# Intro to ArcGIS Pro

What is "GIS"?

Geographic Information Systems (GIS) is a tool used to display, create, and analyze spatial information to help solve real world problems. It combines the graphics that make up a map with data tables of associated attributes. Based on a fictitious case of Starbucks Corporation wishing to open a new coffee shop in St. Catharines, we will use GIS functionality to identify target areas. Download tutorial data at https://github.com/brockmdgl/Intro2Pro

Section 1: Introducing ArcGIS Pro

Before you begin, you must have an Esri account. Email maplib@brocku.ca to request an organizational account and ArcGIS Pro access.

1. Run **ArcGIS PRO**. HINT: Click the Windows button then start typing *ArcGIS*

2. When prompted, login using your ArcGIS Online credentials.

3. Under Create a new project, click **Blank**.

4. At the prompt, enter a name for the project (i.e. NewCoffeeShop) and a folder in which to store the project file and all associated files. Each project (.aprx) includes the associated toolboxes, databases, folder connections, styles and more.

5. Click OK.

The ArcGISPro interface is made up of ribbons, tabs, groups, panels, panes and window views (map).
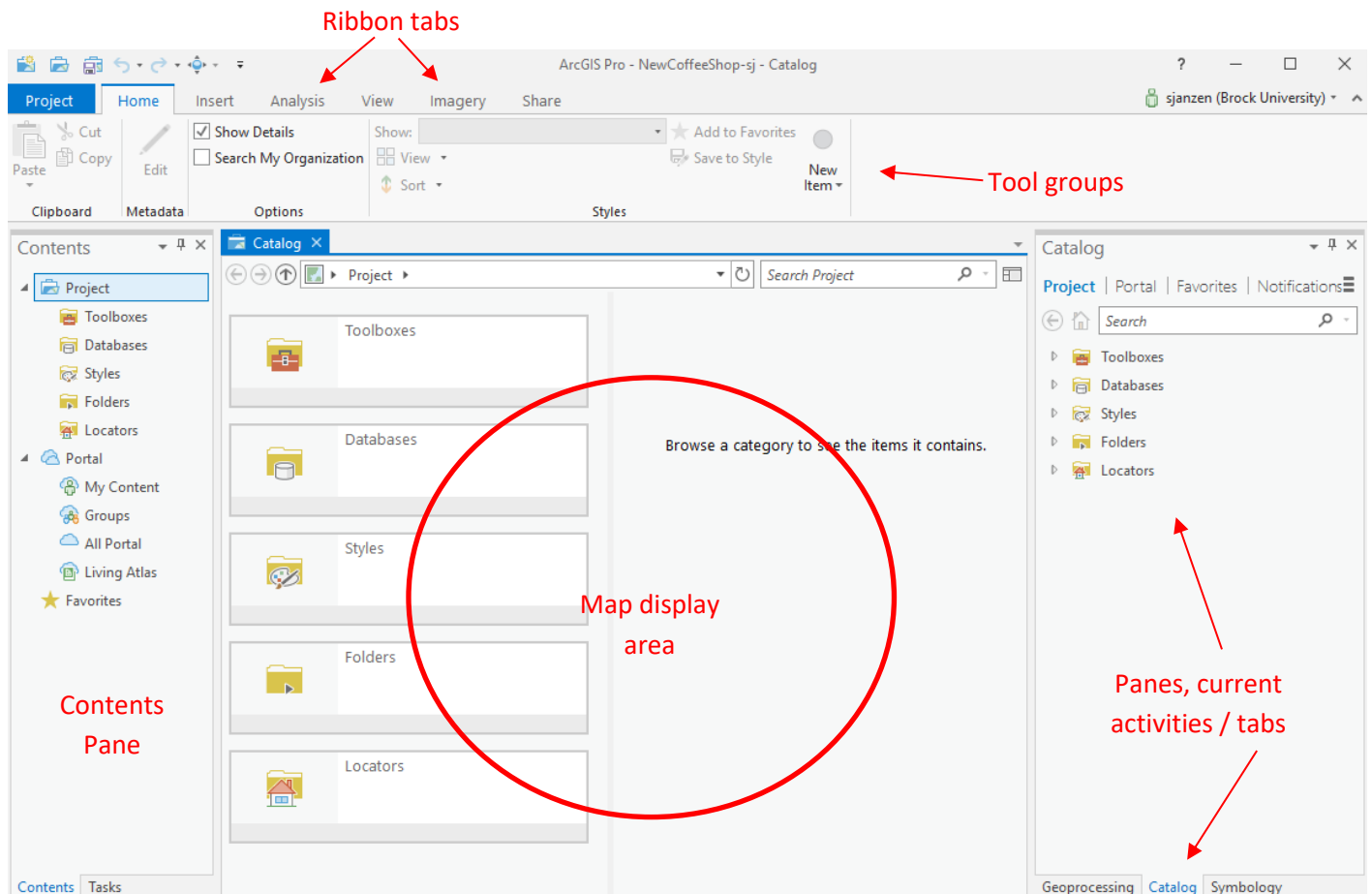
6. ArcGIS Pro is very intuitive and adjusts depending on the layer that is active or the last tool used.

