Lab Exercise #10: Interactive web mapping **Due: Friday, Nov. 15**

CRP 4080: Introduction to Geographic Information Systems
Fall 2024

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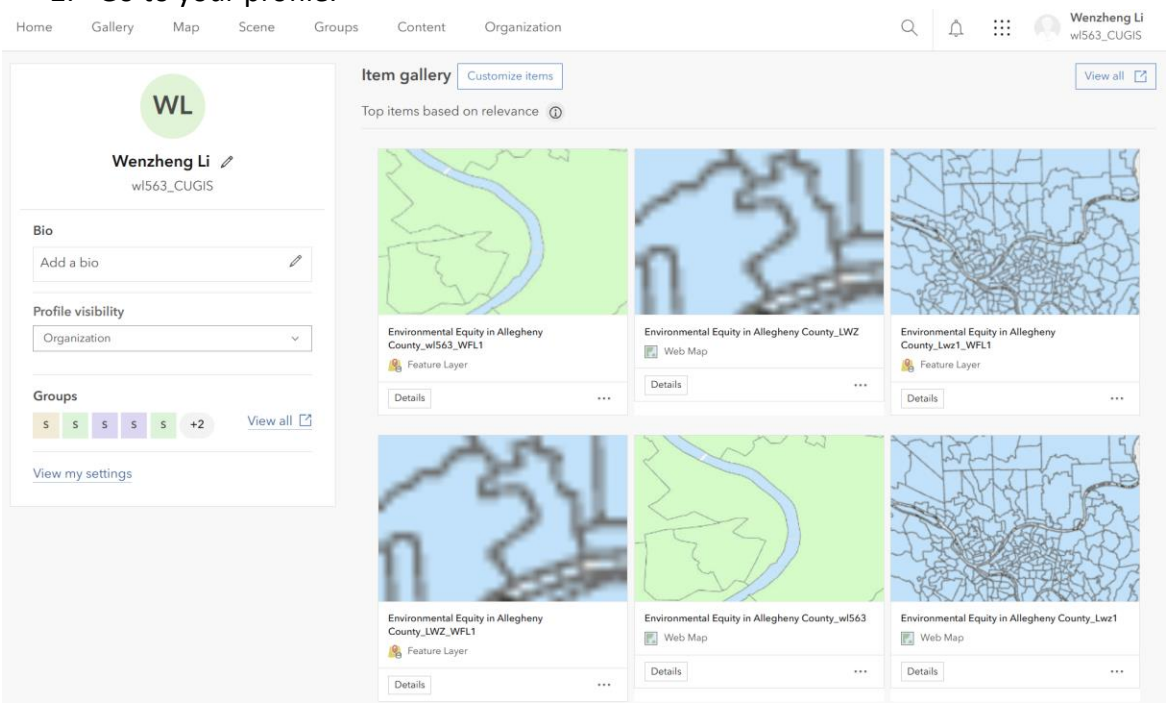
Lab TA: Gauri Nagpal (gn247)
Location: Sibley 305, Barclay Gibbs Jones Computer Lab
Points Possible: 40

In this lab, we will create an online informational interactive map using ESRI StoryMaps that displays municipal tax revenue losses due to sea level rise in Florida, similar to this one: https://storymaps.arcgis.com/stories/e4466555d93842ccb9a3dcc7d255644a.
We will demo this lab using the Florida data set in class, and for the homework we will ask you to create a StoryMap with a dataset for your final project. You will be evaluated on your StoryMap's clarity and descriptive analysis of a data set.

StoryMaps allow you to create interactive web pages that combine maps and text. However, before you can add a map to a StoryMap, you must first make an online map. In the following instructions, you learn how to upload spatial data to your Cornell University GIS (CUGIS) account, create a map, and integrate it into a StoryMap.

