

GEOG 310: Introduction to Computer Mapping and GIS

Lab Exercise #2: Working with Geographic Data using ArcGIS 10.2

Introduction to ArcGIS 10.2

This exercise will acquaint you with some of the basic functions of ArcMap, the main mapping application used in ArcGIS. **ArcMap** is used to display, explore, and analyze GIS datasets, label features, assign symbols, and create map layouts for printing or publication. ArcMap is also used to create and edit spatial datasets. It is available in all three license levels of ArcGIS (Advanced, Standard, and Basic). Fort Lewis College uses the Advanced version of ArcGIS 10.2, and this version gives the ArcMap application more functionality than that available in the Standard or Basic versions.

In this portion of the lab exercise, you will create a map of the Caribbean. The base map that you create today will be used in future GIS lab assignments, with some possible slight modifications.

You are going to first look at the ArcCatalog application. **ArcCatalog** is used to browse, manage, preview, and document geographic data. It is somewhat similar in structure to the Windows Explorer program. One significant difference is that ArcCatalog can preview geographic datasets and their attributes, and Windows Explorer cannot. ArcCatalog exists as both a window embedded in ArcMap, or as a standalone application. The standalone application (see Figure 1 below) is the most fully functional version.

1. Start ArcCatalog by clicking on the Windows **Start menu**, followed by the **Geosciences** program folder. Open the **ArcGIS** folder, and double click on the **ArcCatalog 10.2** icon. All GIS and GPS software programs on FLC computers running the Windows 7 operating system are located in the **Geosciences** folder, available from the Windows Start menu or on the computer's desktop. The GIS software is installed on the **C:** drive of all computers in the FLC computer classrooms; it is the Esri site license that is shared, not the software. Our license of ArcGIS comes with over 8 gigabytes of GIS-ready data sets, these are available through the campus network in the **G:\ArcGIS\DataMaps101** folder.

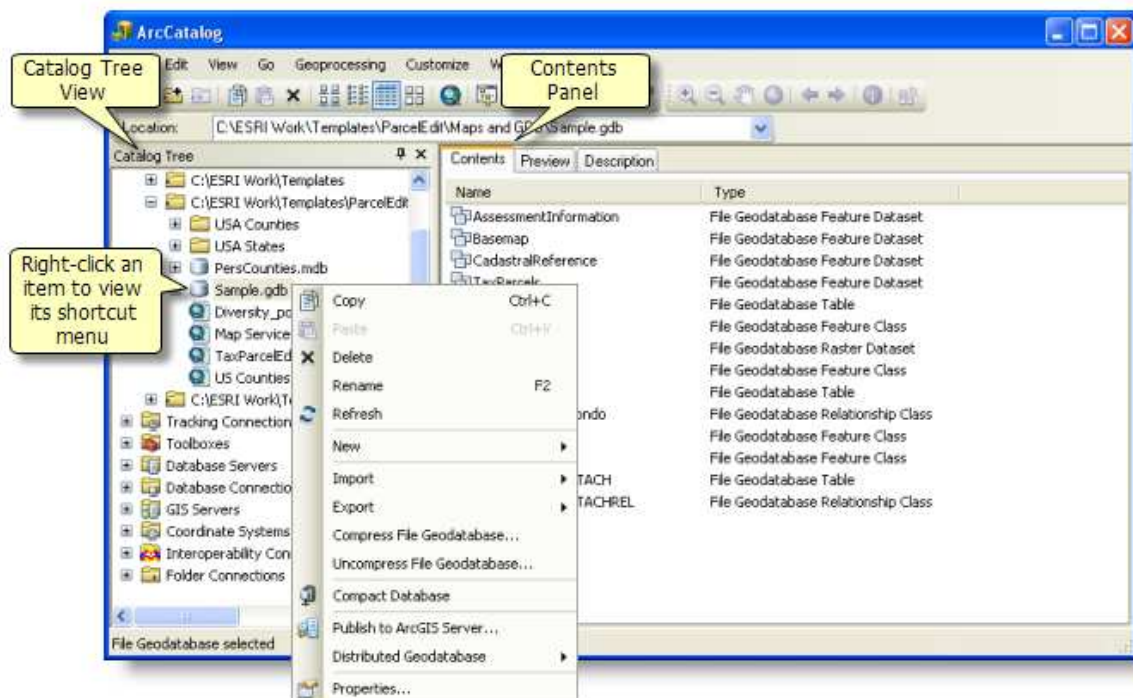











Figure 1: The main components of ArcCatalog. Image from the ArcGIS Desktop Help, © 2012 Esri, Inc.





