

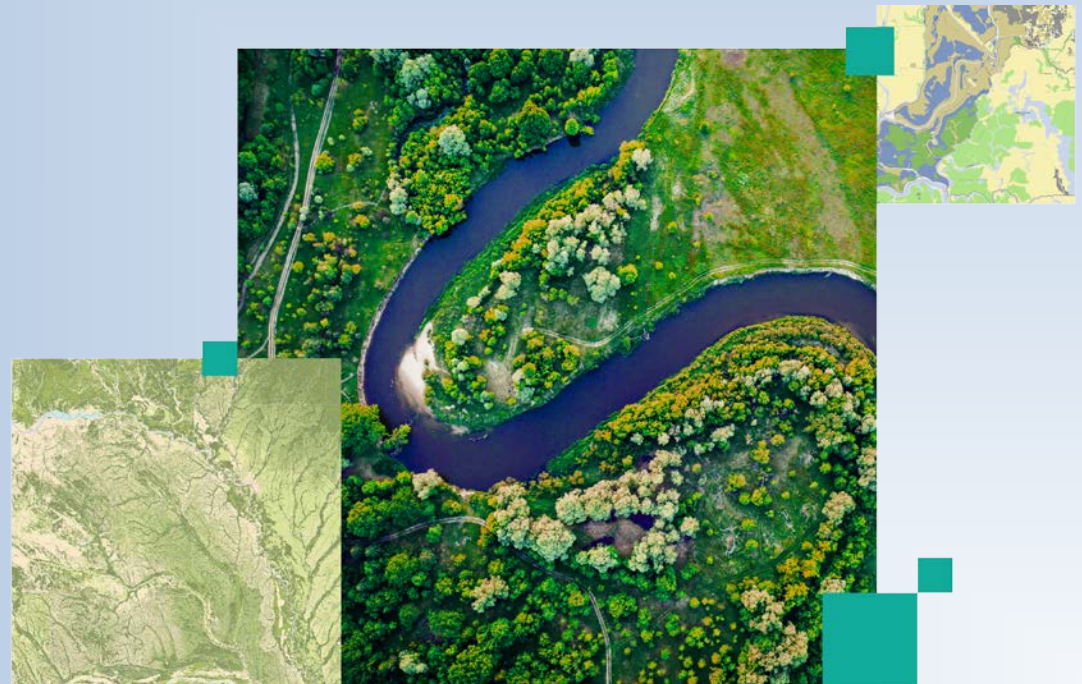
**CE-G0800 GIS in in Water Resources**  
Spring 2022

**Arc Hydro**  
**GIS for water resources**

By

Dr. Tarendra Lakhankar

- Arc Hydro consists of a data model, toolset, and workflows developed over the years to support specific GIS implementations in water resources.
- It operates on both ArcGIS 10.x and ArcGIS Pro, offering the latest in innovation in GIS to help you create a deeper understanding of your hydro data.
- Arc Hydro helps you build a foundational dataset that can be used in water resource analyses and for integration with water resource models.
- It standardizes water data structures so that data can be used consistently and efficiently to solve a wider range of water resource problems at any scale—regional, national, or international.