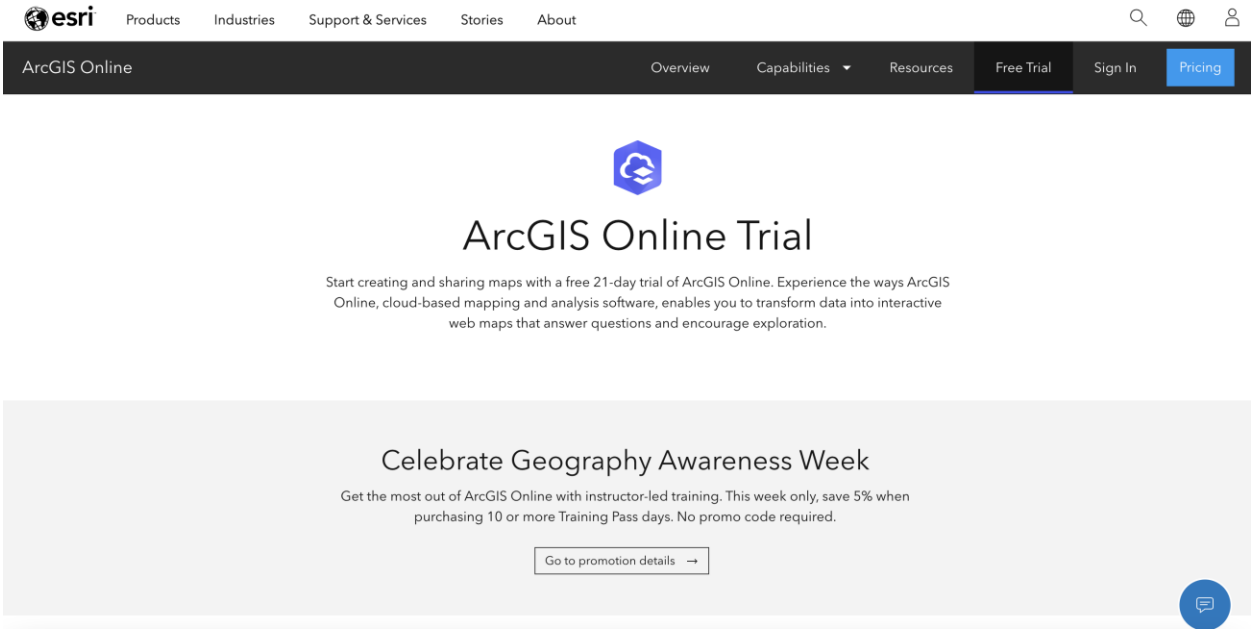
Step 1. Upload data/ Create content
Two Options:

1. Sign in to CUGIS. https://cugis.maps.arcgis.com/home/index.html (You will need to fill a form request)
2. Go to your profile.

