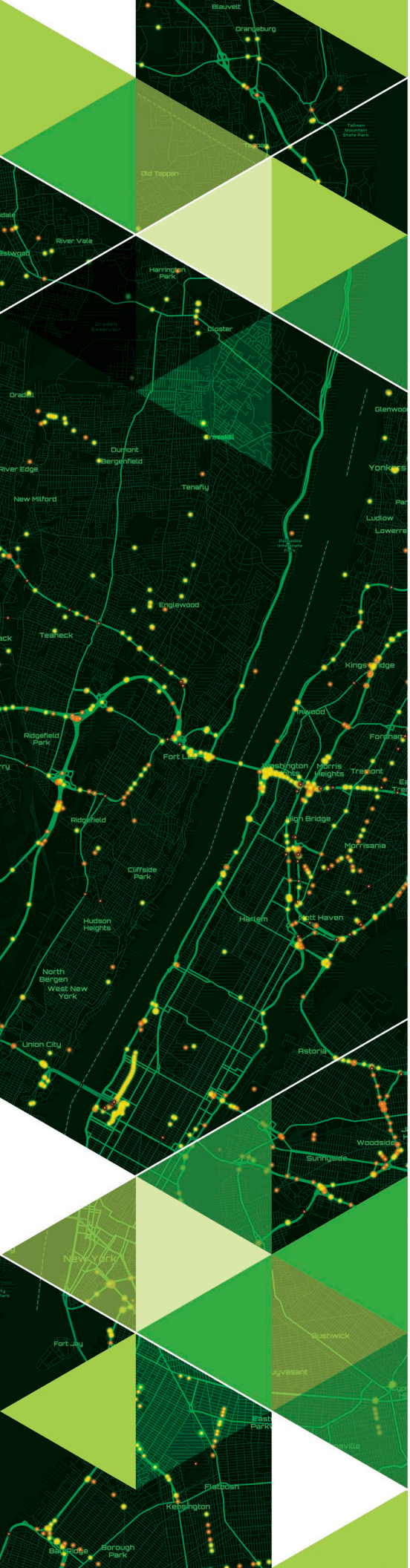

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Arc Hydro: Tips and Tricks for Transitioning from ArcMap™ to ArcGIS® Pro

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Arc Hydro: Tips and Tricks for Transitioning from ArcMap™ to ArcGIS® Pro

Executive Summary

This document provides tips and tricks for transitioning an Arc Hydro implementation from ArcMap™ to the ArcGIS® Pro environment. It focuses on elements that impact Arc Hydro. Most of these are standard ArcMap to ArcGIS Pro transition elements but are highlighted in the context of an Arc Hydro implementation. This document is not intended to be a comprehensive guide for an ArcMap to ArcGIS Pro migration. You should be familiar with Arc Hydro before continuing with this document.

Additional resources include the following:

- *Arc Hydro: Project Development Best Practices*—This technical paper captures what works well when implementing Arc Hydro projects both in ArcMap and ArcGIS Pro.
    - ArcGIS Pro has a default way in which it organizes data and project folders. This structure can be leveraged to support Arc Hydro best practices for data and folder organization (section 4.2 in *Arc Hydro: Project Development Best Practices*).
- *Arc Hydro: ArcGIS Pro Project Startup Best Practices*—This technical paper discusses different ways to start an Arc Hydro project in ArcGIS Pro.
- *Switching to ArcGIS Pro from ArcMap*—By Maribeth H. Price, Esri Press, 2019. This book transitions a user who is familiar with ArcMap into the mechanics of using ArcGIS Pro. Rather than teaching ArcGIS Pro from the start, this book focuses on how ArcGIS Pro is different from ArcMap. Covering the most common and important workflows required for GIS work, *Switching to ArcGIS Pro from ArcMap* leverages the user's prior experience to enable a more rapid adjustment to ArcGIS Pro.

Key Arc Hydro Differences in ArcMap and ArcGIS Pro

Conceptually, an Arc Hydro implementation is the same in ArcMap and in ArcGIS Pro.

- The same approach to data and project development is taken.
- The same workflows are used for data preprocessing.
- The same database structures are established (except geometric network).
- General functionality is the same.

Most of the tools have the same functionality, with minor differences in look and feel to accommodate the two environments. Some differences do exist, and these are usually implemented in ArcGIS Pro to

- Improve tool behavior in the context of a workflow.
- Remove deprecated functionality.
- Improve performance.

At this point in the Arc Hydro development, both platforms are supported, and with few exceptions, new tools are developed and maintained in both.

Key differences in Arc Hydro across the two platforms are related to the following:

- Different management of layer and tool configuration
- Use of Python and ArcPy™ software as the main development platforms in ArcGIS Pro vs. VB.NET and ArcObjects™ in ArcMap
- Use of standard geoprocessing front end for tools in ArcGIS Pro vs. custom interfaces in ArcMap
- Lack of geometric network support in ArcGIS Pro (replaced with new trace network functionality)

If you are an existing Arc Hydro user in ArcMap, there is nothing significant that prevents you from transitioning to ArcGIS Pro, but you should carefully review your current Arc Hydro in ArcMap workflows and see if they are supported in ArcGIS Pro. If you see any missing functionality, please contact the Arc Hydro team via the Esri Water Resources GeoNet community.

Task	ArcMap	ArcGIS Pro
HydroID management	Editor extension for HydroID management of new features	Explicit management of HydroID for new features
Layer management	Via tags	None—via default names
Tracing	Geometric network	Trace network
Toolbar	ArcMap toolbar (extensive)	ArcGIS Pro ribbon (minimal)
Toolbox	Mix of Python, ModelBuilder™, and .NET tools	Mix of Python and ModelBuilder tools
Tool configuration	Extensive configuration capabilities through configuration XML and custom coding	Minimal configuration using standard geoprocessing capabilities

Table 1. Key Arc Hydro Differences in ArcMap and ArcGIS Pro

HydroID management

Arc Hydro in ArcGIS Pro does not have an editor extension that will automatically populate HydroID for newly digitized features. Instead, add all new features (either with regular editing or appending/importing data into feature classes) and then run Assign HydroID from Arc Hydro Tools Pro -> Attribute Tools -> ID Management. Use the Overwrite HydroID option to control overwriting of any existing HydroIDs in the target feature class.

Layer management

Arc Hydro in ArcGIS Pro does not have the concept of a tag, so there is no internal knowledge of which layers should be default inputs into Arc Hydro functions. Most of the Arc Hydro ArcGIS Pro tools have an input default name defined for a layer, so if your Table of Contents contains a feature class of that name, it will be selected as the default input. There is no special Arc Hydro code that manages that. It is a standard geoprocessing tool capability and can be modified by the user if needed.

Toolbar

Only a few functions that take interactively defined x,y locations from the map as input (user's click on the map) are present in the Arc Hydro ribbon in ArcGIS Pro. All other functions are accessible through Arc Hydro Pro Toolbox.

Toolbox

Most Arc Hydro ArcGIS Pro functions are implemented in Python and exposed as a script in the Arc Hydro toolbox/toolset. There are few functions implemented in ModelBuilder. The organization of the toolbox in ArcGIS Pro matches the organization in ArcMap, with minimal changes.

Tool configuration

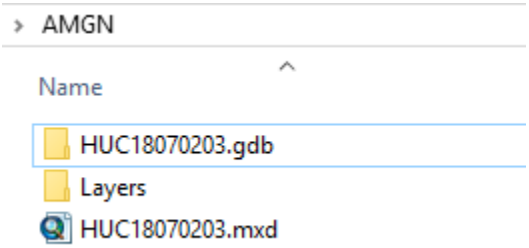
There is no custom Arc Hydro tool configuration in ArcGIS Pro. All tool configuration is done using standard geoprocessing tool configuration capabilities and can be modified by the user if needed.

Starting an Arc Hydro Project in ArcGIS Pro

By now, you should have read the Arc Hydro document *Arc Hydro: ArcGIS Pro Project Startup Best Practices*. That document captures different ways to start an Arc Hydro project in ArcGIS Pro. In this section, we will focus on how to start an Arc Hydro project in ArcGIS Pro when data and .mxd files from an Arc Hydro project in ArcMap exist and are to be used. This is covered in section 2.4 of the *Arc Hydro: ArcGIS Pro Project Startup Best Practices* document. It is presented here but uses a different dataset as an example. This dataset will be referenced later in this document.