2. Maximize the ArcCatalog window by clicking on the Maximize button in the upper right corner of the program. The ArcCatalog user interface consists of the Catalog Tree on the left side, and one of three viewer panes are on the right (Contents, Preview, or Description). You use the Catalog Tree to navigate and browse data. The dataset is selected in the Catalog Tree, and information about the data is displayed in the right pane. Due to the way in which the ArcGIS software is installed, there are initially no connections to GIS data folders available in ArcCatalog. To fix this problem, right-click on **Folder Connections** at the top of the Catalog Tree listing and select **Connect Folder**. In the Connect to Folder dialog box, select **Computer** followed by **M:\geog310\lab2**. Note: If you do not have a **lab2** folder, create it by clicking the Make New Folder button. No spaces in the folder name please. Double click on the **lab2** folder and make sure that it is highlighted. Click the OK button. Connect to the **G:\ArcGIS\DataMaps101** folder and the **O:\GIS** folder. You should now see three folder connections listed in the Catalog Tree. On the FLC computers, GIS datasets are stored in both the **G:\ArcGIS\DataMaps101** folder and the **O:\GIS** folder.

3. Open the **DataMaps101** folder, followed by **world** and then **data**. Inside the **data** folder are 51 files associated with world-scale mapping, along text and numerical attributes (country name, abbreviations, city populations, and many, many others). Each map data category has its own unique icon in ArcCatalog and ArcMap. In the Catalog Tree, click the small  symbol to the left of **continent.sdc**. Beneath this is a **continent** feature class. This spatial dataset holds polygon shape information, attribute information, and geographic location information. Also, click the  symbol next to **cities.sdc**. The  icon represents an SDC dataset. SDC (Smart Data Compression) data consists of vector map features (points, lines, and/or polygons). The other icons  and  indicate that the **cities** dataset consists of point features while the **continents** dataset consists of polygon features. Beneath all of the SDC datasets are icons for layer files  and tables . A layer file (.lyr extension) references a spatial data source that defines how the data should be displayed on a map, and which features from the data source are included or excluded. Symbology and labels can also be defined within a layer file. Data qualities and quantities, also known as attributes, are stored in a table format, and these are typically a part of the spatial data file (for example, part of an SDC dataset), or they can stand alone such as the tables named **cntry_ipc** (census demographic statistics) and **pol_org** (world country memberships in political organizations) listed in ArcCatalog's Catalog Tree.

4. Select the **continent** dataset next to the polygon features icon . By default, the Contents panel is visible in the right side of ArcCatalog. This panel shows a list or thumbnail graphics of folders and files. Click the Preview tab. The Preview panel shows the geographic and tabular information for the data. To see the tabular data, switch the view from Geography to Table beneath the map. This is a pretty simple table consisting of five attributes (*ObjectID*, *Shape*, *CONTINENT*, *SQMI*, and *SQKM*) along with the text and numerical attribute values under the column headers. Click the Description tab. The Description panel shows the explanatory text that has been created for this dataset. In the geospatial technology industry and software world, this text is known as metadata. More on metadata later in the semester...


5. Return to the Preview panel for the **continent** dataset. Notice that the continents are all colored yellow. Scroll down on the listing in the Catalog Tree and select the **World Continents.lyr** layer file. This layer file references the **continent** dataset, and it contains preset colors and labels associated with the continent names. Click the Zoom In tool  and slowly click a couple of times on the Gulf of Mexico. Try using the Zoom In tool to drag a zoom box. As you continue to zoom into the coastline, you may notice that the detail is pretty weak. That's because this map data is designed to be viewed at the world-scale, and not zoomed in to this level. Although you cannot alter the colors or labels on the map in the Preview tab, you can quickly see the general characteristics and geography of the spatial data.