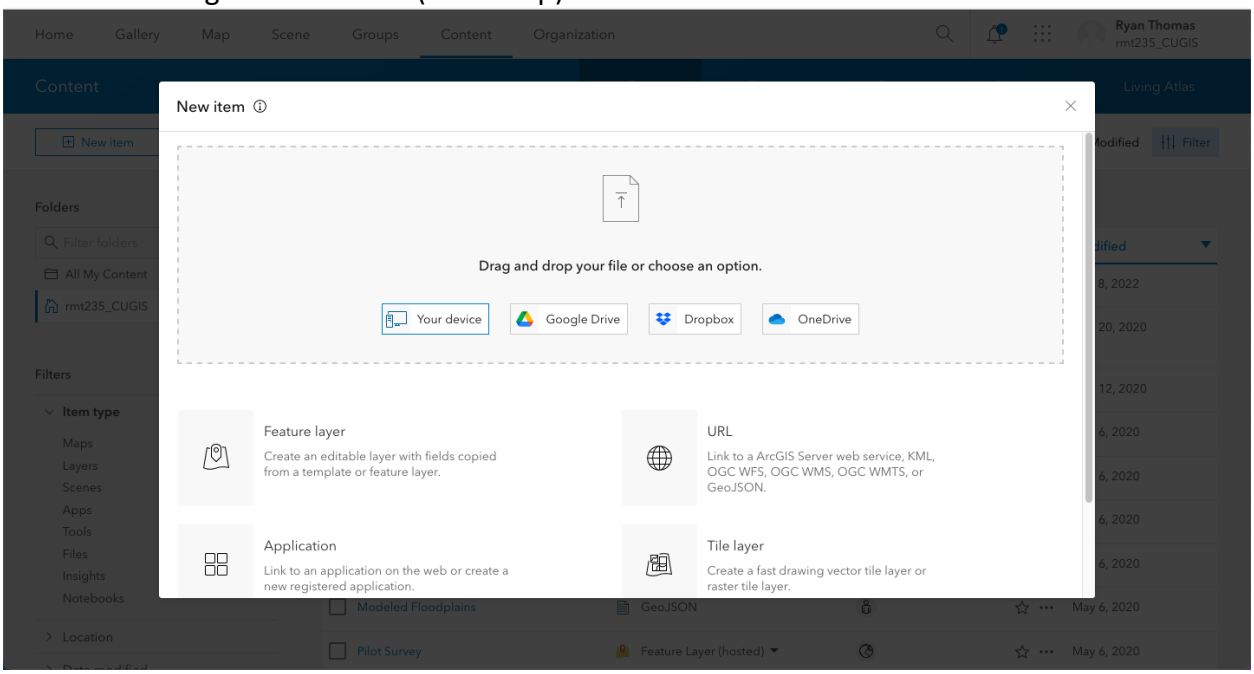


OR for now, create a free trial account.

2. https://www.esri.com/en-us/arcgis/products/arcgis-online/trial



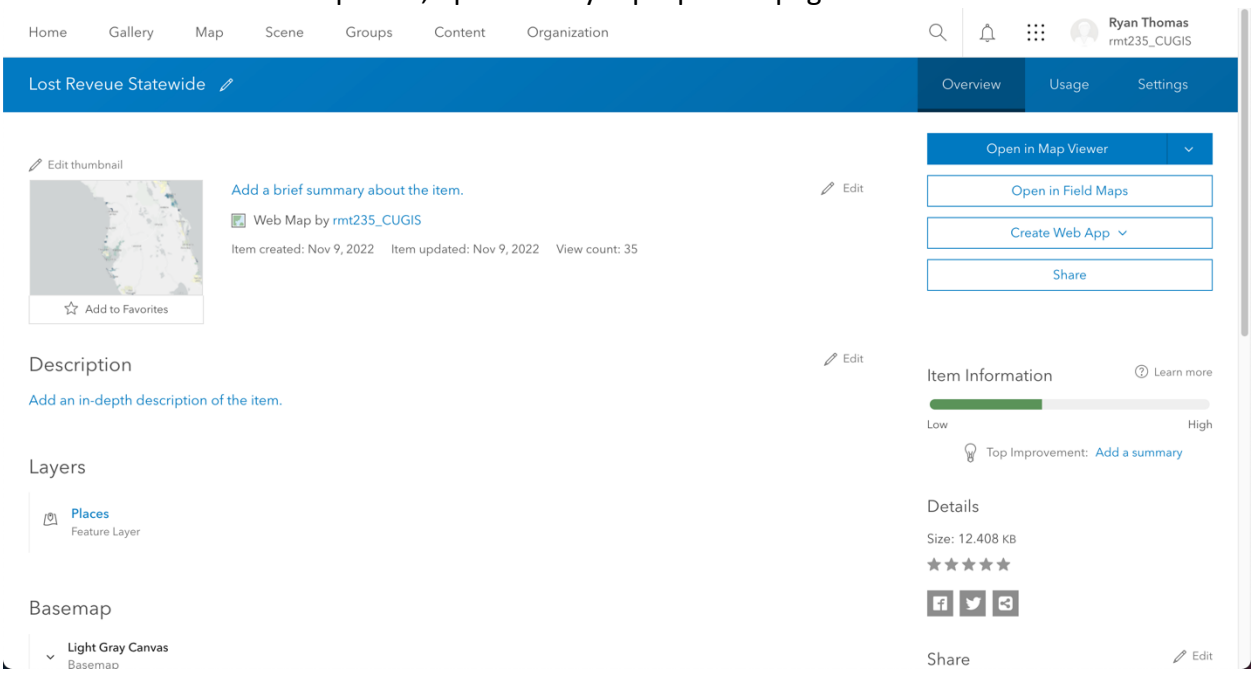
3. Navigate to Content (at the top). Add a New Item.