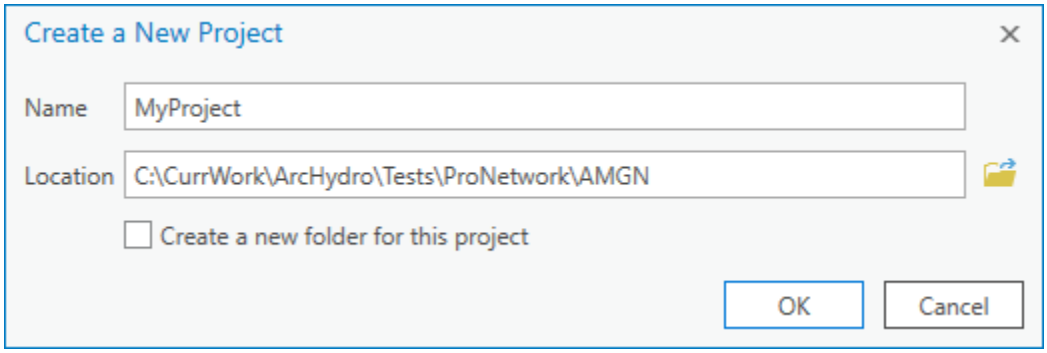
Leveraging an existing Arc Hydro dataset and MXD project

This approach intends to maintain the same folder and naming structure developed in ArcMap. A typical Arc Hydro data structure might look like the one below. In the example, the AMGN folder contains the Layers folder with all the rasters, the HUC18070203.gdb with vector and tabular Arc Hydro data, and HUC18070203.mxd ArcMap project.



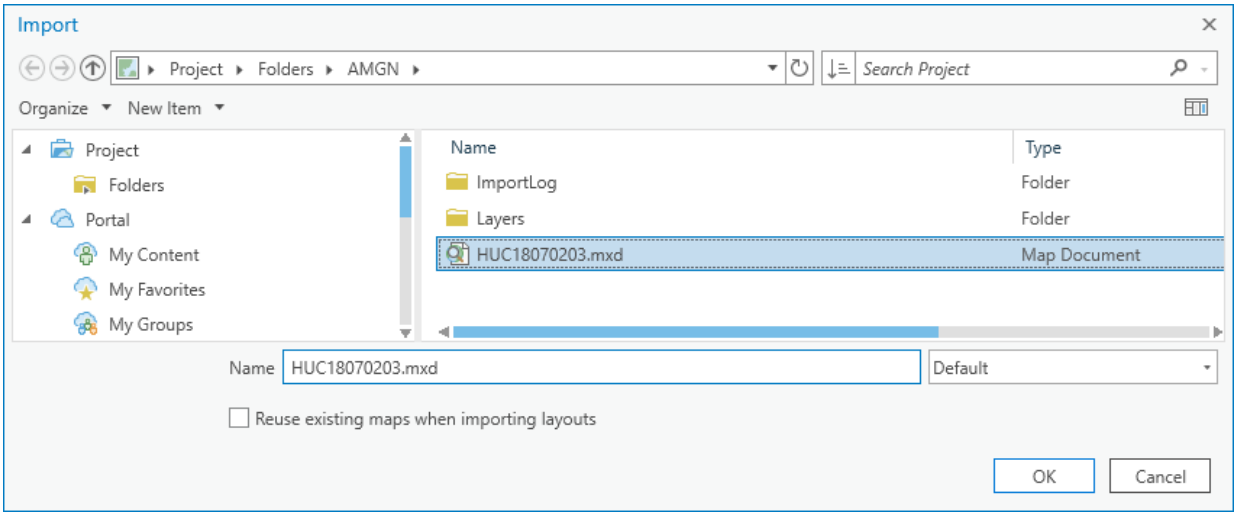
The goal is to use the same main folder (AMGN) to maintain the ArcGIS Pro project using the existing geodatabase as the default project geodatabase and Layers folder for storing rasters. The name of the ArcGIS Pro project will match the name of the geodatabase (HUC18070203.aprx). While this was the recommended project structure in ArcMap, it is not as critical in ArcGIS Pro but is still a good practice and helps with the ArcMap to ArcGIS Pro transition (for consistency).

1. Start ArcGIS Pro and select the new Map template.
2. Specify the name of the new project and the folder in which to create it. Keep the Create a new folder for this project check box unchecked. Note that the specified project name can be anything EXCEPT the name of the existing geodatabase in the target folder. In this case, we are naming the project MyProject and placing it in the C:\CurrWork\ArcHydro\Tests\ProNetwork\AMGN folder.



3. Click Insert –> Import Map (main ArcGIS Pro tab).

4. Navigate to the existing ArcMap .mxd file you need to import (in this case C:\CurrWork\ArcHydro\Tests\ProNetwork\AMGN \HUC18070203.mxd) and click OK.

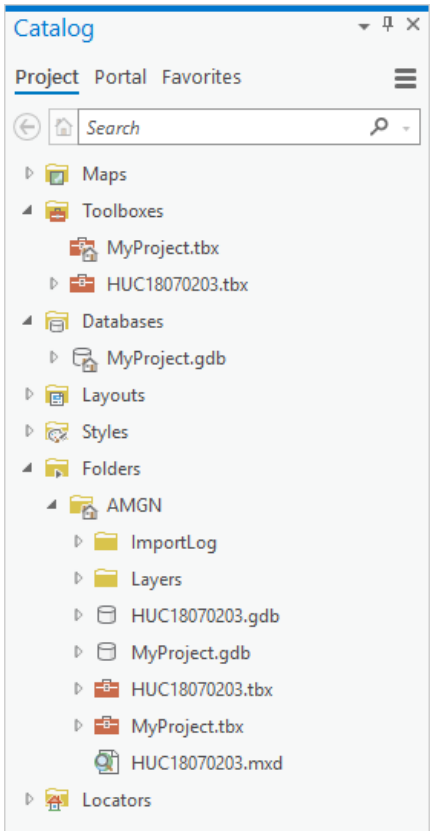


5. Click Project –> Save As (from the main ArcGIS Pro tab).

6. Specify the name of the new project and the folder in which to create it. The specified project name should match the name of the geodatabase in the folder where the project will be saved. In this case, we are naming the project HUC18070203 and placing it in the C:\CurrWork\ArcHydro\Tests\ProNetwork\AMGN folder.

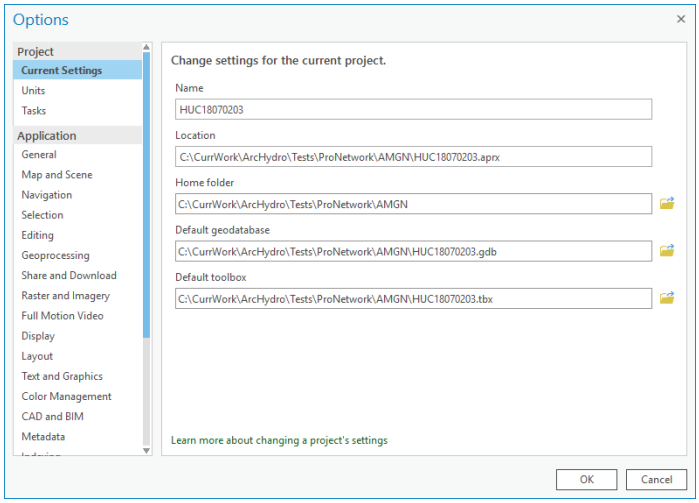
7. Create a new toolbox called HUC18070203.tbx in the project folder (via Catalog).

