Brock University Maps, Data & GIS
Email: maplib@brocku.ca

Using ArcGIS Online to Map Cases of COVID19 in Ontario

The following instructions outline a workflow for mapping confirmed cases of COVID19 in Ontario using the Summarize Within function in ArcGIS Online, the cloud version of ArcGIS software. Then we'll add census data and create some colour themed maps based on the 2016 census.

PART A: Mapping Confirmed COVID19 Cases in Ontario

Section One: Getting the data

1. To get the most up-to-date count of confirmed COVID19 cases, go to:

Confirmed positive cases of COVID-19 in Ontario (GeoJSON) (updated at noon daily)

https://data.ontario.ca/en/dataset/confirmed-positive-cases-of-covid-19-in-ontario

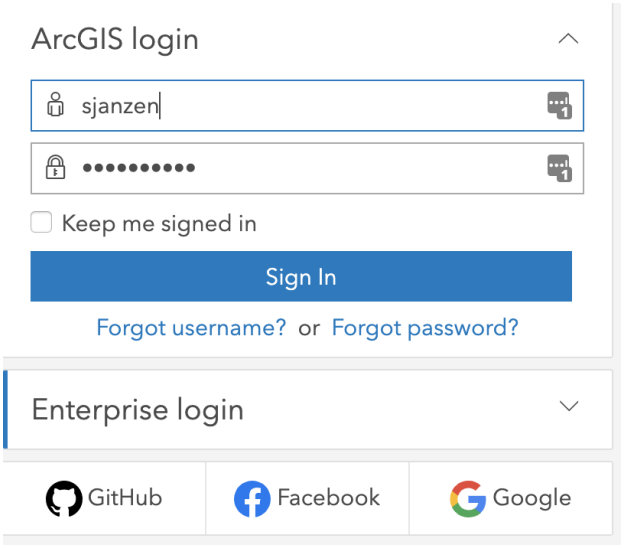
2. Scroll down and select the GEOJSON file to download. This file format can be loaded directly into ArcGIS Online. We will do this in a later step.

3. We also require the Public Health Regions boundary file. This layer will be acquired directly within ArcGIS Online.

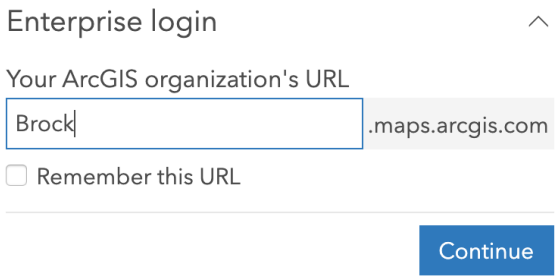
Section Two: Accessing ArcGIS Online

Now that we have our data, we need to sign into ArcGIS Online and load the data to the cloud. This tutorial is using the CLASSIC view of ArcGIS Online. DO NOT USE MAP VIEWER BETA.

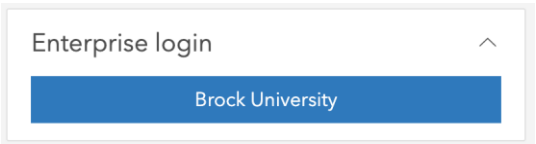
1. Go to https://www.arcgis.com/
2. Click Sign in.
3. Click **Enterprise Login**.



4. Enter the **ArcGIS Organization's URL** as follows and click Continue.



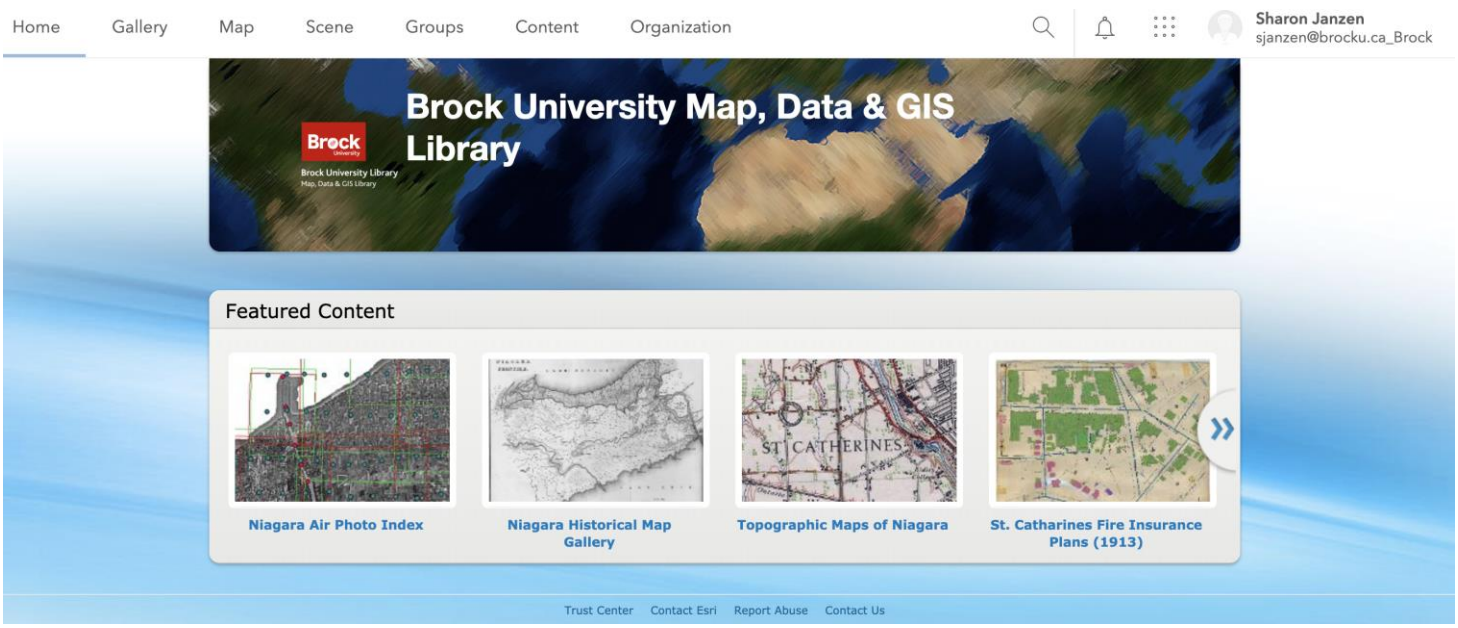
5. Click **Enterprise Login > Brock University**.



You will be taken to the Brock authentication page. If you are already signed into Brock on another tab, the app may bypass this page and take you straight to ArcGIS Online.

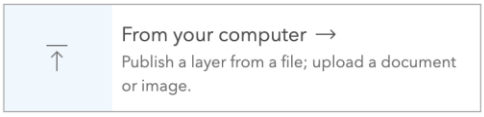
The Brock University ArcGIS Online Organization page appears:

Brock University Maps, Data & GIS
Email: maplib@brocku.ca



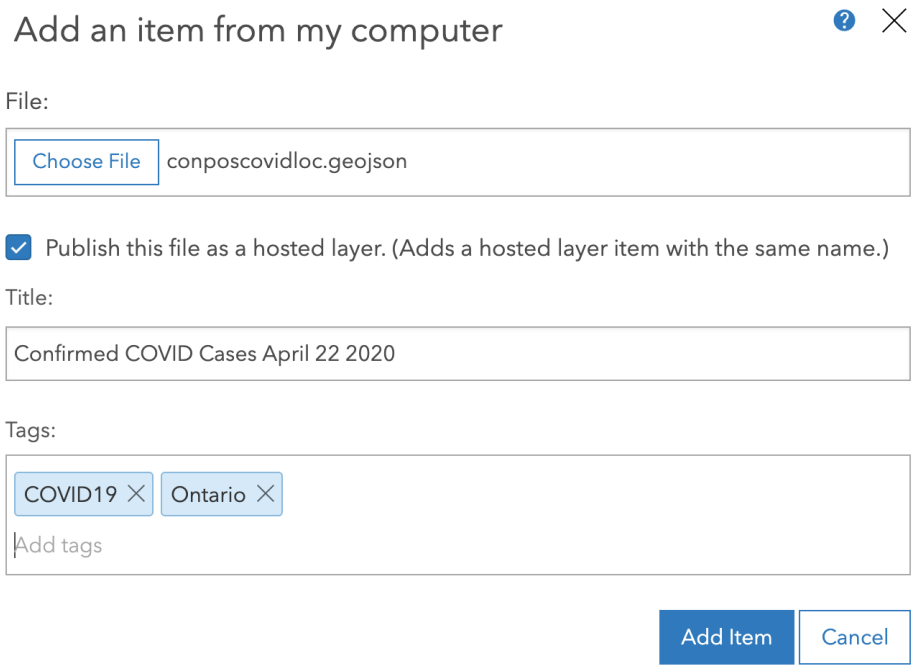
Section Three: loading data into ArcGIS Online

