
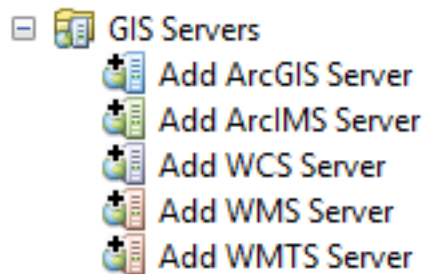


Instructions on Using WATERS Geoviewer Geoprocessing Services in ArcMap

There are two supported Geoprocessing (GP) services in production: The Drainage Area Delineation Tool and the Upstream/Downstream Search Tool. The following is a step-by-step guide to adding and using these two tools in ArcMap.

Part 1: Adding the Services

1. Open a new blank .mxd document in ArcMap
2. Add a base map for reference using the dropdown menu next to the Add Data button
3. Zoom to the area of interest
4. Open the Catalog side panel and click the plus () icon next to the **GIS Servers** folder to expand it
5. Double click on **Add ArcGIS Server**



6. Select **Use GIS services** and click **Next**
7. Under **Server URL** enter <https://inlandwaters.geoplatform.gov/arcgis>
Note: Make sure it starts with https since it is a secure server

General ✕

Server URL:
ArcGIS Server: http://gissserver.domain.com:6080/arcgis

Authentication (Optional)

User Name:

Password:

Save Username/Password

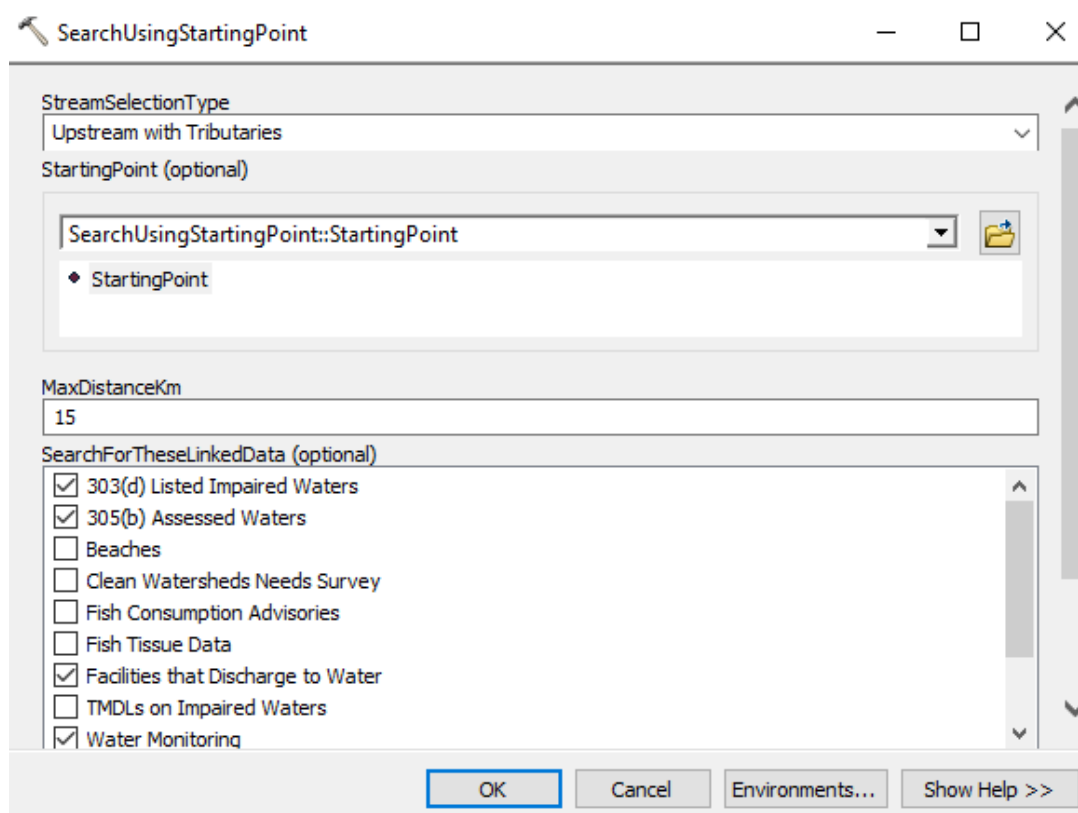
[About ArcGIS Server connections](#)