8. ArcGIS Pro Catalog should look like this:



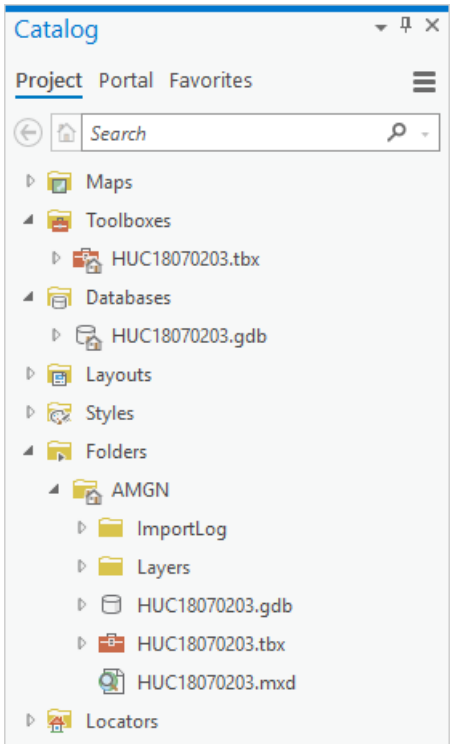
9. Click Project –> Options -> Current Settings (from the main ArcGIS Pro tab).

    a. In Default geodatabase and Default toolbox, select HUC18070203.gdb and HUC18070203.tbx respectively. The form should look like this:



    b. Click OK to apply changes.

10. Click Save to save the project.
11. Use the Catalog view to inspect changes.
12. Delete all references to MyProject (e.g., tbx, gdb, and .aprx files—some might have to be deleted from the file manager).
13. The final folder structure should look like this:



14. An optional step is to remove the .mxd file. It is not recommended to use both ArcMap and ArcGIS Pro versions of the same Arc Hydro project.

Tracing

One of the key differences (from the Arc Hydro viewpoint) in the geodatabase and analytical support between ArcMap and ArcGIS Pro is the management of networks and tracing. ArcGIS Pro does not support geometric networks that were the foundation of the Arc Hydro data model and some of the Arc Hydro analytical tools.

ArcGIS Pro 2.6 introduces trace networks. Trace network in ArcGIS Pro provides geometric network capabilities that the Arc Hydro data model and tools used in ArcMap. While there is no one-to-one equivalency, trace network allows similar capabilities, and as it evolves with future releases of ArcGIS Pro, additional functionality will be available that was not possible with geometric networks.

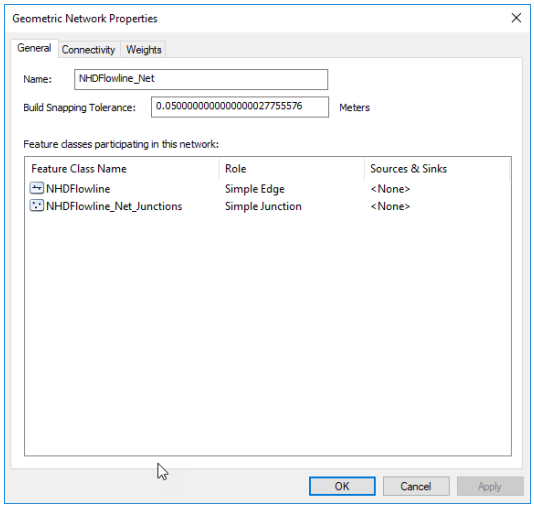
For an overview of trace networks, please read "Introducing the Trace Network with ArcGIS Pro 2.6."

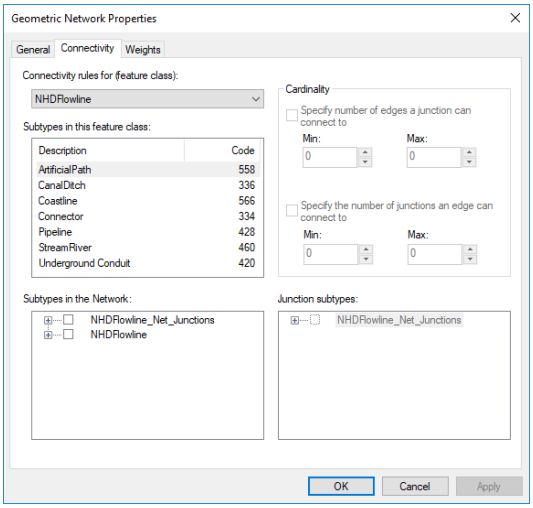
This section presents a quick review on how to mobilize trace network in the context of typical Arc Hydro workflows.

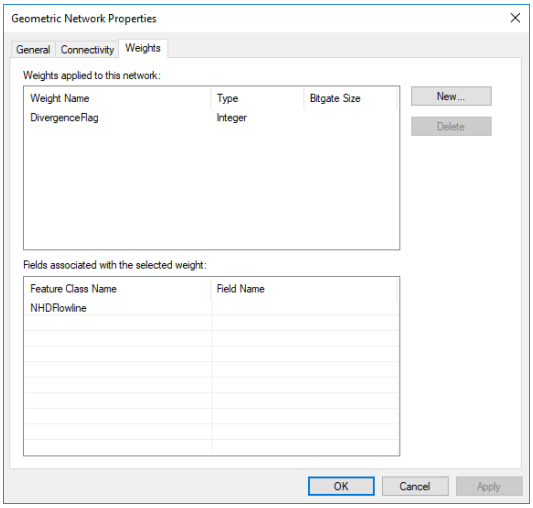
A geometric network developed in ArcMap will be used as a starting point to demonstrate the differences between the two networks. Trace network can also be built within ArcGIS Pro from basic feature classes, which will be demonstrated.

Converting geometric network to trace network

The initial geometric network used in the example was built using NHD data (using NHDPlusHR packaged NHD data). The NHDFlowline feature class residing in the Hydrography feature dataset was used to build a geometric network called NHDFlowline_Net. It has the following properties:



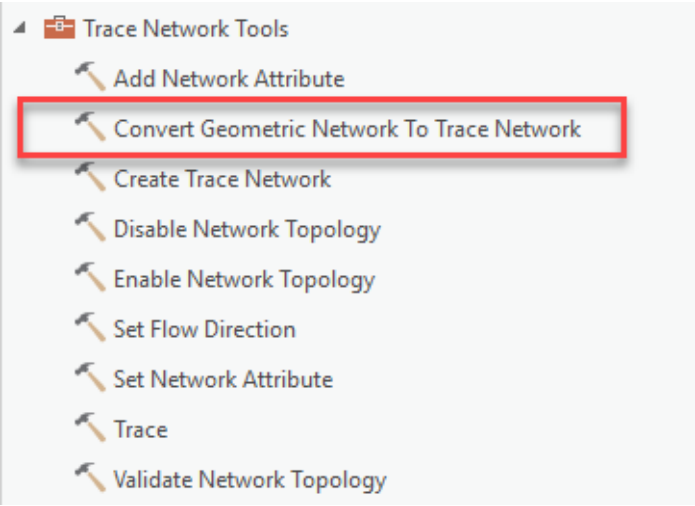




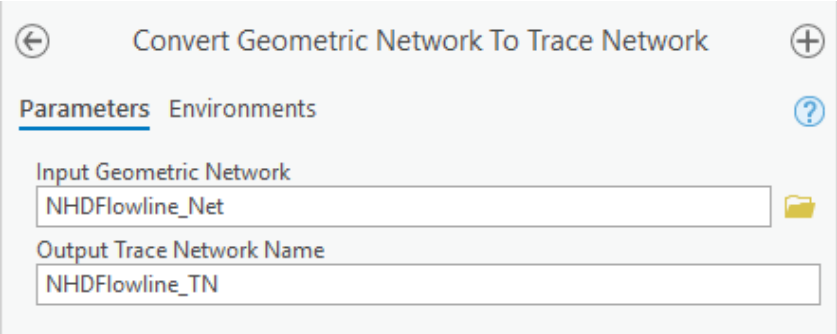
This network is part of the HUC18070203.gdb geodatabase discussed earlier (Starting an Arc Hydro project in ArcGIS Pro).

Note that geometric networks can be seen in a geodatabase via the ArcGIS Pro interface but are not supported. Also, note that the following operation will **delete** the geometric network from the geodatabase, so make sure you make a backup of the geodatabase in case you need it since trace network is not supported in ArcMap.

1. From ArcGIS Pro, use the Trace Network Tools toolbox (available in ArcGIS Pro 2.6 and above) and run Convert Geometric Network To Trace Network.



a. Navigate to the HUC18070203.gdb\Layers feature dataset and select NHDFlowline_Net in the Input Geometric Network field. Type "NHDFlowline_TN" in the Output Trace Network Name field.



b. Run the tool.