1. At the top of the window, click Content.
2. On the left, click 

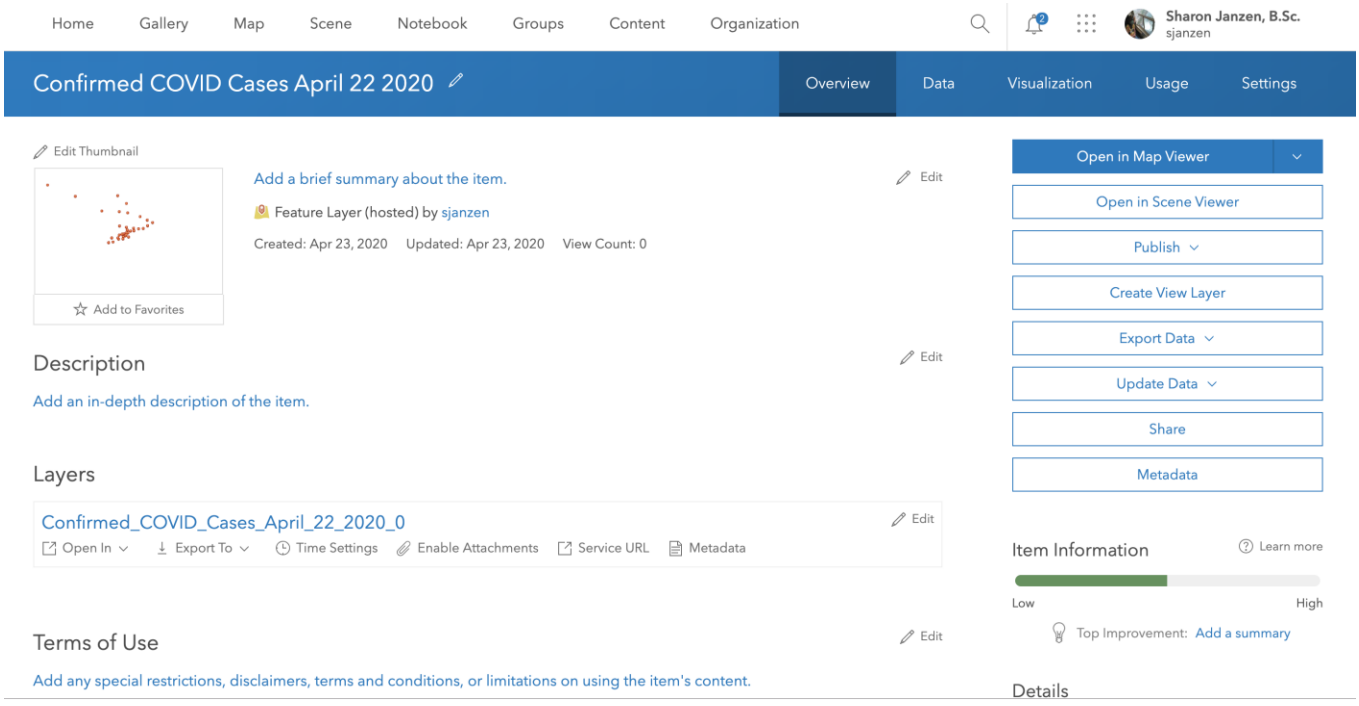
--> 

3. Browse to your DOWNLOADS directory and select the GeoJSON file downloaded in a previous step. ("conposcovidloc.geojson")
4. Provide an appropriate title. (DO NOT USE special characters. See example below.)
5. Add tags by clicking in the **Tags** box, typing a keyword and hitting enter on the keyboard.
6. Click **Add Item**.

Prepared by: Brock University
Map, Data & GIS Library, 2020
Maplib@brocku.ca

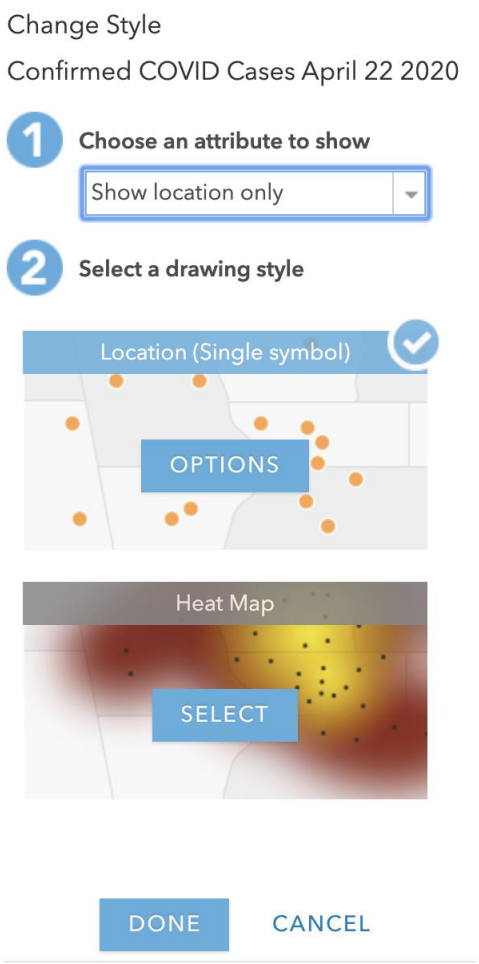


7. An **Item Details** page appears.

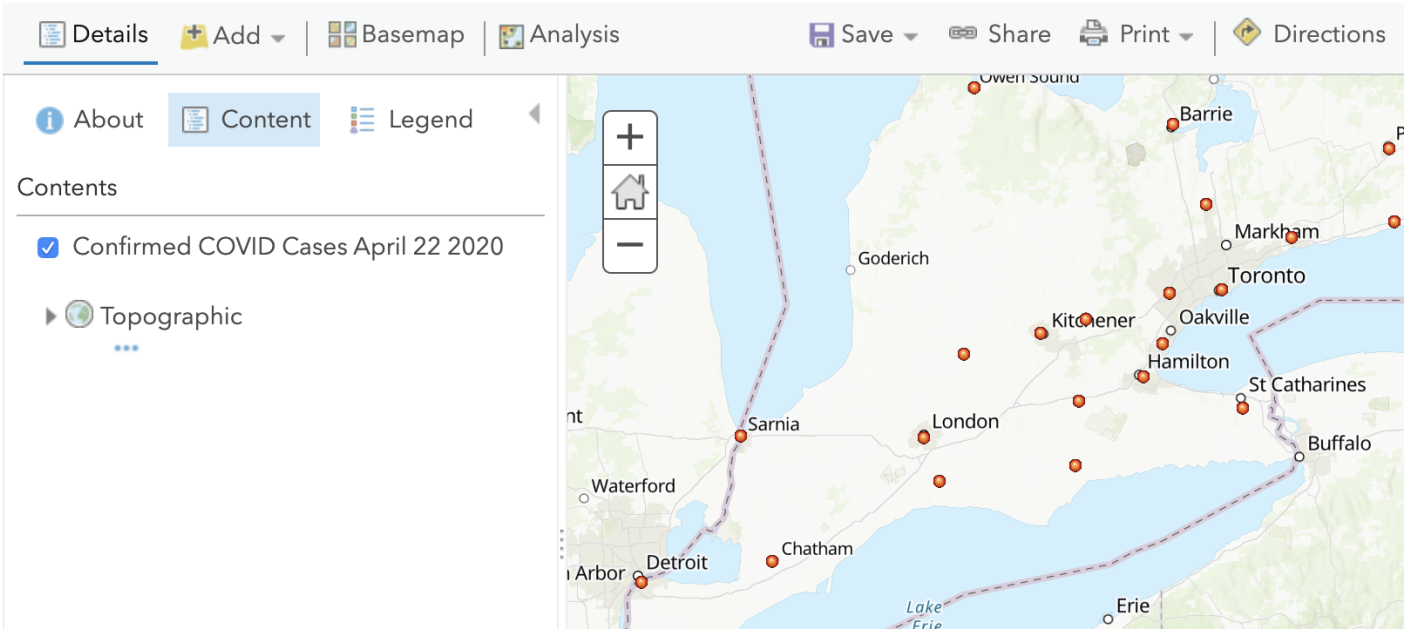


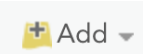
8. Each section of this page can be modified by clicking the **Edit** button to the right of a section. For now, we will add the layer to the map viewer.
9. Click **Open in Map Viewer**. The feature layer is added to the map viewer and automatically symbolized according to postal code.

