

# ArcGIS Online Lesson

Title: Using ARCGIS Online to create a map for recreational boating.

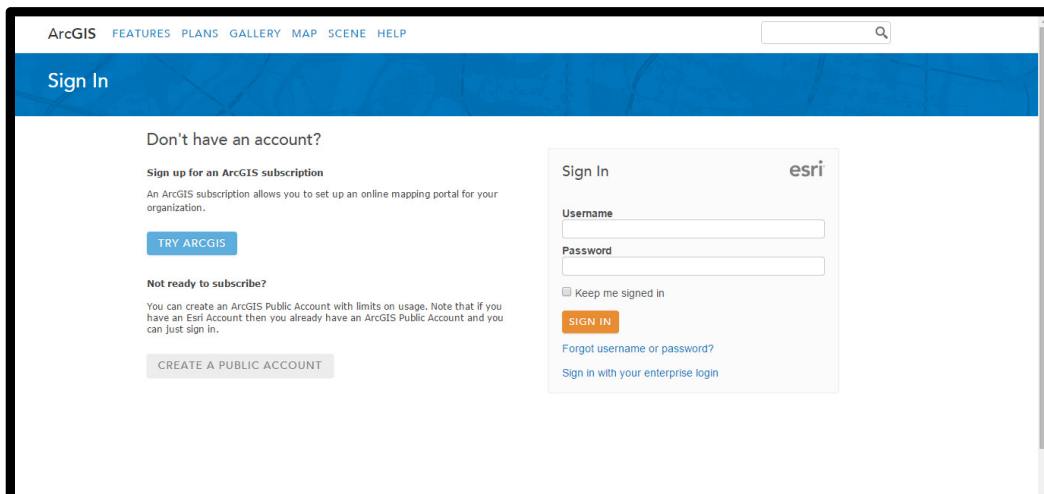
Prepared by: Tim Linkenheimer

Introduction: When I was recently asked to create a lesson that would teach people how to utilize ArcGIS online I wanted to design a lesson that I would be able to incorporate into my life from either a professional or recreational standpoint. After giving it some thought I decided to use it in a recreational manner. A hobby of mine is to canoe the various waterways of Pennsylvania. A crucial part of planning a canoe trip, which for me and the group I travel with usually lasts over a few days, is having an accurate topographic map as this type of map is the easiest to determine your exact location on a waterway. Although a topographic map may not include valuable information such as boat launches, dangerous rapids, points of interest, and camping locations that can be found along the waterway. This type of information can be found on various guide maps that can be found online. Having to go back and forth between two different types of maps can be rather cumbersome while on the river so what this activity will do is combine the both of them into an efficient and personalized way, while learning some of the basic tools and functions of ArcGIS Online. After the completing this tutorial you will be familiar with using the following commands offered in ArcGIS online:

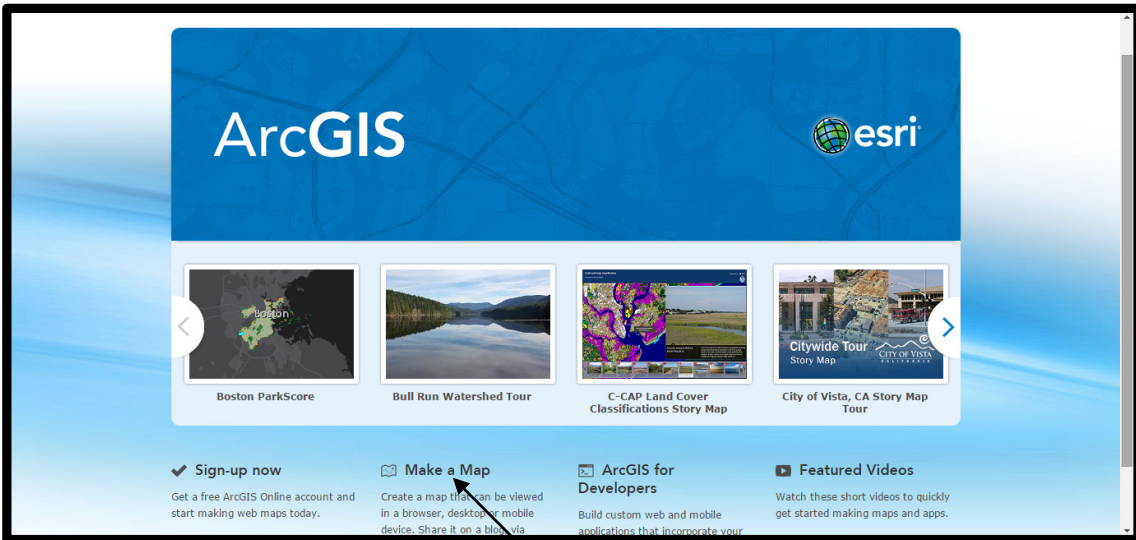
- Utilizing all of the standard functions such as search, zoom, print, save, share, print and bookmark.
- Using the Basemap command to load a topographic map provided by ESRI.
- Using spreadsheet software to load a series of points of reference on a map that are important to locate while traveling.
- Editing those points of interest so they are categorized, easy to interpret and represented properly on the map.