7. From the **View** tab, click **Catalog Pane**.

8. From the **Catalog** window on the right, expand **Databases** and notice the new geodatabase created for this project. All geoprocessing results will automatically be created in this geodatabase.

9. To make a shortcut to the folder holding the tutorial data, right-click **Folders > Connect** and navigate to the location that the zipped tutorial data was extracted to.

Creating a map and adding data

1. Click the **Insert** tab at the top of the window and click **New Map**. The map window is automatically populated with an Esri basemap to give context to your mapping project. To select a different basemap, go to the **Map** tab and click **Basemap**.
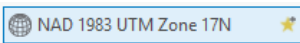
2. To find a location, click the **Map** tab then click **Locate** Locate . Enter a city or other location and select the appropriate result from the list. For example, enter St. Catharines, Ontario and zoom to Niagara.

3. Close the Locate tool by clicking the X in the upper right corner of the pane. **Be sure to click the X for the tool pane, not the software!**
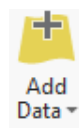
4. To apply a more localized projection, double-click on **Map** under **Drawing Order** in the **Contents** pane.

5. Click **Coordinate Systems** and enter **UTM** in the search box. Navigate to **Projected Coordinate System > UTM > NAD 1983 >** NAD 1983 UTM Zone 17N

6. Click OK to apply the new projection.
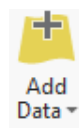
7. From the **Layer** group at the top of the window, click **Add Data** Add Data ▾   Browse to **\Intro2ArcGISPro\StCatharines_Coffee_Shops.csv** The table is added in the **Contents** pane listing to the left of the map window under the heading **Standalone Tables**. Right click the table and click **Open**.

NAME	ADDRESS	CITY	PROV	POSTAL
TIM HORTONS	579 CARLTON ST	ST. CATHARINES	ON	L2M4Y1
TIM HORTONS	400 SCOTT ST	ST. CATHARINES	ON	L2M3W4
TIM HORTONS	211 LOUTH ST	ST CATHARINES	ON	L2S4B8
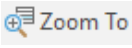
This table includes Tim Hortons and Starbucks restaurants located in St. Catharines, Ontario. We want to see this data on the map. **Geocoding** is the process of comparing addresses to known points on the map and creating geographic features to represent each record. Follow the steps below to create points for each coffee shop.

8. Close the attribute table by clicking the X next to the table name.

9. Right-click the standalone table in the **Contents** pane and click **Geocode Table.** The geoprocessing window is activated with the **Geocode Addresses** tool. Click **Start** at the bottom of the pane.

10. Select **More than one field** (the default) and click **Next**.

11. From the dropdown list for **Input Address Locator**, select **ArcGIS World Geocoding Service**. Click Next.

12. The **Input Address Fields** are automatically populated. Click Next.

13. To change the output feature class name, click the **browse** button and enter the name **coffee_shops**.

14. Click **Save** then **Next**.

15. Select **Canada** from the country list and click **Next**.

16. Accept the default **Category** and click **Finish** then **Run**. The process may take a few minutes. You will be prompted when the tool has finished.

17. The map is automatically zoomed to the extent of the features.
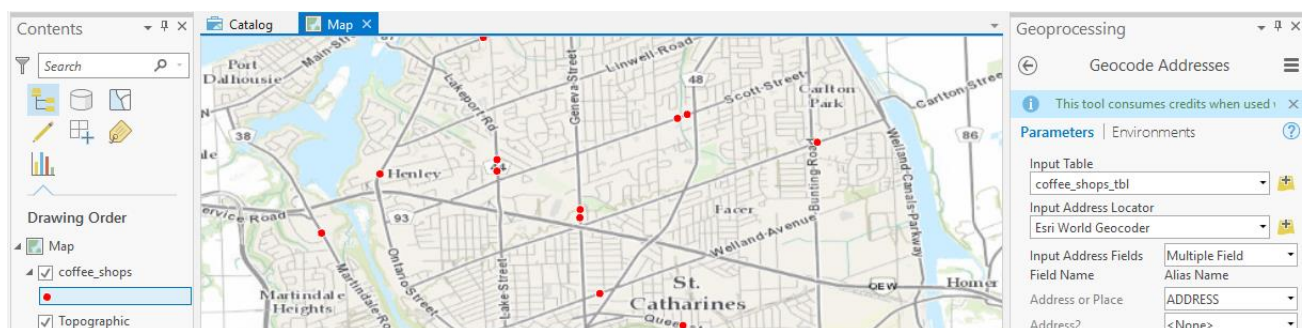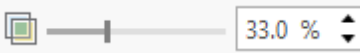

The Connection between attributes and features

1. Right-click the new layer "coffee_shops" from the contents panel and click **Attribute Table**. A number of fields are added to the table but if you scroll across you will see the details of the coffee shops as seen earlier in the standalone table.

2. Click the small gray square to the left of a record. The row is highlighted as well as the point on the map associated with the record. Click the zoom to [Zoom To] tool to find the feature on the map.

3. Click Explore [Explore] to use your mouse scroll and left click to change the view extent, zoom level and pan.

4. From the **Selection** group at the top of the window, click **Select** then click a different point on the map. The first point is deselected as well as the record in the attribute table.

5. To see the newly selected attribute record, click **Show Selected Records** [1 of 21 selected] at the bottom of the table window.

6. Click **Show All Records**

7. Click **Clear** (top of table window) to remove all selections.

8. Click the **Explore** tool to activate it.

9. Right-click the geocoded layer and click **Zoom to Layer**

10. Close the attribute window before continuing.

11. SAVE your map! HINT: click the save button.

Adding Data from ArcGIS Online

ArcGIS Online is considered a portal for GIS data and resources. We will add some prepared data to enhance our study of site suitability for a new Starbucks.

1. Activate the **Catalog** panel (bottom right set of tabs).

2. Click the **Portal** option at the top and click All Portal .

3. Enter the Search term **Niagara Census**. From the listing, click and drag the layer "Niagara_Median_Household_Income" to the map. The layer may take a few seconds to load. This layer gives us a visual of the areas of St. Catharines that have high income.
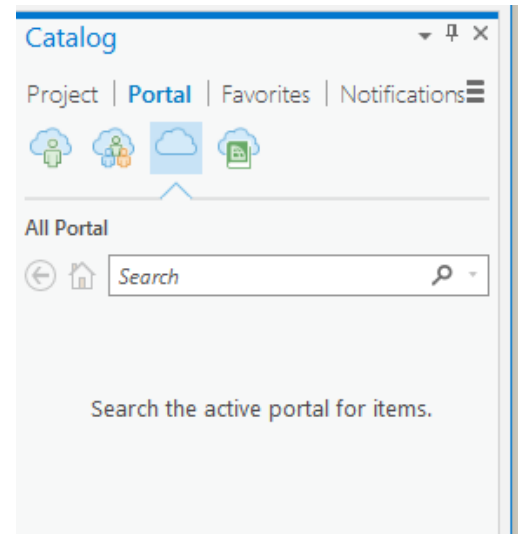
4. Click the **Appearance** tab and adjust the **transparency slider** 33.0 %

5. Enter the search term 'coffeedrinkers' to find a layer created for this exercise depicting fictitious data about the population of coffee drinkers in St. Catharines.
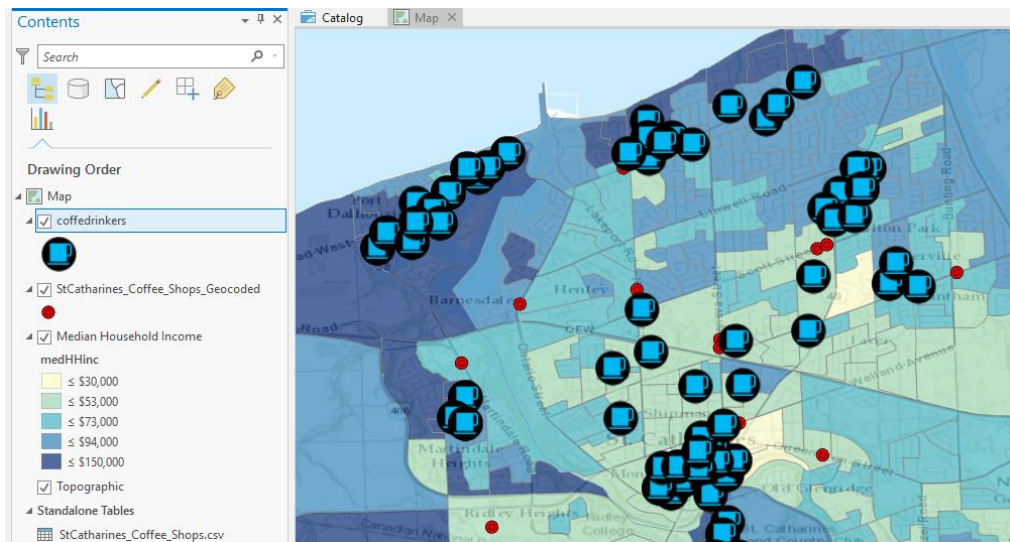
Symbology