2. Review the geodatabase in Catalog (you might have to refresh the view).
3. The geometric network is deleted, and the trace network is created.
4. Right-click on the NHDFlowline_TN trace network and select Properties. Review the network properties.

    a. What are participating feature classes and of what type?

    b. Is network topology enabled, and how many features participate in the network?

    c. How many "dirty" areas are there?

    d. What are the network attributes?

5. Before a trace network can be used, its topology needs to be enabled. Run Enable Network Topology and select NHDFlowline_TN in the Input Trace Network field.

6. Review network properties again.

    a. Is network topology enabled, and how many features participate in the network?

    b. How many dirty areas are there?

7. Add the network to the map.

8. Review all the layers added to the map when the network was added.

    a. What do dirty areas represent?

    b. Can you identify the problems?

    c. Review point errors.

    d. Review line errors.

9. Run Validate Network Topology and select NHDFlowline_TN in the Input Trace Network field. Make sure you validate the full extent of the network.

10. Review network properties again.

    a. Is network topology enabled, and how many features participate in the network?

    b. How many dirty areas are there?

11. Ideally, you will "clean" all the dirty areas. As you are making edits, run Validate Network Topology to see if your edits have fixed the issues. This function can operate on the local extent only so you can do quick checks on a subset of the data (where the edits have been made).

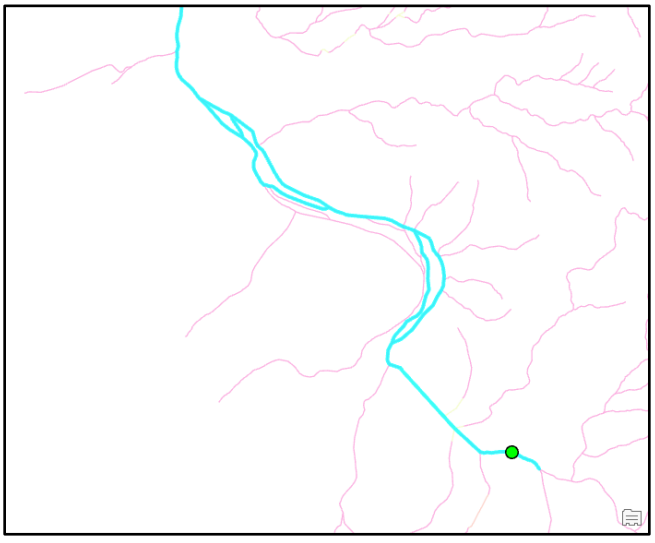
12. In the Trace Network ribbon, run Display Flow Direction.

    a. Zoom in and inspect the direction arrows. Do they make sense?

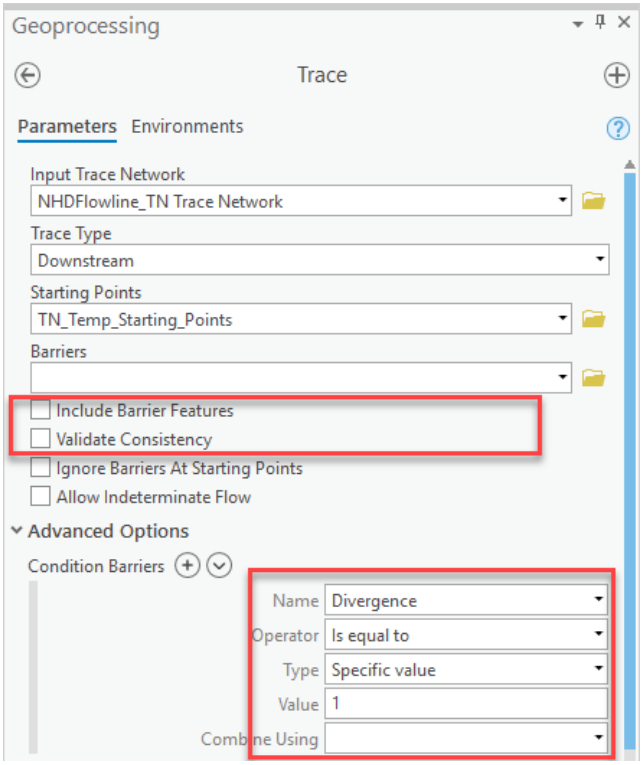
Fundamentals of Tracing through Trace Networks

This section describes basic tracing capabilities in trace networks. Make sure that the trace network is established, enabled, and validated.

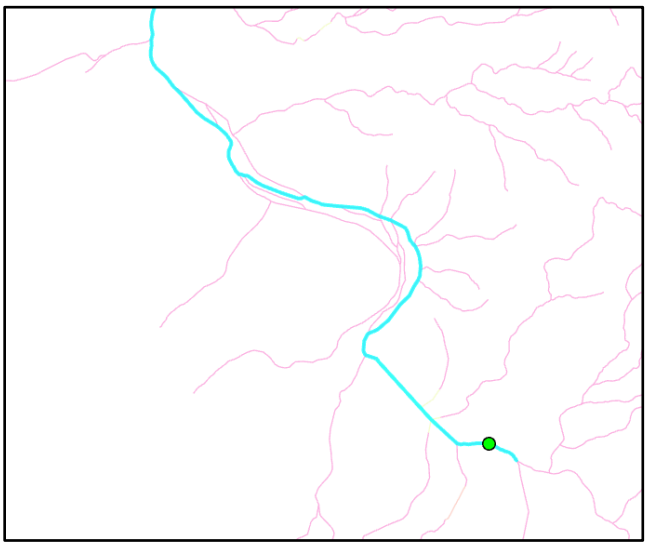
1. In the Trace Network ribbon, click Trace Locations > Starting Points.
    a. A Trace Locations pane will open.
        i. Click on an edge where you would like to start a trace (select something on a main river, close to the downstream end of the system).
2. Once the point is placed, in the Trace Network ribbon, run Upstream. Accept defaults for the geoprocessing tool and run it.
3. Review the results (selected set of features).
    a. If the trace failed, why did it fail? Have you cleaned all the errors and validated the network topology after the edits?
    b. If there are still errors in the network, uncheck Validate Consistency on the trace tool's form and run the tool again.
        i. This allows tracing through errors.
4. Clear selection in the map and clear Starting Points from the Trace Locations pane (click on the red x next to the displayed feature).
5. Identify location upstream of flow splits (look for lines with DivergenceFlag = 1).
6. Add a network start point upstream from a divergence.
7. Trace downstream. Note that multiple paths are selected at divergences.



8. To be able to use a value from a field to control tracing, it needs to be set as a network attribute.
    a. Run Disable Network Topology on NHDFlowline_TN.
    b. Run Add Network Attribute and create an attribute name called Divergence of short type and allow it to be nullable.
    c. Run Set Network Attribute and set network attribute Divergence to be from field DivergenceFlag from NHDFlowline feature class.
    d. Run Enable Network Topology on NHDFlowline_TN.
9. Rerun the trace downstream tool.
    a. Uncheck Include Barrier Features.
    b. Under Advanced Options, fill in the Condition Barriers section. Use Divergence = 1 as the conditional barrier.



10. Notice that now only a single downstream trace path is defined.



11. Network attributes allow you to constrain the trace. In the following example, we will limit the downstream trace to 10 km. Notice that NHDFlowline has the field "LengthKM" that can be used to constrain the trace. If such a field did not exist, it could be easily created and calculated using standard geometry calculation capabilities. Follow this procedure to set up the trace network for trace containment using length in kilometers:

    a. Disable network topology.

    b. Add network attribute LenKM (double, allow null).

    c. Set network attribute LenKM to be from field LengthKM from NHDFlowline feature class.

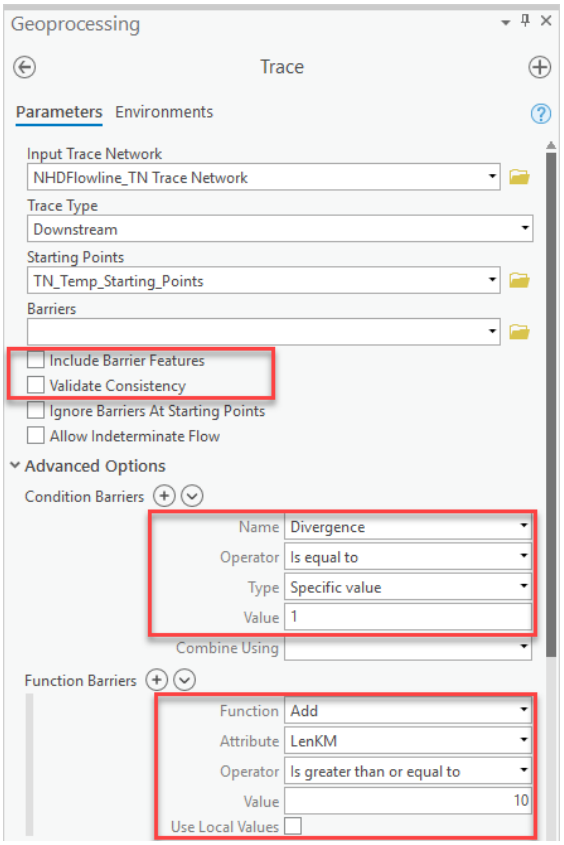
    d. Enable network topology.