8. Click **Finish**

Part 2: Running the Upstream/Downstream Search

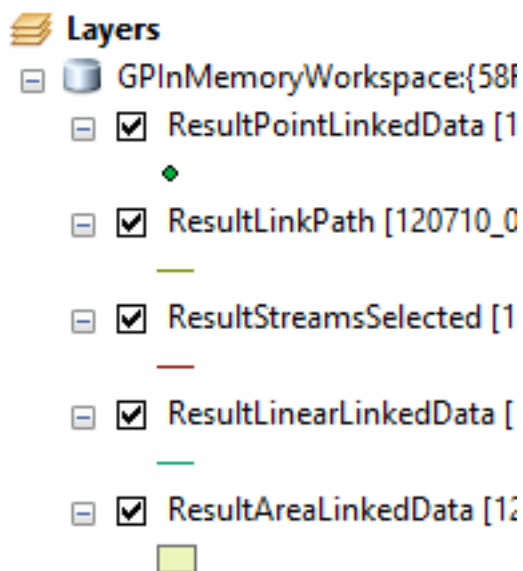
The Upstream/Downstream Search tool allows the user to select a starting point and a distance to travel upstream or downstream based on those settings. The tool also allows the user to select data from various datasets that are linked to the selected network path such as impaired waters, permitted facilities, monitoring stations, and more. This is useful for various use cases such as locating permitted facilities upstream of impaired waters, or locating monitoring stations on assessed waters.

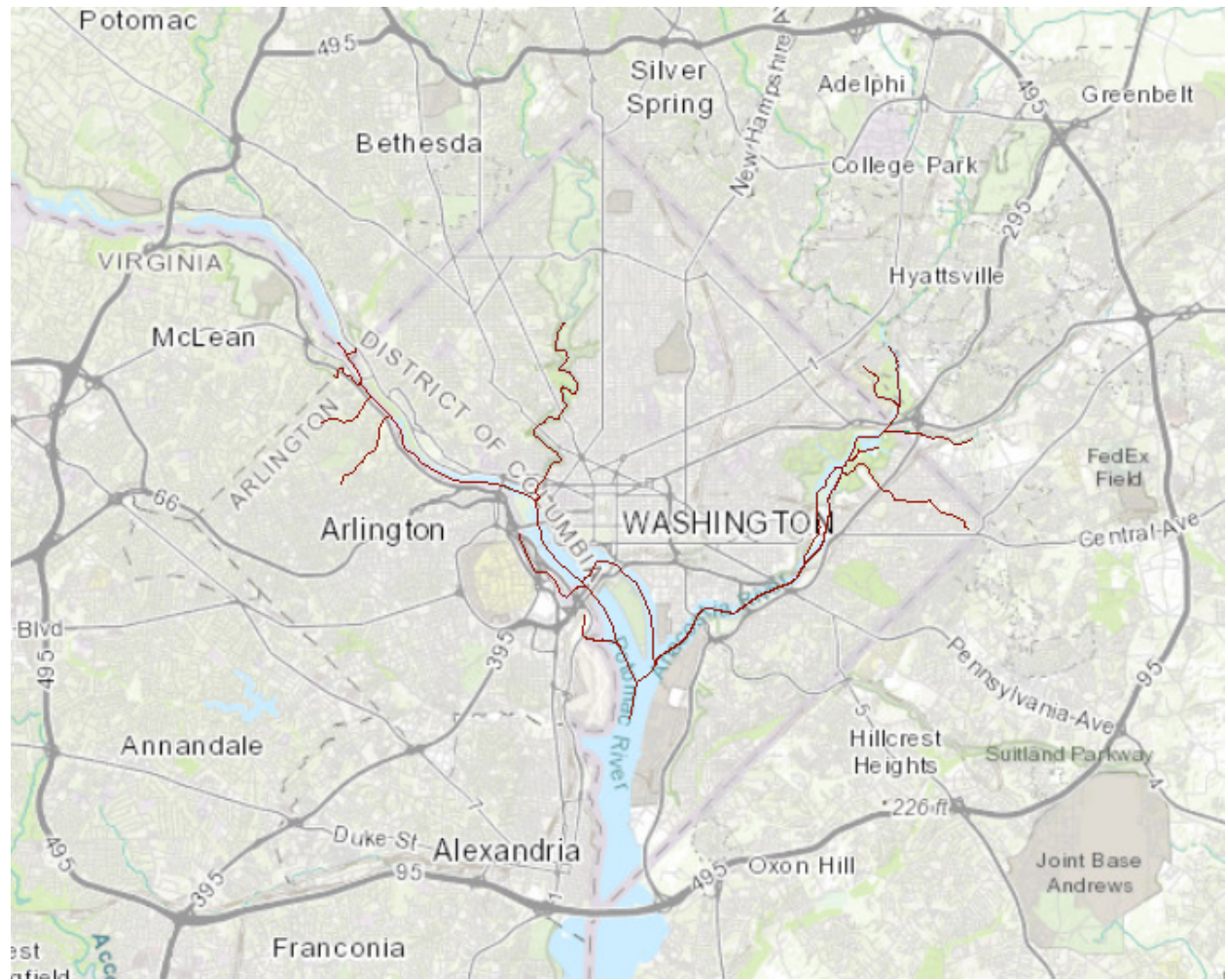
9. Navigate to the Catalog again. Notice that it added a new connection under the **GIS Servers** folder called **arcgis on inlandwaters.geoplatform.gov**
10. Click the plus (**+**) icon next to the new server to expand the view
11. Expand the folder named **WATERS_SERVICES**
12. Let's first look at using the Upstream/Downstream Search tool, use the plus (**+**) icon to expand the toolbox called **GeoplatformUpstreamDownstreamSearch**, and double click on the tool named **SearchUsingStartingPoint**.
13. In the resulting dialog box choose your desired stream selection type (upstream, downstream, upstream with tributaries, etc.) under the field labeled **StreamSelectionType**. In this case, choose **Upstream with Tributaries**
14. Choose **DelineateUsingStartingPoint::StartingPoint**. This puts you into an edit session where you create a new point layer called "Starting Point" to start your upstream navigation from.
15. Choose a maximum distance under **MaxDistanceKm**, in this case, we will enter **15**
16. The **SearchForTheseLinkedData** field allows you to choose which linked data you would like to select as part of your upstream or downstream search. In this case select **303(d) Listed Impaired Waters**, **305(b) Assessed Waters**, **Facilities that Discharge to Water**, and **Water Monitoring**



17. Click on your desired location on the base map to create the starting point
18. Click **OK**. The tool might take a moment to run for large watersheds.
19. You will notice that five new layers have been added to your map. These layers are stored in ArcMap's scratch geodatabase.
 - **ResultPointLinkedData** is where the selected point linked data can be found. In this demo, the two types of point data selected were permitted facilities and monitoring stations. Both of these show up on the map, opening the attribute table or using the identify tool can help you see which ones are permitted facilities and which ones are monitoring stations.
 - **ResultLinkPath** is a single line going between your starting point and the flow line network. It uses a rain drop method to get to the network.
 - **ResultsStreamSelected** are the NHDPlus flow lines included in your upstream search from your starting point to the maximum distance set when you ran the tool. If you had chosen a downstream option, this would be the NHDPlus flow lines downstream of your selected point until the it reached the maximum distance chosen.
 - **ResultLinearLinkedData** is where the selected linear linked data can be found. In this demo, the two types of linear data selected were 303(d) listed waters and 305(b) assessed waters. Both of these types of waters show up on the map, opening the attribute table or using the identify tool can help you see which ones are 303(d) waters, which ones are 305(b) waters, and which ones are both. A water that is both 303(d) and 305(b) will have two records: One for each program.
 - **ResultAreaLinkedData**, which is the where the selected area linked data can be found. If none of the layers that were selected when we ran the tool were polygons, this layer is empty.

Note: Running the tool multiple times will give you multiple layers with the same name, but with a new time and date stamp at the end (formatted as [HHMMSS_MMDDYYYY])





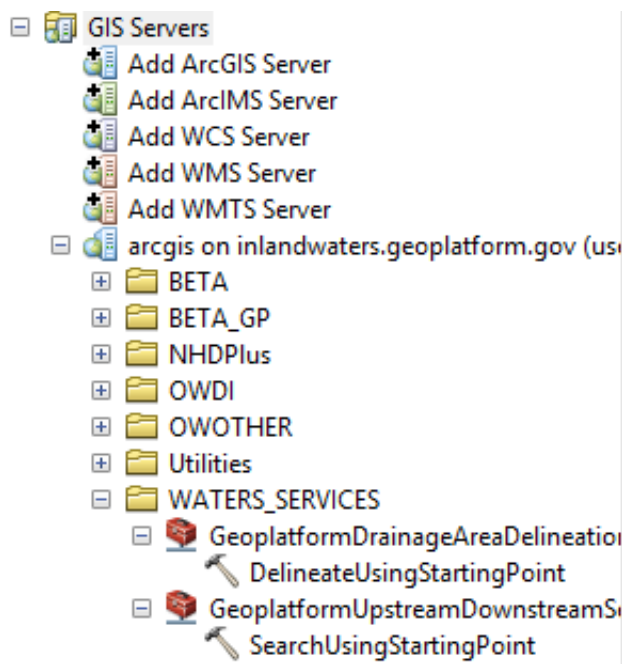
ReachSMDate	FMeasure	TMeasure	EventType Code	EventType	Event_Permanent_Identifier	Source_Originator	Source_FeatureID
2/21/2001	0	100	10001	303(d) Listed Impaired Waters	{07331C0E-57B5-1A1A-E053-0100007FC072}	DC	DCAKL00L_00
2/21/2001	0	100	10002	305(b) Assessed Waters	{07331C0D-0318-1A1A-E053-0100007FC072}	DC	DCAKL00L_00
2/21/2001	0	6.29708	10001	303(d) Listed Impaired Waters	{07331C0E-57B6-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	12.25148	12.51918	10001	303(d) Listed Impaired Waters	{07331C0E-57B6-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	50.72768	77.58614	10001	303(d) Listed Impaired Waters	{07331C0E-57B6-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	6.29708	12.25148	10001	303(d) Listed Impaired Waters	{07331C0E-57B6-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	12.51918	50.72768	10001	303(d) Listed Impaired Waters	{07331C0E-57B6-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	0	6.29708	10002	305(b) Assessed Waters	{07331C0D-0319-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	6.29708	12.25148	10002	305(b) Assessed Waters	{07331C0D-0319-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	12.25148	12.51918	10002	305(b) Assessed Waters	{07331C0D-0319-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	50.72768	77.58614	10002	305(b) Assessed Waters	{07331C0D-0319-1A1A-E053-0100007FC072}	DC	DCANA00E_01
2/21/2001	12.51918	50.72768	10002	305(b) Assessed Waters	{07331C0D-0319-1A1A-E053-0100007FC072}	DC	DCANA00E_01
8/13/1999	0	100	10001	303(d) Listed Impaired Waters	{07331C0E-57B7-1A1A-E053-0100007FC072}	DC	DCANA00E_02
8/13/1999	0	100	10001	303(d) Listed Impaired Waters	{07331C0E-57B9-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	0	100	10001	303(d) Listed Impaired Waters	{07331C0E-57BA-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	77.58614	100	10001	303(d) Listed Impaired Waters	{07331C0E-57BC-1A1A-E053-0100007FC072}	DC	DCANA00E_02
8/13/1999	0	100	10001	303(d) Listed Impaired Waters	{07331C0E-57BD-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	0	6.26638	10001	303(d) Listed Impaired Waters	{07331C0E-57B8-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	36.96508	100	10001	303(d) Listed Impaired Waters	{07331C0E-57B8-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	68.90848	100	10001	303(d) Listed Impaired Waters	{07331C0E-57BB-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	0	68.90848	10001	303(d) Listed Impaired Waters	{07331C0E-57BB-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	6.26638	36.96508	10001	303(d) Listed Impaired Waters	{07331C0E-57B8-1A1A-E053-0100007FC072}	DC	DCANA00E_02
8/13/1999	0	100	10002	305(b) Assessed Waters	{07331C0D-031A-1A1A-E053-0100007FC072}	DC	DCANA00E_02
2/21/2001	0	100	10002	305(b) Assessed Waters	{07331C0D-031D-1A1A-E053-0100007FC072}	DC	DCANA00E_02
8/13/1999	0	100	10002	305(b) Assessed Waters	{07331C0D-031C-1A1A-E053-0100007FC072}	DC	DCANA00E_02

This is an example attribute table from the **ResultLinearLinkedData** layer, notice that the **EventType** field identifies some assessment units as 303(d) and some as 305(b). Also, notice that some assessment unit IDs under the **Source_FeatureID** field show up twice because they are both 305(b) assessed waters and 303(d) impaired waters.