Symbols are used to represent features on a map. We will import a predefined set of symbols for the coffee shops then change the way in which the coffee drinkers are visualized.
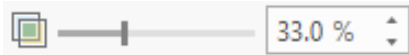
1. Click the coffee shops layer in the **Contents** panel to activate it.

2. From the tabs at the top of the window, click **Appearance** then **Import** from the **Drawing** group. The tool is activated in the panel to the right of the map view.

3. The input layer should be "coffee_shops" (or whatever name you gave the geocoded layer).

4. For **Symbology Layer**, browse to the layer file in **\Intro2ArcGISPro\coffeeshopstcatharines.lyrx**

NOTE: A layer file tells the software how to symbolize a specific data layer.

5. Click OK.

6. Accept the rest of the defaults and click **Run**.

The coffee drinkers' data dominates the map. Point data has a variety of visualization options. We'll use a heat map to highlight areas of the city where there is a concentration of coffee drinkers.

7. Click the **coffeedrinkers** layer to activate it.

8. Click the **Appearance** tab at the top and click **Symbology > Heat map**. This method of visualization really illustrates the hot spots in the city for coffee drinkers!

9. From the **Effects** group at the top, shift the slider over to change the transparency of the layer.

10. Click and drag the coffee shops layer up in the **Contents** panel so they draw over top of the other layers.

11. Save your map!
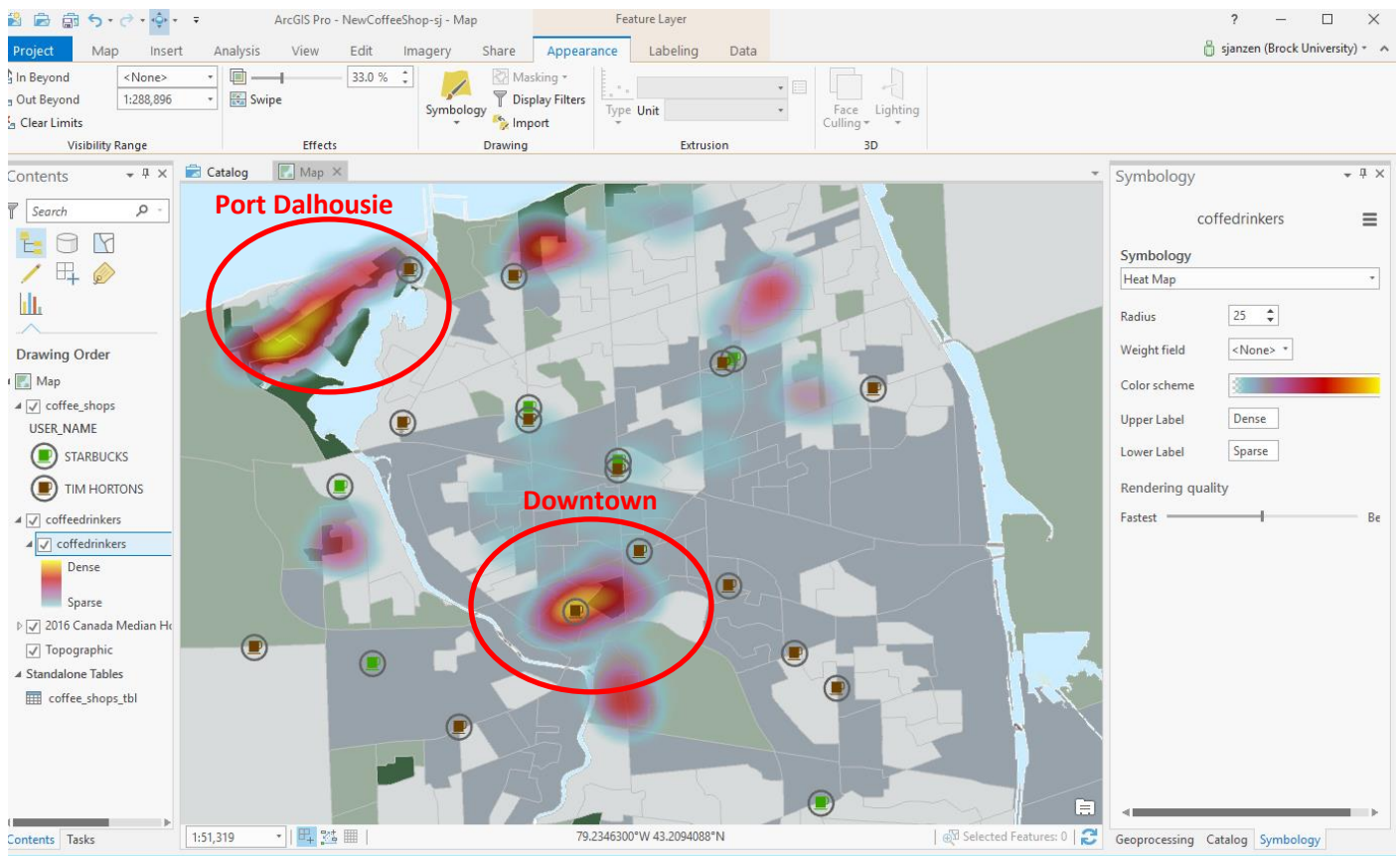
A quick study of the map shows a concentration of coffee drinkers in the downtown core as well as Port Dalhousie. The median average income is higher in Port Dalhousie than in the downtown area.

Query

We want to isolate the locations of Starbucks in the city and will perform a basic query function to accomplish this task.

1. Select the coffee shops layer to activate it.

2. From the **Map** ribbon click **Select by Attributes**;

3. Click **Add Clause: Name is equal to STARBUCKS**; click **Add.**
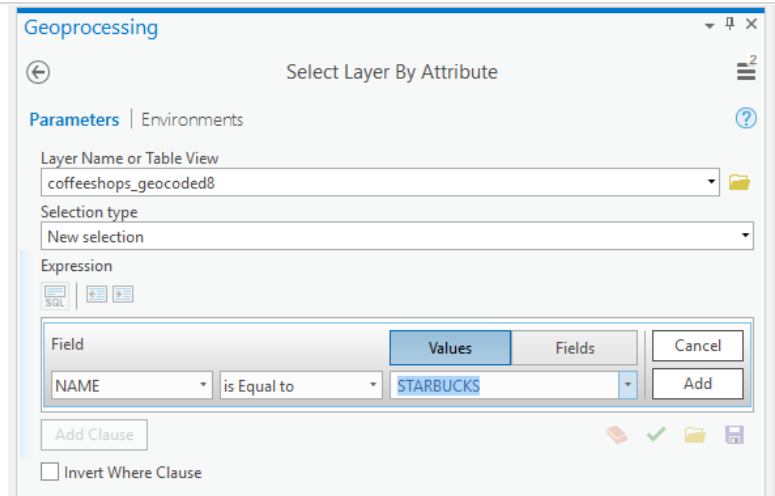
4. Click **Run** to apply the specified query. Only the starbucks locations are highlighted on the map.

5. Right-click the coffee shops layer > **Selection > Make layer from selected features**.

6. Rename the layer to "Starbucks". HINT: slowly click the layer name twice to activate renaming.

7. Turn off original coffee shops layer.

8. To adjust the symbology, click the **selection** layer in Contents then click **Appearance > Symbology**

9. Right-click the symbol entry for Tim Hortons and click **Remove**.

Buffer

Our next task is to create a general service area buffer considering the distance consumers will travel for a cup of Joe.

1. Select the new **Starbucks** layer in the **Contents** panel to activate it.

2. Click the **Analysis** ribbon and then click **Tools**. The GeoProcessing pane opens to the right of the map view. Enter the search term "buffer" and select the **Buffer** result to activate the tool dialogue box.

    a. **Input Features**: Starbucks

    b. **Output Feature Class**: rename default to "Starbucks_buffer_2km"

    c. **Enter a distance of 2 kilometres**.
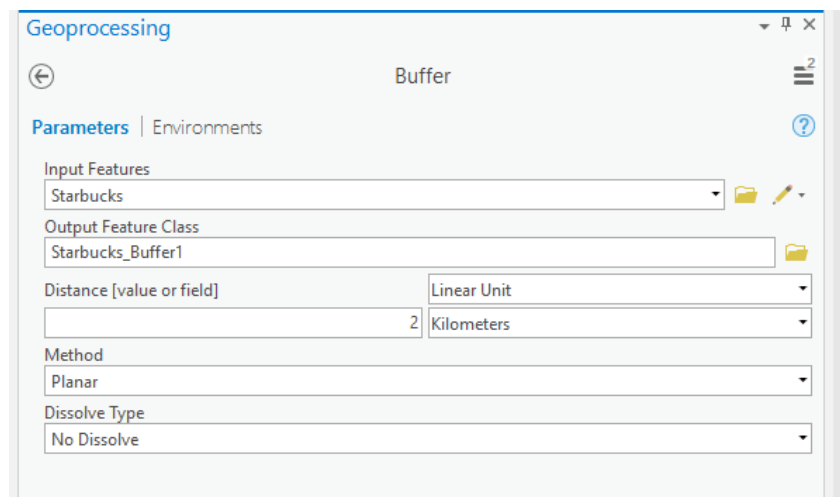
    d. Click **Run**. A new polygon layer is added to the Contents list.

Adding Neighbourhoods and labelling

Our final task is to add a boundary file for neighbourhoods and label it.

1. Click the **Map** ribbon and click **Add Data**.

2. Click on **Project > Folders > Intro2ArcGISPro > StCneighbhourhoods.shp** and click OK.

3. Change the symbology (click the symbol, select the second symbol option)

4. Right-click layer and select **Label**.

5. Click **Labeling** ribbon and select **Label Placement > Basic Polygon**.

Further study of population density, land use or labour force statistics might help us understand the city better.

However, for the purposes of this exercise we have identified these 2 sites as potential locations for a new Starbucks

in St. Catharines. We will prepare a map layout to share with our colleagues.
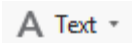

Creating a Layout and Sharing

Let's clean up the Contents panel.

1. Slowly click twice on the **coffeedrinkers** layer name and rename it **Coffee Drinkers**.

2. Rename the other layers as you see fit.

3. Click the **Insert** tab and select **New Layout**.

4. Select **ANSI Landscape Letter**. A new blank layout is added to the project views.
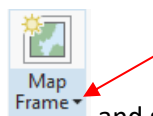
5. Click the dropdown arrow beside **Map Frame** and select the second option **Map 1:52,…** a map window is added to the Layout.

6. Click and drag the window to reposition it.

7. Click and drag a corner handle to resize the map. Leave room for other layout elements such as the legend.

8. To change the zoom level of the map, right click the map and select **Activate**. When the map element is active you can use the Explore tool and other zoom and pan tools to customize the display.

9. When you are finished, click **Layout** ribbon at the top of the display and click .

10. From the **Insert** ribbon in the **Map Surrounds** group, add a **North Arrow** and **Scale bar**. Reposition and resize the elements as you see fit.

11. From the **Map Surrounds** group, click **Legend** then draw a box on the map where you want the legend to sit.

12. **Double-click** the legend to activate the **Format Legend** panel to the right of the Layout view. Options are also available in the Contents panel to the left (turn layers off if you don't want them to appear in the Legend).

13. Click the **Text** tool to add customized text including a title and source statement. Explore the text options on the **Format** ribbon.

14. Save your map!

Our map is complete and ready to share!

15. Click the **Share** ribbon at the top of the window. To make a PDF or JPEG, click **Layout**

16. Change the **Save As** type to the format of choice and navigate to your storage space on X:\ drive.

17. Click **Export**.

Additional Resources:

- *Going Pro: ArcGIS Pro Essentials for ArcMap Users* (1 hour training video)
  https://www.esri.com/training/catalog/590901ecdb250232197d2326/going-pro%3A-arcgis-pro-essentials-for-arcmap-users/

- *Getting Started with ArcGIS Pro* (5 hours, web course)
  https://www.esri.com/training/catalog/57630435851d31e02a43f007/getting-started-with-arcgis-pro/

- *ArcGIS Pro Help* http://pro.arcgis.com/en/pro-app/help/main/welcome-to-the-arcgis-pro-app-help.htm