2021 – ArcGIS Pro

Cartography

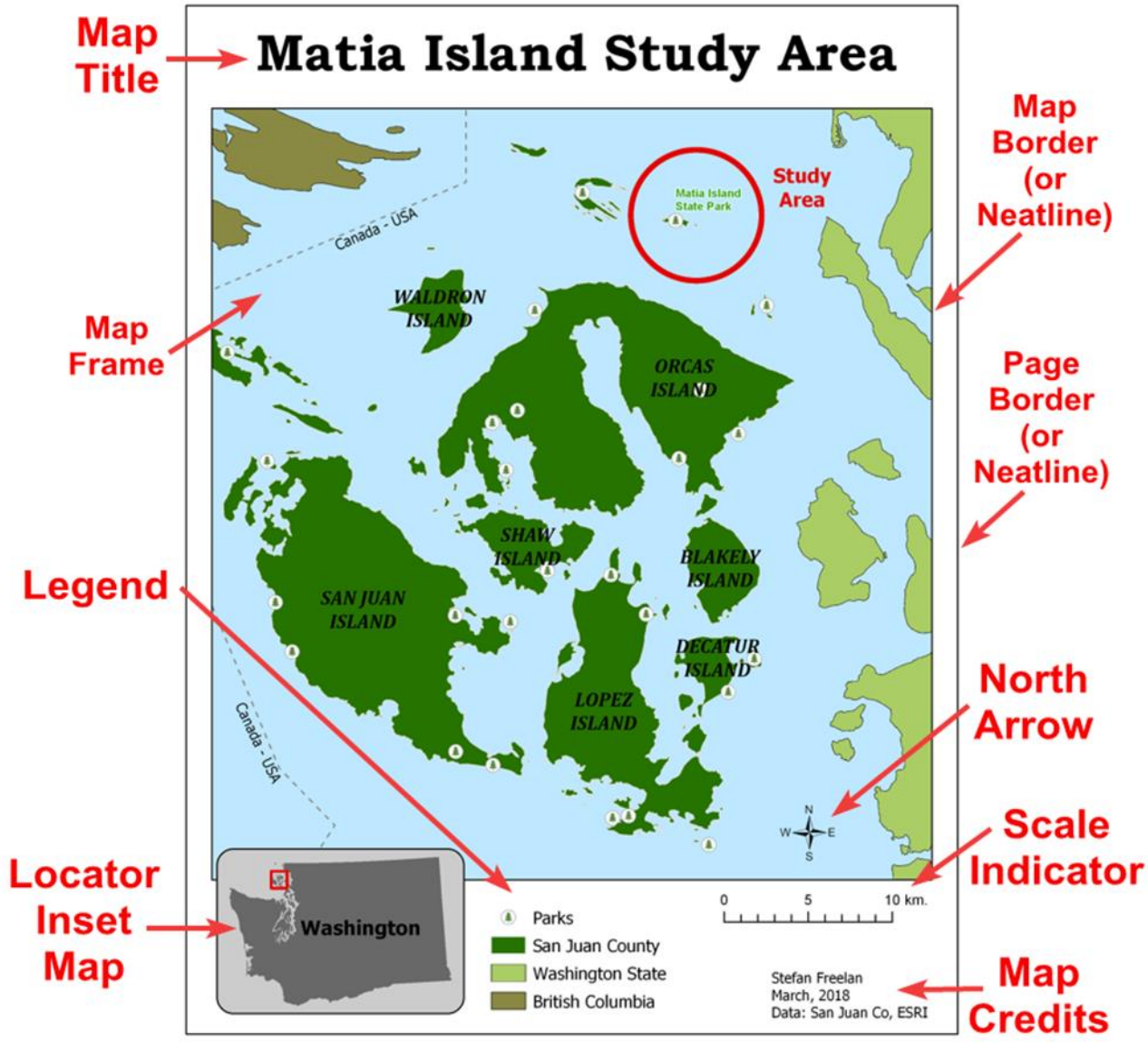
Warthog Information Services

Created by Stefan Freelan

Horizontal units are in meters.

Exercise Introduction

In this exercise, we will create a cartographic product in a *layout view*. So far, we have been working in *map views*. Map views are appropriate for spatial analysis and for working with symbology, etc., but to create a cartographic product we need to shift to a layout view. Layouts are a specific page size with one or more map views inserted onto the page (as *map frames*). In addition to map frames, layouts have various cartographic elements, such as a north arrow, scale bar, a legend, etc. Below is an example of a completed layout, which we will recreate in this exercise, step-by-step.



*You can find a PDF of this map in the **Documents** folder of your Course Data folder.*

Exercise Learning Objectives

- Layout views
- Labels: Classes and Expressions
- Data Frames
- Layout Contents pane
- Cartographic elements

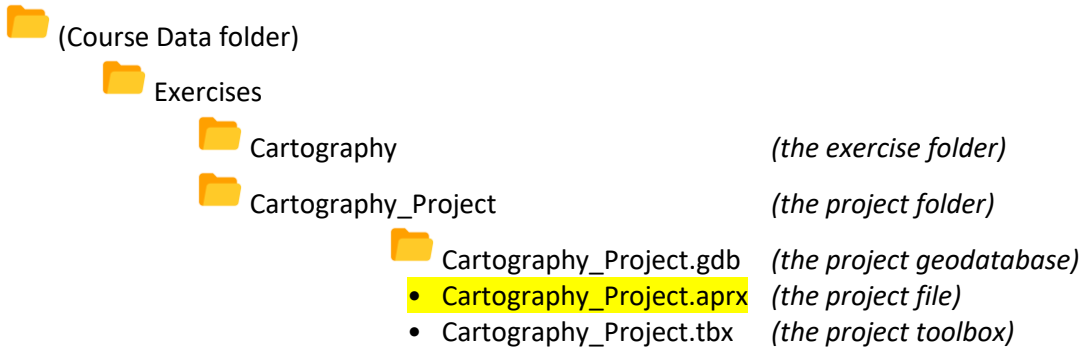
Step 1: Open the Exercise Project

Overview

For this exercise, a project with data and a map has already been created for you. It is stored in the **Cartography** folder in the **Exercises** folder of your Course Data folder.

Instructions

- In Windows File Explorer, navigate to the **Exercises** folder in your Course Data folder.
- Open the **Cartography** folder (in the Exercises folder).
- Open the **Cartography_Project** folder (a project folder).
- Locate the **Cartography_Project.aprx** ArcGIS Project file and double-click it to open the project.



The project should open with the **Matia Island Map** view activated. If this map view is not active in the view, open it from the **Maps** folder in the Catalog pane. You may have various panes open and/or available from previous work. You can close all panes except for the Catalog and Contents panes.