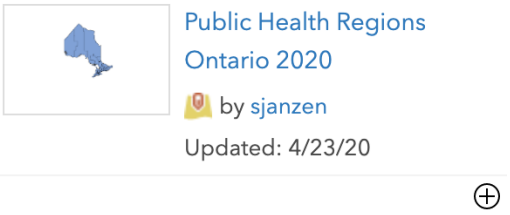
10. Under step **1: Choose an Attribute to Show**, select the topmost option: **Show location only**.
11. Click Done.



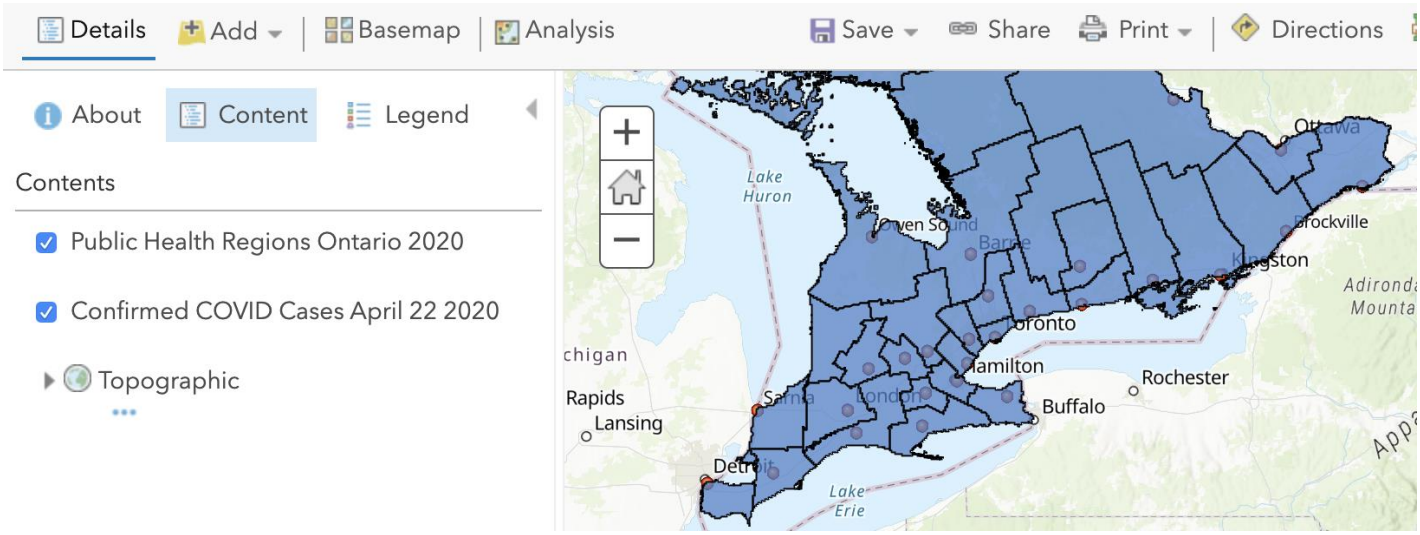
This map includes a single point per case mapped by Public Health Region. It is difficult to see the total number of cases per health unit (the points are piled on top of one another) so we will summarize this data based on the public health unit boundary and symbolize it using proportional symbols.



12. To add the **Public Health Region** boundary layer, click  > **Search for Layers**.
13. Change the location from **My Content** to **ArcGIS Online**.
14. Enter the keywords “Ontario Public Health Regions COVID19”. There are many such layers available but if you enter the keywords as described here, you should see a feature layer by sjanzen.
15. Click the plus sign to add the layer to the map.



16. To return to the layer listing, click the Details tab.



The layers are drawn in the order they appear in the layer listing (CONTENTS).

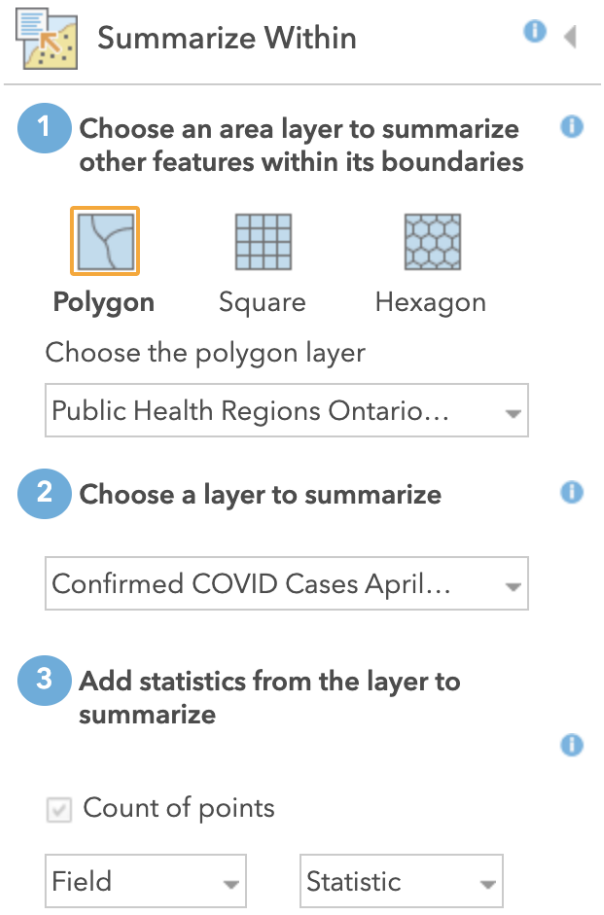
17. Rest the mouse over the Confirmed COVID cases layer and click/drag the 3 *vertical* dots up until it rests above the Public Health Regions layer.

Section Four: Aggregate Mapping

The **Summarize Within** tool provides an aggregate count of the points (COVID cases) within a boundary file (Public health regions) while at the same time summarizing the details of an attribute in the database (I.e. outcome of a case).

1. Click 

2. The **Summarize Within** dialogue window appears to the left of the map.

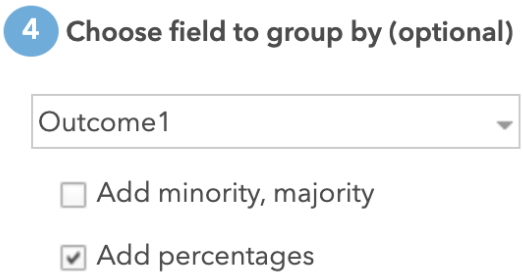


For Step 1: Choose a polygon layer, select "Public Health Regions Ontario".

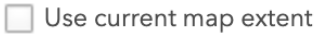
For Step 2: Choose a layer to summarize, select "Confirmed COVID Cases..."

For Step 3: accept the defaults

For Step 4: Choose field to group by (optional), select "Outcome1" from the dropdown. And check the box beside Add percentages. This will add up the various outcomes of each case and display them as a percentage of the total cases in a pie chart.

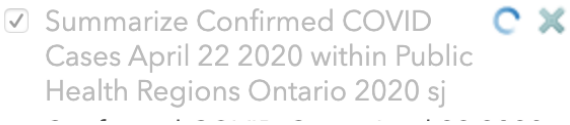


For Step 5: Result Layer Name, accept the default.