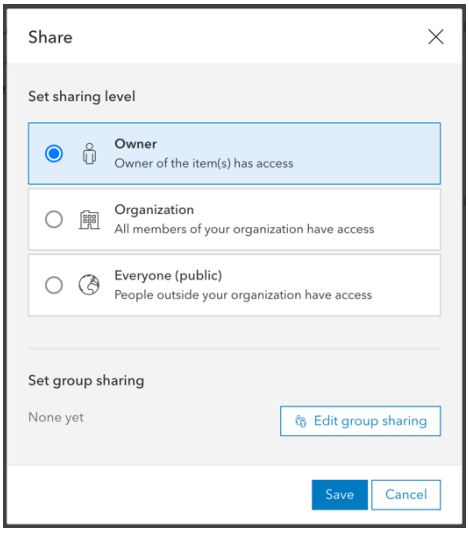
4. Browse to the shapefile of Florida towns and municipalities and add it using the interface.

For this tutorial, we are using a shapefile of Florida towns and municipalities (shown in step 2 below) that displays how much tax revenue they could lose annually in 2100 because of sea level rise.

5. After the file uploads, open the layer properties page.



6. Click Share and change the permissions to allow people from this organization or everyone to view it. If you don't to this, you will get a warning at the end of the third step when you go to publish the StoryMap, and if you continue to publish the map despite the warning, no one will be able to view the map on your StoryMap.

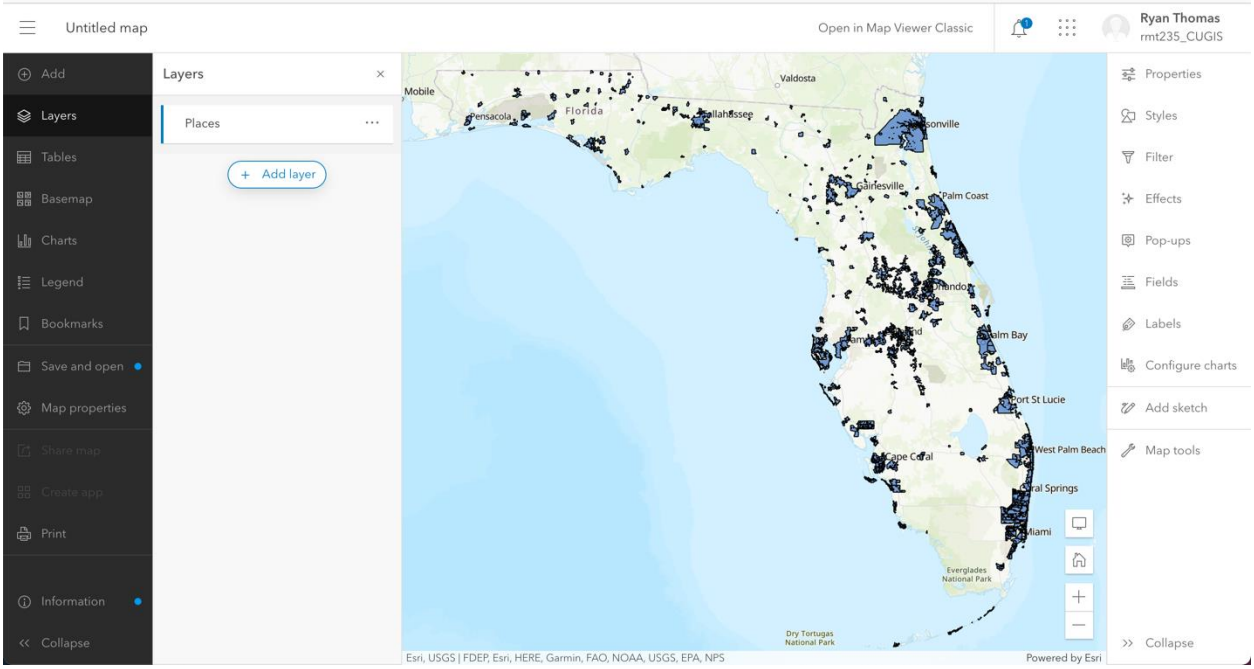


Up to this point, you have created content (a spatial layer) that can be added to a map, which is the first step of making a StoryMap. Note that to add multiple layers to a map, you must upload them first using this process.

