Research Question

An online exhibit was created in Omeka showcasing public art pieces in and around Rochester. In an effort to encourage the public to visit these locations by bicycle we would like to answer the following questions:

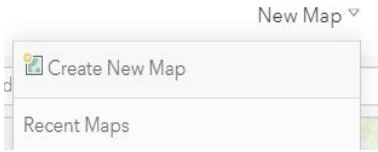
"Which art pieces are easily accessible by bicycle in Rochester? Where is the highest density of easily accessible pieces?"

We will answer these questions using ArcGIS Online software along with data exported from the Omeka exhibit and data provided by the City of Rochester. The final product will be an online map highlighting the pieces that are close to bike lanes and trails.

Getting Started

- Go to www.arcgis.com and click "Sign In" and use the log-in information provided to you.

- On the menu, click on **"Map"**
  - If this is a new account, clicking **"Map"** will open a New Map
  - Otherwise, clicking Map will open the last map you were using
  - If in an existing map, click **"New Map"** to open a New Map



- Click **"Save"** and then **"Save"**
  - Give your map a **"Title"** (you can title it whatever you want, the example map used in these instructions is "Public Art")
  - Be sure to include **"Tags"** as this will help people find your map (METADATA)
  - A **"Summary"** will be useful if you're sharing the Map
  - You must have at least a **"Title"** and one **"Tag"** in order to Save the map.
  - Click **"Save Map"**

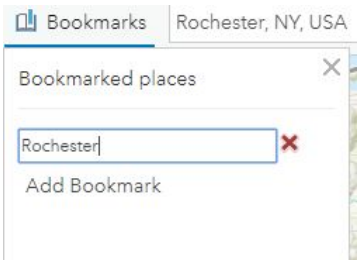
NOTE: the version of ArcGIS Online we are using for this workshop is the paid version provided by UofR as part of their ESRI site license. ArcGIS Online also has free accounts but this exercise uses some functionality not available with the free account. Information regarding ArcGIS online accounts can be found here: ArcGIS Online FAQ

Navigating Tips

- You can search for a specific location using the **"Search"** field in the upper right-hand corner of the Map window
  - In the search box on the upper right-hand corner, type **"Rochester"** and select the option for Rochester, NY, USA from the drop-down box

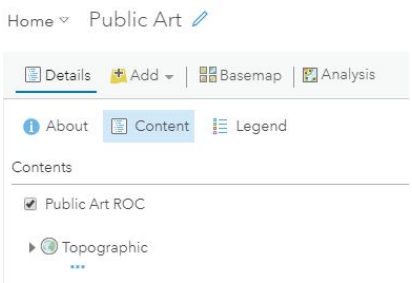
    - The map should zoom in to Rochester and a pop-up should appear next to Rochester on the map, **X out** of the pop-up

- **Bookmarks** are a great way to return to locations of importance with ease
    - Once the map window is centered on the correct area or location (in this instance Rochester), click on **Bookmarks** menu (next to search bar) > **Add Bookmark**
    - Name the current view **Rochester** and press **Return**/**Enter** to save the Bookmark
    - **X out** of the Bookmark menu



Zooming in and out can be frustrating without a mouse
    - Use the **+** and **-** icons on the upper left of the map window
    - Drag two fingers **up** or **down** on a trackpad (this might vary depending on the settings for your trackpad)
    - You can zoom in to a specific area on the map by holding down the shift key, clicking the left button the trackpad (on a Mac, just click the trackpad) and drawing a square on the map where you want to zoom
    - The **Home** icon on the upper left of the map window will take you back to your initial view of the city
    - Under the **Bookmarks** menu, you can select any bookmark take you to the bookmarked view

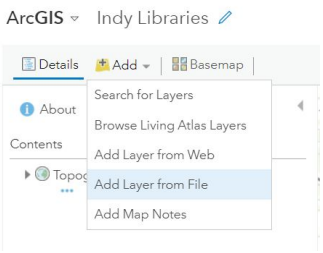
Left Sidebar Overview



- **ArcGIS** drop down menu takes you to ArcGIS Home and to your Content (where you can find your maps, layers, etc.)
- Next to that Menu is your **Map Title** (in the image to the right, the title is **Public Art**); you can edit the title by clicking on the pencil icon to the right of the title
- Clicking on **Details** displays or hides the left side bar where you can see detailed information about the layers in your map
- **+Add** provides various options for adding layers and other content to your map
- **Edit** allows you to edit your map layers (you do not have **Edit** as an option in your map window, yet, because we haven't added any layers to your map; it will show-up later)
- **Basemap** allows you to change the style of your basemap

- **About** provides information on your map
- **Content** is where you will do most of your work; it shows the data layers included in your map and allows you to access various commands for working with those layers, including viewing the data table, adjusting the styling, reordering layers, copying layers, changing the transparency, etc.
- **Legend** provides the legend for the selected layer or the map

Adding a Layer from Downloaded .csv



- Download the public_art_points.csv file to your desktop
- Click **+Add** > **"Add Layer from File"**
- Click **Choose File** and find the file Public_Art_Points.csv on your computer then click **"Import Layer"**
- On the left sidebar, under **"(1) Choose an attribute to show"** select **"dcterms_type"** from the dropdown menu
- Click **Done** at the bottom of the left sidebar
- You should now see the layer listed under the **"Contents"** tab; you should also see the **"Edit"** option on the menu bar

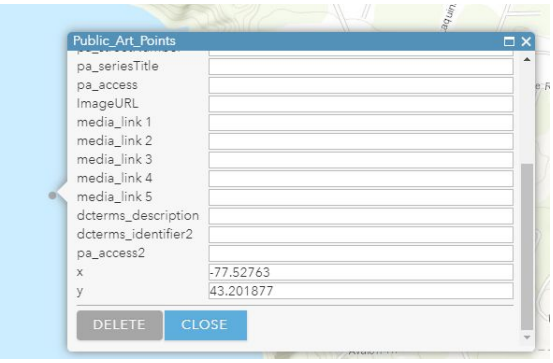
NOTE: When importing a .csv data file there are often problems. ArcGIS doesn't always recognize the address or the Longitude and Latitude. This particular file took a fair amount of cleaning and formatting (~2.5hrs) and several test uploads before it imported correctly. Also CSV files can use either addresses (which will get geocoded) or lat/long fields and the online system is not very flexible when dealing with these data sets.

Editing Layers

- Under the "**Public Art Points"** layer you can see several icons, they mean the following (from left to right)
  - Show Legend
  - Show Table
  - Change Style
  - Cluster Points
  - Perform Analysis

- More Options

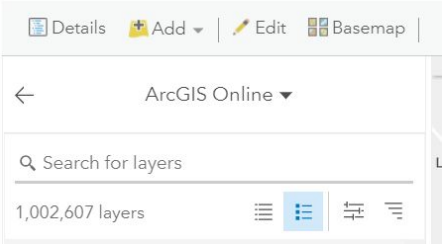
- Click on **“Show Table”** and you’ll see several data rows show up at the bottom of the map window
- Click on the first column “**id”** and select “**Sort Descending”** to spot the error
- Click on **“Edit”** to start editing features (you can also click on a feature and choose **“Edit”** at the bottom of the pop up)
- Select the error point and scroll to the bottom of the pop-up and click **“Delete”** to remove it



- Click **“Edit”** to turn off editing. This will save your edits- you can’t undo your edits at this point!

*NOTE: Please keep in mind that the default styles for ArcGIS Online include Blue, Red, and Green dots as the first three colors. This is not ideal for people who are colorblind. If needed, change the style of the dots by going to **Change Style** and clicking on the **Options** button. You can then change the colors, labels, size, and shape of the dots.*

Searching For and Adding Layers



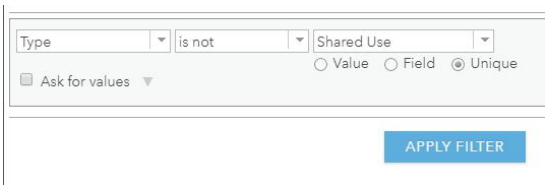
- Under **“+Add”** click **“Search for Layers”**
- Under **“My Content”** select **“ArcGIS Online”**
- *Notice that there are over a million layers available*
- Search for **“rochester bicycle”** which will bring up multiple options
- Click on the **“+ symbol”** on the lower right hand corner of **“Rochester_Interactive_Bicycle_Facilities”** to add the layer to your map

- Click on the **“Details”** menu button at the top of the map window and then the **“Content”** tab
- You should see**“Rochester_Interactive_Bicycle_Facilities”**; click the right arrow to expand the layer and view sublayers. You can click on the boxes to the left of the layer names to have them show up in your map

Filtering Layers

Subsetting your data is a common task when using spatial data. In this case we are going to only use the bike lanes, bike boulevards and cycle track features and we will filter out shared use roads.

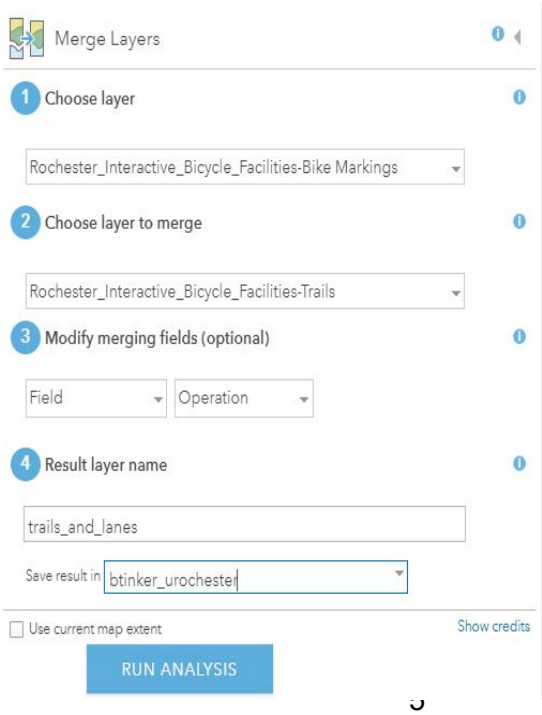
- Under the **“Bike Markings”** layer click on **“Filter”**
- In the first dropdown select **“Type”**, the middle drop down **“is not”**, switch radio button to **“Unique”** and select **“Shared Use”** then click **Apply Filter**



Combining Layers

For our analysis we will want to also include trails with the bike lanes so we will combine the filtered bike lanes with the trails.

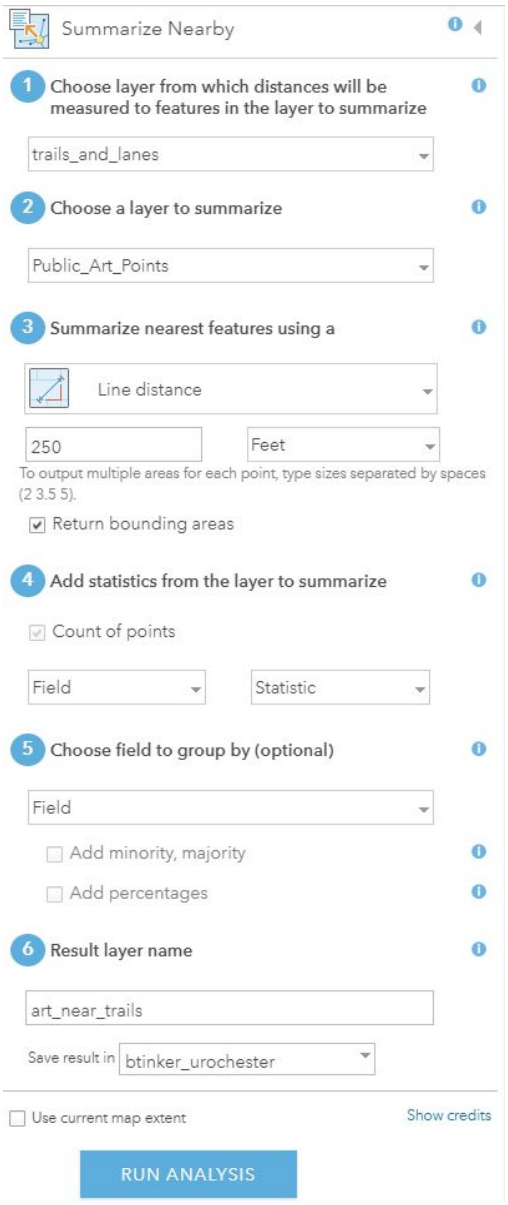
- Click on **“Analysis”** at the top
- Under **“Manage Data”** click on **“Merge Layers”**
- Under **“(1) Choose Layer”** select **“Rochester_Interactive_Bicycle_Facilites-Bike Markings”**.
  Under **“(2) Choose layer to merge”** select **“Rochester_Interactive_Bicycle_Facilites-Trails”.**
  Skip optional step **“(3)”**.
  For **“(4) Result name”** choose a name such as **“trails_and_lanes_*your_initials*”.** Uncheck **“Use current map extent”**
- Click **“Run Analysis”** and wait



Find Trails With the Most Art

We will now use our combined trails and bike lanes layer to figure out which public art pieces are within 250 feet of the trails.

