data for each run must be stored in a subdirectory located in the specified global input location.		x
Dendritic Terrain Processing with Imposed Drainage Line and Wall			x

Utility

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
Convert 3D Line to Raster	Create line raster using by using linear interpolation from 3D Line vertices.		x
Create Thiessen Polygons	Create the Thiessen polygons associated to input points and populate their FeatureID field with the HydroID of the corresponding point.		
Download Time Series Data	Download time series data into a new Arc Hydro geodatabase based on an input Data Cart.		
Export Data Cart to XML	Export a Data Cart layer/table into an XML.		
Intersect Areas	Intersect two polygon layers and attributes the intersection layer with the percentage in area from each input polygon layer.		
Point TSValue to 3D Line	Interpolate or extrapolate elevations along a line based on field value in input points.		
Spatial Reference From Raster	Set spatial reference based on input raster (used in model).		
Update TSValue on Points	Update field in input point based on specified time step and variable.		
Weighted Average	Transfer a value from a source layer into a target layer by computing area weighted average.		

Watershed Processing

Tool	Description	Requires ArcInfo or ArcEditor	Requires Spatial Analyst
-------------	--------------------	--------------------------------------	---------------------------------

Interactive Delineation	Interactive watershed delineation model based on Batch Watershed Delineation tool.		x
-------------------------	--	--	---