6. There are 24 icons in a row beneath the eight pull-down menus (**File**, **Edit**, **View**, etc.) in ArcCatalog. When you hover the mouse pointer on top of a tool icon, a small tool tip box appears. Starting from the left, the first 16 tool icons control various aspects of navigation and data access in ArcCatalog. Some tool icons will launch other

mapping applications (such as ArcMap ). The next 8 tool icons (starting with the Zoom In tool ) control the viewing of the geographic features. Make sure that the Preview panel is visible, and click once on **World Countries.lyr** (not Continents). Use a combination of the Zoom In, Zoom Out, and Pan tools to zoom in and center on the country of Australia. Use the Pan tool  to move or shift the map to another position. If you're not sure which one is Australia, use the Identify tool  and click on a country. Text and numeric attributes are displayed in the Identify Results window. Close this window when you are finished with it. Again, center the map within the screen and make sure no Australian islands are cut off.

7. Screen-capture the Australia map by pressing the Alt and Print Screen keys on the keyboard simultaneously. Now, start Microsoft Word. Type your name, today's date, and lab number (#2) at the top of the Word page. Beneath this text, paste the screen-captured map. Select the map, click the Picture Tools Format tab, and change the image width to 7". Return to ArcCatalog and reopen the Identify Results window for Australia. Screen capture and paste this image in the Word document beneath the map. Save the Word document to your **lab2** folder. [10 pts.]
8. Back in ArcCatalog, close the Identify Results window. Zoom to the full extent of the map data (the world-scale view). There's a tool for doing this! Beneath the Catalog Tree, click on **World Cities.lyr**. Zoom in to the Australian cities until you start to see some of the city labels (Perth, Adelaide, Melbourne, etc.). Beneath the left corner of the map, change the Preview type to **Table**. You are now viewing the tabular data (attributes) that underlie the **World Cities** dataset. Right click on the header for the *CITY_NAME* column, and select **Sort Ascending**. This will alphabetize the counties. You can also try **Advance Sorting** (from the same right click) which lets you sort multiple columns at once! Scroll to the right and sort the *POP* column in descending order. The city with the largest population (Shanghai) appears at the top. FYI, Tokyo has the most populous metropolitan area. Scroll down through the listing. The -999 values indicate that no data was available for the city or town. For other attributes, this "no data" value is -99.



Below are several questions for you to answer based on the tabular data in ArcCatalog. You may need to re-sort the columns in the attribute table to get the answers. You will need to view other map previews, tables, and dataset descriptions in ArcCatalog, not just the information for this world cities dataset. Return to Microsoft Word, and type your answers to these questions on the second page. [30 pts.]


- a) Why are different sized circle symbols used for the world cities preview map? Hint: Zoom in! [2]
- b) Europe's busiest port city is Rotterdam in The Netherlands. What is this city's Port ID number? [2]
- c) According to this table, the second and third most populous cities in Russia are? Use Advanced Sorting. [2]
- d) The population of Damascus, Syria, is ranked as #? according to this table. Sort the *POP* attribute, not *POP_RANK*. [2]
Hint #1: Press the Ctrl and F keys simultaneously on the keyboard to find keywords in the table.
Hint #2: When you click on a gray square to the left of a row, you can see the row's position beneath the table.
- e) What is the name of the deepest lake and what is the lake's area (in miles²) in this collection of world data? [2]
- f) Based on the world airports preview map, which two continents have the greatest density of airports? [2]
- g) Which time zone covers the smallest surface area? What is the name of one country in this time zone? You'll need to use the Identify tool  to help answer these questions. [2]
- h) What kinds of areas or regions are represented by the **wwf_mar** polygons? Be specific, but don't just copy the description you see in ArcCatalog. What is the name of the region closest to South America's west coast? [2]
- i) In the **pol_org** table, the United States is not a member of two international political organizations in this list. What are the abbreviations and full names of these two organizations, and why is the US not a member in them? [4]
- j) Click the **Customize** pull-down menu at the top of the ArcCatalog window. Select **ArcCatalog Options**. In the dialog box, click the Metadata tab. By default, a very simple metadata style is displayed – the **Item Description** style. Switch to the much more detailed **FGDC CSDGM Metadata** style. We'll talk more about the FGDC later in the semester. Click the OK button. In the Catalog Tree, click the **cntry_ipc.sdc** table. In the right side of ArcCatalog, click the Description tab. If an "Upgrade Metadata" dialog box appears, click the No button. Click once on the page, and then press the Ctrl and F keys simultaneously on the keyboard to find keywords in the

metadata document, find the attribute name associated with the keyword, and then return to the attribute table to answer these questions.