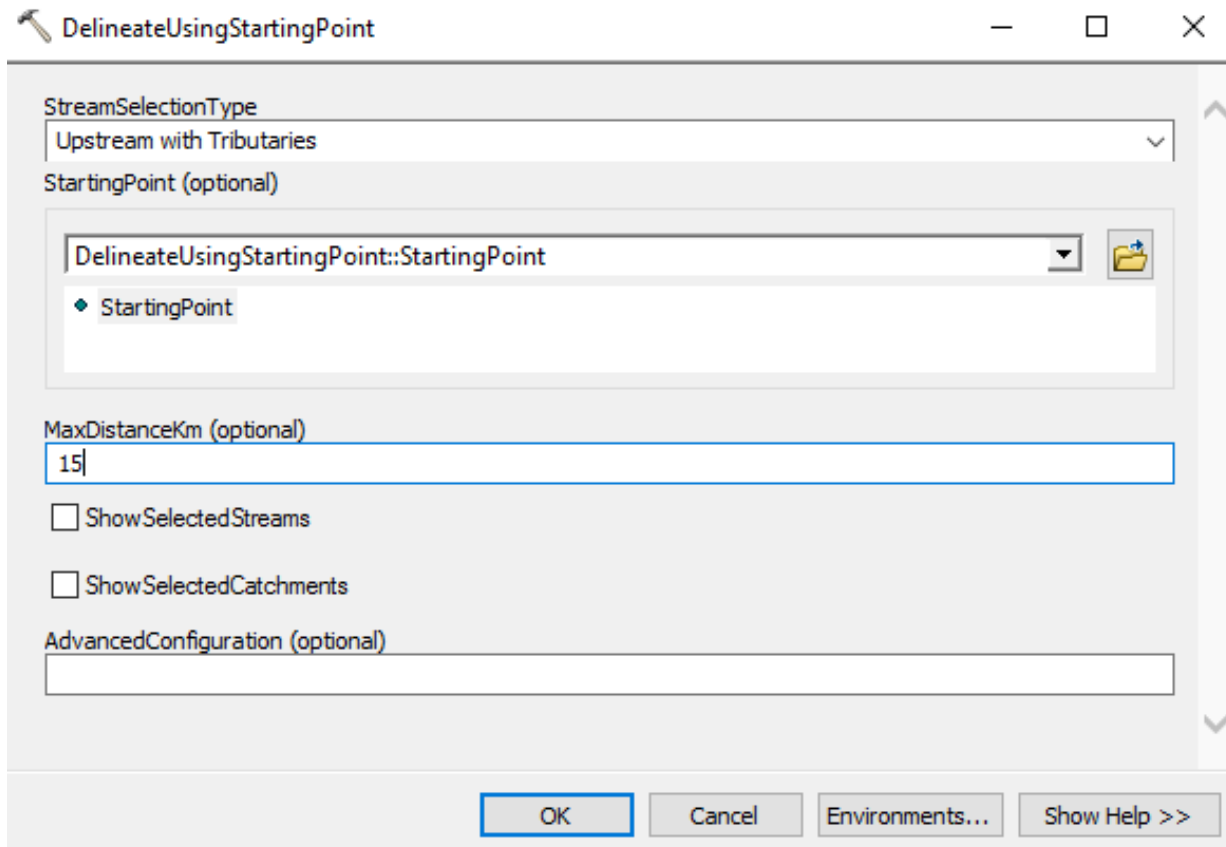
Part 3: Running the Drainage Area Delineation

The Drainage Area Delineation tool allows a user to pick a point and delineate the upstream or downstream drainage basin based upon the options chosen. This tool can also show the streams and catchments contained in the drainage area of interest if those options are turned on. One use case is determining what land area is present upstream of an impaired water.

20. Open the Catalog sidebar and expand the toolbox labeled **GeoplatformDrainageAreaDelineation** and double click on the tool named **DelineateUsingStartingPoint**.



21. In the resulting dialog box choose your desired navigation type (upstream, downstream, upstream with tributaries, etc.) under the field labeled **StreamSelectionType**. In this case, choose **Upstream with Tributaries**
22. Choose **DelineateUsingStartingPoint::StartingPoint**. This puts you into an edit session where you create a new point layer called “Starting Point” to start your upstream navigation from.
23. Choose a maximum distance under **MaxDistanceKm**, in this case, we will enter **15**



24. Click on your desired location on the base map to create the starting point. Note: Zooming the map window with the tool dialog open may cause the tool to not work.
25. Click **OK**. The tool might take a moment to run for large watersheds.
26. You will notice that four new layers have been added to your map. These layers are stored in ArcMap’s scratch geodatabase.
 - **ResultLinkPath** is a single line going between your starting point and the flow line network. It uses a rain drop method to get to the network.
 - **ResultStreamsSelected** and **ResultCatchmentsSelected** are two layers that would contain the streams and catchments selected by the tool if those options were turned on when you ran the tool. They were not turned on in this demo, so the resulting layers are empty.

- **ResultDelineatedArea** is a polygon representing the upstream drainage basin that was delineated by the tool up to the maximum distance that was set when the tool was run. Setting a maximum distance gets you only the watershed up to that distance instead of the whole thing. This is done to improve the performance of the tool.

Layers

- GPInMemoryWorkspace:{1E99
- ResultLinkPath [104616_05]
- ResultStreamsSelected [104
- ResultCatchmentsSelected
- ResultDelineatedArea [104
- World Topographic Map