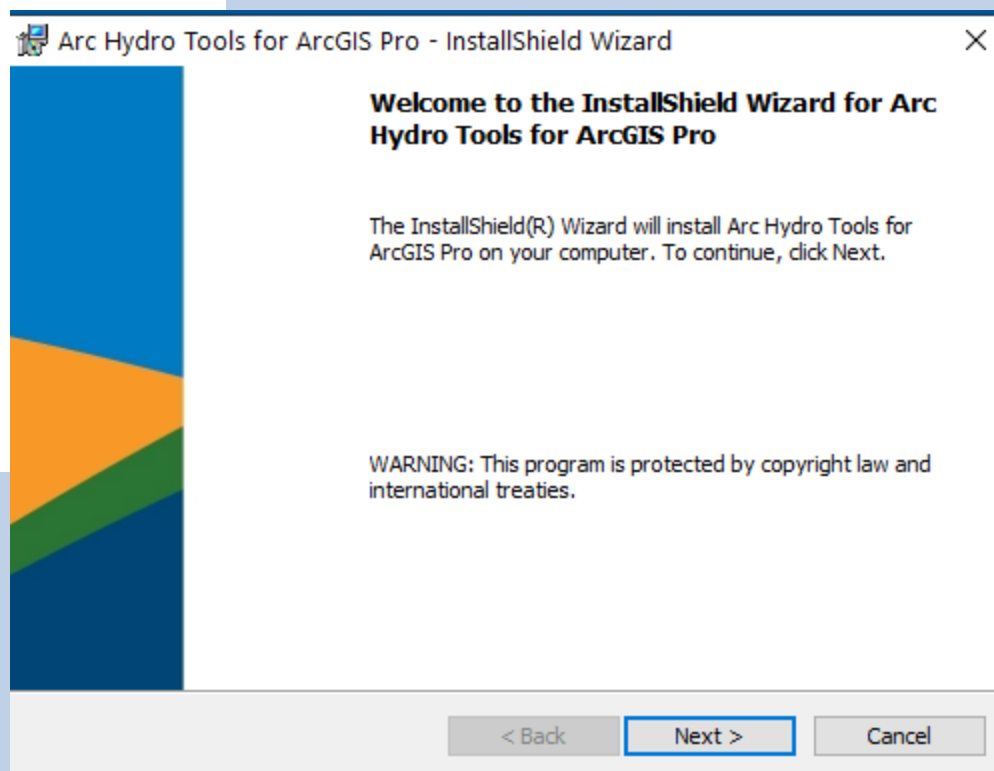


- <https://www.esri.com/content/dam/esrisites/en-us/media/fliers/downloading-arc-hydro-2021.pdf>

yellow.esri.com - /ArcHydro/ArcHydro/Setup/Pro/

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# Arc-Hydro Tools


The screenshot displays the ArcGIS Pro interface with the following components:

- Project Name:** MyProject10 - Map - ArcGIS Pro
- Ribbon:** Project | Map | Insert | Analysis | View | Edit | Imagery | Share | Arc Hydro
- Arc Hydro Tools:** Point Delineation, Flow Path Tracing, Stormwater Delineation
- Contents Panel:** Search, Drawing Order (Map, Topographic)
- Geoprocessing Panel:** Find Tools, Favorites, Toolboxes, Portal
  - 3D Analyst Tools
  - Analysis tools
  - Arc Hydro Tools Pro**
    - Attribute Tools
    - Critical Duration
    - GIS Data Exchange
    - H & H Modeling
    - Network Tools
    - Point Characterization
    - Terrain Morphology
    - Terrain Preprocessing
    - Terrain Preprocessing Workflows
    - Utility
    - Watershed Processing
    - Wetland Identification

<b>Task</b>	<b>ArcMap</b>	<b>ArcGIS Pro</b>
<b>HydroID management</b>	Editor extension for HydroID management of new features	Explicit management of HydroID for new features
<b>Layer management</b>	Via tags	None—via default names
<b>Tracing</b>	Geometric network	Trace network
<b>Toolbar</b>	ArcMap toolbar (extensive)	ArcGIS Pro ribbon (minimal)
<b>Toolbox</b>	Mix of Python, ModelBuilder™, and .NET tools	Mix of Python and ModelBuilder tools
<b>Tool configuration</b>	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*

<https://community.esri.com/t5/water-resources/ct-p/water-resources>

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In this post, you will find resources that were shared in part two of the Getting Started with Arc Hydro webinar seri...

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# ArcHydro: HW2 Watershed Delineation

- Add DEM data in map
- Terrain processing
  - DEM Manipulation Toolbox
  - Fill Sinks (Input: DEM Output: Fil)
  - Flow Direction (Input: Fil Output: Fdr)
  - Flow Accumulation (Input: Fdr, Output: Fac)
  - Stream Definition (Input: Fac Output: Str)
  - Stream Segmentation (Input: Fdr, Str Output: StrLnk)
  - Catchment Grid Delineation (Input: Fdr, StrLnk, Output: Cat)
  - Catchment Polygon Processing (Input: Cat, Output: Catchment)
  - Drainage Line Processing (Input: StrLnk, Fdr, Output: DrainageLine)
  - Adjoint the catchment Processing (Input: DrainLine, Catchment, Output: AdCatch)
  - Point Delineation (Input: Fdr, Str, DrainageLine, Catchment, AdCatch, Out: Watershed) (Select point location on stream)
- Geoprocessing
  - Clip watershed (Drainage line and wshpoly)

# Resources for ArcHydro

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- <https://www.esri.com/content/dam/esrisites/en-us/media/technical-papers/archydro-arcmap-arcgis-pro-tips-and-tricks.pdf>
- <https://www.esri.com/en-us/industries/blog/articles/new-geonet-water-resources-arc-hydro/>

Exercise:

- [https://www.youtube.com/watch?v=Mx8six5LwLk&ab\\_channel=EsriIndustries](https://www.youtube.com/watch?v=Mx8six5LwLk&ab_channel=EsriIndustries)



# Wetland Identification Model

- <http://downloads.esri.com/ARCHYDRO/ArcHydro/Doc/Arc%20Hydro%20-%20Wetland%20Identification%20Model.pdf>



# Introduction Model Builder

The screenshot displays the ArcGIS Model Builder interface. The main workspace shows a workflow diagram with three steps: 'smdem\_raw' (blue oval), 'Fill Sinks' (yellow rounded rectangle), and 'Fill' (green oval), connected by arrows. The left pane shows the 'Contents' window with a 'Drawing Order' list including 'Map', 'wshpnt', 'Point\_Delineator\_Input\_Batch\_Point\_I', 'DrainageLine\_Clip', 'DrainageLine', 'wshpoly', 'AdjointCatchment', 'Catchment', 'Cat', 'StrLnk', 'Str', 'Fac', and 'Fdr'. The right pane shows the 'Geoprocessing' window with a list of tools, including 'Fill', 'Fill Gaps', 'Fill Sinks', 'Fill Missing Values', 'Cut Fill', and 'Zonal Fill'. The 'Fill Sinks' tool is highlighted in blue. The top menu bar includes 'Project', 'ModelBuilder', 'Insert', 'Analysis', 'View', 'Share', and 'Arc Hydro'. The title bar reads 'MyProject10 - ModelDel - ArcGIS Pro'.

```
graph LR; A(smdem_raw) --> B(Fill Sinks); B --> C(Fill);
```

**Geoprocessing Tools:**

- Fill** (Spatial Analyst Tools): Fills sinks in a surface raster to remove small imperfections in the data.
- Fill Gaps** (Topographic Production Tools): Fills gaps between polygon features that participate in a topology where the coincident boundaries are evident.
- Fill Sinks** (arcpyhydropro): Fill sinks in input DEM. (Selected)
- Fill Missing Values** (Space Time Pattern Mining Tools): Replaces missing (null) values with estimated values based on spatial neighbors, space-time neighbors, time-series, or glob...
- Cut Fill** (3D Analyst Tools): Calculates the volume change between two surfaces. This is typically used for cut and fill operations.
- Cut Fill** (Spatial Analyst Tools): Calculates the volume change between two surfaces. This is typically used for cut and fill operations.
- Zonal Fill** (Spatial Analyst Tools): Fills zones using the minimum cell value from a weight raster along the zone boundary.
- Align Marker To Stroke Or Fill** (Cartography Tools): Aligns the marker symbol layers of a point feature class to the nearest stroke or fill symbol layers in a line or polygon featu...