- For year 2007, which country had the lowest life expectancy at birth (both sexes), and what was the age? [2]
- Which country had the highest HIV/AIDS adult prevalence rate, and what was the %? [2]
- For year 2007, which country had the highest % of the population age < 15, and what was the %? [2]
- What are the names of the two countries that are predicted to see the greatest % population change through year 2025? [2]
- For year 2007, which country had the highest net migration rate, and which country had the lowest rate? [2]

Save the Word document, but keep the program running in the background. You will use it again shortly.

9. Back in ArcCatalog, click the Launch ArcMap icon . This will start the ArcMap program. You can also start ArcMap from the **Geosciences** program folder – this is the way you'll open it most of the time.
10. The first dialog box in ArcMap that appears is named "Getting Started". This dialog box is used to start a map template. A map template is a predefined collection of map data, such as geographic features, map borders, text, special symbols, etc. The most basic form of the map template is the blank map template, and this is the one you will start with today. Click **My Templates** on the left side of the dialog box, select **Blank Map**, and click the OK button.
11. Maximize the ArcMap window by clicking the Maximize button in the upper right corner of the window. Click the Add Data button . In the Add Data dialog box, you should see the folder connections that you created earlier in ArcCatalog. Double click on **G:\ArcGIS\DataMaps101** and navigate through the following folders: **world>>data**. Single left click on the **country.sdc** file to select it, and then hold down the Ctrl key on the keyboard, and select the **cities.sdc** and **world30.sdc** files. You are getting ready to add three files at once, a map of country borders, a map of cities, and a map showing a latitude and longitude grid. Click the Add button.
12. You are now viewing the three map datasets in ArcMap, the ArcGIS program that you use to explore and edit geographic data, perform spatial analyses, and create professional-quality maps. Refer to Figure 2 at the top of the next page as you read the remainder of this paragraph. The ArcMap interface consists of the Table of Contents and a map display area within the Data Frame, as well as a number of toolbars and menus for working with the map and its data. The order of layers within the Table of Contents is important; the layers at the top of the Table of Contents draw on top of the layers below them. Therefore, you should put the layers that form the background of your map at the bottom of the Table of Contents. Make sure your Table of Contents shows **cities** at the top, **country** in the middle, and **world30** in third place. If this is not the case, drag a layer to the correct position. In ArcMap, there are two views for working with data: the Data View and the Layout View. In the Data View, you explore, edit, query, analyze and symbolize data. In the Layout View, you arrange map data frames and add other map elements such as scale bars, titles, and legends, to create a map layout that can be printed or exported to an external file (i.e., JPEG and TIFF images, PDF files, etc.). In the Data View, you can view only one data frame at a time, while in the Layout View, you can view and work with multiple data frames. The work that you do in ArcMap is saved to a map document file (.mxd extension).

Another way to get data into ArcMap is by dragging and dropping datasets from ArcCatalog to ArcMap. Instead of using the standalone version of ArcCatalog, you will now use the embedded version from within ArcMap. Move your mouse pointer to the Catalog button located to the right of your map. A small ArcCatalog window appears along the right side. You may need to click on the Catalog button if ArcCatalog doesn't immediately appear. This version of ArcCatalog has an Auto Hide feature that can be turned on/off by clicking on the very small pushpin icon near the upper right corner . To differentiate this minimalist version of ArcCatalog from the standalone full version that you used earlier in this lab exercise, I'll refer to the ArcMap-embedded ArcCatalog as simply "Catalog". In the Catalog, click on **Folder Connections** and navigate to the **G:\ArcGIS\DataMaps101\world\data** folder. Single click on the **wwf_terr.sdc** file (terrestrial ecosystems dataset). