

UA Libraries Data Cooperative Unit's

GIS TUTORIALS

CREATING A BASIC MAP

QGIS

SOFTWARE USED

3

TUTORIAL NUMBER



DIFFICULTY LEVEL



LEVEL OF STOKE



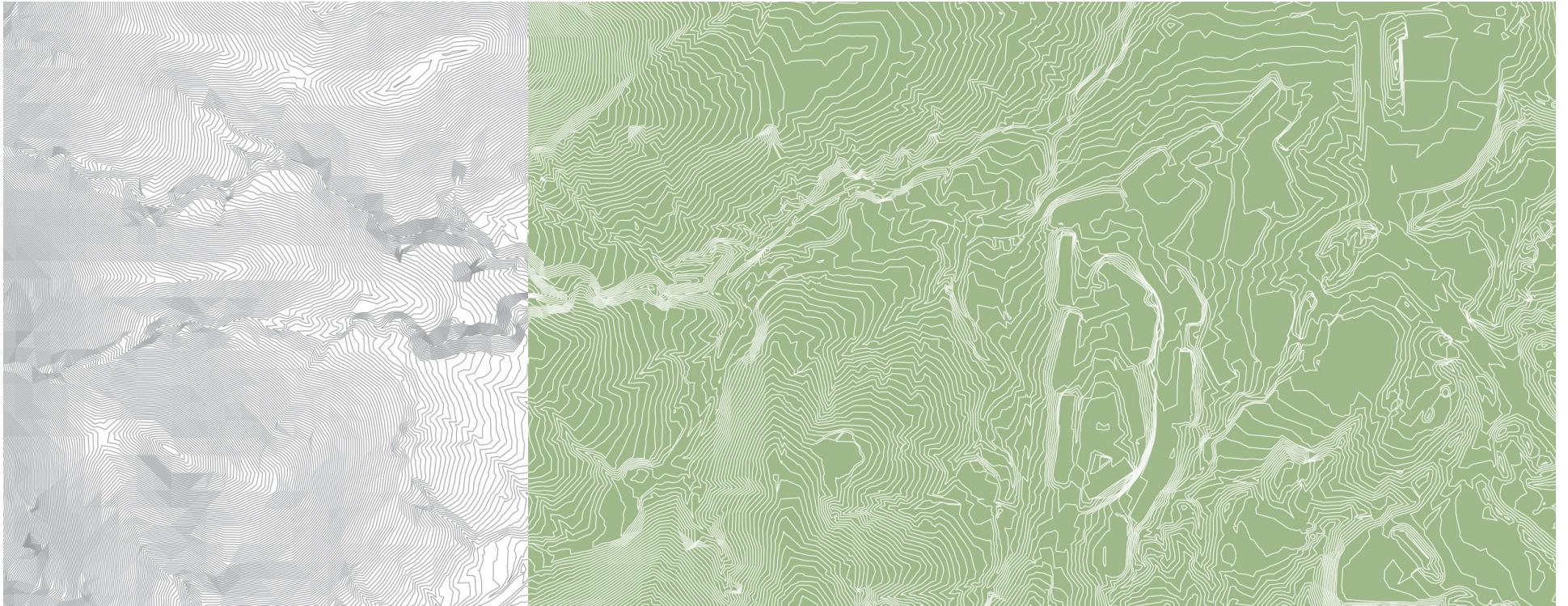
HARDWARE NEEDED:

desktop or laptop computer
running Windows, Mac, or
Linux

internet connection

SOFTWARE NEEDED:

QGIS



INTRODUCTION

3

The purpose of this tutorial is to teach you how to create a basic map in QGIS that contains the necessary cartographic elements. Generally the type of map layout that you will create will be based on where your final map will be used (e.g. publication, in a report, as a stand alone layout, etc...) and this tutorial will serve as a basic guide to get you familiar with creating maps in a general context.

Upon completion of this tutorial, you should be comfortable:

1. Creating multiple maps within the same project.
2. Designing a map layout with all of the proper cartographic elements.
3. Gaining an understanding of all the cartographic elements that are necessary for map layout.

STARTING A NEW PROJECT

Before opening QGIS, download the data that will be used in this tutorial from the following link:

[GIS Mapping.gdb.zip](#)

Please note: All of the data used in this tutorial is available on the UA Library's GeoBlacklight Data Portal:

<https://geodata.lib.arizona.edu/>

1. Within the QGIS start screen click on New Empty Project.

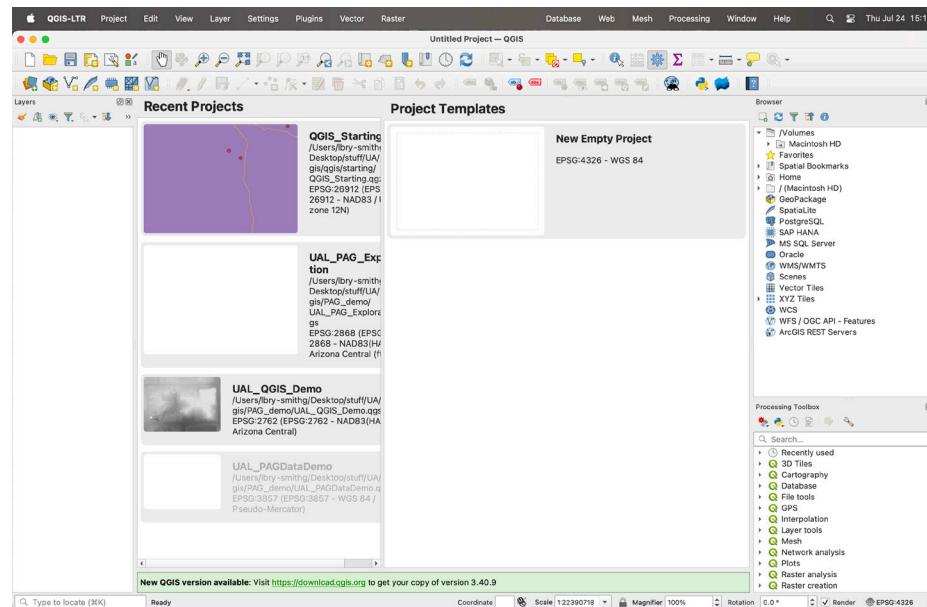
Once the project opens in the Menu Bar click on File and Save As...

Save your project on your computer.

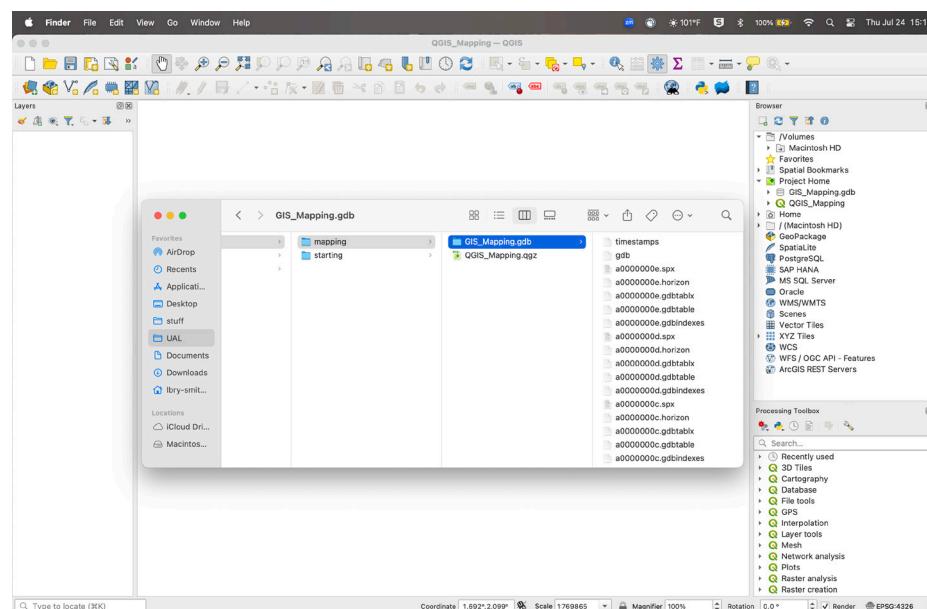
2. Extract the GIS_Mapping.gdb.zip and place it in the project folder you created above.

