

Tracing the Drop in ArcGIS Online

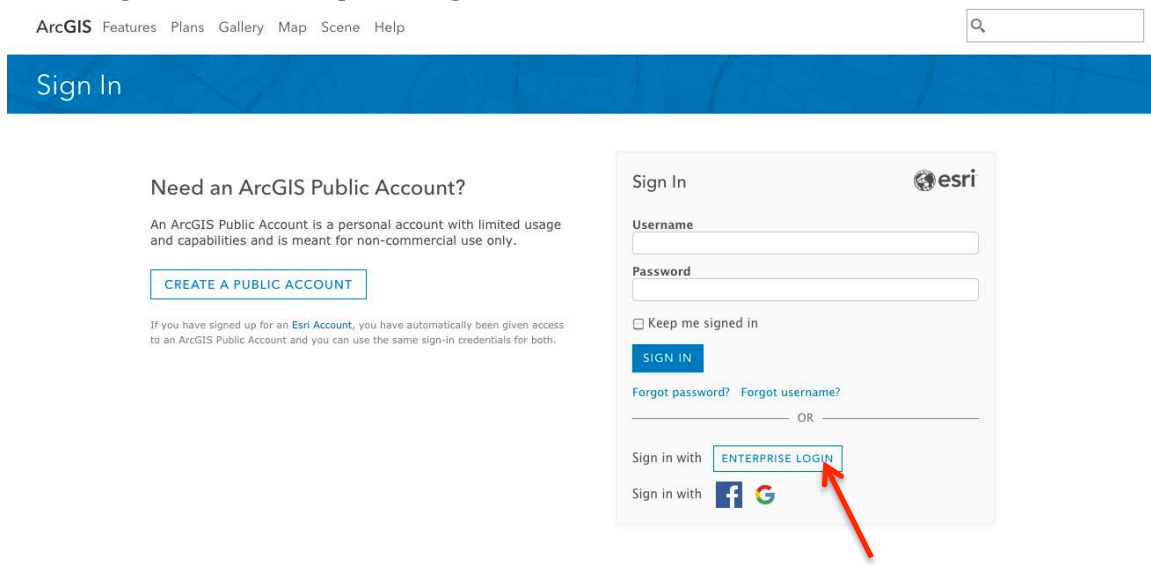
by Andrea Ludwig, Associate Professor, Biosystems Engineering & Soil Science, University of Tennessee

This tutorial is for Tennessee 4-H Agents interested in using the “Trace the Drop” feature in ArcGIS Online.

Introduction: We are all connected by water as individuals and as members of communities. We are all either upstream or downstream from someone else, and in most cases, both. There now exists technology that allows us to trace a drop of rainwater runoff from the any location on the Earth’s surface (e.g. your school’s roof or parking lot) to the ocean using a geographic information system (GIS) that includes topographic elevation information. This tool is a powerful demonstration of how everything is connected by water and is an excellent technology supplement to curriculum on the water cycle, watersheds, or using maps.

You must have an internet connection and a University of Tennessee NetID and password to complete this tutorial. Here are step-by-step instructions to execute the “Trace the Drop” feature:

1. Access ArcGIS online at www.arcgis.com.
2. Click “Sign In” in the upper right corner.
3. Click “Sign in with Enterprise Login”



4. Type “myutk” into the sign in box so that url reads “myutk.maps.arcgis.com” and click Continue.

Sign In

Need an ArcGIS Public Account?

An ArcGIS Public Account is a personal account with limited usage and capabilities and is meant for non-commercial use only.

[CREATE A PUBLIC ACCOUNT](#)

If you have signed up for an [Esri Account](#), you have automatically been given access to an ArcGIS Public Account and you can use the same sign-in credentials for both.