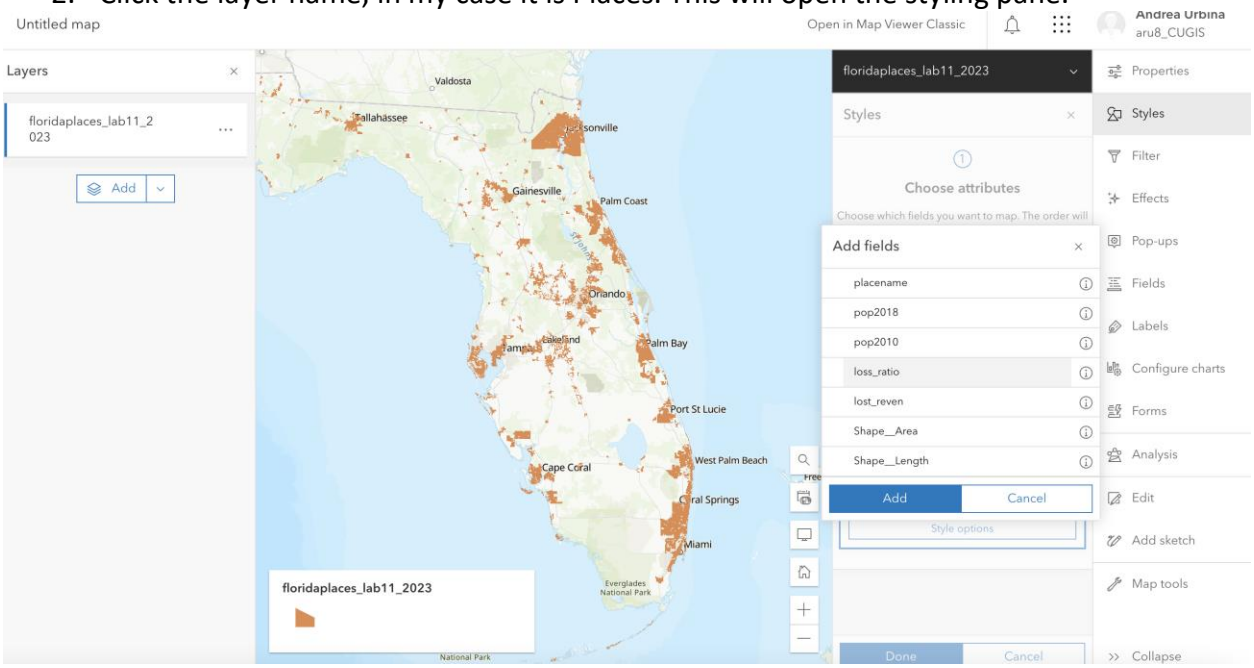
Step 2. Make an online map

After adding content, you can begin to style it into a map, and optionally add multiple layers. Styling is done in Map Viewer. There are two versions of ArcGIS Online's Map Viewer. The current version, and a classic version. It is easy to toggle between the two, and some options are available in the classic version, Map Viewer Classic, that are not available in the newer version. We will use both in this tutorial.