Below step 5 uncheck the box 

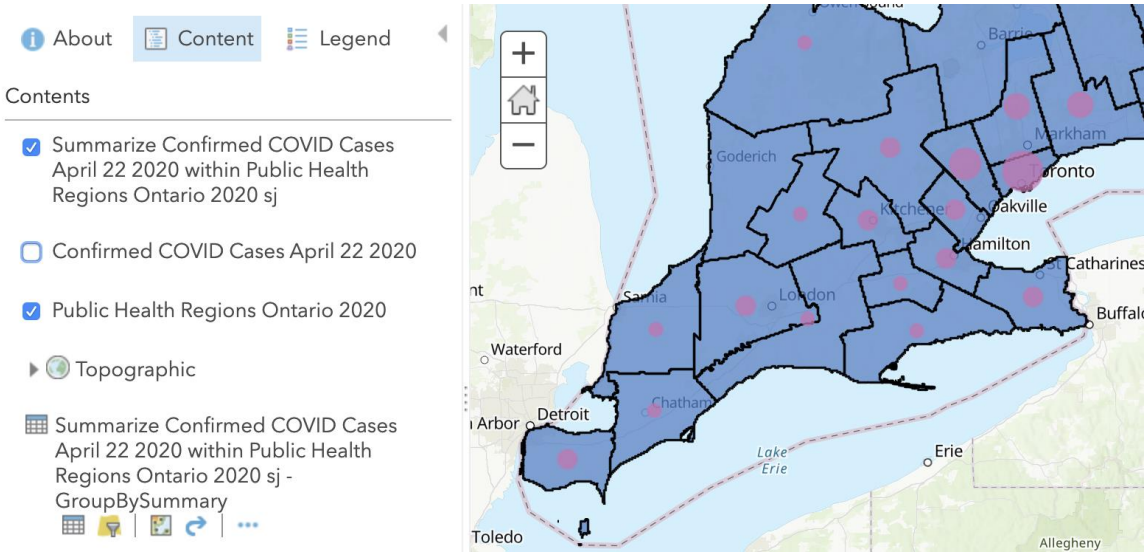
to ensure all of Ontario is captured in the analysis.

3. Click RUN ANALYSIS.
4. A new layer appears with a processing symbol showing the status of the tool. It may take several seconds to run the tool.

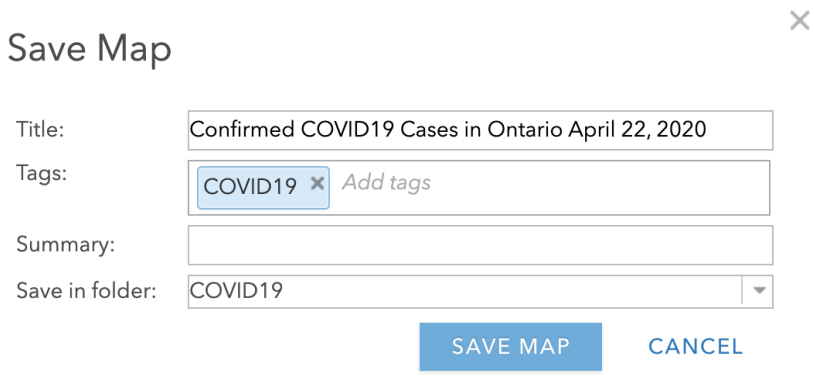


The resulting layer automatically displays proportional symbols based on the count of points within the Public Health Region boundary layer.

5. Turn off the original COVID19 cases layer (represented by orange dots). HINT: click the blue checkmark to turn the layer off.



6. Above the map, click **Save > Save as** to save the map to the cloud. Provide a suitable title, tags and summary.
7. **Click SAVE MAP**.



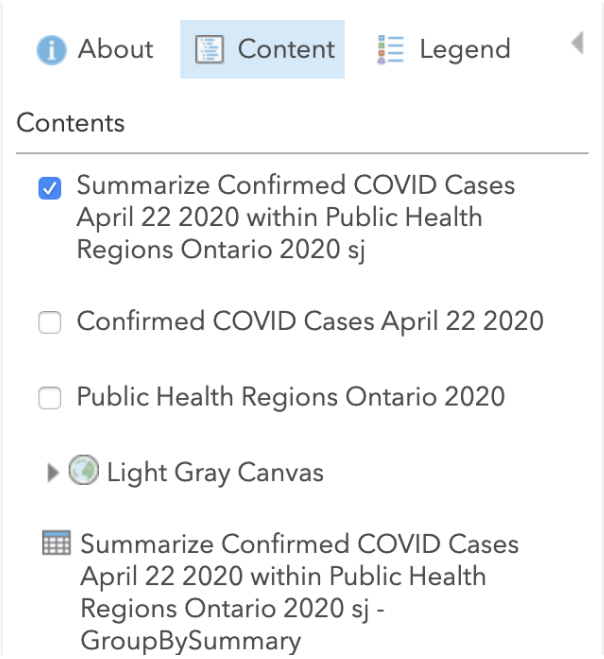
Section Five: Symbology & Pop-ups

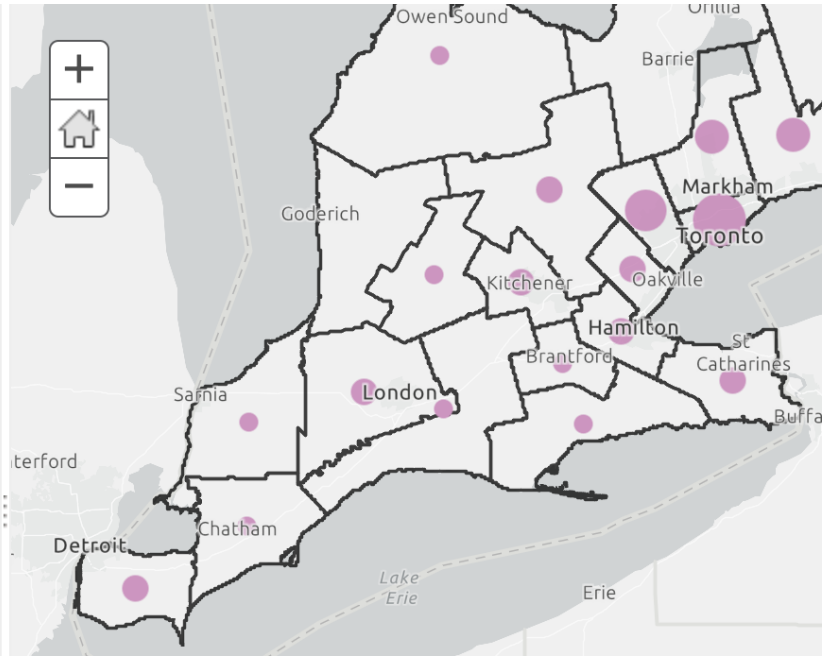
In this section, we will be looking at changing the look of our map and customizing the popup to reflect relevant information.

To make the data the focal point of the map, we will choose a different base map.

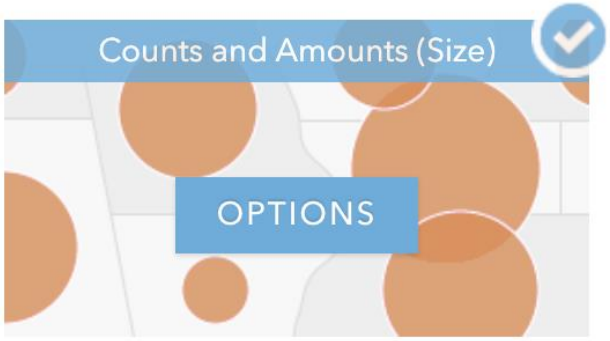
1. Click 

and select the light or dark gray canvas.
2. TURN OFF Public Health Regions layer. HINT: uncheck the blue box. The summarized layer includes the boundary of each Public Health Region.