12. Rerun the trace downstream tool.

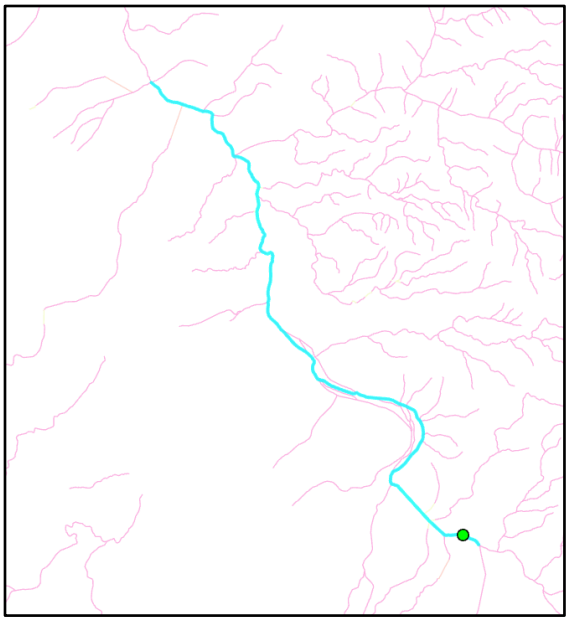
    a. Uncheck Include Barrier Features.

    b. Under Advanced Options, fill in the Condition Barriers section. Use Divergence = 1 as the conditional barrier.

    c. Under Advanced Options, fill in the Function Barriers section. Use LenKM => 10 as the functional barrier. Note that the operator **Is greater than or equal to** is used since this is the condition to place the barrier (so we limit the overall distance to less than 10 km).



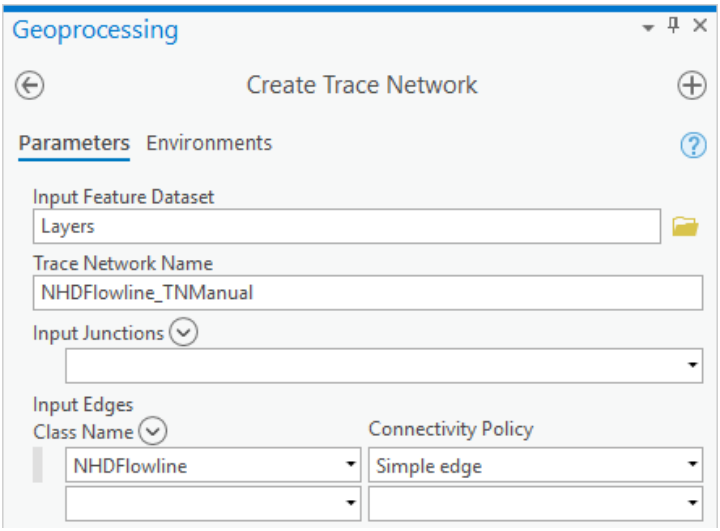
13. The result shows the length limited main stem downstream trace.



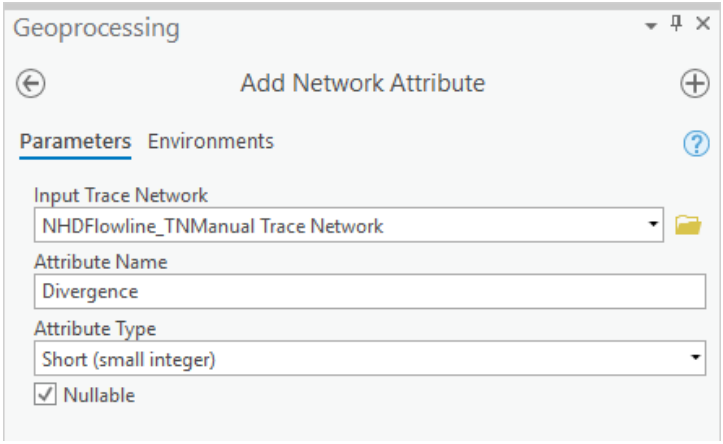
Building the Trace Network from the Ground Up

If a geometric network did not exist in the geodatabase as input for trace network creation, a trace network can be built from the ground up. We will use the same feature class and attributes as in the Tracing section earlier in this document. First, we will delete the existing trace network (NHDFlowline_TN) since a feature class can participate only in one network (do it from Catalog). If necessary, remove all trace network artifacts from the map. The network will consist of only the NHDFlowline feature class, and we will use DivergenceFlag and LengthKM fields as network attributes. The following functions are all run from the Trace Network Tools toolset:

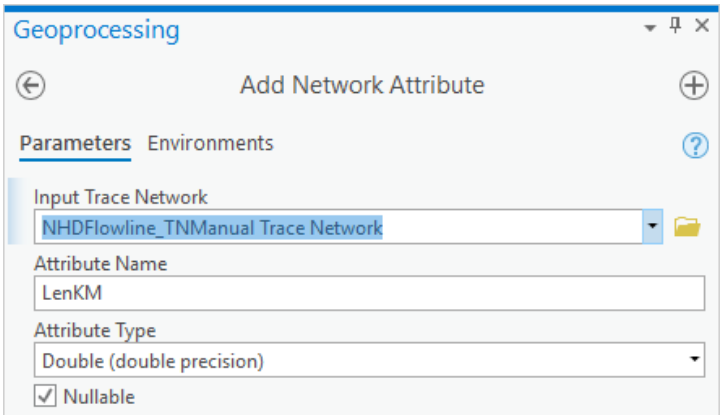
1. Create Trace Network (NHDFlowline_TNManual).



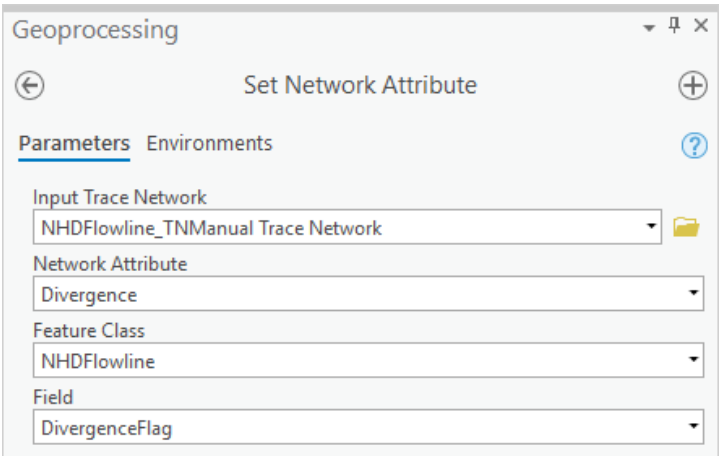
2. Add Network Attribute (Divergence).



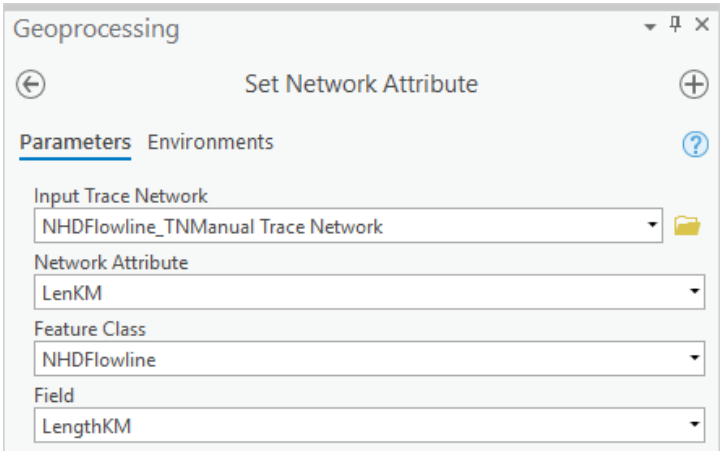
3. Add Network Attribute (LenKM).



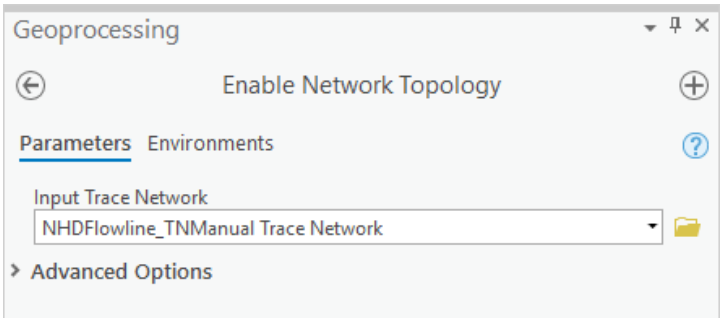
4. Set Network Attribute (Divergence).



5. Add Network Attribute (LenKM).



6. Enable Network Topology.



7. Inspect the network in Catalog.
    a. Is topology enabled?
    b. How many features participate in the network and from what feature classes?
    c. Are network attributes properly configured?
8. Inspect the network in Contents.
    a. Point and line errors
    b. Dirty areas
    c. Flow direction
9. Are there any differences from the network created by geometric network conversion in the previous Tracing exercise (pg.11)?
10. Perform traces starting from page 16.
    a. Are there any differences in behavior and results?
11. What other feature classes and attributes might be useful in network analyses.

    Note that with proper design and planning of the network (specially its attributes), its creation can be straightforward and linear.

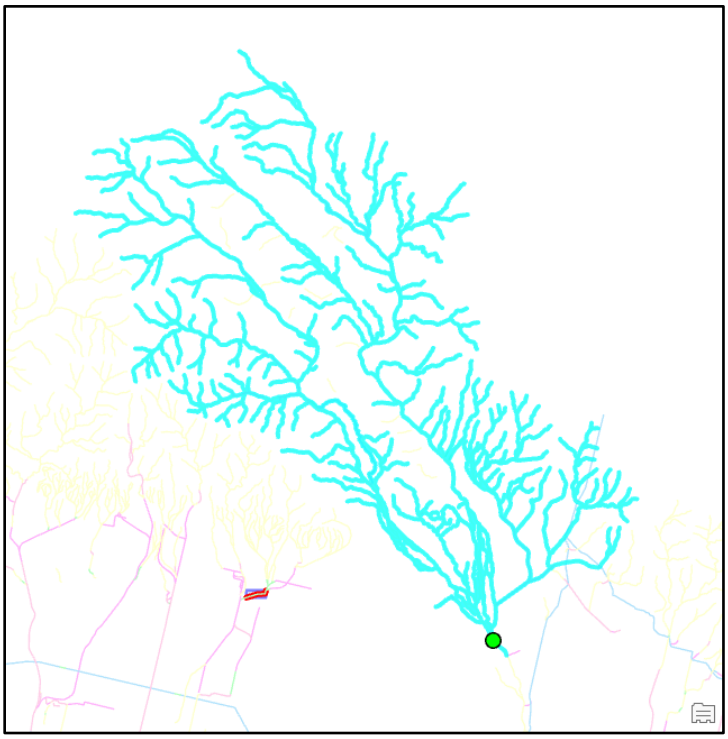
Creating a Network Diagram

Trace networks enable the building of network diagrams. Be aware of the following rules:

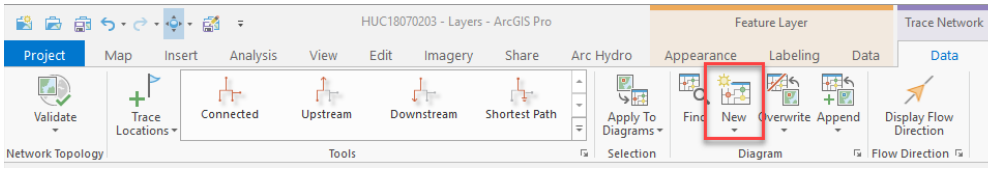
1. Diagrams are built from selected features in the network.
2. They cannot be built over dirty areas.

As an example, we will build a diagram from a trace result.

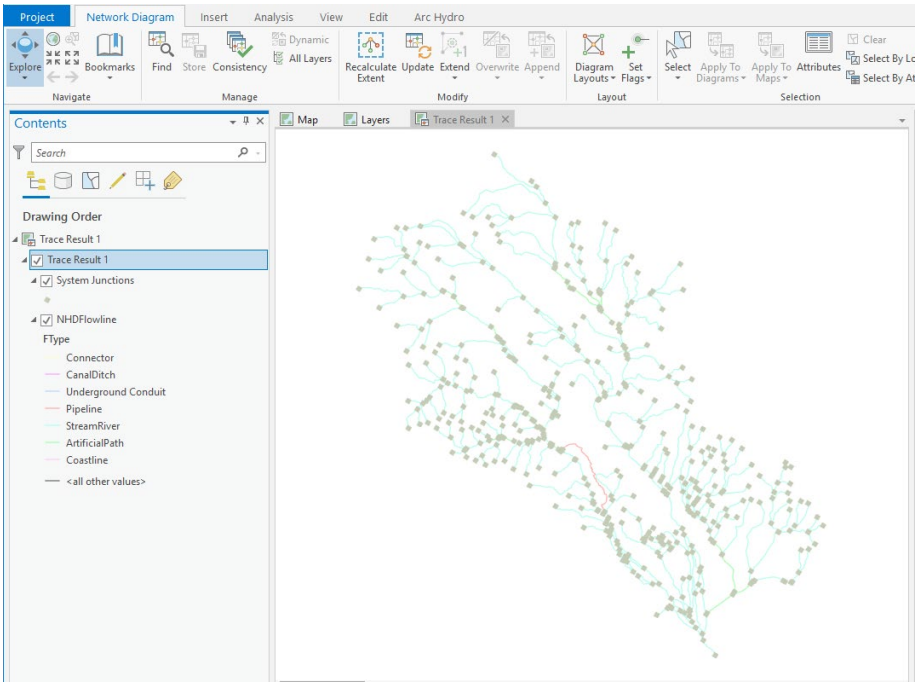
1. Select a point on the network and trace upstream. Make sure that the trace does not go over any dirty areas.



2. On the Trace Network ribbon, click New under the Diagram section and select Basic.



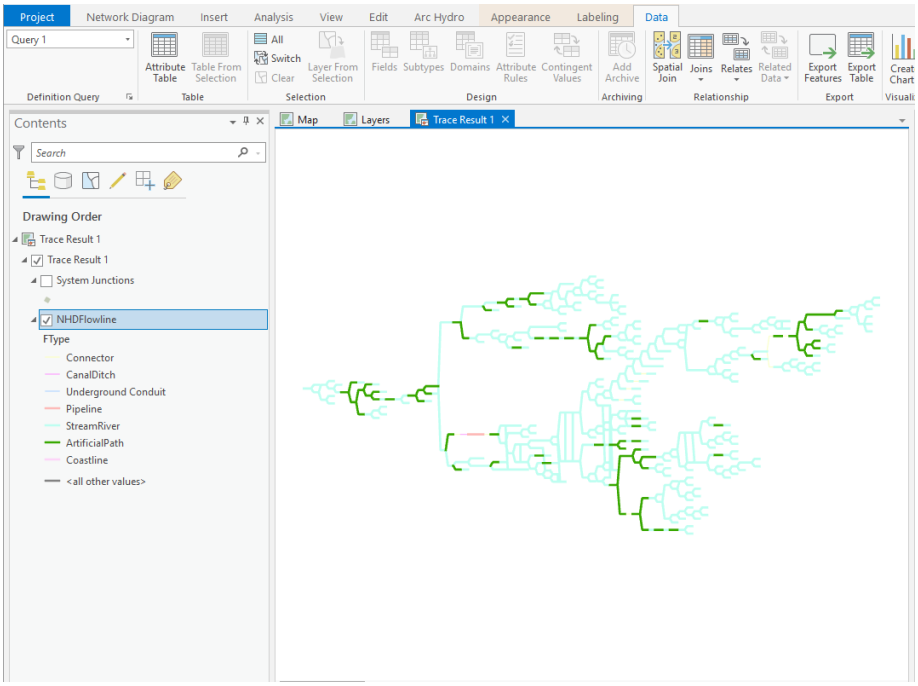
3. A new network diagram is created.
4. On the Network Diagram ribbon, click Store to store the diagram (give it a name, e.g., Trace Result 1).



5. On the Network Diagram ribbon, click Diagram Layouts and select Smart Tree.

    a. Accept the defaults for the geoprocessing tool and run it.

    b. The figure below shows the diagram with system junctions turned off for better visibility.



6. Review the diagram.

    a. Does it help with understanding the system morphology better than the geographic representation?

    b. Zoom in to see the detail.

7. Experiment with other types of diagram layouts.

8. Explore other capabilities of network diagrams.

Trace Network Observations Regarding Geometric Networks

To build, edit, and use trace network, you need standard or advanced licensing of ArcGIS Pro. All vertices in a line feature participating in a trace network are important, not just those vertices where edges and junctions participating in the network connect. This makes the "cleanliness" of the features more important in trace networks than it was for the geometric networks. Topology that was clean in the geometric network might not be clean in the trace network.

Trace networks have distinct management of topology (errors and dirty areas).

When building a trace network, do the following:

a. Create a trace network.

b. Optionally add and set network attributes.

c. Enable the network.

d. After making edits, validate the network.

You can ignore the errors in the trace network and perform tracing through errors, but the results might be incorrect.

By default, flow direction in edges will be set to digitized direction once the network topology has been enabled and validated.

Not all types of traces that were available in the geometric networks are available in trace networks.

Trace networks support richer tracing options than geometric networks (for those traces that are supported).

Trace networks support the generation of network diagrams.

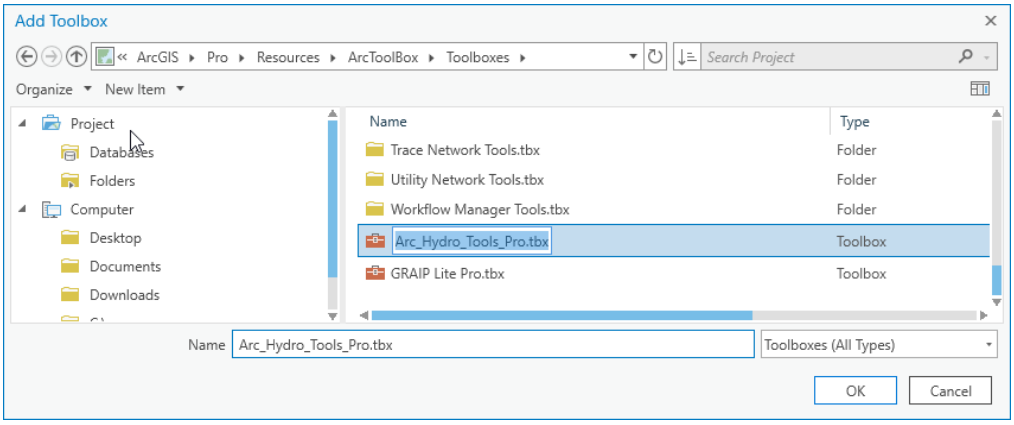
ArcGIS Pro Implementation Tips

This section presents a diverse collection of ArcGIS Pro workflows that are often used with Arc Hydro in ArcMap and can be confusing for first time ArcGIS Pro users.

Add Arc Hydro toolbox to the project toolboxes

After Arc Hydro tools are installed, both the Arc Hydro ribbon and toolbox (Arc Hydro Tools Pro) are available for use in ArcGIS Pro. The toolbox is accessible like any other toolbox in ArcGIS Pro, primarily via the Geoprocessing -> Toolboxes pane. If you want to add Arc Hydro toolbox to your project toolboxes, follow this procedure:

1. Go to the Catalog pane.
2. Right-click Toolboxes and select Add Toolbox.
3. Navigate to the location where the Arc Hydro toolbox has been installed (typically C:\Program Files\ArcGIS\Pro\Resources\ArcToolBox\Toolboxes) and select Arc_Hydro_Tools_Pro.tbx.



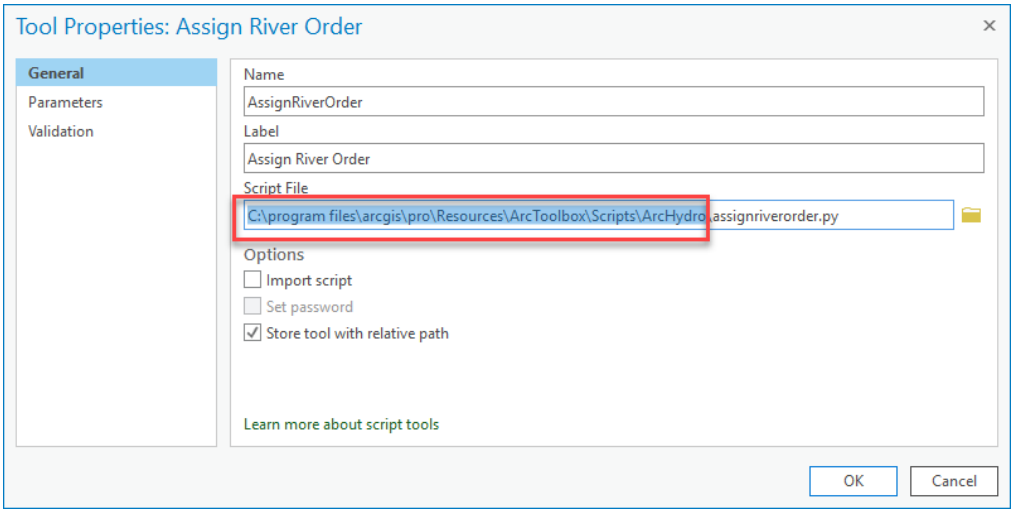
4. Click OK to add the toolbox to your collection of project toolboxes.

Once the Arc Hydro toolbox is in your project, you have full access to Arc Hydro tools for copying and editing (you cannot copy Arc Hydro tools directly from the Geoprocessing pane).

Editing Arc Hydro tools

Depending on your system privileges and how you started ArcGIS Pro, you might not be able to edit Arc Hydro tools directly in their native location (you need to be a system administrator to be able to do that). It is also not recommended to edit the tools directly but rather make a copy of them. To create a copy of an Arc Hydro tool, follow this procedure:

1. Add Arc Hydro toolbox to your project set of tools (see pg.26).
2. Navigate to and right-click the Arc Hydro tool you are interested in, then click Copy.
3. Navigate to the toolbox you want to place the tool in (e.g., your default project toolbox or any other toolbox you have edit privileges for), right-click on it, and select Paste.
    a. This will create a copy of the selected tool.
4. Right-click on the tool and select Properties.
    a. Notice that the source code for the tool is still pointing to the original source code for the Arc Hydro tool.
5. Right-click on the tool and select "Edit".
    a. In the text editor, click Save As and place the tool in the directory where you have **write** privileges. Note the location of the target directory. It is recommended that you change the name of the **Python file** to avoid any possible confusion on which version of the tool is being run (e.g., add your initials at the end of the file name).
6. Close the text editor.
7. Right-click on the tool and select Properties.
    a. Under General, change the location of Script File to point to the location and name where you saved the copy of the code (step 5a).
    b. It is recommended that you change the name of the **tool** to avoid any possible confusion on which version of the tool is being run (e.g., add your initials at the end of the tool name).



You have now created a copy of the Arc Hydro tool that you can edit any way you want without impacting the original tool.

Geoprocessing and other options

The Options pane is accessible through Project -> Options in the main ArcGIS Pro ribbon. The following are options of interest:

1. Current Settings
    a. Location of default geodatabase and toolbox.
2. Map and Scene
    a. Add layer
        i. Make newly added layers visible by default. Uncheck the check box if processing large datasets in batch operations.
3. Geoprocessing
    a. Allow geoprocessing tools to overwrite existing datasets. Check the check box.
    b. Add output datasets to an open map. Check the check box.
    c. Script editor—Point to your favorite script editor.
    d. Write geoprocessing operations to the XML log file. Check the check box if you are interested in reviewing the operations outside the ArcGIS Pro environment.
4. Display

a. Local cache—Note potentially large cache being stored. It might be worth clearing it from time to time.

5. User Interface (for all elements)

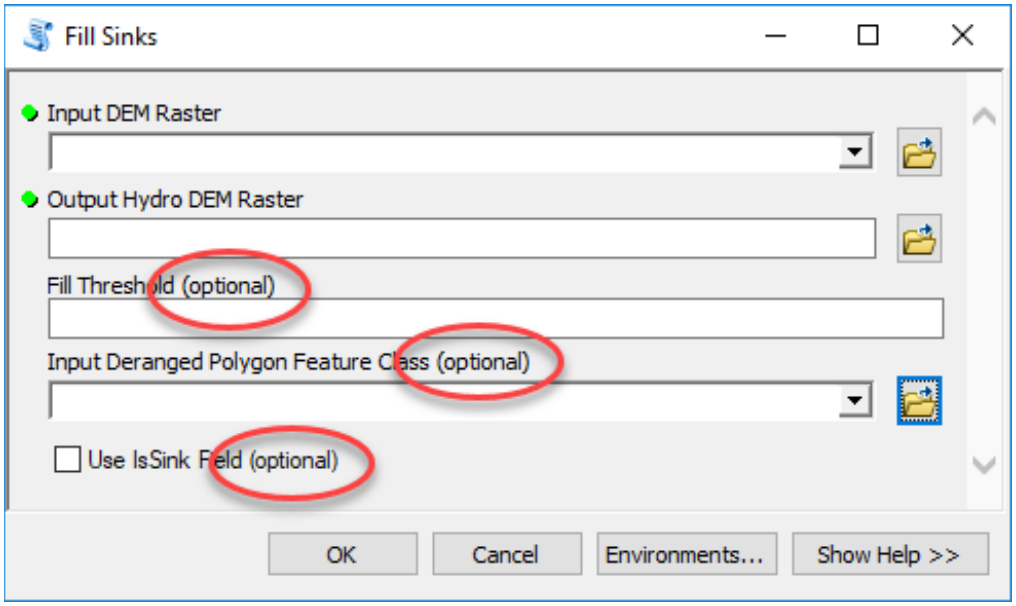
    a. Position of the first view opened in the project—You can control whether to place the window in the active map or separately.

6. Customize the Ribbon—Add commands to existing ribbon elements.

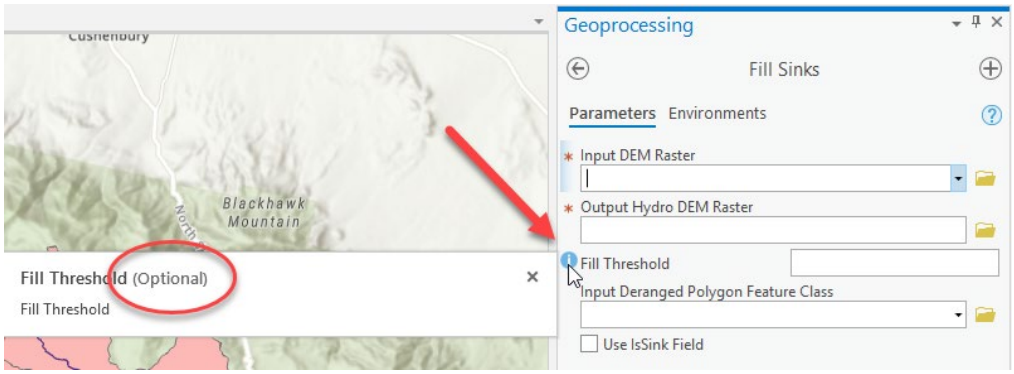
7. Quick Access Toolbar—Add commands to Quick Access Toolbar.

Required vs. optional inputs

In ArcMap, optional inputs for a geoprocessing tool would be identified as such on the geoprocessing form after the parameter name.



In ArcGIS Pro, you have to highlight the information about the parameter to see if the parameter is optional (hover over the "i" next to the parameter name).



Layer and feature class properties

In general, layer or feature class Properties in ArcGIS Pro work similarly in ArcMap. A notable difference is that to view an attribute list, you access it through Design -> Fields and not through Properties (when right-clicking on the layer [Contents] or feature class [Catalog]).

1. To set up a display field to be used for feature pop-up (identify), go to Layer Properties -> Display -> Display field.

2. To configure feature pop-up (identify), right-click on the layer in the Contents pane and select Configure Pop-ups. Very detailed configuration is possible.

Creating a hillshade/shaded relief

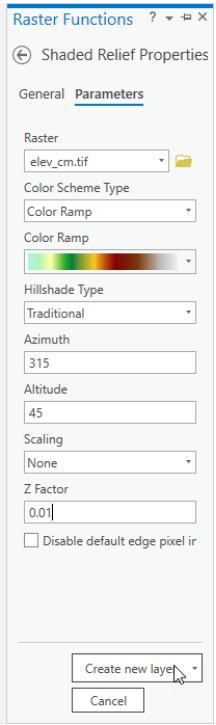
Creating a hillshade was one of the first operations when dealing with terrain processing in Arc Hydro in ArcMap. The easiest way was to use Image Analysis (under Windows in the main ArcMap interface) is to select the digital elevation model (DEM) in the list of rasters, and then click on the Shaded Relief icon. This would generate a temporary raster.

In ArcGIS Pro, the process is slightly different. First, if you are using a default basemap, it will include the World Topographic Map and World Hillshade. The World Hillshade might be good enough for quick visualization of the topography, and the development of explicit hillshade might not be needed.

If you need to create a hillshade (often if your DEM is more detailed than the one used for the World Hillshade, or if you have hydro-conditioned the DEM and want to see the impact), there are several ways of doing it.

The article "Create Amazing Hillshade Effects Quickly and Easily in ArcGIS Pro" presents one of the ways to do it.

The following steps follow the same pattern as the article (using a raster function instead of a geoprocessing function that creates a new raster) but generate a shaded relief instead of a hillshade.



1. Open the Raster Functions pane from Analysis on the main ArcGIS Pro ribbon.
2. Scroll to the bottom and expand the Surface functions and select the Shaded Relief option.
3. Set Raster to your DEM dataset.
4. Set Hillshade Type to Traditional or Multidirectional, as desired.
5. Set Scaling to None if you are making a map at a single map scale (such as a printed map), or select Adjusted if you are making a multiscale map (such as a web map).
6. Set Z Factor to a higher number to exaggerate the height variation in the terrain, or use it to convert the elevation units to the x,y linear units if they happen to be different. In this example, the factor is set to 0.01 since the vertical units of the DEM are in centimeters.
7. Click the Create new layer button at the bottom of the Raster Functions pane to create a new layer in the current map. Note that this creates a new display of the processed data—it is not a new raster dataset.

ArcGIS Pro for developers

While these tips are not directly Arc Hydro related, we find them useful when developing Arc Hydro projects.

Log file—It is useful to write geoprocessing operations to the XML log file (see pg.28) that will allow you to review the full report for each geoprocessing function. Note that the logs are stored in the %APPDATA%\ESRI\ArcGISPro\ArcToolbox\History directory. Also, these logs are verbose, and while not large, they can accumulate quite quickly, so it is recommended that during normal operations, this option is checked off.

Copy path—Getting a full path to a layer is often used when executing operations from a Python command line.

1. Click on the data element (feature class/table/raster/…) of interest in the Catalog pane.
    a. Note it must be the **Catalog** *not* Content pane.
2. Under Map in the main ArcGIS Pro ribbon, click Copy Path. This will place the full path to the data element onto the clipboard.

Notebooks—Jupyter notebooks are fully integrated into ArcGIS Pro 2.6 and higher. The article ArcGIS Notebooks in ArcGIS Pro (2.6) presents an overview of working with notebooks in ArcGIS Pro 2.6.

Jupyter notebooks can be very useful when developing and documenting new workflows.

Raster cell iterator—Raster cell iterator (RCI) allows you to access individual cells in a raster. RCI has been available since ArcGIS Pro 2.5. The article "Introducing the Raster Cell Iterator" presents an overview of working with RCI.

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