The Pennsylvania waterway that you will be creating is a map for my next planned trip which is the lower Clarion River found in northwestern Pennsylvania. The map will begin near the small municipality of Gravel Lick, PA and conclude in the city of Parker, PA which is actually found on the Allegheny River just below the mouth of the Clarion River. Parker is considered the smallest *city* in the United States with an approximate population of 800 people. It should also be noted at this time that in order to complete this activity you will be required to create an ArcGIS online account. This can be done at the following website: <http://www.arcgis.com/home/index.html>

After creating an account sign in to your account. The login page should look very similar to what is shown below:

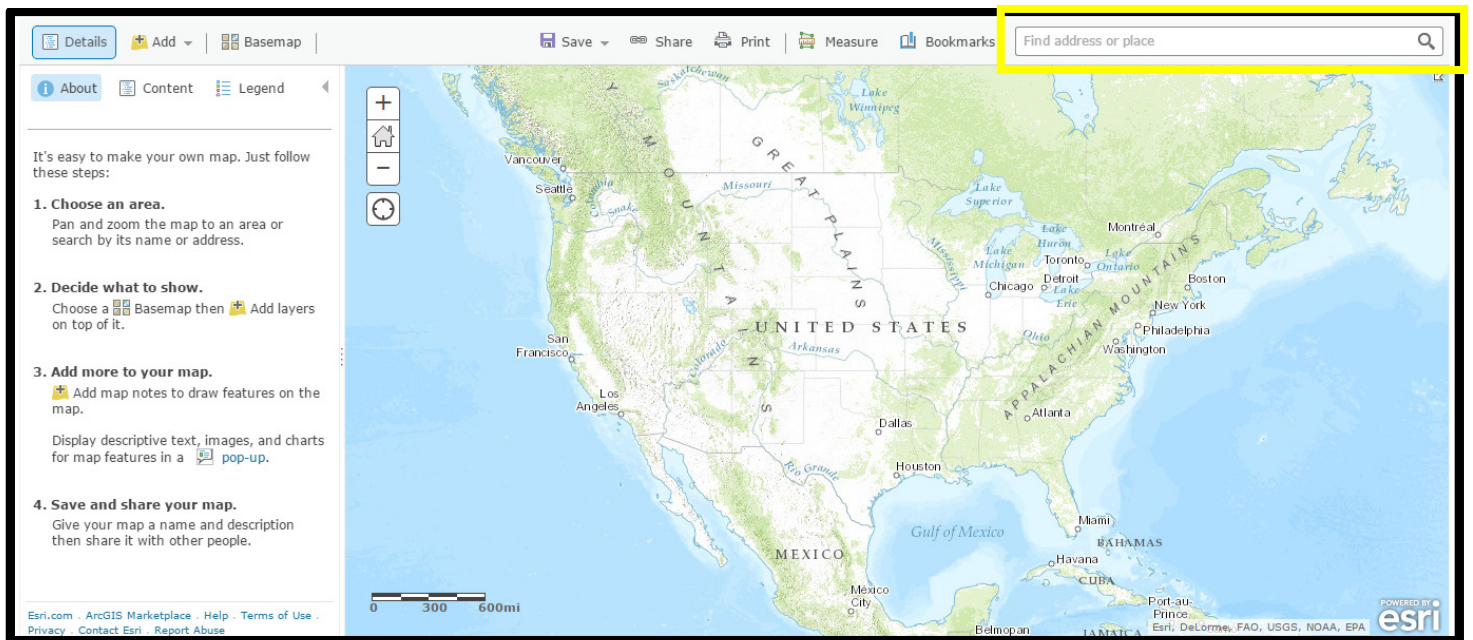


After signing in you will be taken to the page shown below. Click on the “Make a Map” link found near the bottom center of the page.