Sign In



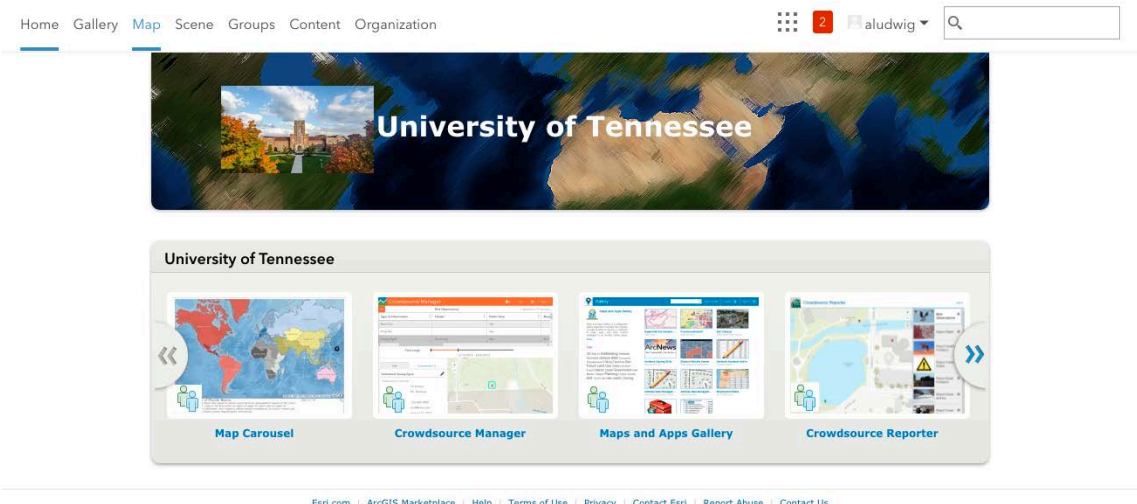
Enter your ArcGIS organization's URL below.

.maps.arcgis.com

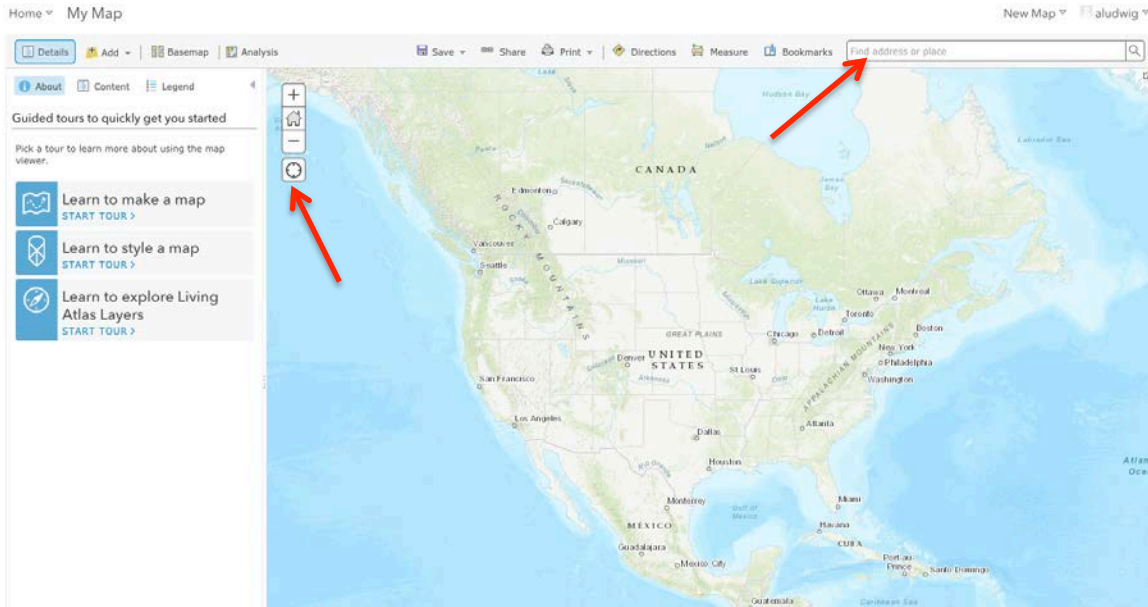
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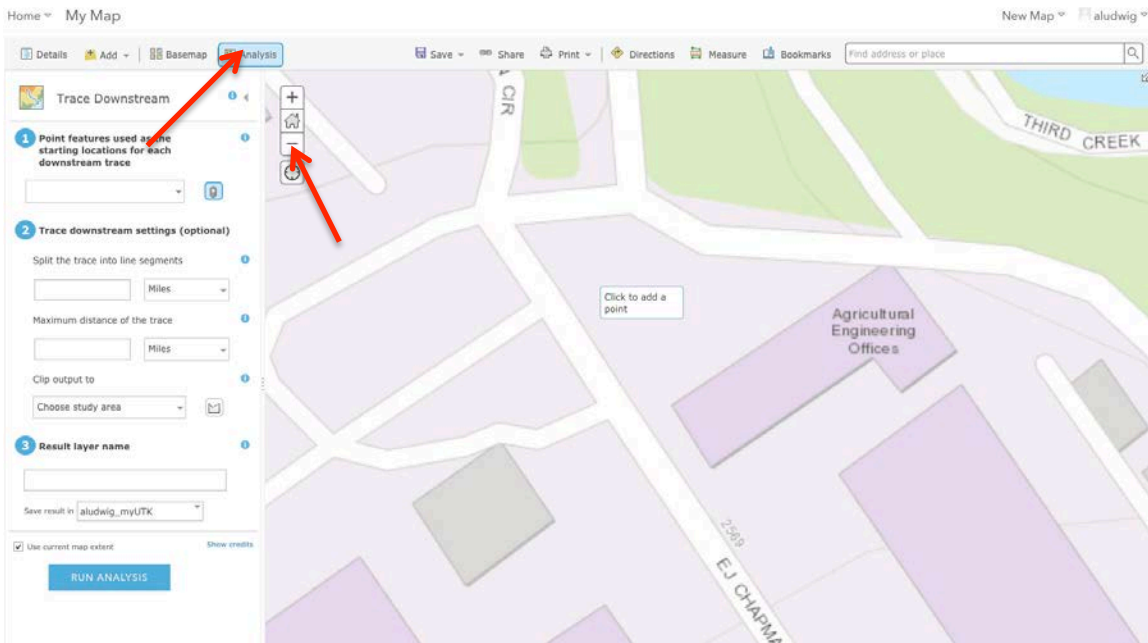
5. Sign in to University of Tennessee by clicking the “University of Tennessee” blue box; you will be automatically directed to UT Central Authentication Service.
6. Enter your NetID and Password and click Login; this will take you to the University of Tennessee ArcGIS home screen. You should see your NetID in the upper right corner of the site.



7. Click the “Map” tab to create a new map.
8. Enter in the address of the location you wish to use, or if that is your current location, then use the “Find my location” button to find your current location. If you use the “Find my location” button,” then you may be asked to share your location with the site.

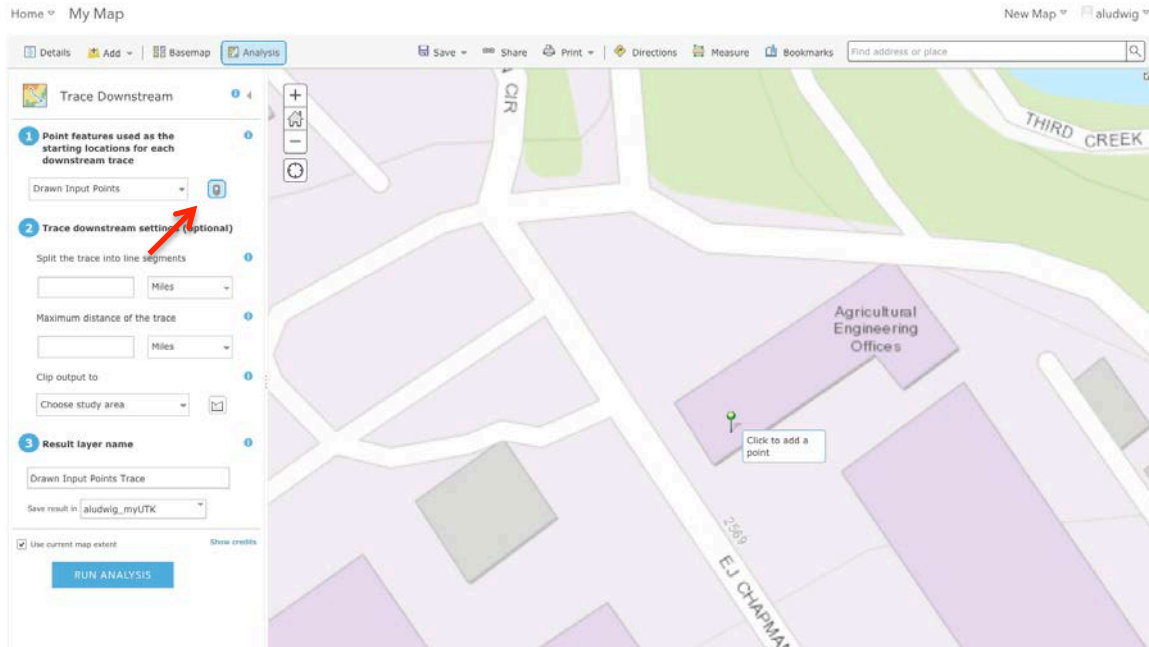


9. Zoom out using the “-” sign until the location can be confirmed as correct.
10. Click the “Analysis” button in the toolbar. Click “Find Locations” to expand the tool options. “Trace Downstream” is the last option in the list. Click it.

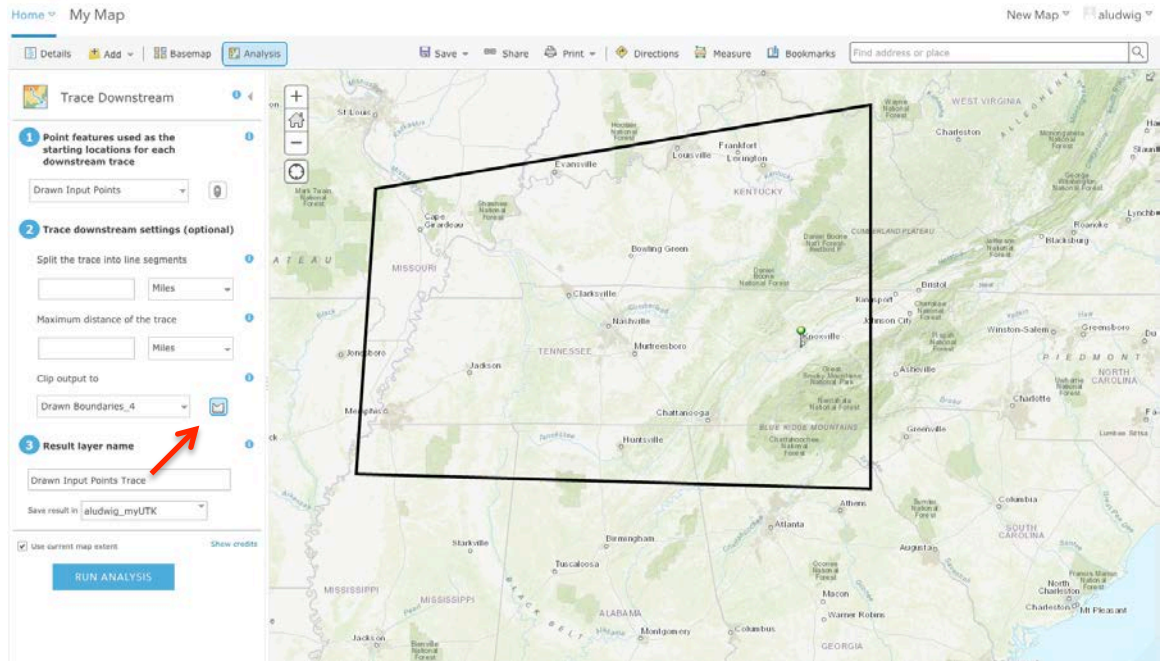


11. Notice there are three steps in this analysis:
 - a. 1) Point features used as the starting location.
 - i. To select a starting location using your mouse, click the draw icon to the right of the drop down box. Move your cursor over the map and to the intended starting location for your trace; notice your cursor is instructing you to “Click to add a point.”

- ii. Click the map at the starting location to add a point. A pin now designates the starting location.



- b. 2) Trace downstream settings.
 - i. To split the trace line into segments, enter the value and length unit desired. Leave blank to default to no splitting.
 - ii. To trace downstream to a predetermined distance, enter the value and length unit (i.e. to trace a drop 100 miles downstream, enter "100" and select "Miles" from the unit drop down menu). Leave blank to default to no distance limit.
 - iii. To select a study area boundary (e.g. a limit as to how far downstream to trace the drop), click the draw icon to the right of the box. Move the cursor over the map and draw a polygon around the area of interest. Click to designate a point along the perimeter and double click to complete the polygon. Press escape to cancel.



c. 3) Result layer name.

- i. The resulting layer of data will be saved automatically in your directory. Give the layer a unique name by typing it into the box.

12. Notice at the bottom of the toolbox, there is a checkbox for “Use current map extent” and that the default is that this box is checked. Uncheck this box if you wish for the analysis to result in a trace that extends beyond the boundary of the current map extent (e.g. the ocean).

13. Click “Run Analysis.” A blue line will appear on the map; this is the trace. If trace line was split into segments, then the segments are labeled and the total trace distance is indicated at the end of the line. This line is held in a layer that is now included on the map and can be turned on or off in the “Content” tab.

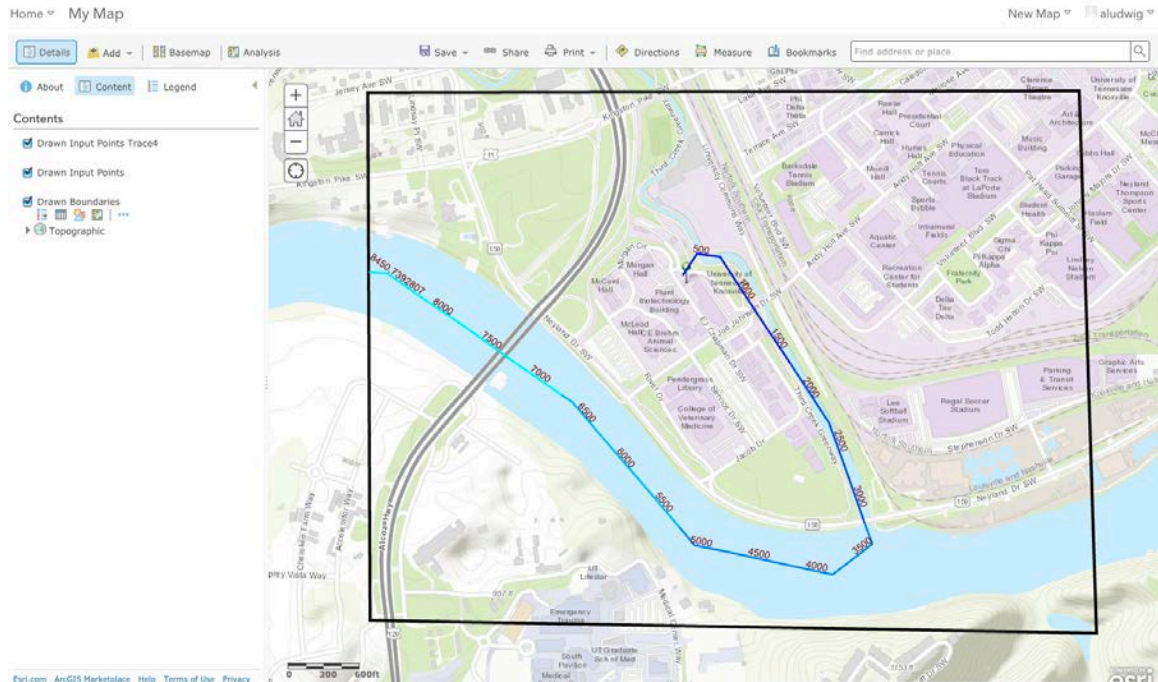


Figure 1. Example trace split using 100-foot segments and a drawn boundary, which ended the trace just below the closest bridge.

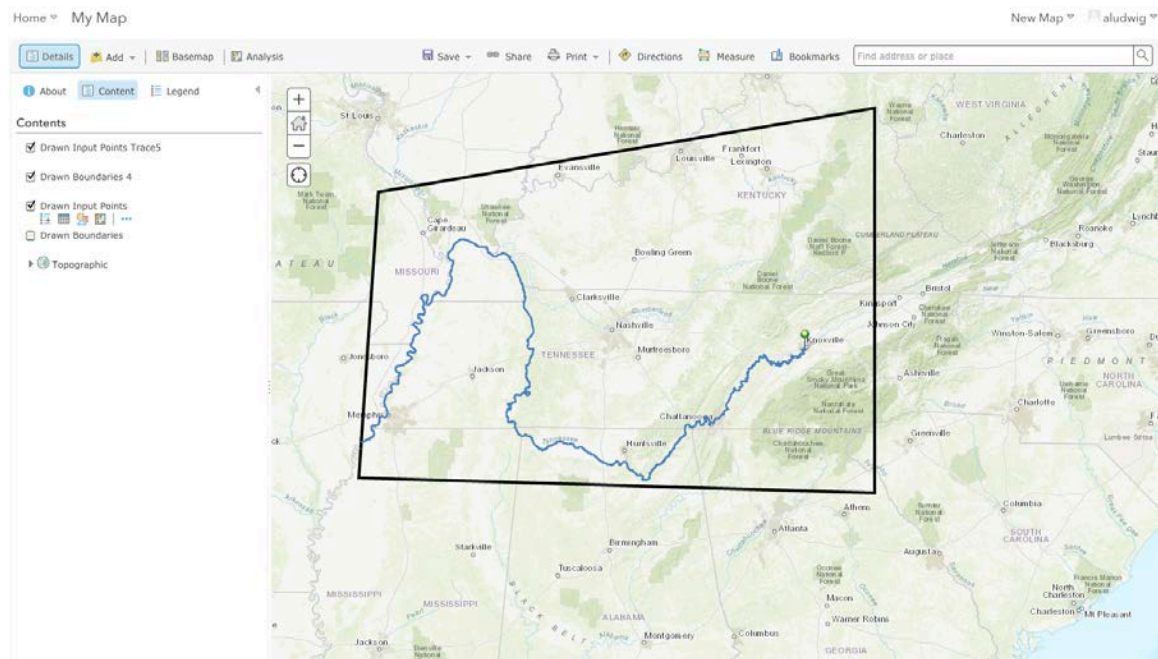


Figure 2. Example trace that used no splitting segments and a drawn boundary, which ended the trace in the Mississippi River at Memphis.

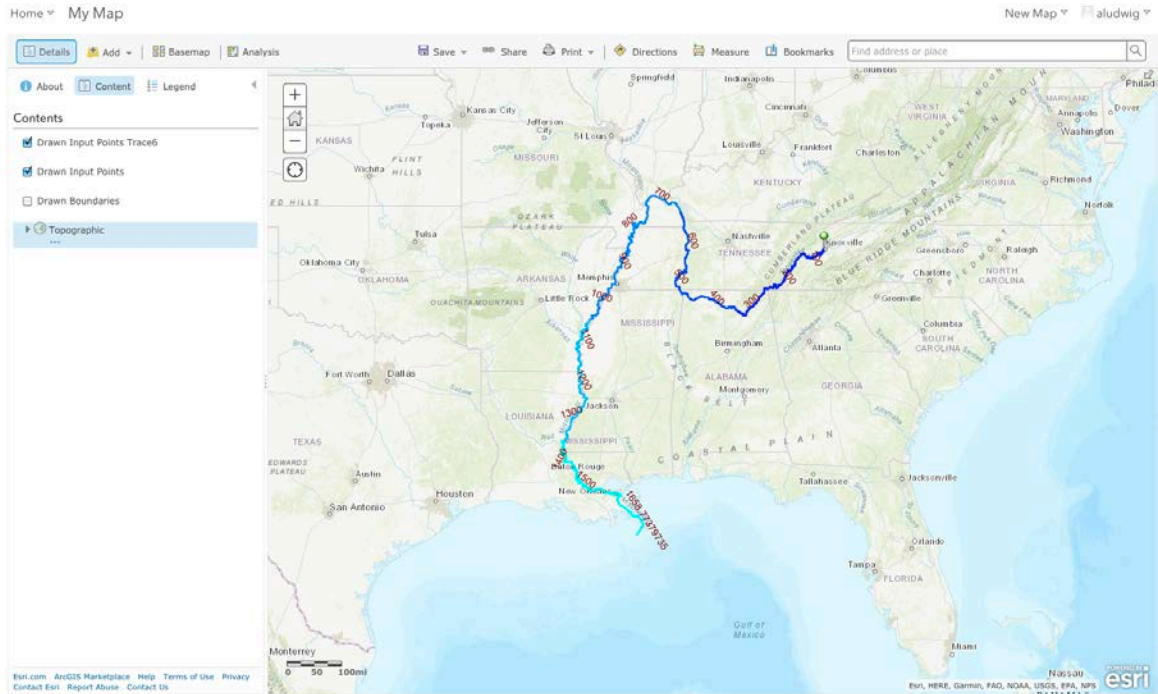


Figure 3. Example trace that used 100-mile segments and no clip boundary, which took the trace all the way to the ocean.

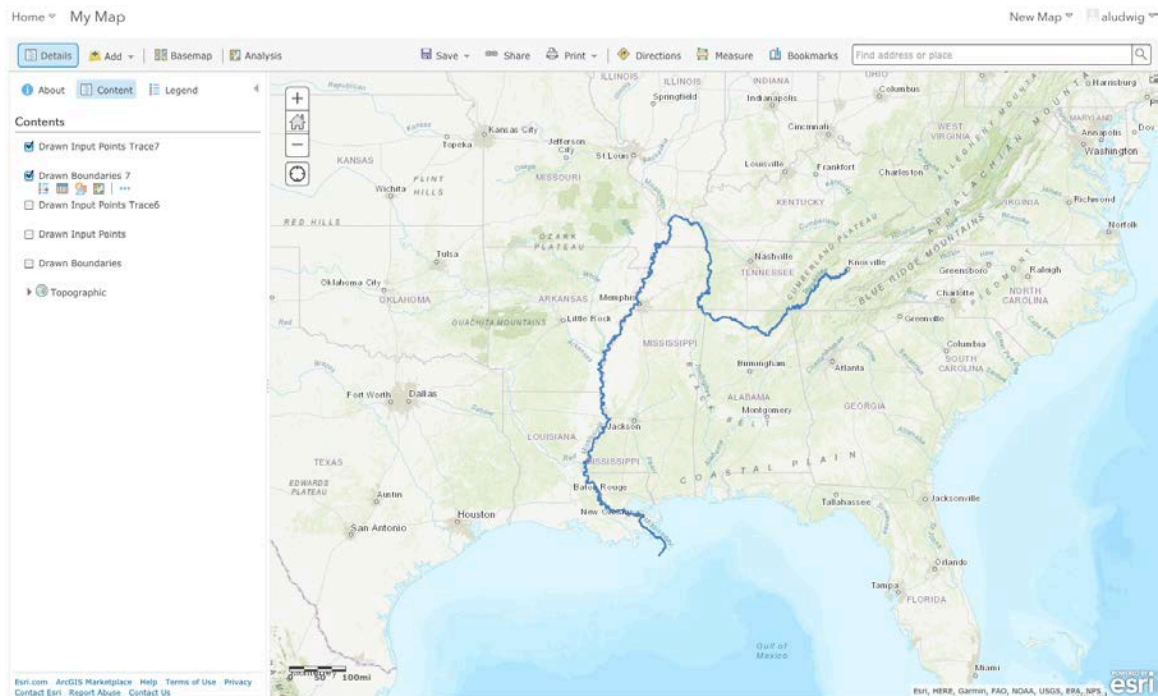


Figure 4. Example trace that used no segments nor boundary.

Applications: The “Trace Downstream” analysis produces a powerful visual to demonstrate how we are all connected by water. This trace can also be used to discuss how many miles

of streams and rivers lie between the school rooftop/parking lot and the ocean, or to establish a *watershed address* for a location by using the trace to identify the names of the watersheds in which points of interest lie. For example, the watershed address for the example used above is Third Creek watershed inside the Upper Tennessee River Basin. A water chain can also be identified. For the above example, the chain would be Third Creek, Tennessee River, Ohio River, Mississippi River, Gulf of Mexico, Atlantic Ocean.

Example questions for activities using the Trace Downstream feature:

How many miles of streams and rivers lie between the school parking lot and the ocean?

Where would you end up if you launched a boat on the nearest stream and traveled 10 miles? 100 miles?

Into which stream does our schoolyard runoff flow?

How many states does the Tennessee River flow through before it flows into the Ohio River?

How many miles would you travel if you sailed a boat from Chattanooga to Memphis? From Knoxville to Memphis? From Nashville to Memphis?

What is your home's *watershed address*?