FILE GEODATABASE:

File geodatabases (.gdb) are a container that holds a collection of files in a folder. You can store, query, and manage spatial and nonspatial data within a file geodatabase. File geodatabases are also an efficient means to transfer multiple files.



1



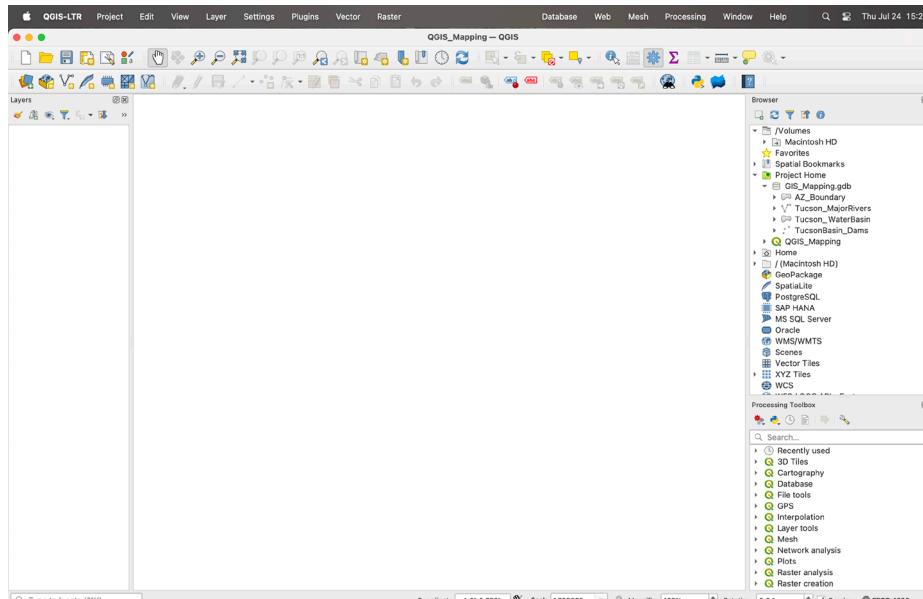
2

- 3.** In the Browser window expand your project folder and the GIS_Mapping.gdb.

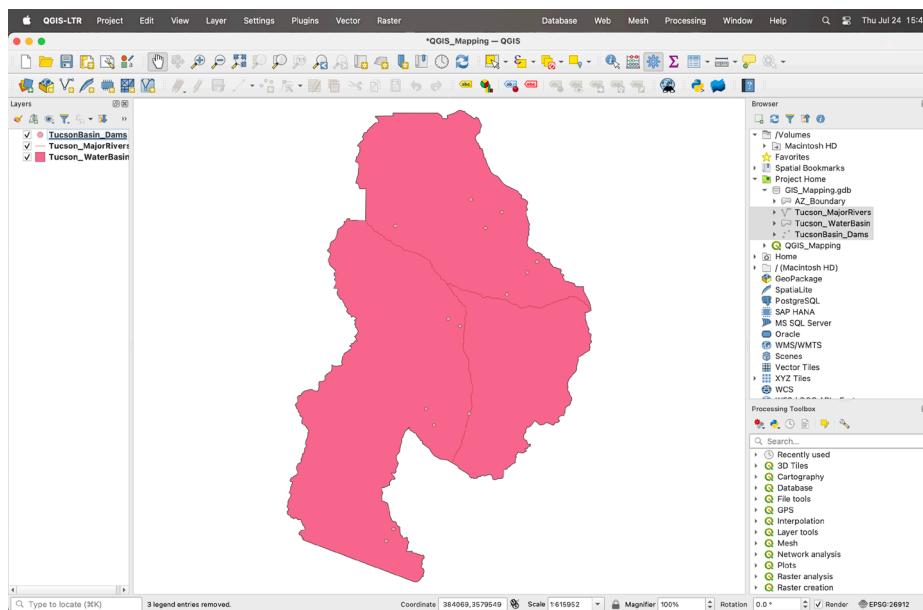
If you do not see the GIS_Mapping.gdb, right-click on the main project folder and select Refresh.

- 4.** Add the following shapefiles to your map:

TucsonBasin_Dams
Tucson_MajorRivers
Tucson_WaterBasin



3



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PREPARING TO MAP

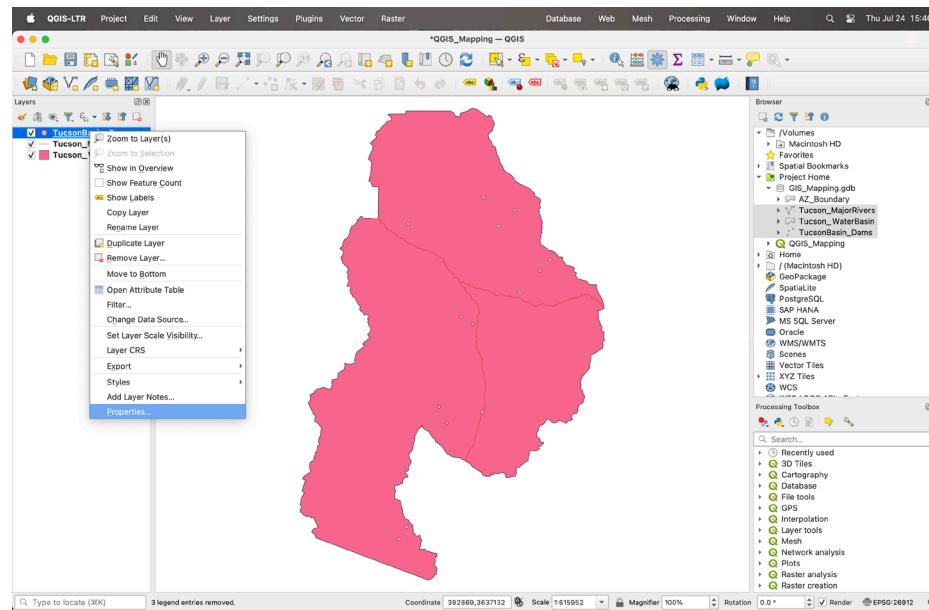
For this project you are interested in differentiating the dams in the Tucson water basin based on their Federal Hazard classifications.

1. Right-click on the TucsonBasin_Dams feature layer and select Properties.
2. In the Layer Properties menu select the Symbology tab.

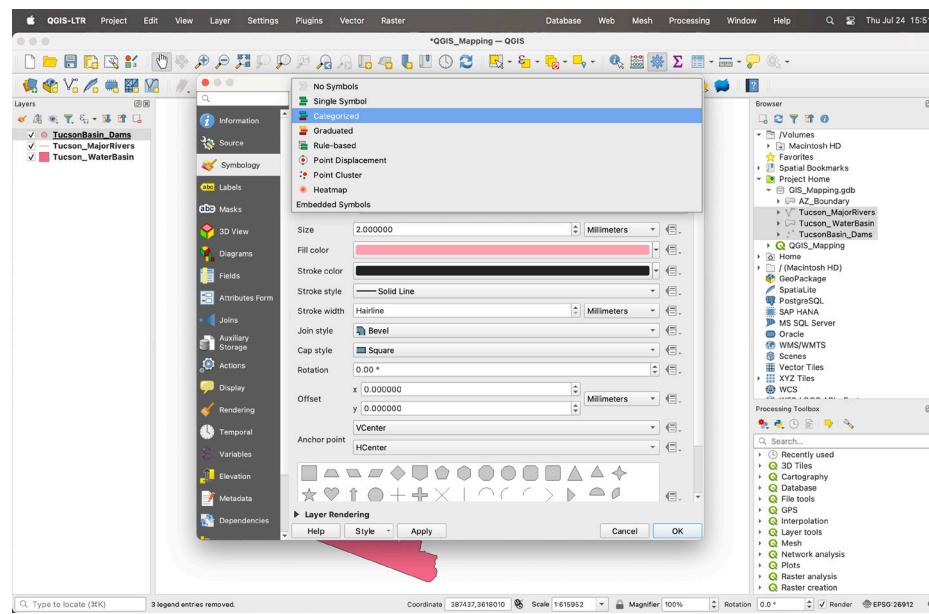
At the top the Symbology window select Categorized from the drop down menu.

SYMBOLITY:

The Symbology pane allows you to change the way that data is displayed on the map based on attributes (characteristics) that are found within the attribute table. You can also control the basic properties of feature layers including fill color, outline color, and outline width. The symbology method you choose will be based on the characteristics of the attributes.



1



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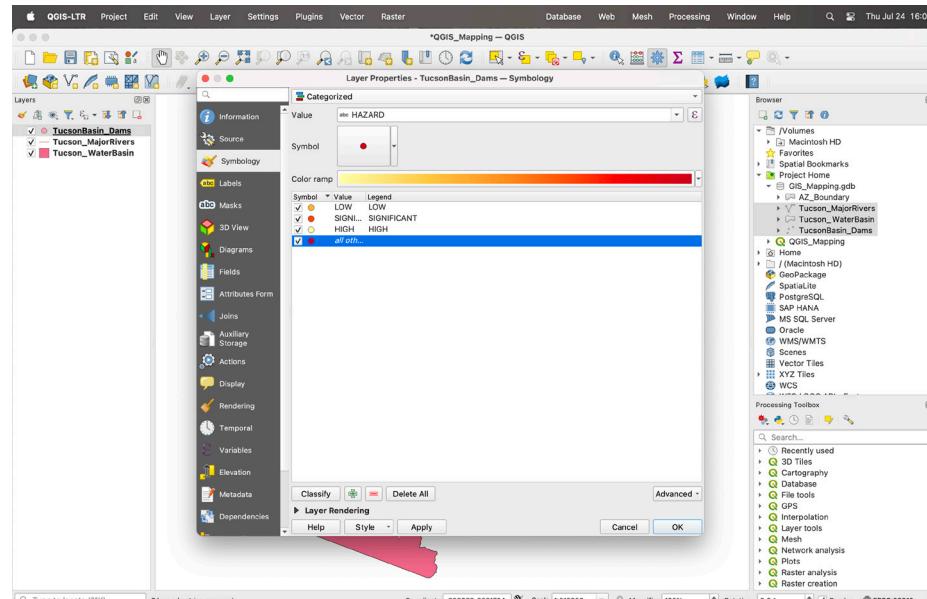
3. In the Layer Properties - TucsonBasing_Data symbology window match the following:

Value
HAZARD

Color ramp
Choose a color

In the Symbol window rearrange the values to
LOW
SIGNIFICANT
HIGH

Highlight all other values and click on the - button to remove these values.

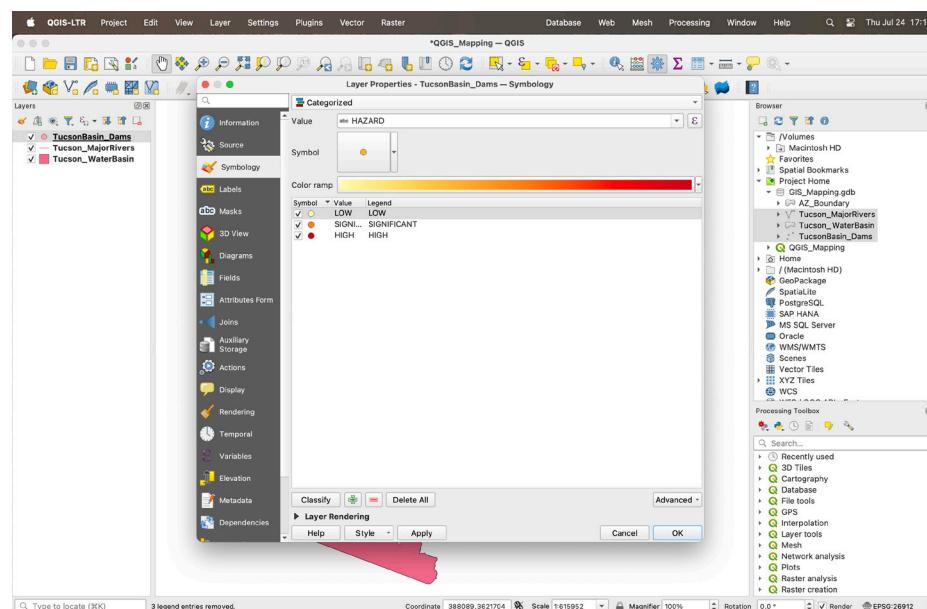


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4. After rearranging the Symbols and removing the all other values reselect the color ramp that you selected above.

The symbol colors should go from lightest (LOW) to darkest (HIGH).

Click OK.

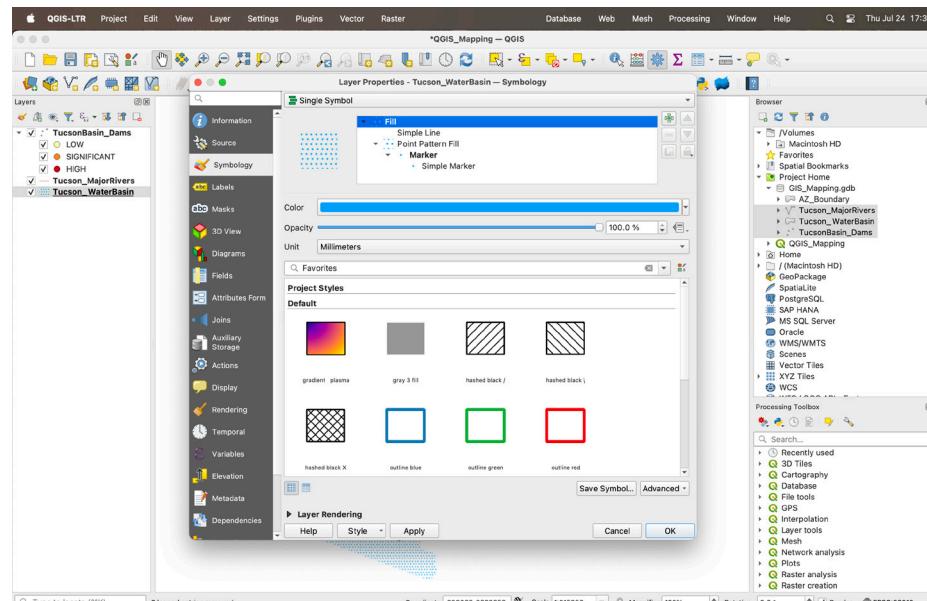


4

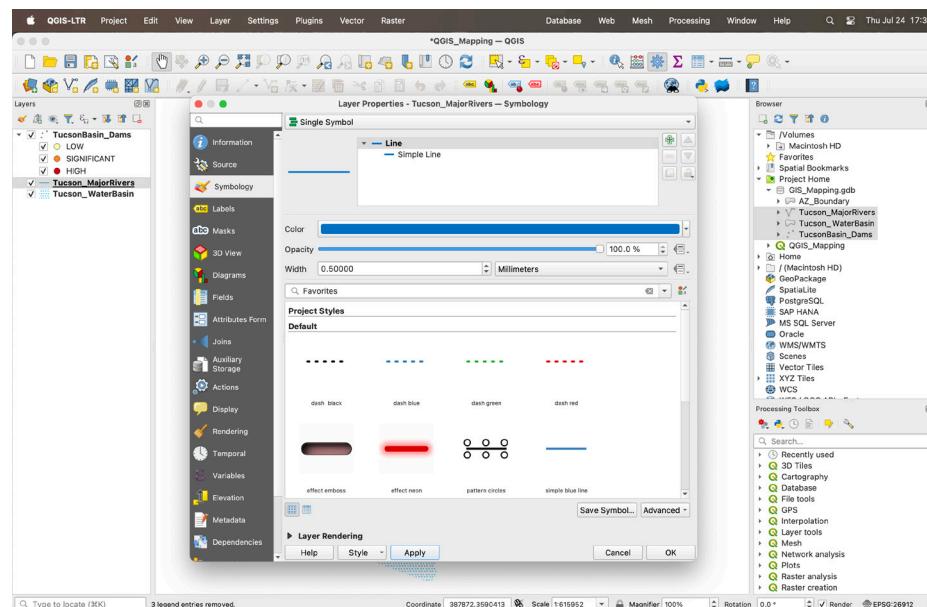
5. In the Layers window highlight the Tucson_WaterBasins layer and open the Symbology window.

Choose Simple Symbol and then choose a Color and Fill Style of your choice.

6. If your color scheme does not properly represent the attribute you are trying to display (in this example the highest level of dam hazard is lighter than the lowest level) you can click on More and then Reverse symbol order to reverse the color scheme.



5

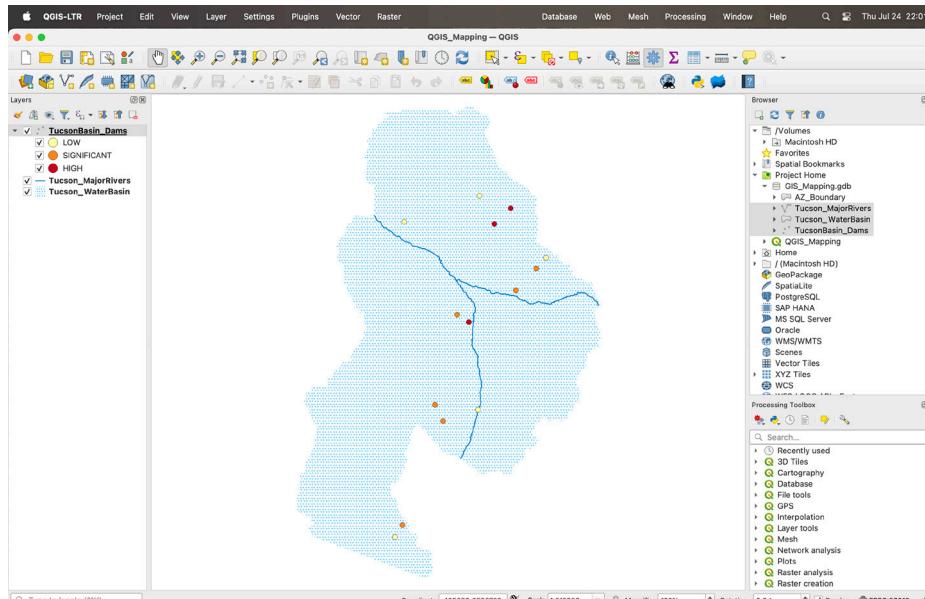


6

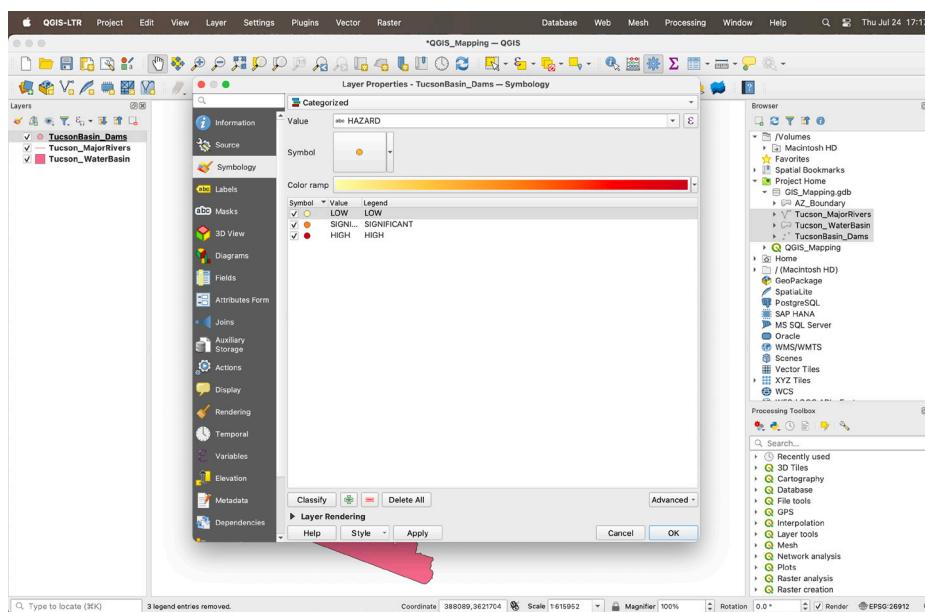
7. In the Map View window notice that the dams points are relatively small and hard to see.

Open up the Symbology window for the dams layer.

8. In the Layer Properties - TucsonBasin_Dams - Symbology window click on the Symbol button.

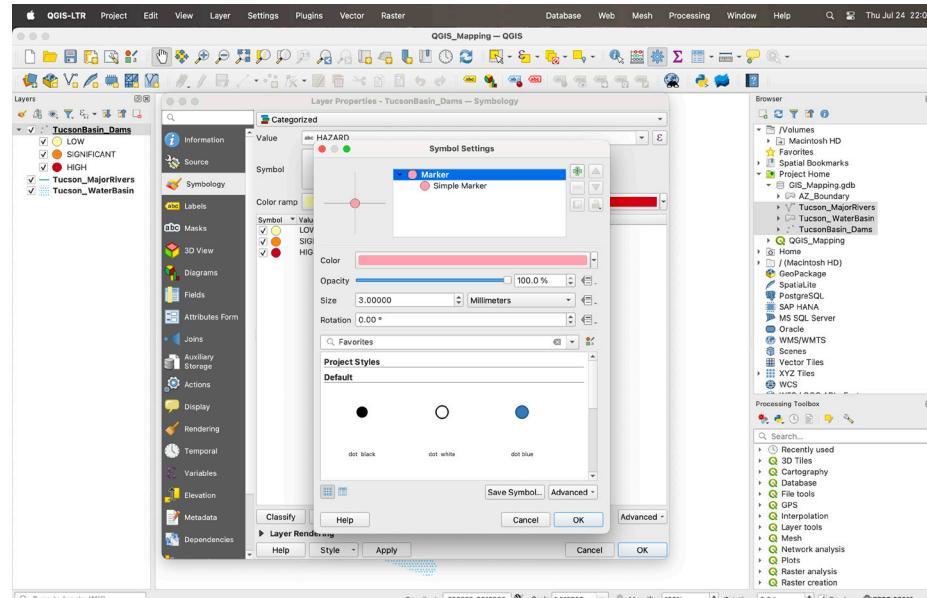


7



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9. In the the Symbol Settings window you can increase the size of the dams points by adjusing the Size setting.

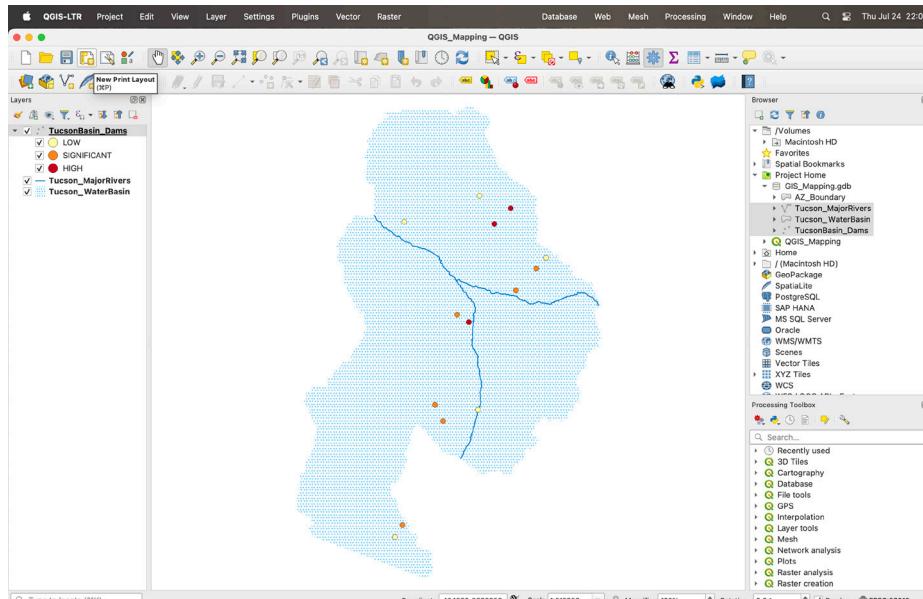


MAP LAYOUT

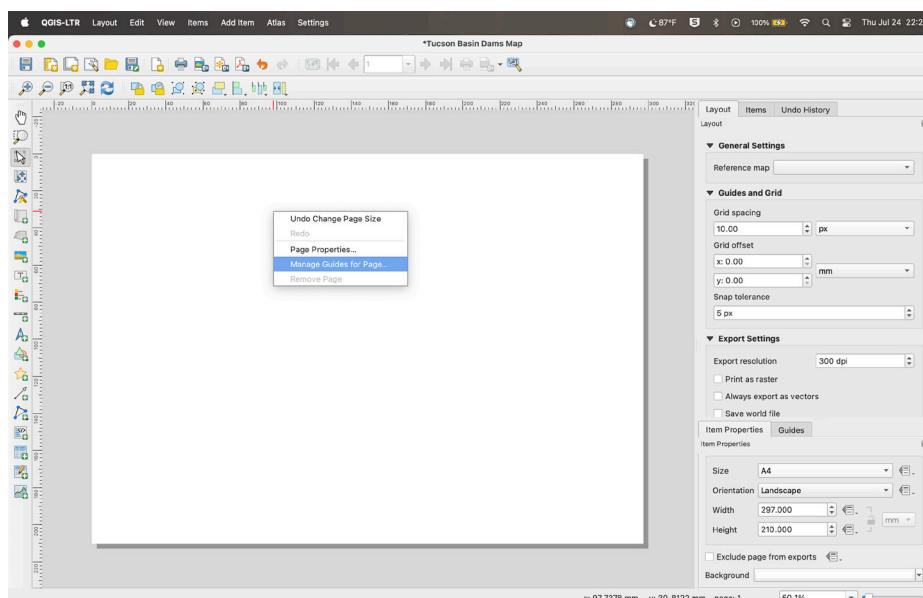
1. In the top Toolbar select the New Print Layout button.

In the Create Print Layout window enter a name for your layout.

2. Right-click anywhere on the layout and select Manage Guides for Page...



1



2

3. In Guides tab press the + button to manually type the following values to both the Horizontal and Vertical Guides windows.

Horizontal Guides

6.35
25.4
184.6
203

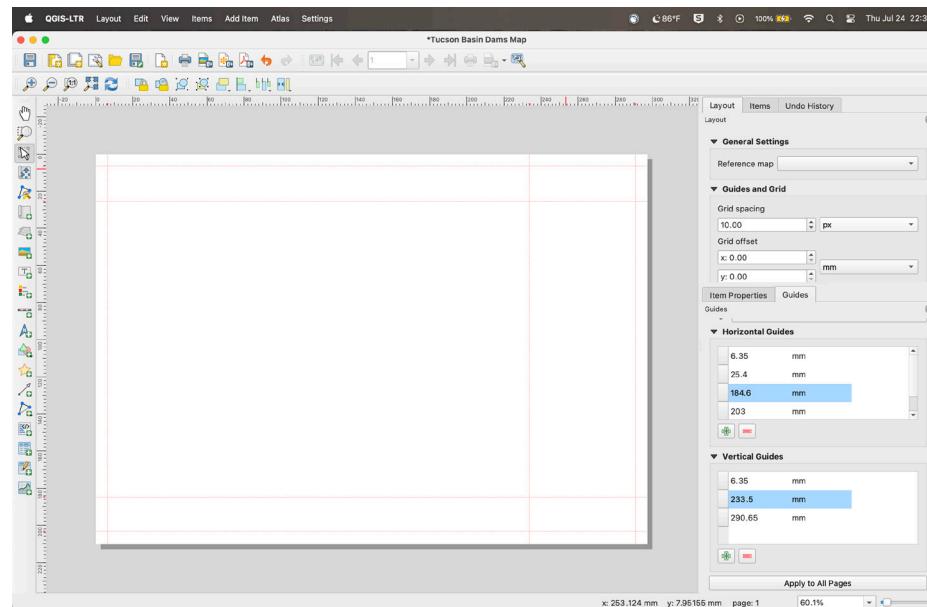
Vertical Guides

6.35
233.5
290.65

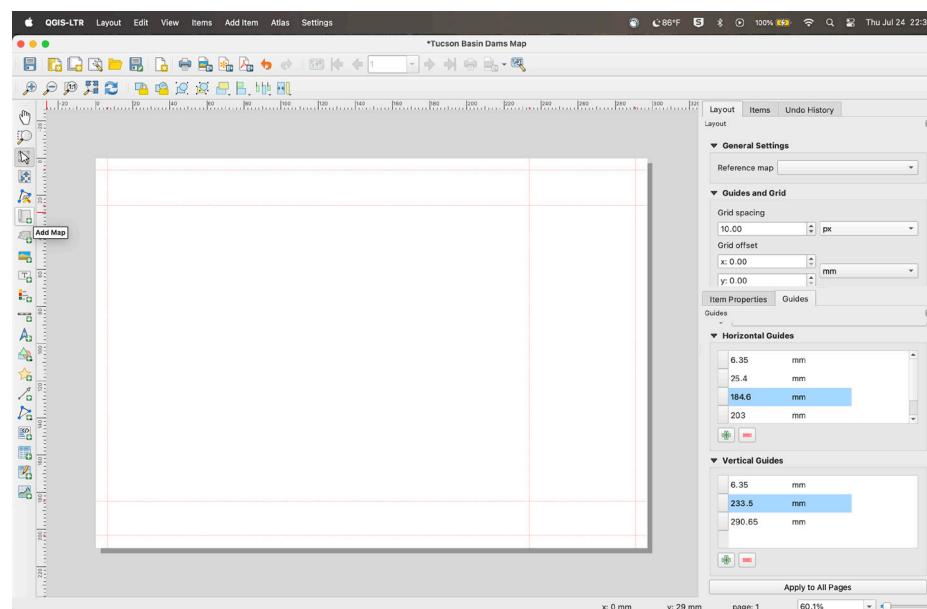
4. In the left hand Toolbar select Add Map.

HELPFUL HINT:

Guides allow you to set up page margins and position and size elements on the page. Guides, like in most graphical design programs, are for visual reference and are not included when the layout is exported or printed.



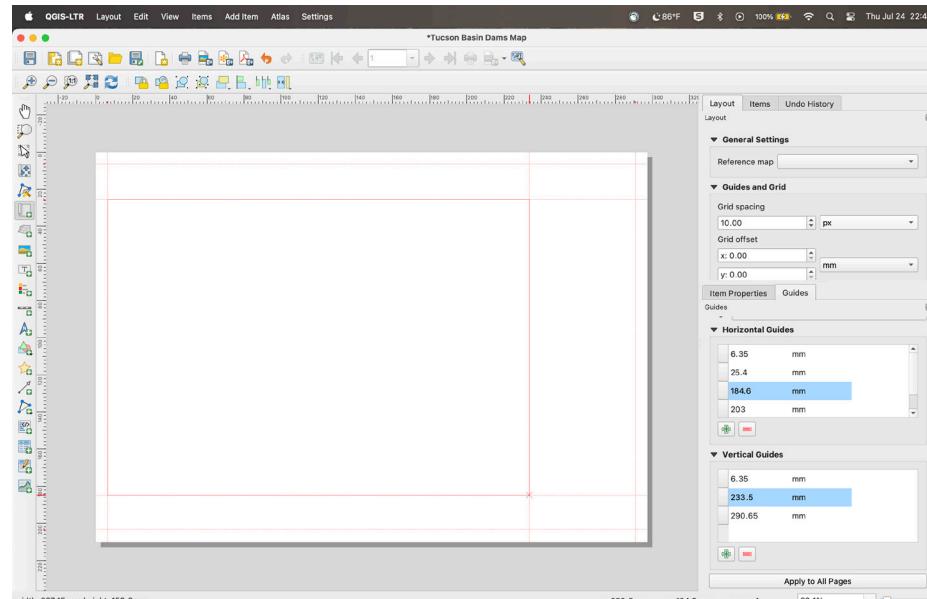
3



4

5. Click and drag the Add Map tool bounding box from the second horizontal guide from the top to the second vertical icon from the right.

Right-click on the Map Frame and select Properties. Change the border color to none.



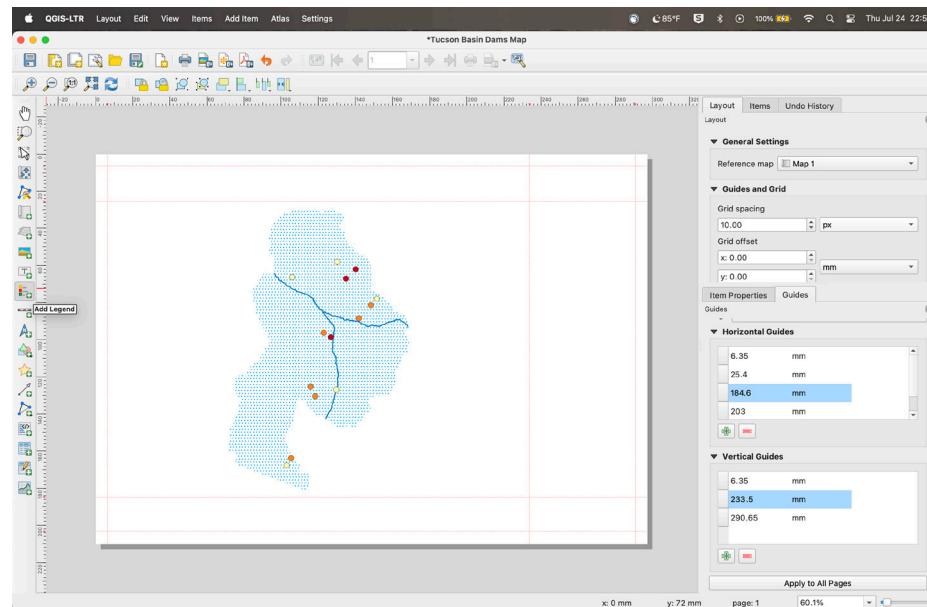
CARTOGRAPHIC ELEMENTS

All maps contain cartographic elements that provide viewers with context about what is happening on the map.

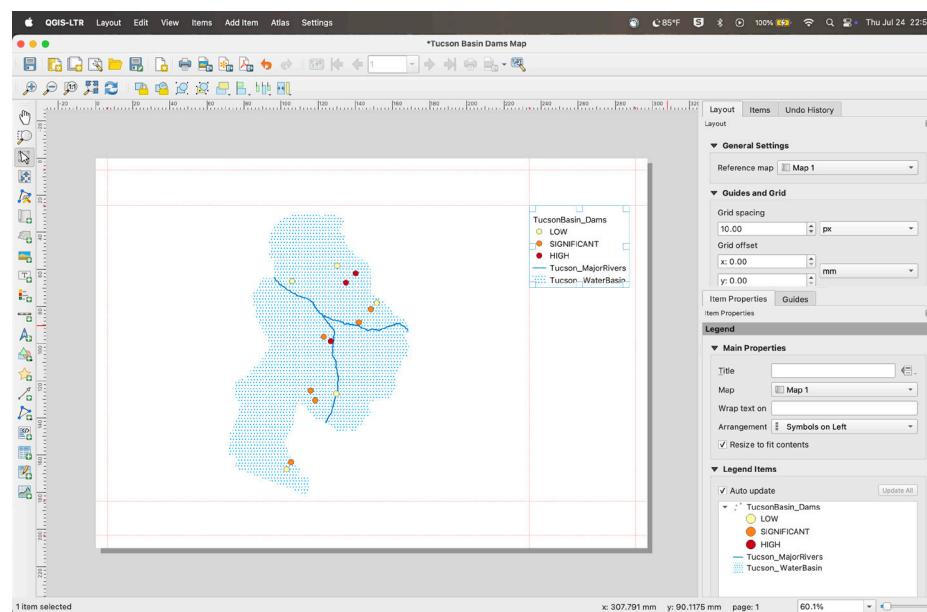
1. In the left hand Toolbar click on Add Legend.
2. Click and drag the Add Legend tool bounding box between the right-hand margins.

LEGENDS:

Legends allow viewers of the map to understand the meaning of the symbols used to represent features on the map. If there are multiple feature layers they are represented in the legend as individual legend items. By default legends are dynamic and will update show the feature layers that are visible in the current map frame's extent if new feature layers are added or removed.



1



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- 3.** Notice in the legend that the layers have names that may not make sense to people who are reading the map or are not grammatically correct (e.g., Tucson_MajorRivers).

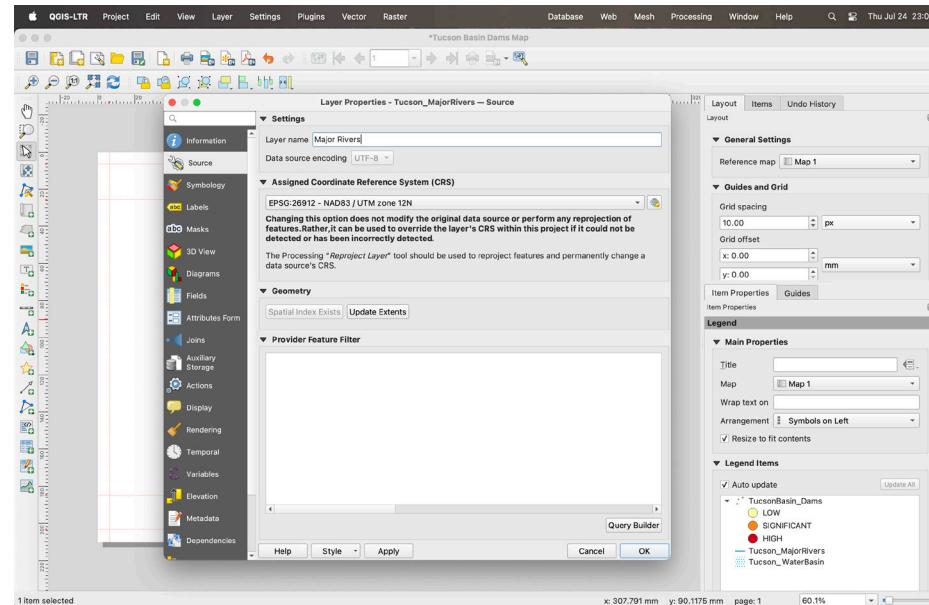
To change each of the layers names return to your map and open the properties of each of the layers.

In the Source tab type in a more appropriate layer name in the Layer name field.

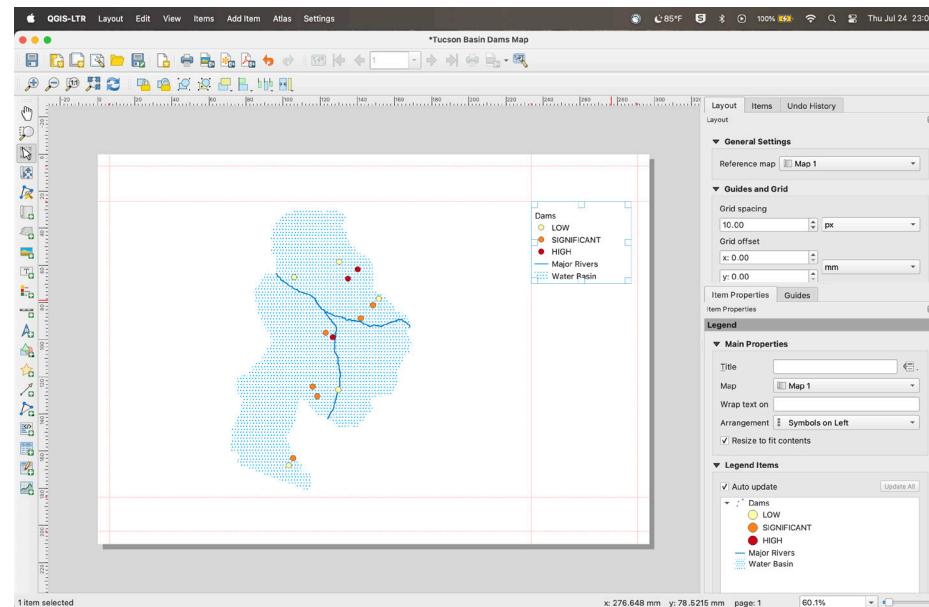
- 4.** You can alter other aspects of the legend by right-clicking on the legend and selecting Item Properties...

FEATURE LAYER LABELING:

By default, when you make a map in QGIS, the legend will contain the name of the layer unless you give it a more appropriate name. In this example the legend would label the feature layer as Tucson_WaterBasins which might not make sense to people. If you populate the Layer name field the legend will contain the name that you provide that should make more sense to people that are viewing the map.



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4

- 5.** In the left hand Toolbar click on Add North Arrow.

Click on the page to place the North Arrow.

In the Item Properties window you can choose a north arrow that you feel is appropriate.

- 6.** In the left hand Toolbar click on Add Scale Bar.

Click on the page to place the scale bar.

In the Item Properties window you can customize the scale bar.

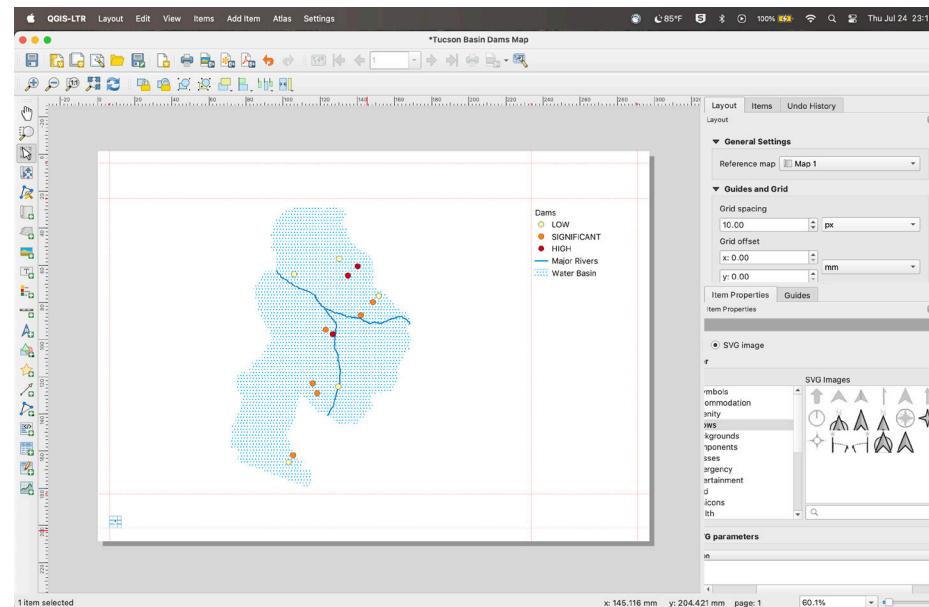
Place the scale bar next to the north arrow at the bottom left-hand corner of the layout.

NORTH ARROW:

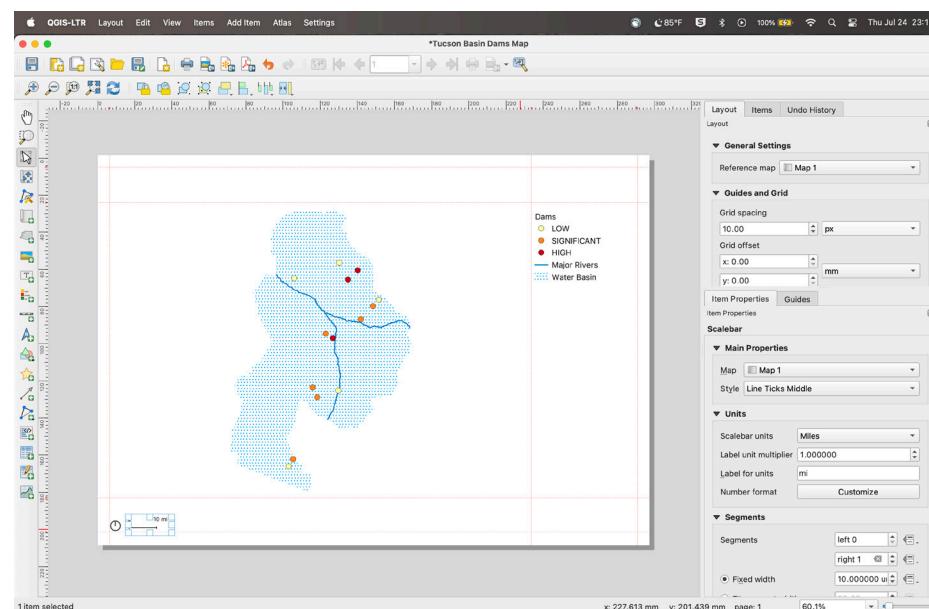
The north arrow indicates the orientation of the map and when placed on the map is automatically associated with the default map frame.