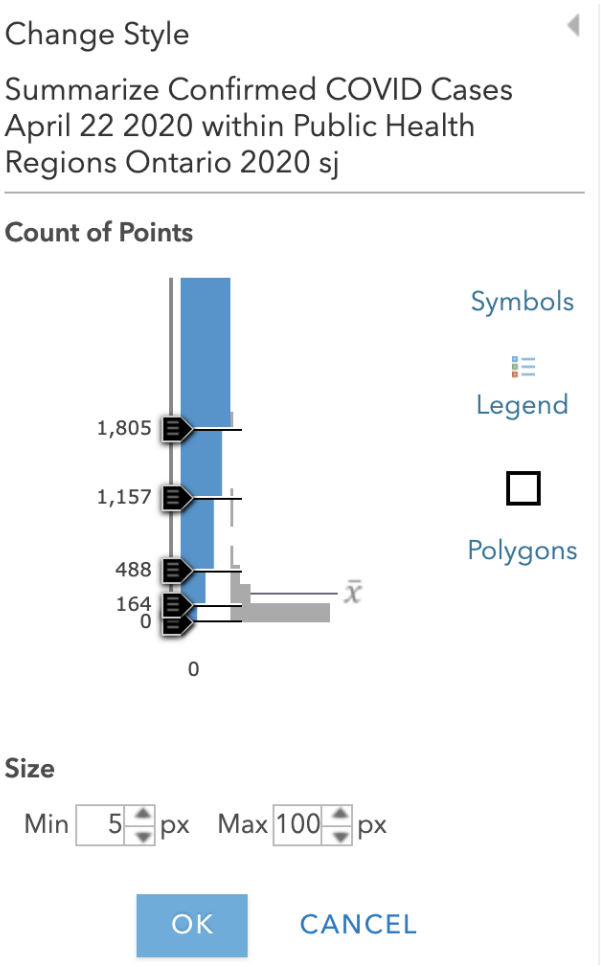




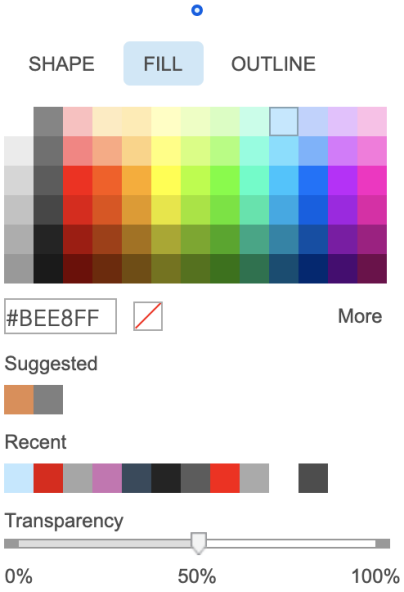
3. To adjust the intervals for the proportional symbols, click the 'change style' button  below the title of the summarized layer ("Summarized Confirmed COVID Cases April 22 2020...").
4. Click OPTIONS below 'Counts and Amounts (Size)'.



5. Adjust the max class range to be approximately double the next largest (click the number and enter a value, i.e. 1800).
6. Adjust the symbol size to be **min 5 pts** and **max 100 pts**

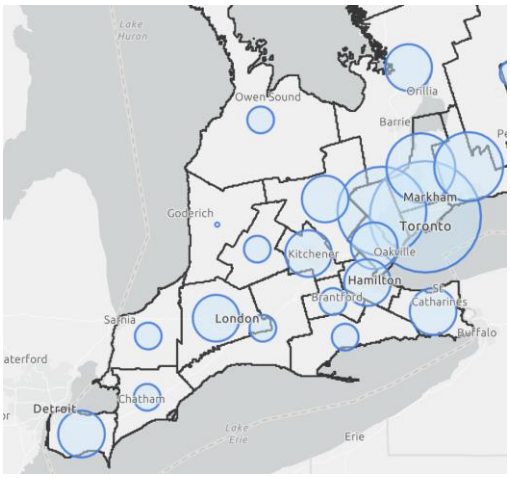


7. Click “Symbols” to the right of the sliding scale.
8. Click the Fill tab then select a pale blue colour.
9. Adjust the transparency to 50%.

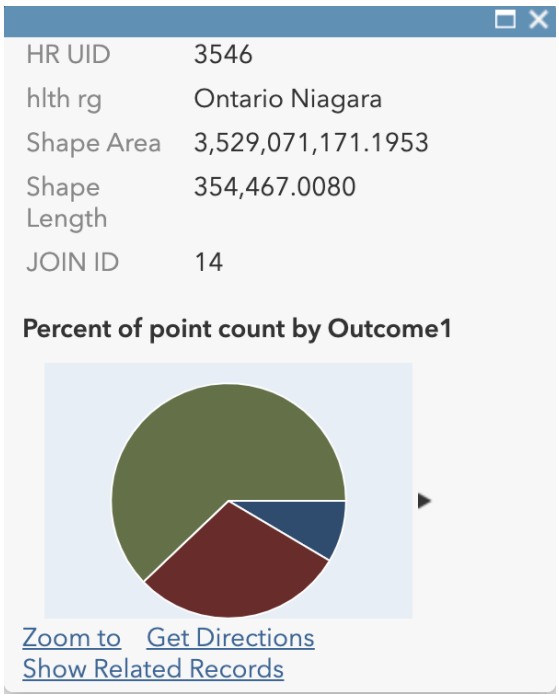


10. Click OUTLINE and select a bright blue colour and change the **Line Width** to 2.

11. Click OK.
12. Click OK then Done to return to the map.



13. Click a point on the map to see the default pop-up that includes a pie chart of outcomes (you may need to scroll down in the pop-up to see the pie chart). Rest your mouse (or click) a pie wedge to see the details that include the percentage of cases unresolved, resolved or fatal.

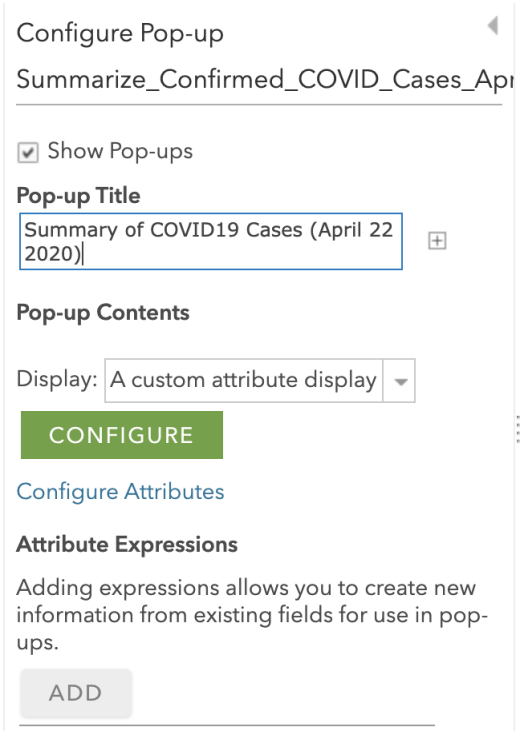


14. SAVE YOUR MAP!

Configuring the Pop-up

15. Click the title for the summarized layer and click the ellipses to access more options.
16. Click **Configure Pop-up**.
17. Enter a title for the pop-up (i.e. “Summary”).

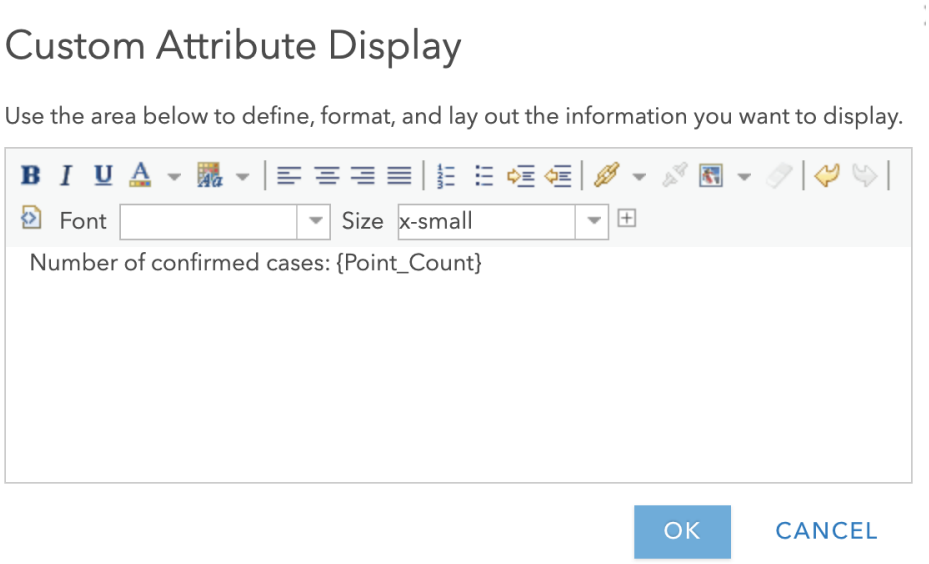
18. Beside Display, click the dropdown and select **A Custom Attribute Display**.
19. Click the green **CONFIGURE** button.



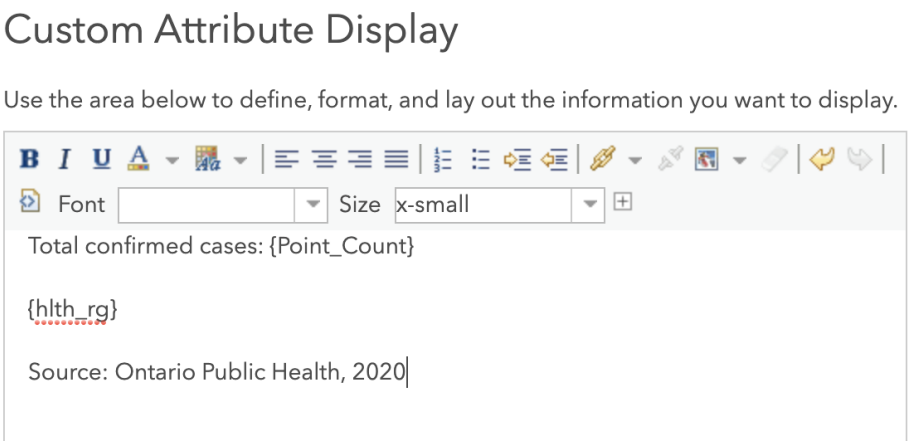
The window that opens provides you with some basic tools for creating a custom pop-up display.

20. Click in the text box and type “Number of confirmed cases:”.
21. To enter the “point count” field data, click the little plus sign to the right of 

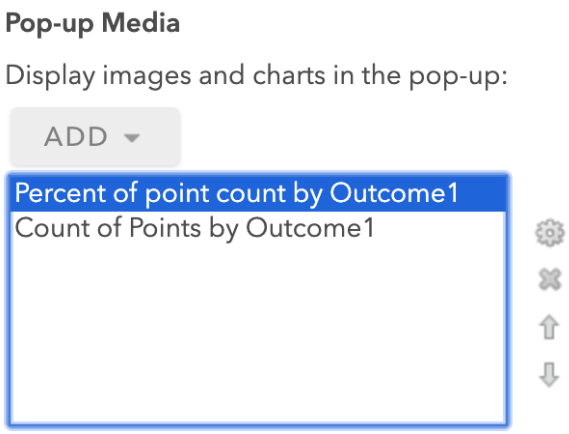
. The field name appears inside curly brackets.



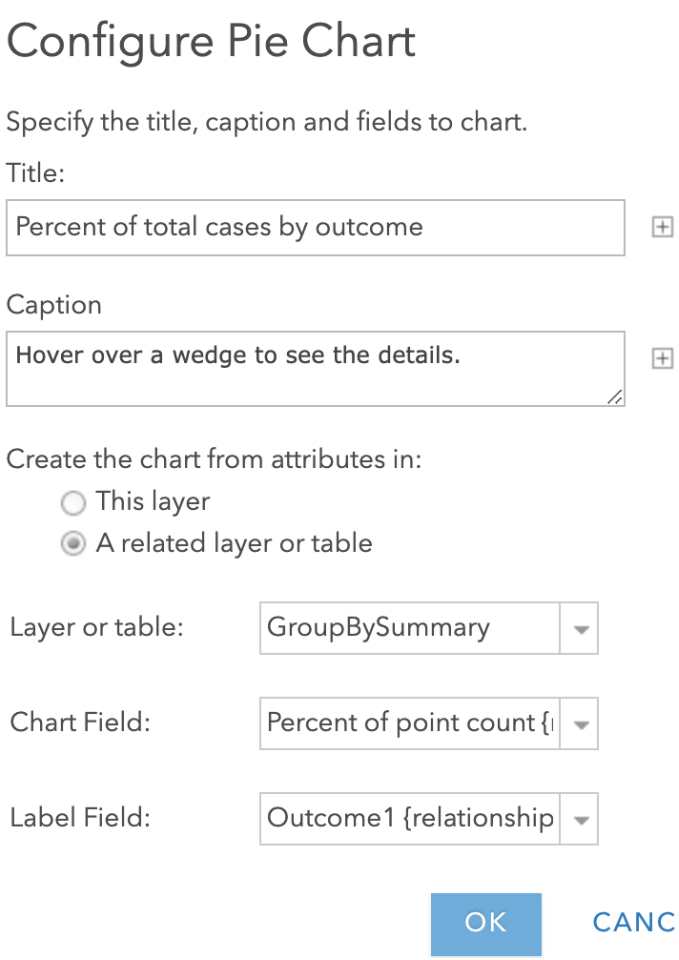
22. Add other details such as sources for the data or other statistics of interest.



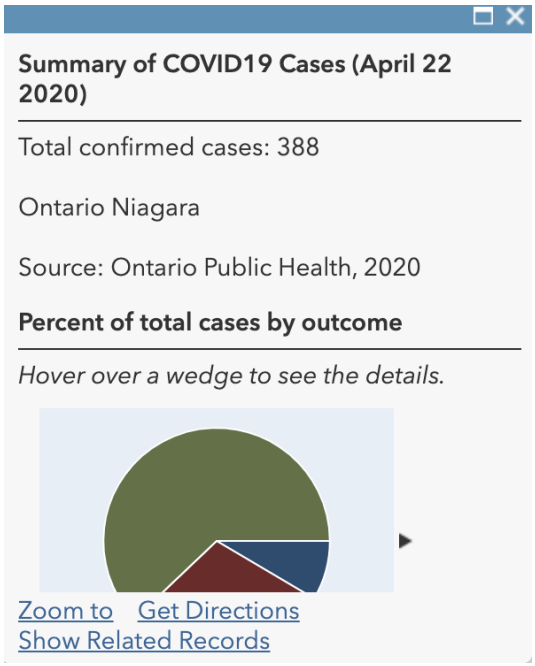
23. Click OK.
24. Scroll down to see additional details. Under **Pop-up Media**, click "Percent of point count by Outcome1" then click the gears button  to access settings.



25. The Configure Pie Chart dialogue box appears. Enter an appropriate title and caption (see below).
26. Accept the rest of the defaults and click OK twice to return to the map view.



27. Click a point on the map to see the pop-up. NOTE: You may need to hit the **Next Feature** arrow next to the X in the top right corner of the popup.



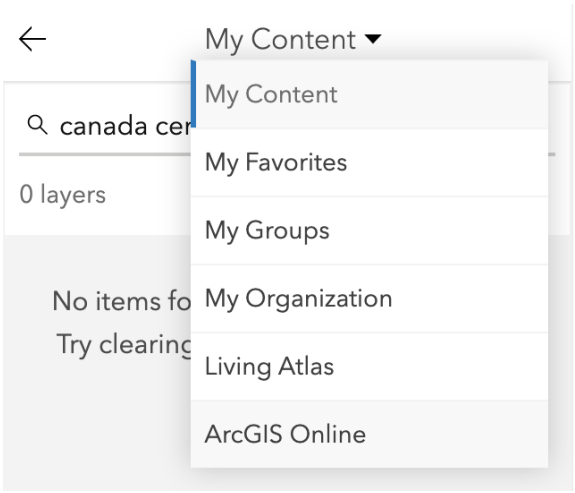
28. SAVE YOUR MAP!

PART B: Census Mapping

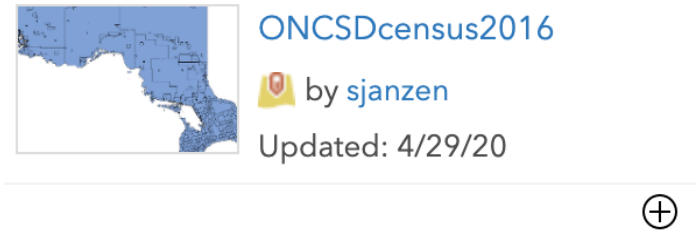
Section Six: Adding Census Data

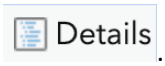
1. Click the Add button 

and select **Search for Layers**.
2. Click the dropdown under **MY CONTENT** and select **ArcGIS Online**.

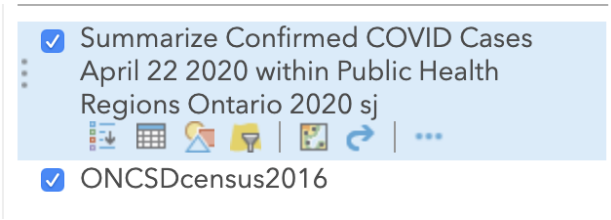


3. Enter the search term “Ontario census COVID19” without the quotations. The result should list an item created by “sjanzen”.
4. Click the plus sign to add the **ONCSDcensus2016** layer to the map.



5. To return to the CONTENTS listing, click the Details tab 

. The census subdivision layer appears on top of the summarized data layer.
6. Click the 3 vertical dots beside the Summarized layer and drag it up until you see the dashed line and drop it there.



7. Turn off the summarized data layer by clicking the check box to the left of the title.

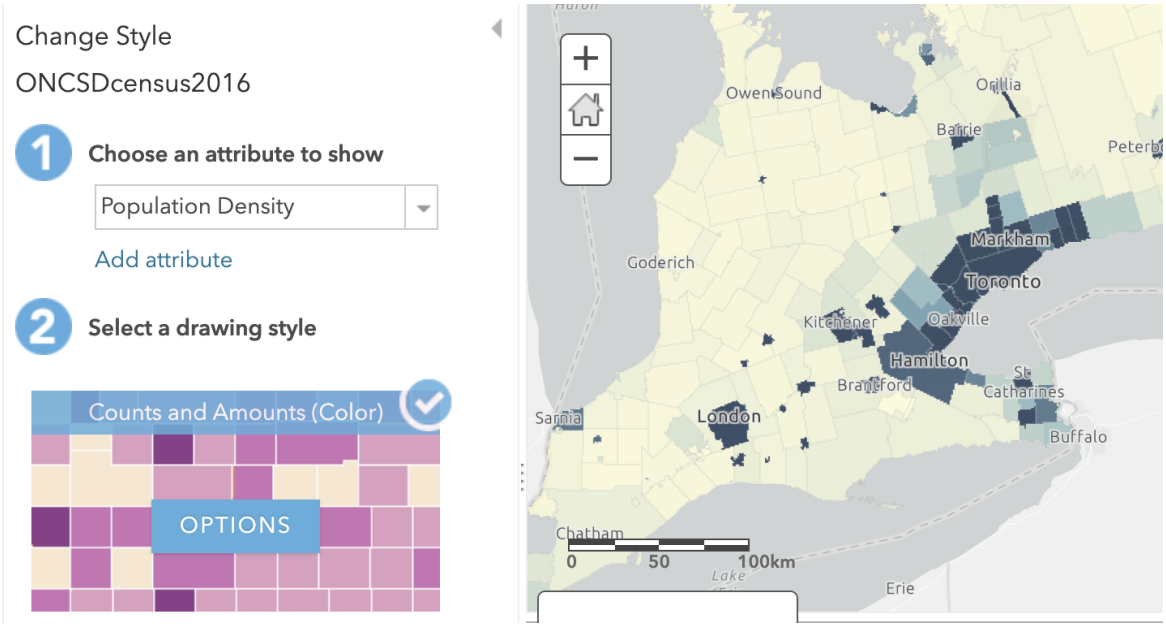
The census data layer is showing the census subdivision boundaries on the map. There are census data variables attached to these boundaries.

8. Hover your cursor over the ONCSD2016 layer and click the table button  . The table shows the attributes associated with each census subdivision in Ontario. The selected subset of census variables includes Population Density, Average Age, Percent Seniors and Median Household Income.

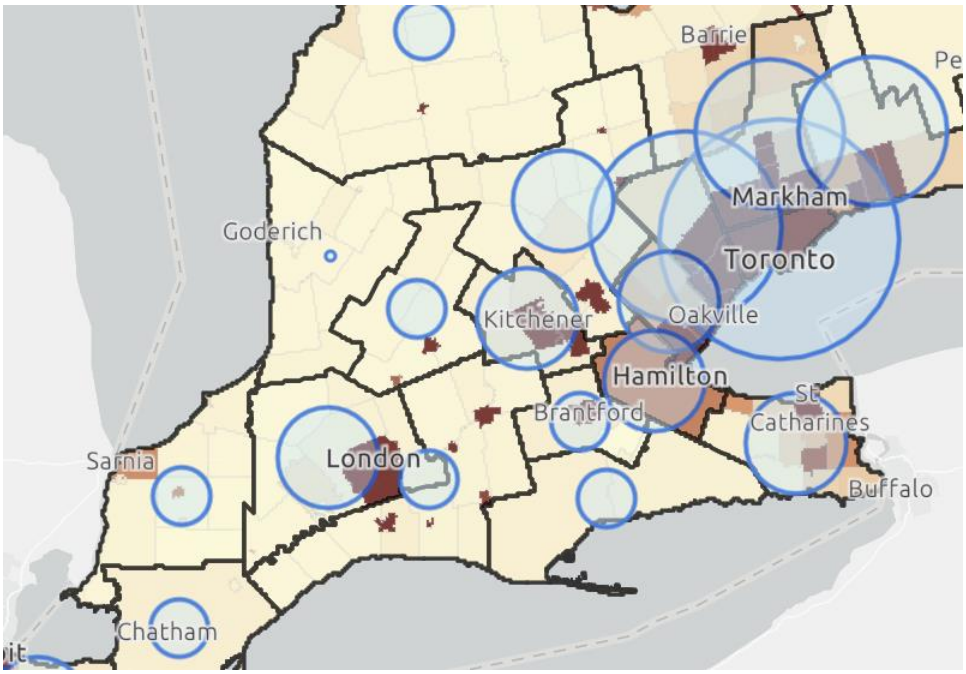
ONCSDcensus2016 (Features: 575, Selected: 0)

CSDNAME	GeoUID	Population Density	Average Age	Percent Seniors	Median Household Income
Gravenhurst	3,544,002.00	23.80	48.60	27.40	59,648.00
Bracebridge	3,544,018.00	25.50	46.30	25.10	69,461.00
Callander	3,549,066.00	36.40	44.30	20.30	86,455.00
Orangeville	3,522,014.00	1,851.90	38.70	14.00	85,241.00
Prescott	3,507,008.00	856.20	47.10	26.70	46,293.00

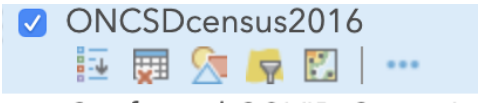
9. To create a classified map showing a census variable, click the Set Style button  below the **ONCSDcensus2016** title.
10. Under Step 1 **Choose an attribute to show**, select Population Density from the dropdown list.



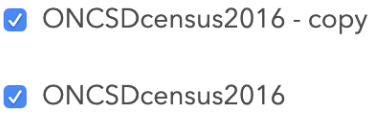
11. Under Step 2 **Select a drawing style**, click **OPTIONS**.
12. Click  Symbols and choose a brown to cream colour swatch.
13. Click OK then click Done to return to the map.



14. Below the title of the census data layer, click the 3 dots to the right of the tools to select More Options.

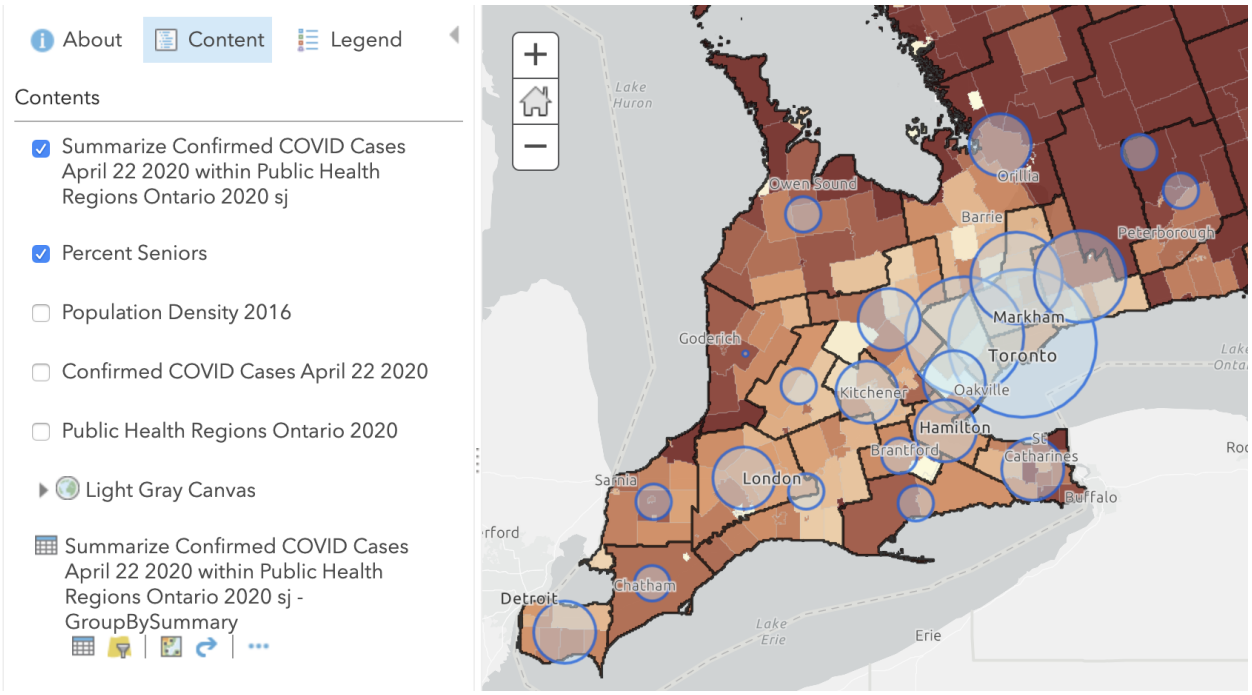


15. Click Copy and the layer duplicates itself in the layer listing. You may need to rearrange the layer order as in a previous step.