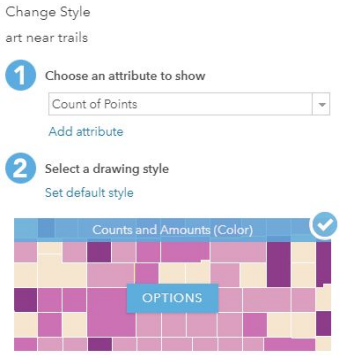
- Click on **"Analysis"** at the top
- Under **"Summarize Data"** click on **"Summarize Nearby"**
- Under **"(1) Choose Layer..."** select **"trails_and_lanes_*your_initials*"**.
  Under **"(2) Choose a layer to summarize"** select **"Public_Art_Points".**
  Under **"(3) Summarize nearest..."** use **"Line Distance"**, type in **"250"** and select **"Feet"**
  Leave **"(4)" and "(5)"**
  For **"(6) Result layer name"** choose a name such as **"art_count_*your_initials*".** Uncheck **"Use current map extent"**
- Click **"Run Analysis"** and wait



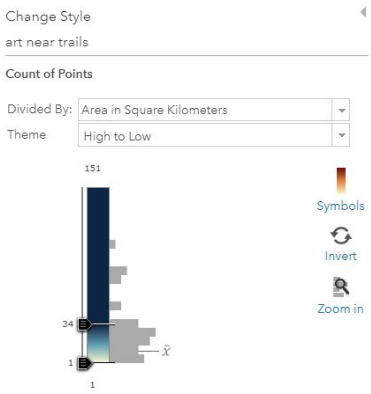
Styling Layers

The analysis tool created 250 foot buffers around the trails features and included a count of the number of points that fall within the buffers. We will color code those buffers to show where the highest density of art is after we filter out the records with no art.

- Using the same method as when we filtered out the shared use roads above, filter trails that have no art near them. Click the **"Filter"** button on **"art_near_trails_*your_initials*"** and use the expression **"Count of Points is greater than 0"**
- Under the **"art_count_*your_initials*"** layer click on **"Change Style"**
- Under **"(1) Choose an attribute to show"** select **"Count of Points"**
- Under **"(2) Select a drawing style"** select **"Counts and Amounts (Color)"** and click on **"Options"**



- Under **"Divided By:"** choose **"Area in Square Kilometers"** to create a value representing "art per square kilometer"



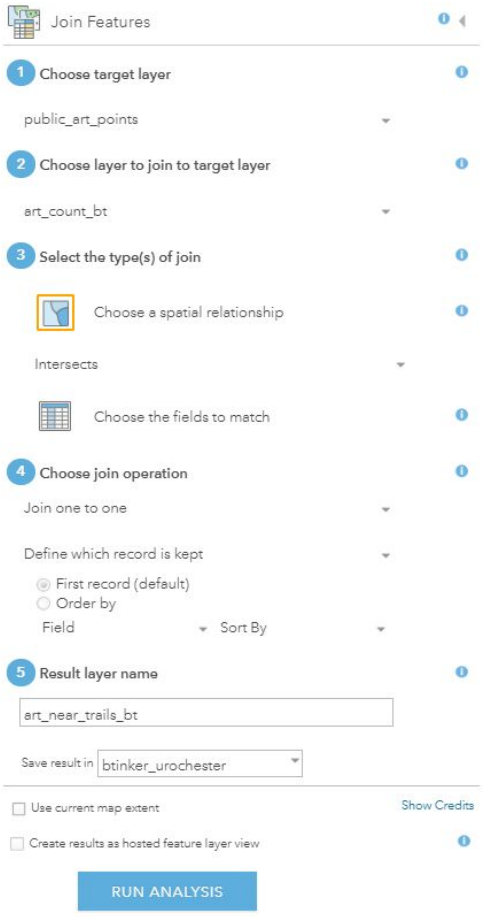
- Under the **"Change Style"** sidebar, you can change the color by clicking on **"Symbols"** and selecting a different color scale from the pop-up window

- Don't forget to click **OK** on the color pop-up window, then **OK** on the Change Style sidebar, then **DONE** to return to the **Content** list

*Note: You can also change the transparency on a map layer, which is useful when you're trying to see behind it or when the content of the layer makes it challenging to view other layers. In the Content list, select the map layer. Click on the **More Options** (the ellipses) > **Transparency**. Select a different percentage (0% = opaque; 100% = transparent).*

Selecting Points to Highlight in our App

In the steps above we created buffers that have a count of art points within 250 feet. Now we will select those points that are within 250 feet of bike trails and create a new layer to display in a web app.



- Select **"Analysis"** at the top
- Under **"Summarize Data"** click on **"Join Features"**
- Under **"(1) Choose target layer..."** select **"public_art_points"**
  Under **"(2) Choose a layer to join.."** select **"art_count_*your_initials*"**
  Under **"(3) Select the type of join"** use **"spatial relationship"**, select **"Intersect"**
  Leave **"(4)"**
  For **"(5) Result layer name"** choose a name such as **"art_near_trails_*your_initials*".**
  Uncheck **"Use current map extent"**
- Click **"Run Analysis"**

Creating and Configuring Pop-ups

Most layers in ArcGIS Online can have informational pop-ups enabled to display any content in the attribute table. These pop-ups may need to be enabled (depending on the layer type) and have many configuration options. The default view of a pop-up is not very appealing so we will customize the pop-ups to improve readability and include an image.

- In the table of contents select **"More Options"** for the **"art_points_near_trails_*your_initials"*** and choose **"Configure Pop-up"**
- Change the **"Pop-up Title"** to **{dcterms_title}** by using the plus box to the right and selecting the **{dcterms_title}** field.
- Click "Configure Attributes" and uncheck all fields except **{dcterms_creator}**, **{dcterms_type}**, **{ImageURL}** and **{dcterms_description}**
- Click **"OK"** and examine the pop-ups
- Click **"Configure Pop-up"** again.
- In the dropdown under **"Display"** choose **"A custom attribute display"** and click **"CONFIGURE".** Paste in:

  Artist: {dcterms_creator}

  Type of piece: {dcterms_type}

  Description: {dcterms_description}
- Click **"OK"**
- Under **"Pop-up Media"** choose **"Add"** and then **"Image"**
- Under **"URL"** click the **"[+]"** and select **{ImageURL}**
- Under **"Link"** click the **"[+]"** and select **{ImageURL}**
- Click **"OK"** and then **"OK"** and examine the pop-ups again

Preparing to Share your Map

Now that we have all the layers we need in our map we will need to get it ready to share. You can make your map convey information more clearly by reordering layers, creating feature labels, changing the symbology and renaming layers.

- Drag layers up and down by mousing over the left edge of the layer until you get a mover icon. Some layers like base layers and image layers will not move so you may just need to work around that
- Add labels to features by clicking **"More Options"** for a layer and choosing **"Configure Labels".** Choose the field with which to label, the label style and scale range for the labels
- Rename layers by clicking **"More Options"** for a layer and choosing **"Rename"**
- Make sure to **"Save"** your map. If you want to make multiple similar versions of a map, use the **"Save As"** option

Publish a Web App

Once your map is completed it can be shared in the viewer as is (in the map viewer) or in a more polished and functional "web app".

- Make sure your map is saved and then click the **"Share"** icon
- In the section **"Choose who can view this map"** check the **"DSI_Mapping"** group. If you get a pop-up asking to **"Update Sharing"** click **"UPDATE SHARING"**
- The url in the **"Link to this map"** box can be shared and it will link to the map editor window we have been working in. In many cases a more refined "web app" will be better suited so click **"CREATE A WEB APP"**
- There are approximately 30 configurable apps that can be quickly customized and deployed displaying your map data. Each template is suited for a slightly different purpose. For this exercise experiment with the **"Basic Viewer"**
- Hover of **"Basic Viewer"** and choose **"Select"** and then **"Create Web App"**
- Choose a **"Title"**(you may want to append "web app" to the title), **"Tags"** and **"Summary"** and choose **"Done"**
- Go through the **"General"**, **"Theme"**, **"Options"** and search **"Tabs"** and change the configuration as you see fit
- Click **"Save"** and **"Launch"** to see your finished map.
- Here is my finished map! https://arcg.is/10zLni0

Optional Steps

Adding a Layer from Online .csv

Instead of adding a file from your computer you can point to a file online. The advantage of this is that the data can be changed and will update in the app without having to re-upload. Data added this way can't be edited in the map.

- Click **+Add** > **"Add Layer from Web"**
- Choose **"A CSV File"** in the **"Type of data"** dropdown
- Enter into the URL field: https://raw.githubusercontent.com/tech-at-arl/Digital-Scholarship-Institute/master/July%202019/Geospatial%20and%20Temporal%20Mapping/public_art_points.csv
- Click **"Add Layer"**
- You should now see the layer listed under the **"Contents"** tab; you will NOT see the **"Edit"** option on the menu bar for a web layer

Saving to Excel or CSV

- In the table of contents select **"More Options"** for the **"art_points_near_trails_*your_initials*"** and choose **"Show Item Details"**
- In the details view for the layer choose **"Export Data"** and choose **"CSV"**
- Choose an appropriate title for your layer and fill in **"Tags"** and **"Summary"**
- Click **"Export"**