SCALE BAR:

The scale bar are used to visually identify the distance and feature layer sizes on the map. The scale bar is dynamically linked to the default map frame and if that map's extent changes the scale bar will automatically update to represent these changes. Scale bars should be displayed in measures that are appropriate for the scale of the analysis.



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7. In the left hand Toolbar click on Add Text.

Add a text box at the top of the layout and type in an appropriate title.

Add a text box under the legend and add some descriptive text.

Add a text box at the bottom of the layout and insert the following credit text:

Source: Environmental Protection Agency,
US Census Bureau, and University of Arizona
Libraries.

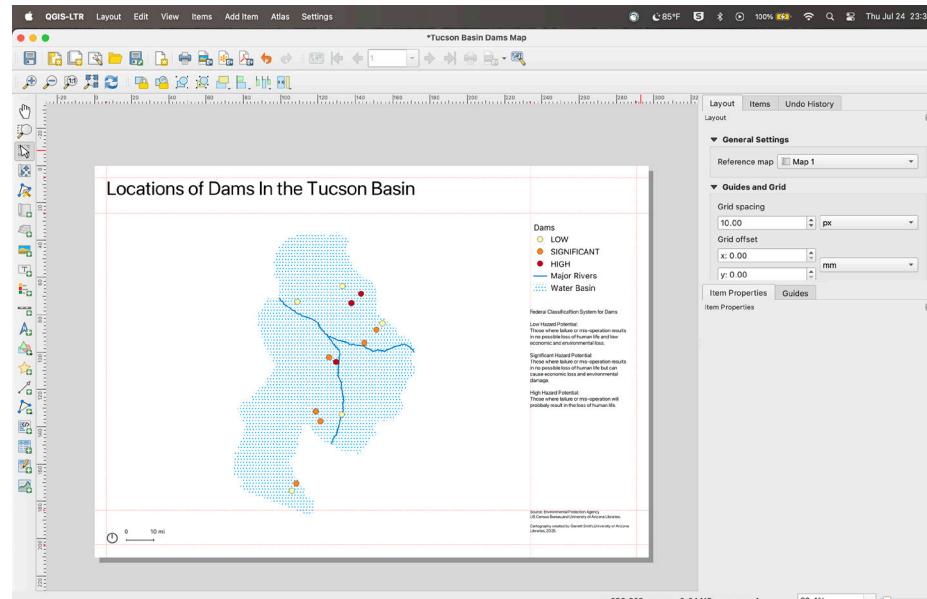
Cartography created by your first and last name, organization, and year.

You can edit the fonts, font sizes, and other text elements in the Item Properties window that will appear with you click on the text boxes.

TEXT:

Map titles need to be concise and descriptive generally mentioning the location of the analysis. If needed, descriptive text can provide additional context for the attributes that are being mapped. Finally, you want to give and receive attribution for the map.

In addition, the text on your map should follow some sort of hierarchical format moving from the largest text (title) to the smallest text (sources).



EXPORTING MAP

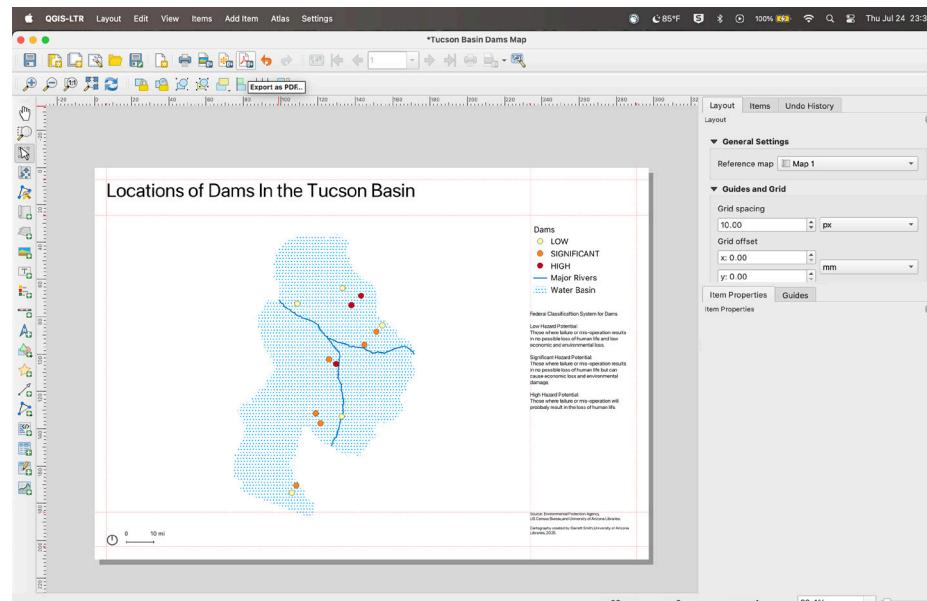
1. In the top Toolbar select Export as PDF...

Choose a location to save your map layout.

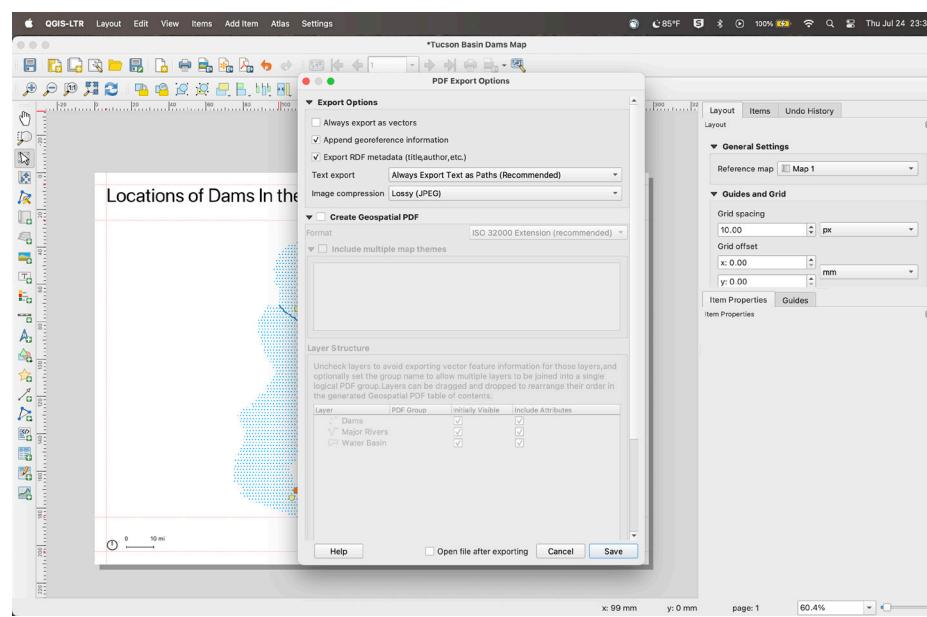
2. In the PDF Export Options window adjust the setting that are appropriate for the type of file that you would like to export.

EXPORTING MAPS:

The type of map that you will export will be based on how your map layout will be used. There are a number of different options for exporting maps and each has its own utility.



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END