1. From the layer properties page, open the layer in Map Viewer (not classic).



2. Click the layer name, in my case it is Places. This will open the styling pane.



3. Style the layer as you see fit.

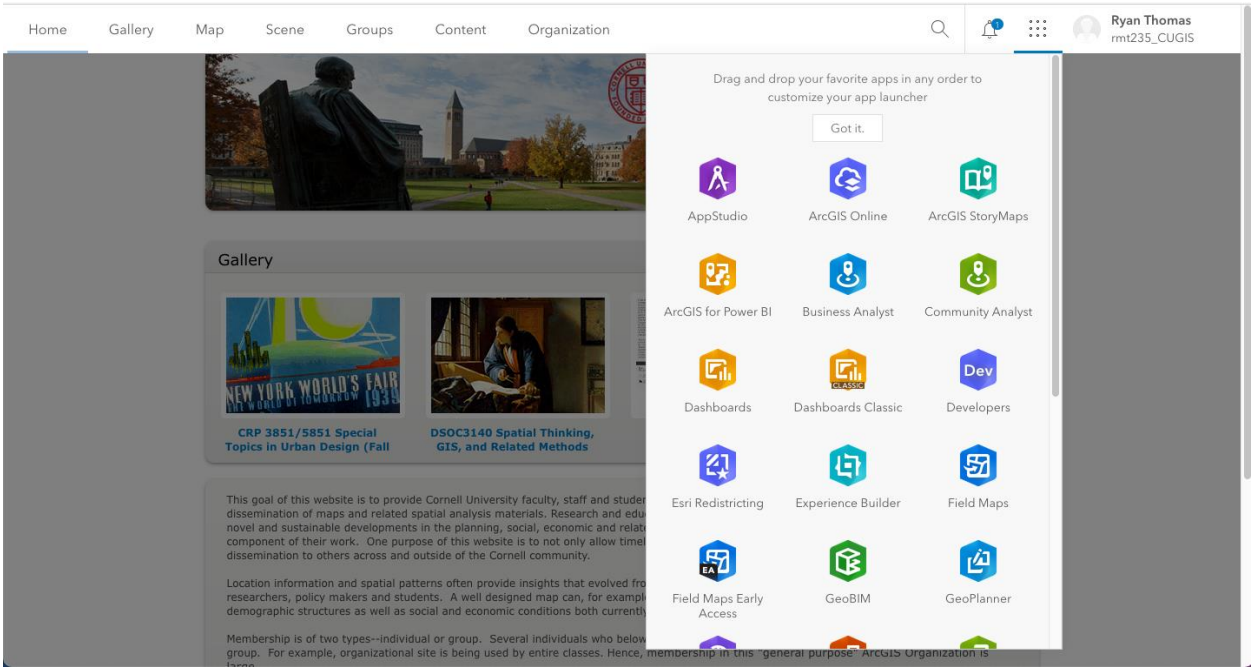
Almost all the styling options from ArcGIS Pro are available in the Map Viewer and Map Viewer Classic. In this case, we will use the lost revenue attribute, which is already normalized as a percent of the total revenue.

4. Once you are satisfied with the layer styling, give your map a name, using Map Properties from the left side of the window.

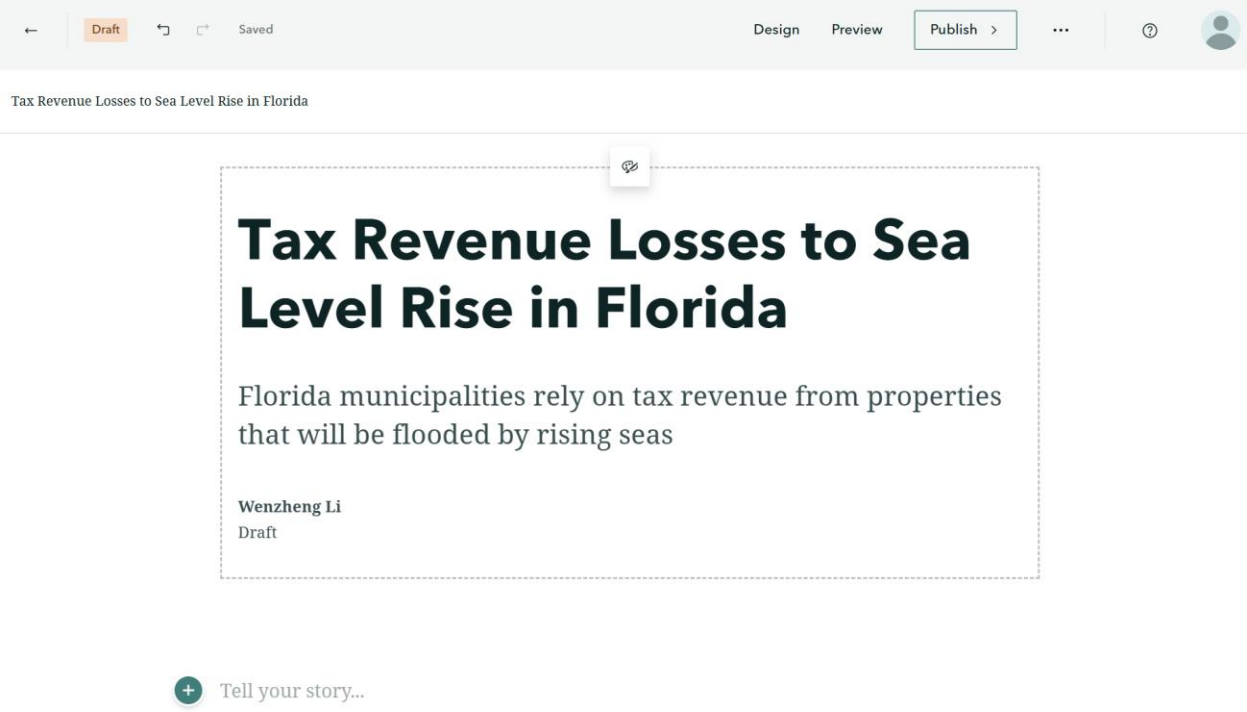
Now we can add this map to a StoryMap. Note that each map you want to include in the StoryMap must be created in Map Viewer before you can include it. Similarly, if you want to make a map with multiple layers, you would add the additional layers at this phase. For now, we will create a new StoryMap and add this map with one layer. Later on, you will need to return to the Map Viewer to create another map or edit this one.

Step 3. Create a StoryMap.
Let's create a new StoryMap and add our new map along with some text. To create a new StoryMap, click the 9-point array at the top of the screen.

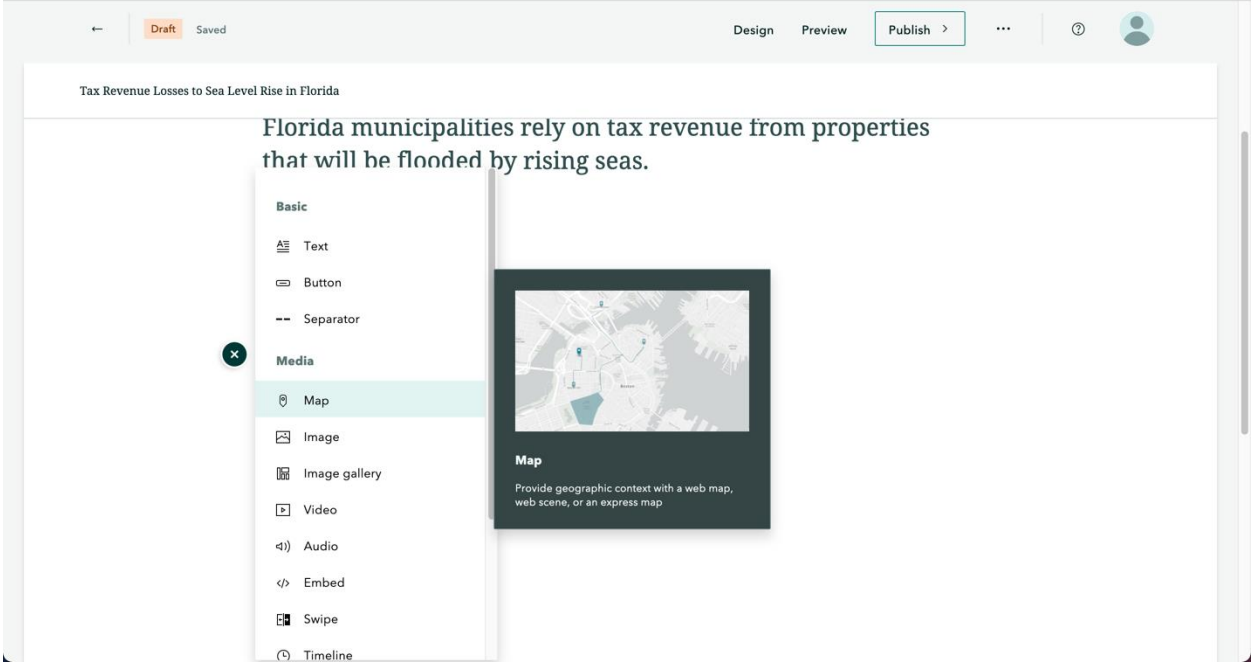
1. Use the top 9-point array to open the app menu, then select ArcGIS StoryMaps.



2. Click Start a story. Give your story a name and brief description.



3. You can use the plus symbols to add new content in the form of Maps, Text, or others. Add the Map.



Now that you have added your map to the StoryMap, you can begin to describe the data using text.