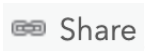
16. Click More Options on the original layer **ONCSDcensus2016** and select **RENAME**. Assign a descriptive name such as “Population Density”.
17. Now, using the copied layer, change the layer style to reflect another census variable such as “Percent Seniors”. This variable describes the percentage of the population who are 65 years of age and over.

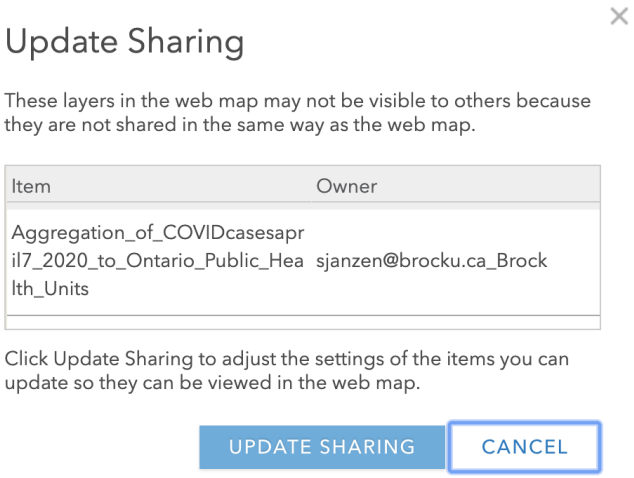
Brock University Maps, Data & GIS
Email: maplib@brocku.ca



18. SAVE YOUR WORK!

Section Seven: Sharing

1. Click the **Share** button  at the top of the map.
2. Select **Everyone** and you will be prompted to update sharing on the layers added to your map.
3. Click **UPDATE SHARING**.



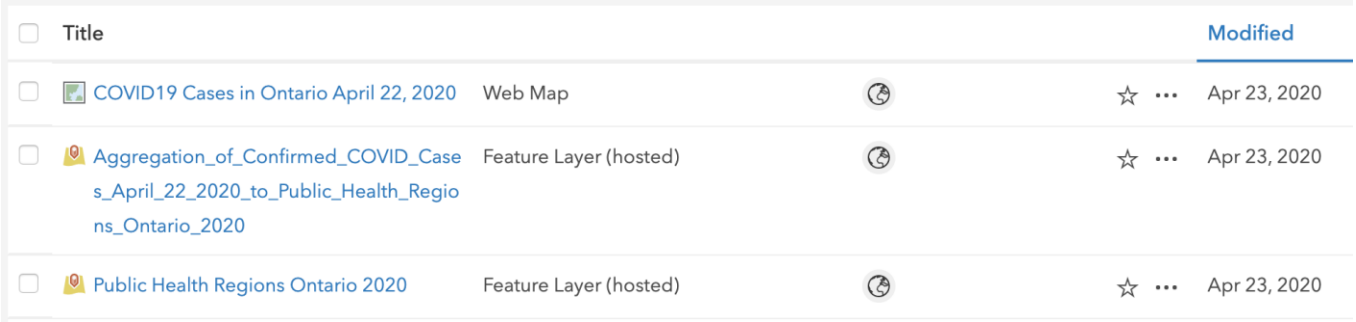
4. Copy the link provided or click a social media button to share the map in that way.

Prepared by: Brock University
Map, Data & GIS Library, 2020
Maplib@brocku.ca

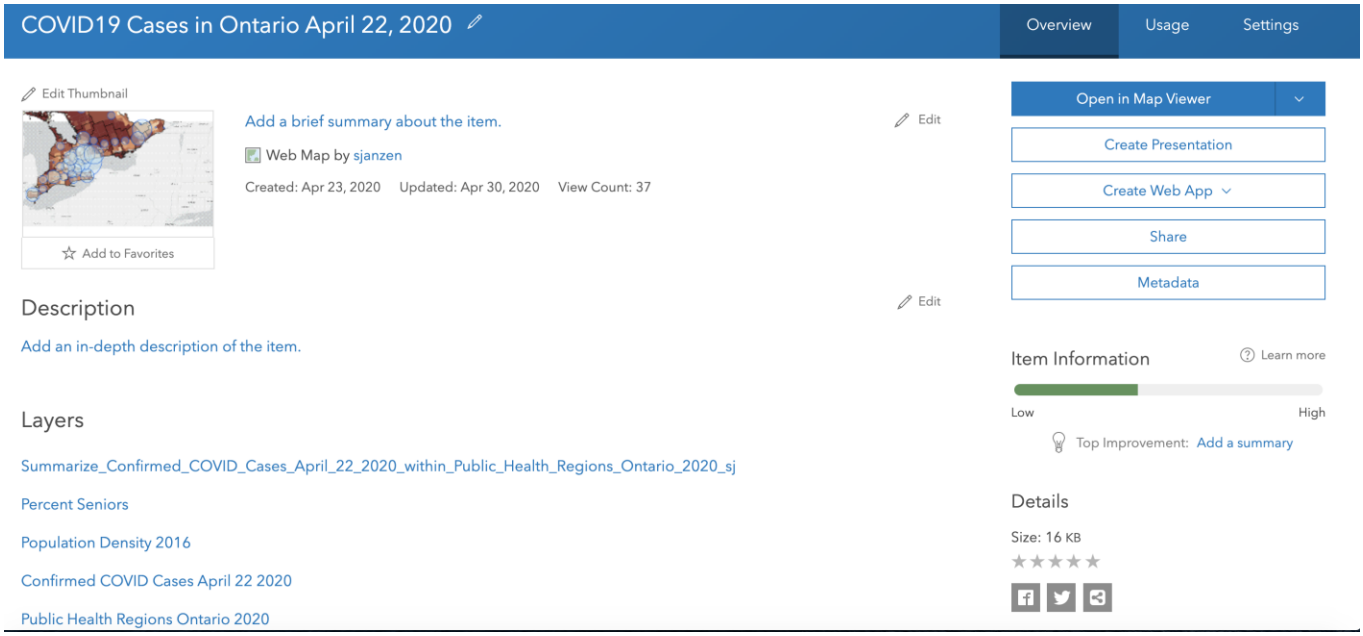
5. Click DONE when finished.

Section Eight: Accessing a Previously Made Map

1. Sign into ArcGIS Online (as described in SECTION TWO).
2. Click on the CONTENT tab at the top of the browser window. You will see a listing of all the feature layers and web maps you've created under your Brock credentials.



3. Click the title of an item to see the Item Details page.



4. Click **Open in Map Viewer**.

Brock University Maps, Data & GIS
Email: maplib@brocku.ca

Congratulations! You've completed this tutorial. There are many tutorials and resources available in the ArcGIS Online HELP pages.

STRETCH EXERCISE

Using what you have learned in the above tutorial, add another layer to your map (search ArcGIS ONline for "ICU COVID19 April 22"). Explore the attribute table and try to create a colour coded map showing the number of ICU beds for each LHIN (Local Health Integrated Network). Do you see regions at risk, given the number of confirmed cases? What other data would be useful for analyzing the situation in Ontario?

For more information about COVID19 in Canada, explore this web app created by ESRI using 'live' data.
https://resources-covid19canada.hub.arcgis.com/app/82e586188b7049e1896b771cd4875815

University of Toronto hosts up-to-date sources for COVID19 from their site "How's my Flattening?"
https://howsmyflattening.ca/#/home

Sources used in this exercise:

Confirmed Positive Cases in Ontario by the Government of Ontario, https://data.ontario.ca/en/dataset/confirmed-positive-cases-of-covid-19-in-ontario

COVID-19 Canada Health Regions by the University of Calgary,
http://geo.scholarsportal.info/#r/details/_uri@=2735915971&_add:true_nozoom:true

Census Subdivision Boundary File 2016, Statistics Canada

2016 Canadian Census Profiles, Statistics Canada

LHIN boundaries https://data.ontario.ca/dataset/local-health-integration-network-office-lhin-locations

ICU capacity https://howsmyflattening.ca/#/home

Prepared by: Brock University
Map, Data & GIS Library, 2020
Maplib@brocku.ca