Step 2: Modify Matia Island Map Symbology and Labels

Overview

Prior to creating a final cartographic product in a layout view, all the required analysis, and generally most of the symbology and labeling/annotation, should be completed in a map view (or views). This project currently has one map view, named **Matia Island Map**, which you should already have open. From the Catalog pane, you can see that the project does not (yet) include any other map views nor any layout views. We will eventually need to add a second map view for the locator map, and then create a layout view (which will display both the **Matia Island Map** and the locater map views, in addition to various cartographic elements, all on one page). Before creating the layout, we will need to adjust the symbology, add labels, etc., to the **Matia Island Map**.

Instructions

- In the map Contents pane, right-click on the **San_Juans** layer and open the layer *Properties*.
- In the General tab of the Layer Properties dialog box, change the display name (under Name) from **San_Juans** to **San Juan County**.

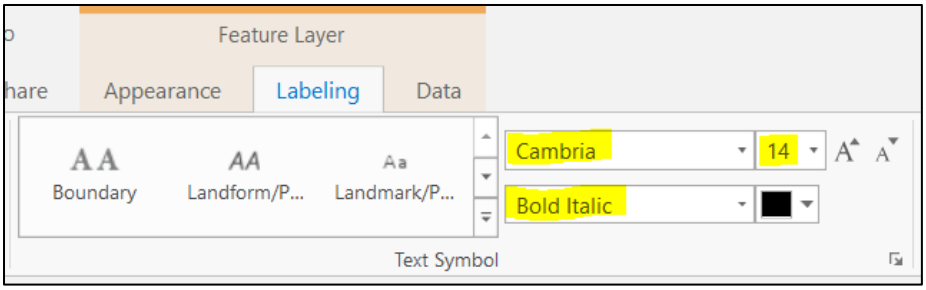
Many data layers use abbreviated names and/or names without spaces in them. This is because some GIS tools, especially with older versions of the software, would not work with files that had spaces in the file name. For this reason, it is quite common to find the names of data folders, geodatabases, and data files with underscores in the names or simply with the spaces removed. These names make sense for making sure the GIS works properly and are good for a database. However, for our layout we would prefer fuller, more descriptive wording.

Changes made to the display name will be reflected in the Contents pane and (later) in a legend, but it does not change the actual name of the data.

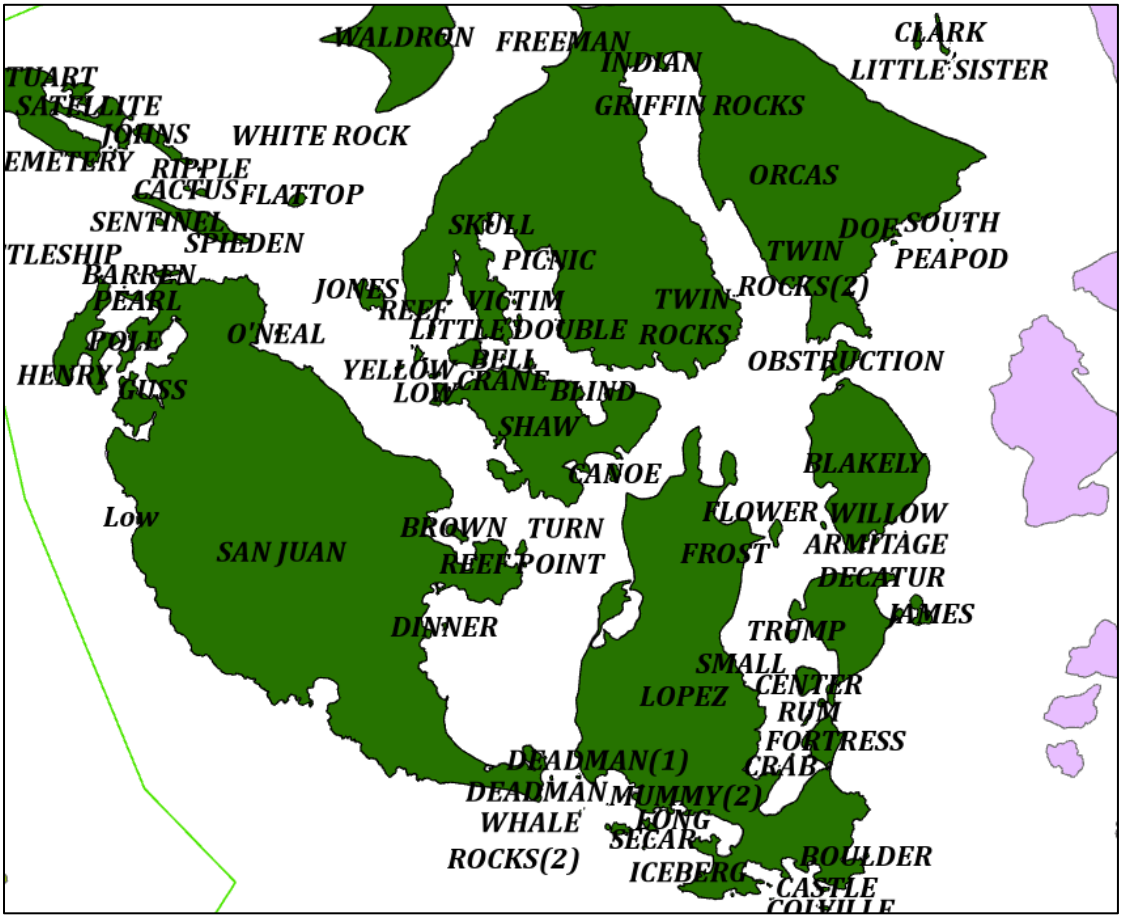
- In the map Contents pane, right-click on the newly renamed **San Juan County** and open its Symbology pane.
- In the Symbology pane, change the symbology to a shade of dark green for **San Juan County**.

  Feel free to adjust the colors of for BC_Province or Wa_State if you'd like.

- Next, in the map Contents pane, right-click on the **San Juan County** layer and click *Label* to toggle the labels for the layer On.
- Zoom in a bit on the map so there is more room for the island labels.
- Click the *Labeling* tab of the ribbon.
- In the Text Symbol group, change the text to **Cambria, 14 pt, Bold Italic**.
    - If you don't have the Cambria font (or the bold, italic Cambria font) you can use Geogria, Bold Italic or the font of your choice).



Note that it is customary to use an italic font for natural features, such as islands.



This is a good size for the labels, but there are too many islands too close together to display all of the label text. Some islands are probably not even labeled, and we have no control over which ones are labeled and which are not. It would be better to label just the large islands.

By default, labels are created for all features. However, we can use a *SQL label query* to limit the labels to only certain features (i.e., those meeting the SQL criteria of the label query).

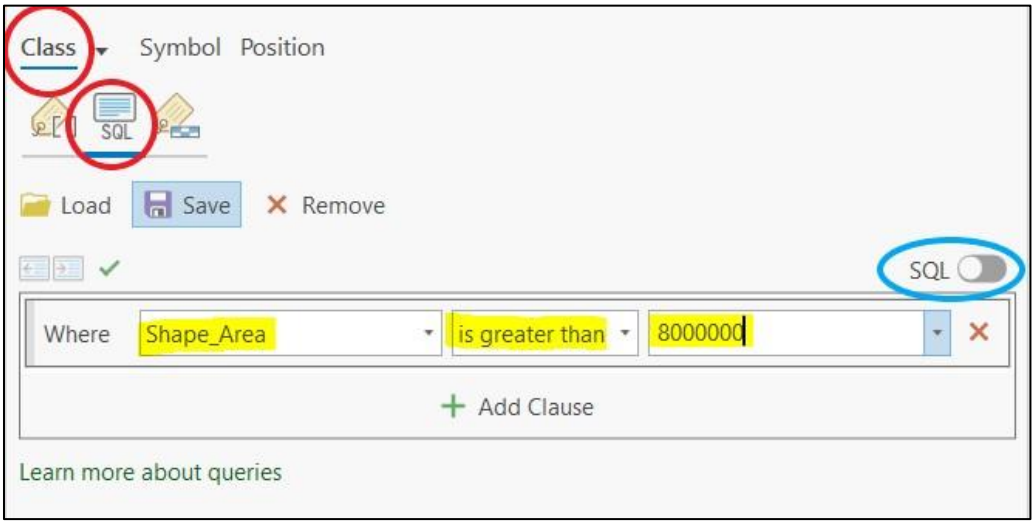
- In the Labeling tab of the ribbon, click the SQL icon beside the Class (Class 1) box on the left end of the ribbon. This should open the Label Class pane.
- At the top of the Label Class pane, choose Class 1 from the Class drop-down menu (you can have multiple classes of labels if you want).
- Ensure that the SQL sub-tab is selected (you can click on the other tabs and sub-tabs to see some of the options available - then return to Class and SQL).
- Under the SQL sub-tab, click ✚ *New expression*.
- In the Clause dialog box create the following SQL query:

Where **Shape_Area** *is greater than* **8000000**

You will need to type in the value of 8000000 manually, and do NOT use commas. (SQL statements need to match the database values exactly, and the values in the database are numbers, not text strings with commas. Thus, our SQL statement needs to likewise be a number, not a text string).

Remember, if you are familiar with SQL syntax, you can modify SQL queries directly in SQL mode by toggling the slider button just above the expression builder On/Off.

You can use the Save and Load buttons to save and later reuse an SQL expression, or the Remove button to delete a query expression.



The Shape_Area field uses square meters. 8,000,000 square meters is equal to 8 square kilometers or a little over 3 square miles. You can find out the units for a data layer from the Metadata or from the Source tab of the Layer Properties.

- Click the *Apply* button at the bottom of the pane.
  This should reduce the number of labels to a more reasonable subset, labeling only the big islands.

By default, labels are derived from the values of a field in the attribute table. If there is a field named "Name" that field will be used by default.

We are almost done with the labels for the islands, but first we will add one more tweak: a *label expression* to create a custom label. Label expressions allow the construction of more complex labels. Expressions can be used to combine multiple attribute fields (e.g., the Name and Population for a cities layer) or to add text to the labels that is not found in an attribute field.

- In the Labeling tab of the ribbon, click the Expression icon beside the Field (NAME) box (a small luggage-tag-like icon). This should “re-open” the Label Class pane to the Label Expression sub-tab.

  Below the Label Expression sub-tab, the current expression Language should be *Arcade*. Arcade is an expression language written for ArcGIS. If you are familiar with other expression (or code) languages you can choose VBscript, JScript or Python from the drop-down menu. We will use Arcade.

  In the Expression box the current expression should be:

  ```
  Expression:
  $feature.NAME
  ```

- Manually type into the box to add to the current Expression to create a new expression:

  ```
  $feature.NAME+TextFormatting.NewLine+"ISLAND"
  ```

- Click *Apply*.

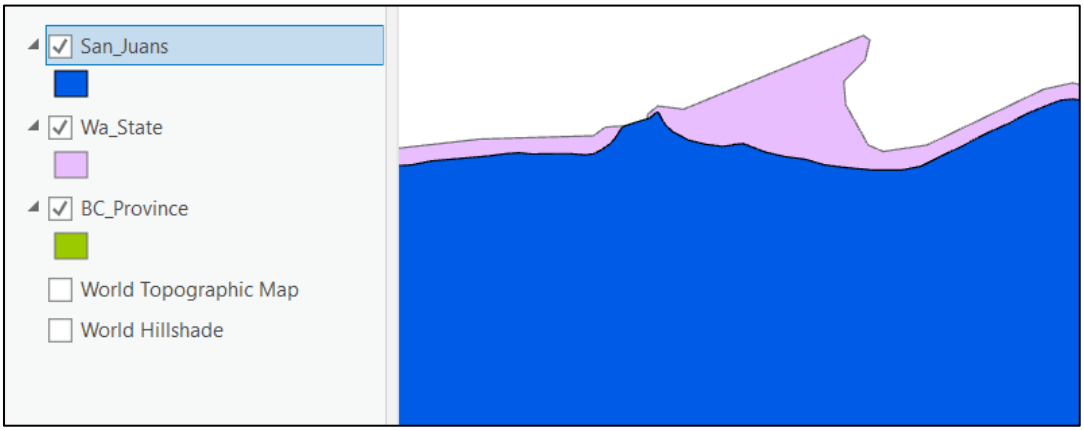
  This new expression appends the word "ISLAND" (in all caps to match the names of the islands) to the current labels, and places the word ISLAND on a new line, so that the text of the label is "stacked".

- Close the Label Class pane when finished.
- Save your project.

So far, we have used SQL to specify which features are to be labeled (using an SQL label query) and created a custom label expression.

We can also use SQL to specify (or "filter") which features are to be shown at all. This is known as a *definition query*.

If you zoom in to the shoreline of one of the San Juan Islands, you will note that there are two shoreline layers that are visible: One is the **San Juan County** layer that we have been working with, the second is the **Wa_State** layer.



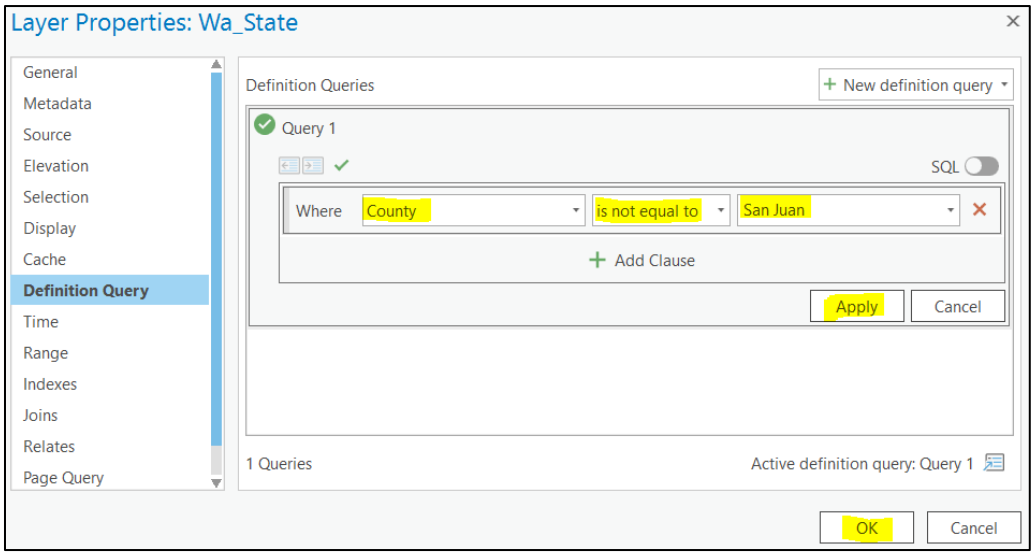
We want both layers in the map, but we don't want two mismatched shorelines, especially as we move into making our layout. Applying a definition query can assist here, constraining which features are shown, and which features are filtered out.

- In the map Contents pane, right-click on **Wa_State** and choose *Properties*.
- From the Layer Properties dialogue box, choose the *Definition Query* tab.
- Click ✚*New definition query* to create an SQL query:

  Where **County** *is not equal to* **San Juan**

- Click *Apply* then *OK* to apply the definition query.

  This should remove the feature for San Juan County from the **Wa_State** layer. Now there should be only one shoreline for the islands.



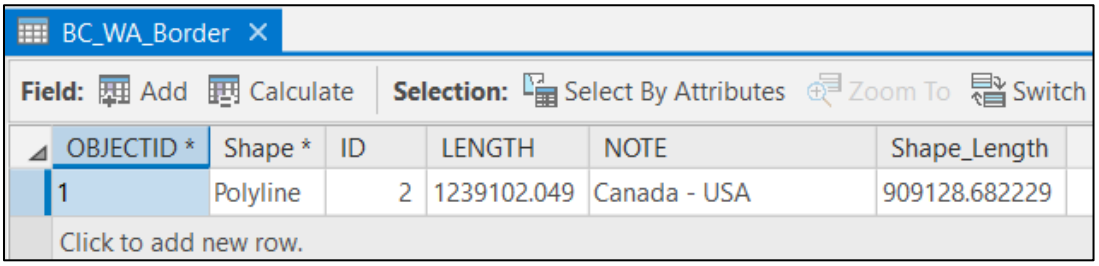
Next, we will turn our attention to the USA-Canada border

- Zoom back out in the map view so that you can see both the land polygons of British Columbia (BC) and Washington State (so that you can also see the border line between the two).
- In the map Contents pane, right-click the **BC_WA_Border** layer and click *Symbology*.
- In the Symbology pane, click on the line symbol icon.
- Select the Gallery tab to scroll through the gallery: choose a dashed line symbol.

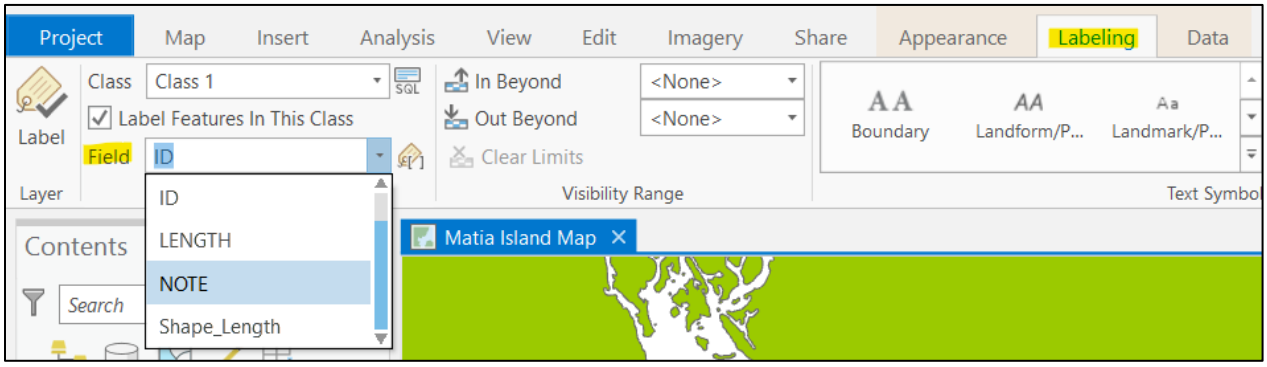
  Note that it is customary to use a dashed line for an international border symbol.

- Right-click the **BC_WA_Border** layer again in the Contents pane, this time to click *Label* (turning On the layers labels). A "2" should appear as a label somewhere along the border.
- Right-click the **BC_WA_Border** layer in the Contents pane and click *Attributes Table*.

  Since there is not a field named "Name" in the attribute table, the labels are created from the first field in the table, which is the OBJECTID (a unique ID field). This isn't what we want. We want "Canada - USA" from the NOTE field.



- Close the **BC_WA_Border** attribute table.
- Ensure that the **BC_WA_Border** is still highlighted in the contents pane.
- From the Labeling tab in the ribbon choose the NOTE field from the *Field* drop-down list. The label should now read "Canada - USA."



- Right-click **BC_WA_Border** in the Contents pane and open *Labeling Properties*.
- In the Label Class pane choose the *Position* tab.
- Below the Position tab, click the Position sub-tab (a square box with crosshairs icon).
- Expand the Placement section below the Position sub-tab.
- For the “Constrain offset" choose *Below line* from the drop-down list.

  Feel free to modify the border text font, color, and size if you wish.

Finally, we’ll adjust the labels for the parks using more SQL.

- Right-click **San Juan Parks** and turn On the Labels.

  The pre-configured labels (a green font with a halo) is fine but there are too many labels for this space. Indeed, since the layout we are going to make will be focused on Matia Island, all we really need to do is label the park on Matia Island.

- With the **San Juan Parks** layer selected in the map Contents, click the SQL icon from the Labeling tab of the ribbon.
- Use ✚*New expression* to open clause mode and create an SQL query:

  Where **GEONAME** *is equal to* **Matia Island State Park**

- Click *Apply*.
  Matia Island State Park should be the only park that is labeled.
- Close the Label Class pane.

- Save your project.

Step 3: Locator Map (Create a New Map View)

Overview

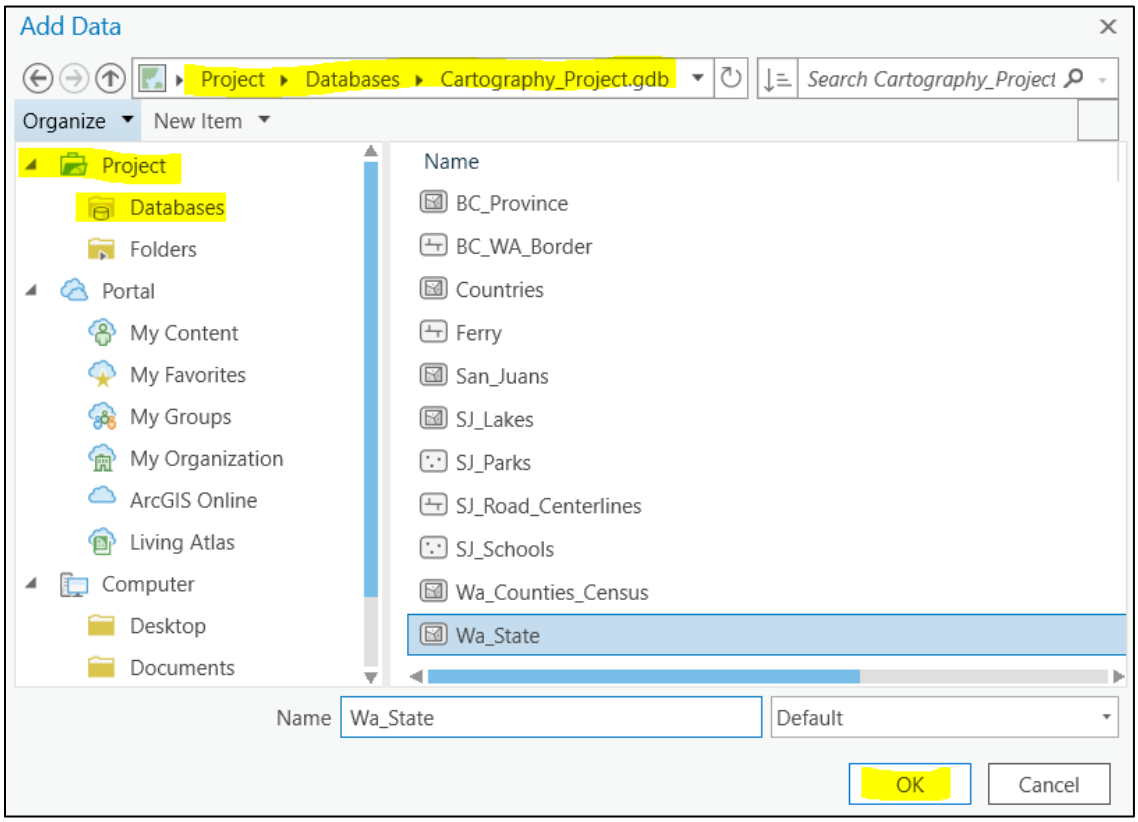
One of the major cartographic elements we will add to our layout will be a locater map. Locater maps are generally simple maps that give geographic context to the main map, providing more information to the audience about “where” features in the main map are located. Our main map focuses on the San Juan Islands. Viewers of our layout may not know where exactly the San Juan Islands are located. Our locater map will show the whole of Washington state, with an *extent indicator* outlining the extent of our main map, giving larger geographic reference to where the San Juan Islands actually are in Washington state. Locater maps are often a vital element to creating a complete cartographic product.

Instructions

- From the Insert tab of the ribbon, click *New Map*. This adds a new map view to your project and automatically opens it as the active view.
- In the map Contents pane, change the name of this map view to **Locator Map.** You can do this by either right-clicking and opening the map view properties, or by clicking on "Map" once to highlight it, then a second time to edit the name.
- In the Contents pane, turn the Topographic and World Hillshade basemap layers Off.
- From the Map tab of the ribbon, click *Add Data*.
- Browse to:

  Project / Databases / Cartography_Project.gdb

- Select the **Wa_State** layer.
- Click *OK*.



- Right-click the **Wa_State** layer from the **Locator Map** Contents pane and open the *Symbology*.
- Change the symbology to your liking (click the square polygon icon to access symbology properties).
- Right-click the **Wa_State** layer and turn On labels.
- In the Labeling tab of the ribbon, change the label Field to *State*.
- Change the label to **Tahoma, 14 pt, Bold** in the Text Symbol group.

You may note that by default every island in Washington is individually labeled. We only need to label the state once.

- In the Contents pane, right-click **Wa_State** and open *Labeling Properties*.
- In the Label Class pane, click the *Position* tab and the *Conflict resolution* sub-tab (use screen hints for help).
- Expand the *Remove duplicate labels* section.
  From the drop-down menu, choose *Remove all* to remove all duplicate labels.
  There should now be a single, 14 pt, bold label for the state.

- Save your project.

Step 4: Create a Layout

Overview

Now we are ready to build a page layout. We will begin our page layout by inserting the **Matia Island Map** view onto a layout page, then the **Locator Map** view. When a map view is inserted onto a layout it is referenced on the layout as a *map frame*.

Instructions

- From the Insert tab of the ribbon click *New Layout* and choose:

  ANSI - Portrait - Letter 8.5" x11"

  A new 8½ x 11 page layout is added to the project. The new layout opens as the active view.

  Recall that the Contents pane operates contextually, so the Contents pane is now the layout Contents pane (not the map Contents pane), since the layout is now your active view.

- In the layout Contents pane, right-click on **Layout** and choose *Properties*.
- Click the *General* tab.
- Change the Name to **Matia Layout**.
- Click *OK*.
- From the Insert tab of the ribbon click *Map Frame*.
- In the Map Frame drop-down list, choose the **Matia Island Map** view.
- Using the left mouse button, click and drag to draw a box on the page approximately where you want the map frame to be located (roughly the top 2/3's of the page). Don't worry, we will make this more exact in a moment.

  Notice that when you add a map frame to the layout it is also listed in the layout Contents pane.

Next, we will format the map frame properties to make its size and position on the layout more precise.

- With the **Map Frame** highlighted in the layout Contents pane, click the *Format* tab on the ribbon.
- On the right-hand side of the ribbon, in the Size & Position group, format the values as:

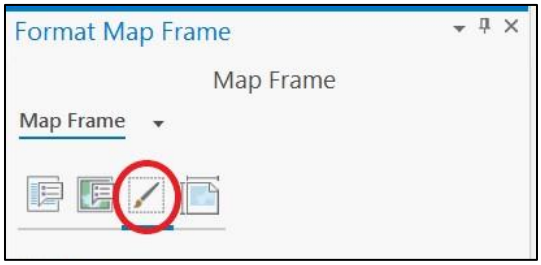
X:	**.75 in**
Y:	**2.0 in**
Width:	**7.0 in**
Height:	**7.5 in**

Notice how this element is anchored in the bottom left corner of the layout page, indicated by the small blue box in the array of 9 boxes (possible anchor point locations).

- Now right-click the **Map Frame** in the contents pane and click *Properties*.
  The Format Map Frame pane opens.

  Many of the same settings found in this pane are also available via the ribbon. The ribbon provides a slightly reduced set of options compared to the pane, providing faster access to the most commonly used items.

- Click the *Options* tab of the Format Map Frame pane.
- Under Options, in the General section, change the Name of the map frame to **Matia Map Frame**.
- Now click the *Display* sub-tab (be sure to click the Display tab and not the Display Options tab).



- Format the Border:

Symbol:	**Black, 1 pt**
X gap:	**0.06 in**
Y gap:	**0.06 in**
Rounding:	**0% (No Rounding)**

- Format the Background:

  Symbol**:** **<Choose a light blue color>**

  (Leave X gap, Y gap, and Rounding as is, at 0" and 0%).

- In the layout Contents pane, use the arrow beside **Matia Map Frame** to expand its contents.
- Likewise, expand the contents of the **Matia Island Map** view within the **Matia Map Frame**.
- Still in the layout Contents pane, right-click the **San_Juans** and click *Zoom to Layer*.

  *For reference thus far, compare your layout to the Matia Island Study Area example layout from the **Documents** folder of your Course Data folder (also shown in the Introduction of this Exercise).*

- Save your project.

Next, lets add our **Locator Map**.

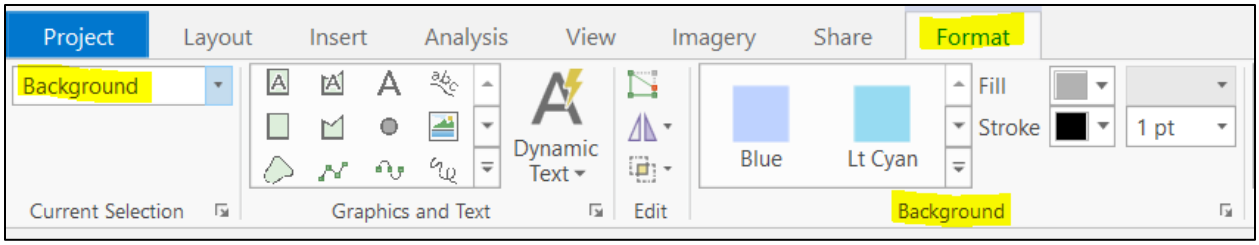
- With the **Matia Layout** still the active view, click the *Insert* tab of the ribbon and click **Map Frame**.
- Select the **Locator Map**.
- Click and drag anywhere below the **Matia Map Frame** to add the Locator Map as a second map frame (we will adjust its size position shortly).
- Rename the map frame to **Locator Map Frame** either via its Properties or the Contents pane.
- Right-click on the **Locator Map Frame** to open its *Properties*.
- In the Format Map Frame pane, choose the *Placement* tab.
- Specify the size and position of the **Locator Map Frame** to be:

  X: **0.8 in**
  Y: **0.7 in**
  Width: **2.4 in**
  Height: **1.6 in**

  You can specify size and position via the Format tab in the ribbon or in the Format Map Frame pane. Recall that the ribbon is often a subset of elements found in a pane.

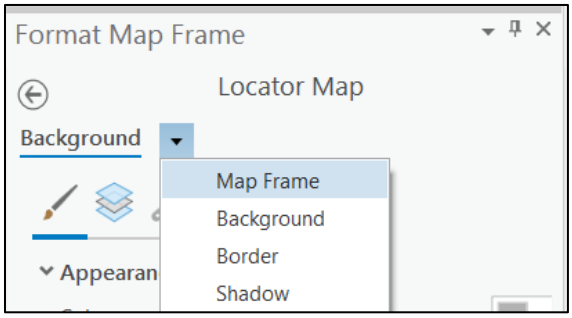
  The locator map frame will slightly overlap the main map frame.

- In the layout Contents pane, expand the **Locator Map Frame** and the **Locator Map**.
- Right-click the **Wa_State** layer and choose *Zoom to Layer*.
- With the **Locator Map Frame** highlighted in the layout Contents pane open the Format tab of the ribbon.
- In the Current Selection group to the far left of the ribbon, use the drop-down list to change Map Frame to *Background*.
- In the Background group of the Format ribbon tab, change the Fill to a light shade of gray.
- Change the Stroke (the outline or border) to **1 pt., black**.



The example map for the course uses rounded corners for the locator map frame. Many of the properties for map frames are available in both the Format Map Frame pane and the ribbon, but not rounded corners. Thus, we will need to switch to the Format Map Frame pane.

- If the Format Map Frame pane is not still open for the **Locator Map Frame**, open it by right-clicking the **Locator Map Frame** in the Contents pane and choosing *Properties*.
- In the Format Map Frame pane, choose Map Frame from the main drop-down menu at the top of the pane.



- Click the *Display* sub-tab.
- Under the Background section, change rounding to 20%.

Rounding can be applied to either or both the border and background of a map frame. Since we applied rounding to our background, we can "turn off" our border by changing the symbol to *No color* (or by changing the size to 0 pt):

- Still in the Display sub-tab of the Format Map Frame pane, change the Symbol of the Border to *No Color*.
    - Note that you could also select Border from the Format Map Frame pane.
    - Or you could select Border from the drop-down menu of the Format tab on the ribbon.

- You may need to unselect the Locator Map Frame to be able to see the rounded corners.

- Save your project.

Recall that the purpose of the locator map is to give geographic context to our main map (the **Matia Island Map**/**Matia Map Frame**). The key to giving that geographic context is an *extent indicator*. This is typically a box (or a point symbol or arrow or label) indicating where the main map is located. Without an extent indicator, a locator map is not adding any key information to the layout.

- In the layout Contents menu, select the **Locator Map Frame** (single click so that it is highlighted).
- From the Insert tab of the ribbon, click the *Extent Indicator* button in the Map Frames group to view its drop-down menu.
- Select the **Matia Map Frame** from the Extent Indictor drop-down menu.
  An extent box is added to the **Locator Map Frame** indicating the location of the main map (ie., the **Matia Island Map**).

- In the layout Contents pane, select the *Extent of Matia Map Frame* element (the Extent Indicator element).
- On the Format tab of the ribbon, specify a **2 pt, red** line for the extent indicator.

- Save your project.

Step 5: Add Cartographic Elements

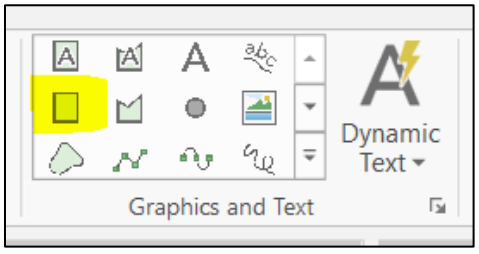
Overview

In addition to a map frame (or frame), layouts generally have additional cartographic elements. These are things such as a north arrow, a scale bar, a title, and map credits (creation date, the cartographers name, data sources, etc.)…

Instructions

We will begin by adding a page border, often referred to as a *neatline*.

- From the Insert tab of the ribbon, choose the Rectangle tool (a rectangle icon among a collection of icons).
-



- With the tool selected, draw a rectangular page border.
  Note that a Rectangle item is also added to the layout Contents pane.

- With the Rectangle you just placed selected in the layout Contents, click the *Format* tab on the ribbon.
- Format the Size & Position (at the far right of the ribbon) as follows:

X:	**0.5 in**
Y:	**0.5 in**
Width:	**7.5 in**
Height:	**10 in**

  This should position the neatline at ½" from the edges of the page.

  Elements can be turned On/Off via the checkboxes in the layout Contents pane.

- Click the padlock icon beside the rectangle in the Contents pane to lock the element. Locking an element prevents it from being accidently selected or modified.

Another key cartographic element is the map title.

- From the insert tab of the ribbon, choose the *Straight text tool* in the Graphics and Text group (capital "**A**" icon among a collection of icons).

  Remember that you can hover over a button or icon to view screen hints.

- With the text tool selected, click in the upper section of the page (above the **Matia Map Frame**) to create a title for the map and type "Matia Island Study Area".
- Click anywhere outside of the text string to complete the text string.
- With the text selected (in either the layout or the Contents pane), click the *Format* tab in the ribbon.
- In the Text Symbol group, change the font style and size. For the font, choose a font to your liking from the drop-down menu. For the size, choose **36 pt.** (or an appropriate size for your font choice). For the style, choose **Bold**.
- With your cursor, position the title so that it is vertically centered between the **Matia Map Frame** border and the top page border.
- You can do this manually, or to be more precise:

  - From the Format tab of the ribbon, click *Align* in the Arrange group.
  - From the Align drop-down menu, click *Align to Page*.
  - Click the Align button in the ribbon again, this time choosing *Align Center.*

  If you are unable to select the title text on the page layout, ensure that the Select tool is active from the Layout tab of the ribbon.

- In the layout Contents, change the name of the Text to **Title Text**.

  It is helpful to use descriptive names to identify Layout elements – this will help to distinguish the title text element from other text elements we add, like the map credits.

Next, we will add map credits. It is customary to include the cartographers name, the data of the map, the source of the data, and the date of the data (if it is known) on a map.

- From the Insert tab of the ribbon, use the Text tool again to add a second text element to the bottom of the page.
- For the text, type:

  <Your Name>
  <Today's Date>
  Data: San Juan Co., ESRI

  You can change the font and size in the Format tab of the ribbon when the text is selected.

- Move the map credits text to the bottom, right-hand corner of the page.
- Rename the Text element to **Map Credits Text**.
- Save your project.

Next, we will add a north arrow and a scale bar.

- Ensure that the **Matia Island Map Frame** is selected (highlighted) in the Contents pane.

This is important because if the locator map is selected, the north arrow and the scale bar would be created for it instead. The north arrow wouldn't matter much (unless one of the map frames was rotated), but the scale bar for the locator map would be quite different than for the main map.

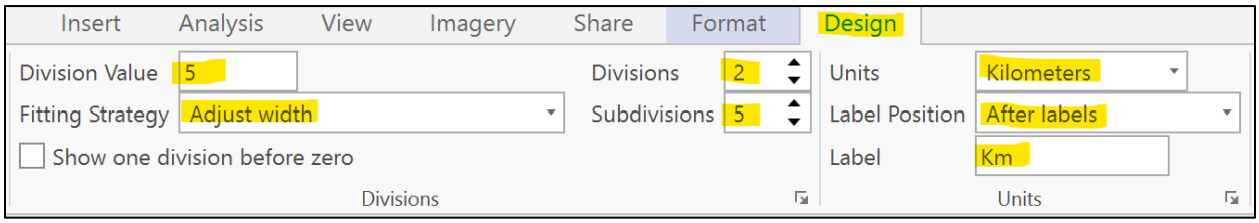
- From the Insert tab of the ribbon, click the *North Arrow* drop-down menu.
- From the North Arrows menu choose a north arrow to your liking.
- Click anywhere on the layout to add it.
- Move the north arrow to the lower right-hand corner of the **Matia Map Frame**.

  Use the Matia Island Study Area example layout for reference.

- From the Insert tab of the ribbon, click the *Scale Bar* drop-down menu.
- Select a scale bar to your liking from the Metric section and click generally in the lower right-hand section of the layout page.

- With the scale bar selected, click the *Design* tab in the ribbon.
- In Divisions and Units groups, specify:

Division Value:	**5**
Fitting Strategy:	**Adjust width**
	(earlier versions of ArcGIS Pro called this Resize Behavior)
Divisions:	**2**
Subdivisions:	**5**
Units:	**Kilometers**
Label:	**Km** *(manually type this in)*



- Right-click on the scale bar (in the layout view or the layout Contents) to open its *Properties*.
- In the Format Scale Bar pane, click the *Properties* sub-tab.
- In the *Numbers* section, choose *Divisions* for the Frequency from the drop-down menu.
- Adjust the position of the scale bar in the lower right-hand section of the page (below the **Matia Map Frame** and above the **Map Credits Text**).

Finally, we will add a legend.

- Ensure that the **Matia Map Frame** is selected (highlighted) in the layout Contents pane.
- From the Insert tab of the ribbon, click the *Legend* button.
- Click once on the page between the **Locator Map Frame** and the scale bar.
- A legend is created for the visible layers in the **Matia Map Frame**.
- In the layout Contents pane, expand the Legend element.
- Uncheck the box beside **BC_WA_Border** to turn it Off in the legend (not anywhere else). Since it is labeled on the map we don't need to include it in the legend.
- Still in the Contents pane, expand the **Matia Map Frame** element if it isn't already, and expand the **Matia Island Map** view.
- Change the name of **San Juan Parks** layer to **Parks**.
- Change the name of the **Wa_State** layer to **Washington State**.
- Change the name of the **BC_Province** layer to **British Columbia**.

  Remember that you can do this via either the layer Properties or the twice- single-click method.

  The legend should now be updated to these new, more user-friendly layer names.

- Reposition the legend so it is centered on the page and lined up with the locator map.

- Save your project.

Step 6: Final Touches

Overview

We are almost done with our layout. The final detail we need to add to our map is a means of demarking the Study Area referenced in our title - otherwise this layout isn't really serving its intended purpose.

Additionally, we'll introduce the concept of activating a map frame and panning/zooming a map from within a layout. Note that the process of determining the page layout (the size and shape of the different map frames, etc.) along with the scale and extent of the map frames is often an iterative process. In this exercise, this layout design was pre-determined for you. In the future, you will likely find yourself panning and zooming a map within a map frame of a layout in order to see how it will appear in the layout – which can often be quite different than how it looks in a map view.

Instructions

- In the layout Contents pane, select the **Matia Map Frame** element.
- In the Layout tab of the ribbon, click the *Activate* button.

  Most of the layout becomes grayed out: everything except for the map view is now deactivated.

  With the **Matia Map Frame** activated, the normal map view Explore tool functions just as it would in a map view.

- Pan and/or zoom the extent of the **Matia Map Frame** to your liking using the Explore tool from the Map tab of the ribbon.

  Note that normally this tab is not available when a layout view is active (a map frame has to be activated).

- From the Layout tab of the ribbon click *Close Activation* to return to the normal layout view.

  Alternatively, you can click the red X at the top of an activated map frame to close the activation.

  The ability to change the scale and extent of the map frame, from within the layout view is a very useful feature for getting the map to 'fit' the page.

- Now that the map extent is finalized, use the Select tool (from the Layout tab of the ribbon) to select and reposition the north arrow as necessary (so it does not cross a shoreline).

Finally, we will mark the location of the Study Area (Matia Island).

- Right-click on the **Matia Map Frame** and click *Activate.*

With the map frame activated, we have access to the Map tab of the ribbon.

- From the Map tab of the ribbon, click *Select by Attributes* and specify:

  Input Rows: **Parks** *(the renamed San Juan Parks layer)*
  Selection Type: **New Selection**

  Click *+ New Expression* and specify:
  Where **GEONAME** *is equal to* **Maita Island State Park**

- Click *OK*.
  The park point feature on Matia Island should be selected (highlighted in light blue).
- Right-click on the **Parks** layer in the Contents pane and choose *Selection* and then *Make Layer from Selected Features*.

A new layer (**Parks selection**) should be added to the map contents and to the map display. This new layer contains a single point (Matia Island State Park, i.e., just the feature that was selected). A selection layer is a virtual subset of a data layer, similar to a definition query.

- From the Map tab of the ribbon, *Clear* the selection.
- In the Contents pane, turn the **Parks** and the **Parks Selection** layers On/Off to see the difference between them.
- Rename the **Parks selection** layer to **Study Area**.
- Open the Symbology pane for the **Study Area** layer.
- Click the tree park symbol to open its symbology.
- From the symbology *Gallery*, choose *Circle 2* (a hollow circle symbol).
- In the symbology Properties tab and the Symbol sub-tab, modify the symbol:

  Color: **<choose a Red color>**
  Size: **60**

- Click *Apply*.
  You should now have a large red circle around Matia Island, indicting the study area. Modify the circle size to work for your map if needed.

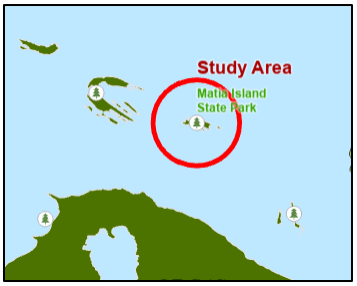
- Labels for the **Study Area** layer should already be On (if not, right-click on the **Study Area** layer to choose *Labels*).
- Right-click on the **Study Area** layer and choose *Labeling Properties*.
- In the Label Class pane, click the *Label Expression* sub-tab.
- For the Expression *remove*: $feature.GEONAME

  and replace it with: "Study Area"

  (Must include quotation marks)

- Click *Apply*.
  Your red circle should now be labeled "Study Area" on the map.

- From the Symbol sub-tab (of the Label Class pane), adjust the color, size, font and position of the Study Area label text to be a large, red, bold font.



- Close the Activation for the map frame (returning to the normal layout view).

- Save your project.

- Take a moment to look over your map layout as a whole. Adjust the settings or sizes of the different map elements as you think appropriate.
- Every element on the page can be precisely positioned and customized…

- You can also return to the layout view later to continue the process…

- When you are happy with the layout (for now), Save your project one more time.

Step 7: Export and Print a Layout

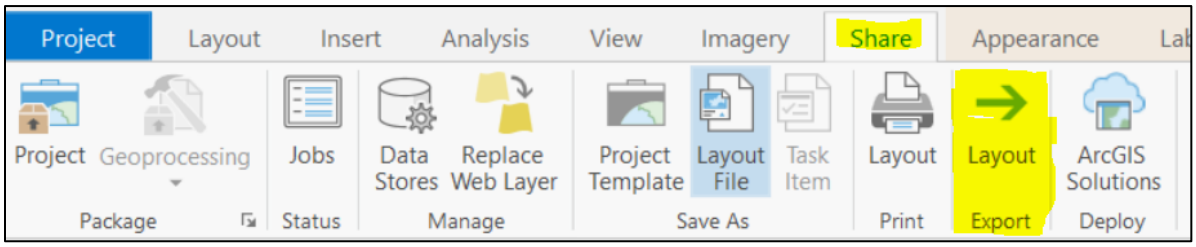
Overview

Once you have your map as you want it (a process that can take hours), you can print or export a copy of the map layout. Common export file formats are .jpg and .pdf files.

Instructions

From the Share tab of the ribbon, there are options for Printing or Exporting a layout.

- Click the *Share* tab of the ribbon.
- In the Export group, click the *Layout* command. An Export Layout pane opens.



From the Export Layout pane you can choose the file type and the location where you'd like to store your layout.

- Choose .pdf for the File Type.
- Click the *Folder icon* to the right of the Name box which has the file path.
- Save the map export in your Cartography folder (in the Exercises folder).
- Name the file **Matia Study Area Map** (or whatever you like).
- Leave all the other settings alone for now.
- Click *Export*.

- Using Windows File Explorer, browse to your Cartography folder to open your .pdf map export.

If you open the Catalog pane you will not see your .pdf file - this is because a .pdf file is not a type of spatial data and Catalog only shows spatial data files.

You will, however, find your **Matia Layout** view (in the **Layouts** folder) and your **Locator Map** view (in the **Maps** folders).

The Layout command from the Print group (on the Share tab of the ribbon) opens the Print Layout pane with setting for printing your layout to a local printer.

End of Exercise

Cartography

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