The following steps explain data outliers and create descriptive statistics, and can be done in any order. In your homework, you may have to do this iteratively if you are still learning about your data. Use the descriptive statistics to summarize the data and identify outliers. In my case, I already know about one of the anomalies in the data, so I will do that first.

4. Explain any data outliers

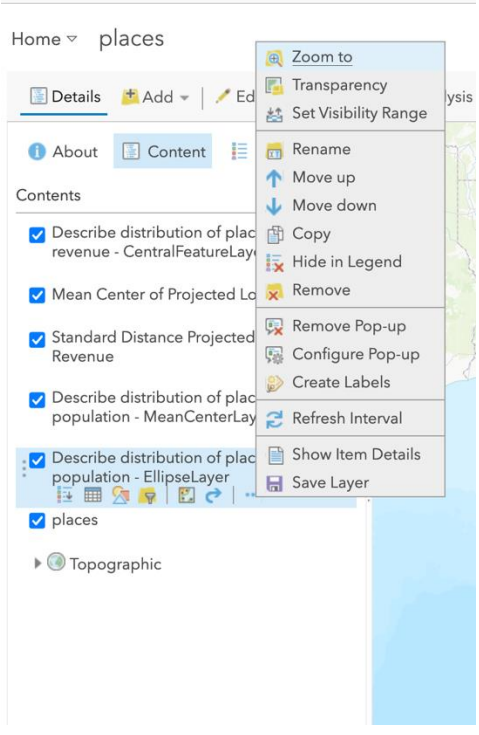
In the Florida data, the percentage of projected lost revenue exceeds 100% for some municipalities. That would raise eyebrows for a curious reader. I offer the following explanation:

"*The formula we used to estimate the projection is based on two data sources, the Census of Governments and the Florida Parcels database for 2017. We calculated property taxes based on the municipal property tax rates and the assessed values in the parcels data set. We also multiplied the proportion of inundated property taxes to the amount of charges and fees reported to calculate the total lost revenue. This led to a few municipalities (9) with higher levels of lost revenue than the amount of total revenue reported in the Census of Government data set. These municipalities are small in population, face high levels of property lose to sea level rise, and we assume this means they would lose 100% of their revenue before the year 2100.*"

5. Choose a descriptive statistic that helps explain the data set and present it in a map.

For my map, I will show the mean center and standard distance for the 2018 population and lost revenue. These simple statistics begin to tell a story about the distribution of losses and the disproportionate burden on South Florida.

For this, we need to open the map in Map Viewer Classic, which has additional options for analysis. Hover over the layer you wish to describe and select the button for Perform Analysis.
On the top go to Analysis, Summarize Center and Dispersion
You will see many options here. I am using Summarize Center and Dispersion under the Summarize Data drop down. Once you select a function, you will see additional parameters to customize the analysis.



6. After running your analysis, rename the layers. Customize the symbology. I changed mine so that the mean center is the same color as the ellipse of the standard (directional) distance.

Homework (40 points)

Upload at least one spatial data layer you will use in your final project. Make a map using the layer. Create a StoryMap with the following items:

1. Provide an overview map that shows the full extent of the data. Style it appropriately. Describe it in text so that your readers understand where it came from and how you will use it. Include a link to the website where you got the data or tell us where it came from. (10 points)
2. Provide a second map or an ArcGIS Dashboard showing descriptive statistics for an important variable. You may copy the procedure I used if it is appropriate for your data. Describe what you see. (10 points)
    a. https://www.esri.com/arcgis-blog/products/ops-dashboard/mapping/create-first-arcgis-dashboards/
3. Add one of the following advanced features (10 points).
    a. Use express maps: https://storymaps.arcgis.com/collections/d34681ac0d1a417894a3a3d955c6913f?item=5
    b. Add a sidecar to your story: https://storymaps.arcgis.com/collections/d34681ac0d1a417894a3a3d955c6913f?item=6
    c. Compare two layers with a swipe block: https://storymaps.arcgis.com/collections/d34681ac0d1a417894a3a3d955c6913f?item=11
4. Publish the map and ask a friend to view it to make sure the permissions are correct. (10 points if I can view the StoryMap after you submit it.)

Submit the link in the assignment on Canvas. An example link like this: https://arcg.is/1550zv