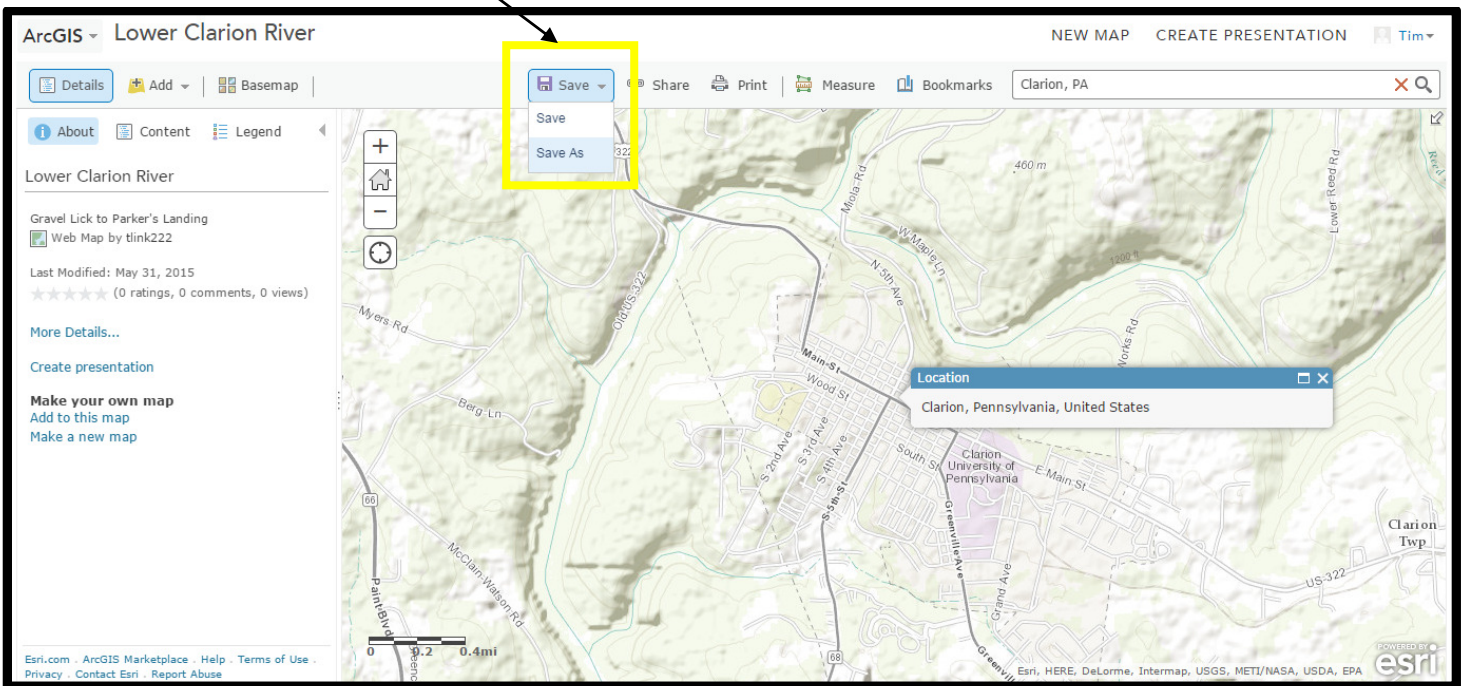


Click Here

After clicking on the “Make a Map” link you will be led to default page that shows a standard map of the continent of North America. The first step you will want to do is find the “Find Address or Place” Search Bar which can be found on the upper right hand side of the page (Pictured & Highlighted Below) and type “Clarion, PA”.



Clarion, Pennsylvania is largest populated town along this Clarion River trip which makes it an ideal place to start on this map. Before going any farther now would be a good time to save your map. To do this click on the “save” pull down menu found along the top center portion of your screen and select “save as”.



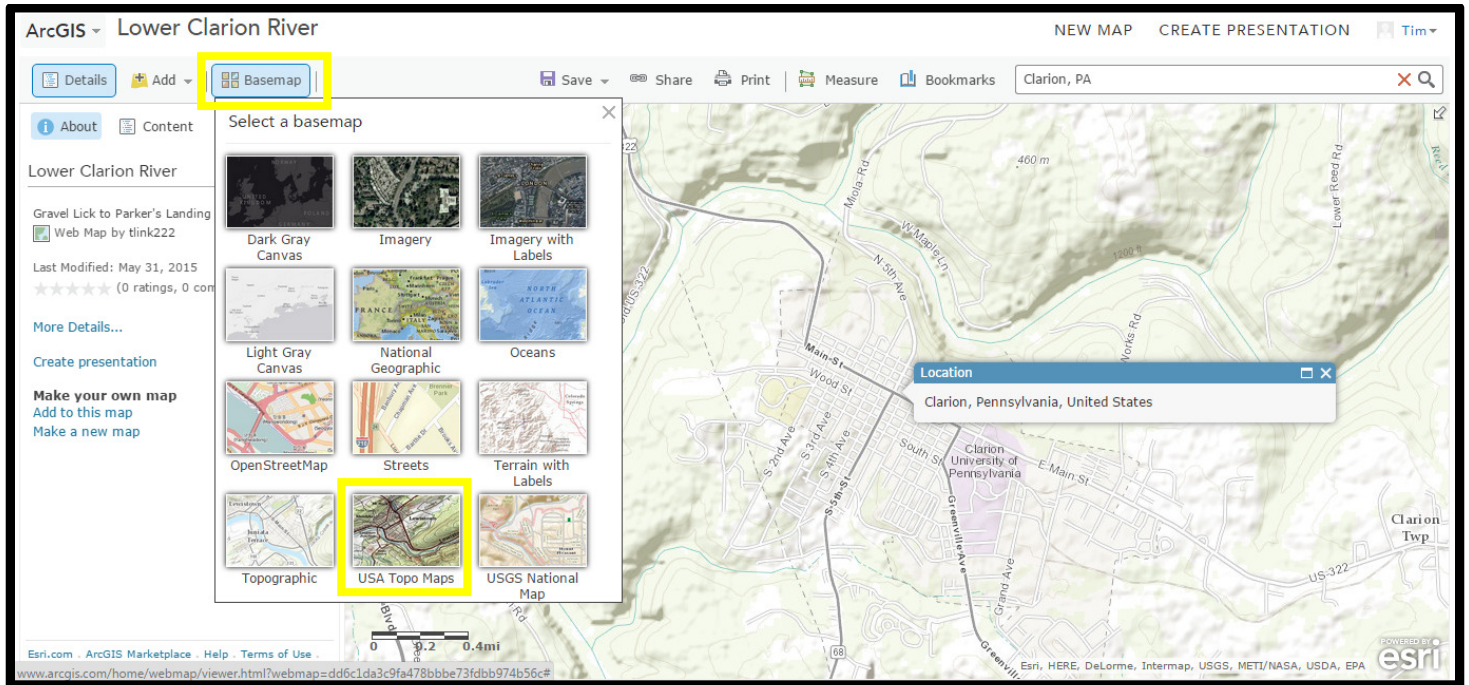
After selecting “save as” you will be prompted to give it a title, tag, and a summary. See below for a suggested entries for each category:

Title: Lower Clarion River

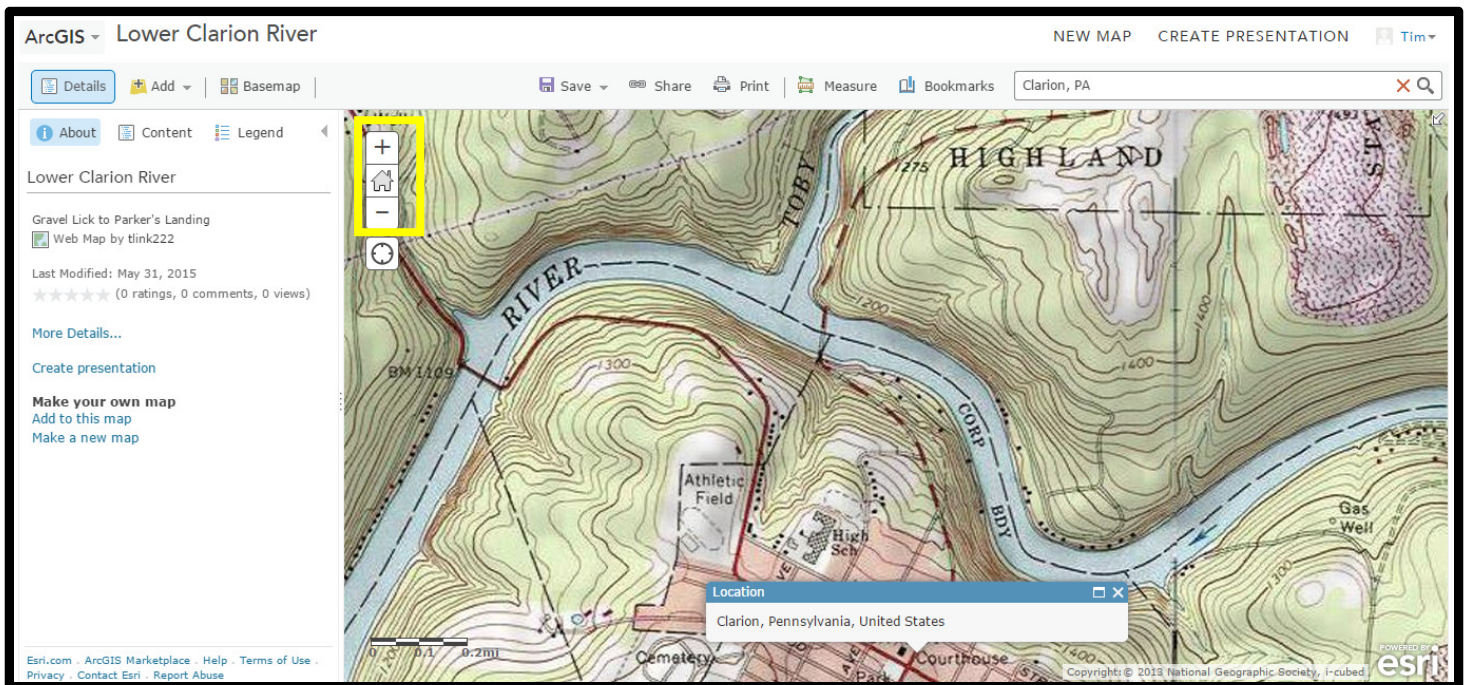
Tag: Clarion River (You will not be able to save your map without entering a tag. This will allow other people to search for your map.)

Summary: Gravel Lick to Parker’s Landing

Now we will change the map type to a topographic map. The easiest way to do this is to click on the “Basemap” menu button found in the upper left hand corner of your screen and select the “USA Topo Maps” option found in the fourth row center column of this menu. (See illustration below)



Your map type should now change to a topographic format. This is a good time to experiment with the “Zoom In” and “Zoom Out” commands. These commands can be found just to the right and below the Basemap pull down menu. (See below illustration) “Zoom In” until you are so close that your map features disappear and you have a white background. Then click once on the Zoom Out button so the topographic map features reappear. This would also be a good point to save by clicking on the “save” option under the save menu.



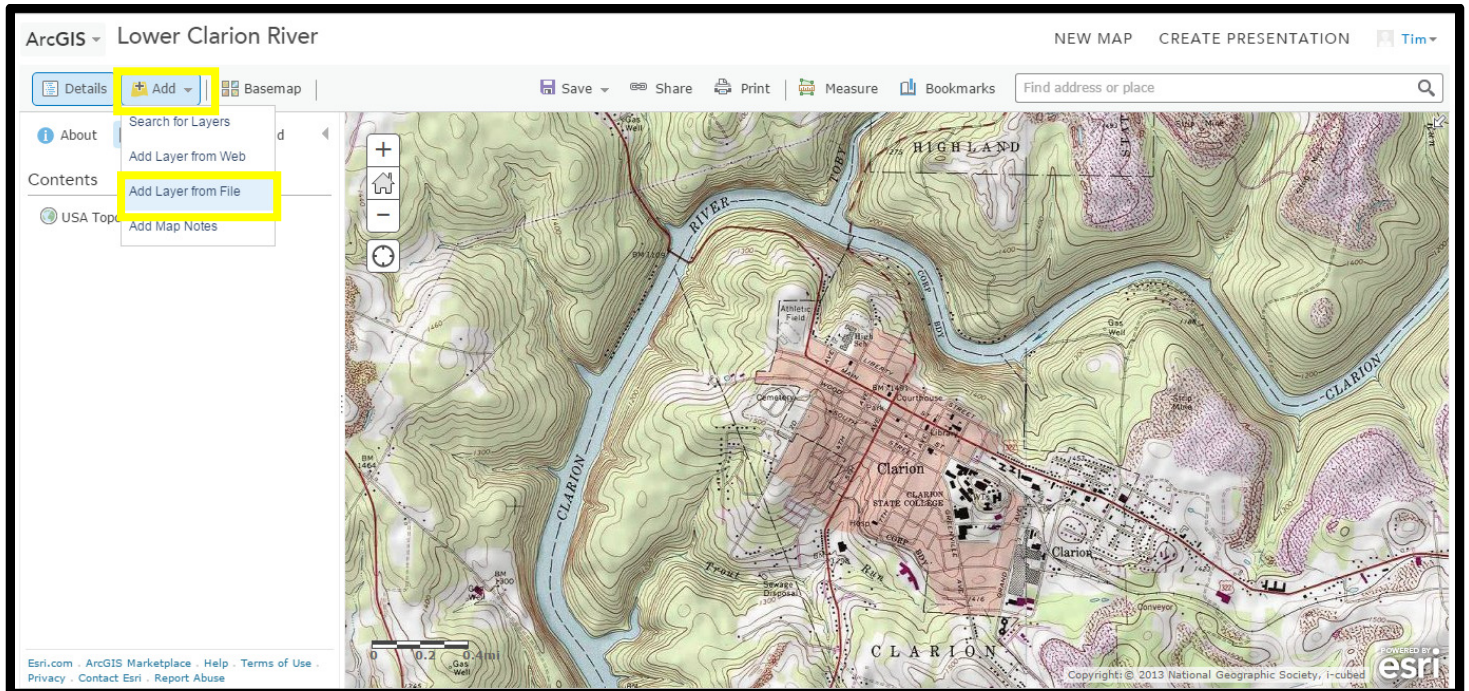
We have now come to the point in this tutorial where we will now load all of the locations deemed important to be placed on this map. These are locations such as boat launches, cautionary locations, USGS Water Gauging Stations and other points of interest. The screenshot below shows the points of interest that should be included on your map along with their latitude and longitude location. The software used to create this spreadsheet was Microsoft excel. You may use any type of spreadsheet software as long as it can create a "Text (Tab Delimited)" file type. It is important the "A1" Cell is titled: "Location", A2: "Latitude", and A3: "Longitude" It is also important that you title the locations the same as you see on the screenshot below. This will make your map legend and labels easier for the map reader to understand. Using the spreadsheet illustration below to enter in the following locations along with their latitude and longitude readings.

	A	B	C
1	Location	Latitude	Longitude
2	USGS Gauging Station Clarion River @ Piney	41.192563	-79.440045
3	Gravel Lick Access	41.305138	-79.244818
4	Millcreek Access	41.234817	-79.321796
5	State Game Lands 74 Access	41.23656	-79.323313
6	Clarion Access	41.223701	-79.387198
7	Rapp Runn Falls	41.23514	-79.384251
8	322 Bridge Access	41.223144	-79.40221
9	Piney Dam	41.191952	-79.4334
10	Train Trestle and Tunnels	41.181706	-79.454219
11	Deek Creek Access	41.172168	-79.477691
12	Callensburg Access	41.130464	-78.554669
13	Alum Rock Access Point	41.135726	-79.622624
14	Turnip Hole	41.142079	-79.583759
15	American Golf Hall of Fame	41.150474	-79.679444
16	Parkers Landing Access Point	41.101881	-79.677803
17	USGS Gauging Station Allegheny River @ Parker	41.100618	-79.68116
18	Foxburg Inn Restarant	41.139779	-79.679385
19			

Once you have completed creating this data file, save it as a Text (Tab Delimited)" file with the file name being "Clarion River Data". If you are prompted with a message asking to continue to using this type of file format answer "yes"

We are now going to take the following data and load it into our ArcGIS online map.

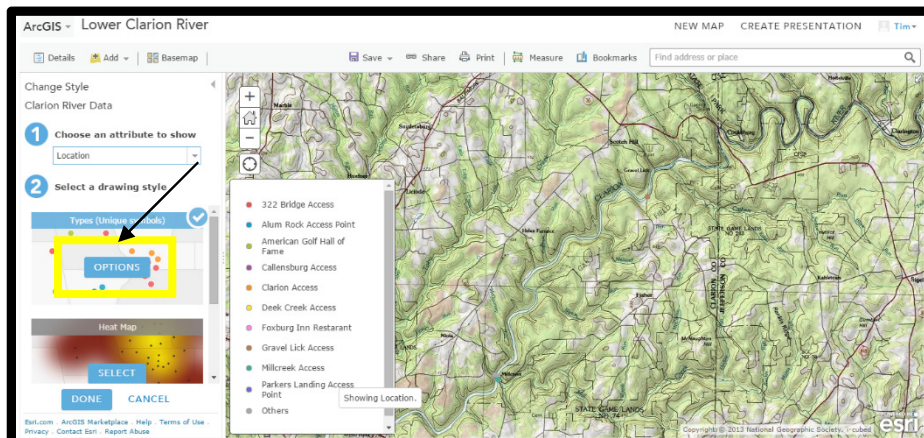
Click on the “Add” Button (found just to the left of the Basemap button) and then select “Add Layer from File”.



A window will then appear prompting you to navigate to the file you want to add. Navigate to the location of your Clarion River Data Text Tab Delimited file. Choose the file by clicking on the “choose file” button, double click on the file and then click on the “Import Layer” button. You will now notice a series of points appear on your screen and your map will zoom out to the extent of those points.

You may have noticed that all of these locations are identified by a circle with each having a different color. The locations identified by these series of points can be broken down into five basic categories: boat access (9), gauging stations (2), area of caution (1), points of interest (4) and restaurant (1). Therefore we should have five different symbols to categorize these points.

Let's now go and edit the symbols for these different points. You should now have a Change Style Panel on the left side of your screen. Step 1 gives the option to choose an attribute to show. The default is location, leave this as the attribute to show. Step 2 asks you to select a drawing style. Click on this options button underneath (see illustration below) this category as this is where some changes will be made.



You will want to make sure that all of the points are a part of your map by making sure they are all active underneath the “location” scroll panel. Most likely you have only ten points that were created being active. You can make them all active by clicking on the up arrow near the title for each point. Do this for all inactive points and make “other” inactive. You should now have 17 active points appearing in the scroll menu over the map. We are now going to change some of the shapes of the symbols. Underneath the location scroll menu put your mouse over the dot for the first boat access which is most likely “322 Bridge Access”, and click on it. A “change symbol” window will appear. At the bottom of this window you will see the option to change the symbol size. The default is 8 but change it to 40 and select a green circle and then click “OK”. Do this for the other remaining eight boat access points.

Now edit the four points of interest: Rapp Runn Falls, Train Trestle & Tunnels, Turnip Hole, and the American Golf Hall of Fame. When changing these select the star as the shape and set the point size to 40. Keep the color the same for all four points of interest but a different color than the boat access symbols.

Now change the symbols for the two gauging stations. Use the square shape, size 40 with the same color but different than the first two.

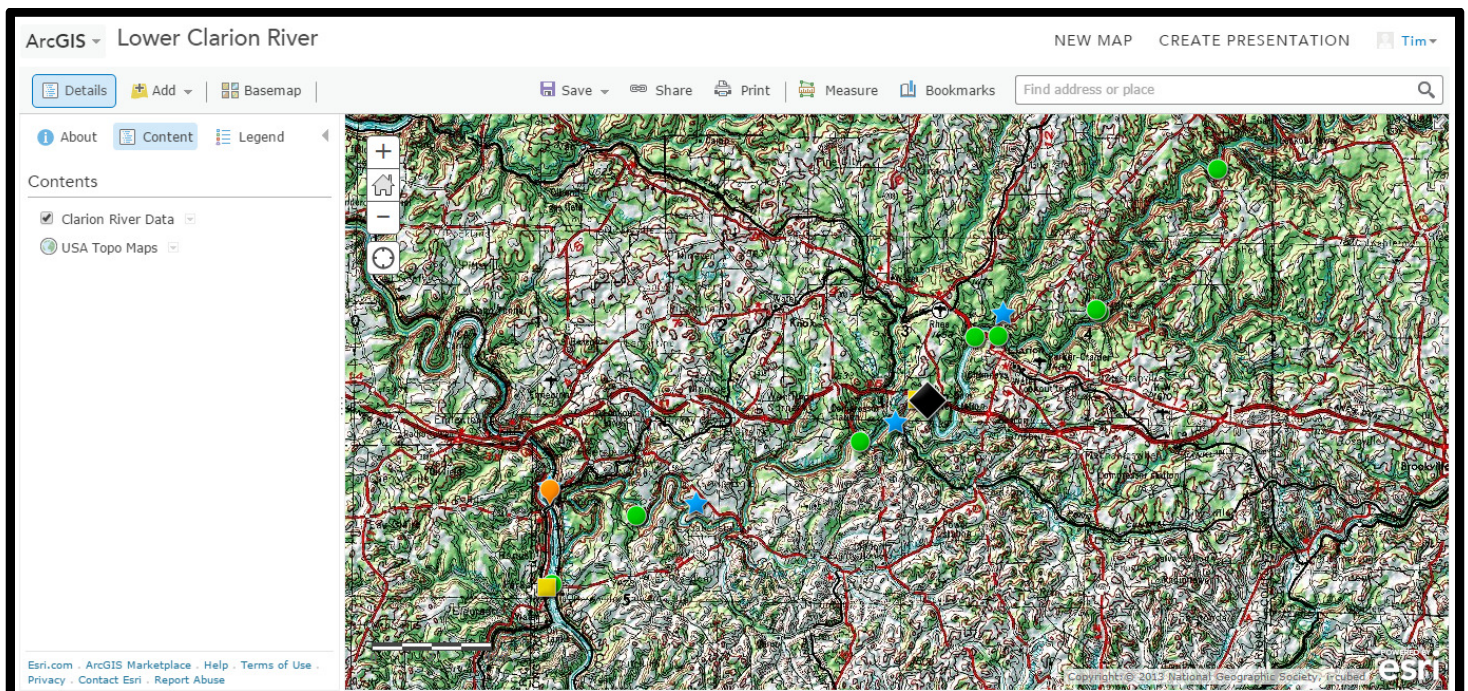
The Piney Dam is the only Hazard on this stretch of the river so use a Black Colored Diamond with a size of 60.

Change the restaurant to a size 40 round balloon shape a different color than the rest of the symbols.

Do not change the Transparency or Visible Range settings and click on OK at the bottom of the panel and then click on the blue colored “Done” button.

This would be a great place to save your map once again.

Your map with its symbols should look similar to the illustration below.

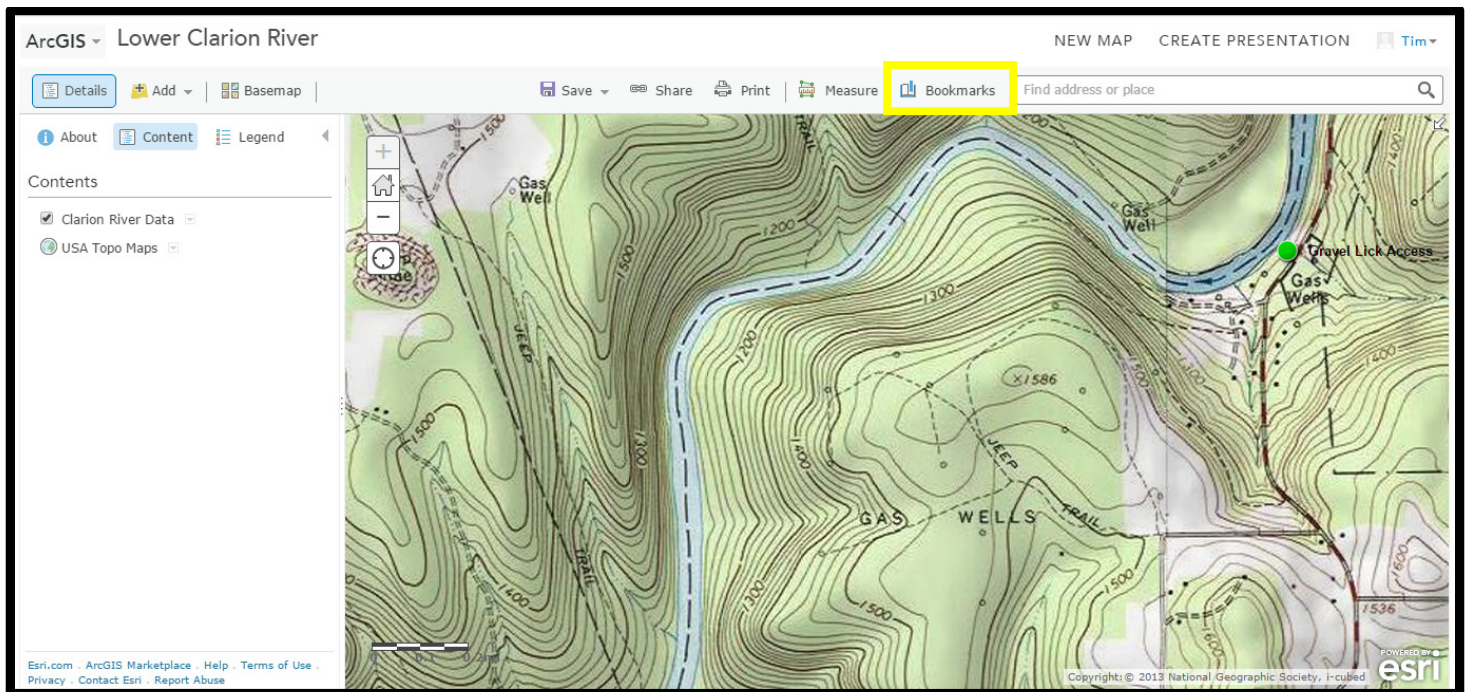


We are now going to label all of these points.

In the Table of Contents click on the down arrow to the right of the Clarion River Data. A pull down menu will appear, click on “create labels”. Leave the text size at the default setting and the text bold. Change the text color to black and use the right center alignment option found in the middle row, right column. Once clicking OK all of your labels should appear.

Once again, a great place to save your map.

We are now going to create a series of bookmarks which will serve as pages for when this map is printed and taken on the canoe for travel. Zoom in as close as possible and pan to the first access “Gravel Lick” which can be found as the farthest northwest point. Make sure the entire label appears in your screen and that the river stays in your view for the entire time. It should look similar to what you see below:



Click on the bookmarks option at the top center portion of the page. (Highlighted in illustration above) Select the Add Bookmark button and title it Page 1 and hit your enter key. Using the Pan command create a series of bookmarks following the river until you reach your final point of interest in Parker, PA. To be able to cover this stretch of the river you will have to create at least 20 bookmarks.

This concludes the hands on portion of this lesson. The bookmarks can be used to set up pages to print so you can have this series of maps on the canoe. You could also share this map with your canoeing partners through social media with the aid of the share command.

Below is the critical thinking portion of this lesson. Please answer the following questions with aid of the measuring tool found just to the left of the bookmarks button.



**Critical Thinking Question:**

Gravel Lick is river mile 46 on the Clarion River, and the mouth of the Clarion River where it flows into the Allegheny just above the city of Parker is river mile 0. Therefore it takes 46 river miles to travel this portion of the Clarion River. An ideal day of recreational canoe travel is 15 river miles. Therefore it would take three days to travel this stretch of the river in a leisurely like manner. Therefore your challenge is to determine where these river travelers should stop each day. Use the measure tool to keep each day of river travel as close to 15 river miles as possible. You must use one of the boat accesses on the map you created for the start and end of each day. You will also be required to indicate the exact river mileage (to the nearest tenth of a mile) traveled each day. Here a few hints/suggestions:

- When using the measuring tool, try to stay near the center of the river. The more points you create by clicking the more accurate the measurement will be. The measuring tool will add the distance for you. Make sure you select the distance measuring option.
- Keep in mind that the travelers will have to portage around the Piney Dam. Portaging involves more travel time so you may want to make the day's travel that involves getting around this dam a little shorter than the other two day's travel.
- Your total river miles for all three days should come to an approximate sum of 46 miles.

**Day 1:** Start: Gravel Lick Access                      End: \_\_\_\_\_                      River Miles: \_\_\_\_\_

**Day 2:** Start: \_\_\_\_\_                      End: \_\_\_\_\_                      River Miles: \_\_\_\_\_  
(Same as Day 1 End)

**Day 3:** Start: \_\_\_\_\_                      End: Parker's Landing Access                      River Miles: \_\_\_\_\_  
(Same as Day 2 End)

**References:**

The following websites were used in creating this lesson:

ArcGIS Online: <http://www.arcgis.com/home/index.html>

Pennsylvania Viewer: <http://pages.towson.edu/morgan/PennsylvaniaViewer/index.htm>

Clarion River Water Trail Map & Guide: <http://waterlandlife.org/assets/crwtm.pdf>

Federal Communications Commission Degrees Minutes Seconds to/from Decimal Degrees:

<https://www.fcc.gov/encyclopedia/degrees-minutes-seconds-tofrom-decimal-degrees>

## Critical Thinking Answer Key

**Day 1:** Start: Gravel Lick Access

End: 322 Bridge Access

River Miles: 14.2  
(Nearest 10<sup>th</sup>)

**Day 2:** Start: 322 Bridge Access  
(Same as Day 1 End)

End: Callensburg Access

River Miles: 12.7  
(Nearest 10<sup>th</sup>)

**Day 3:** Start: Callensburg Access  
(Same as Day 2 End)

End: Parker's Landing Access

River Miles: 19  
(Nearest 10<sup>th</sup>)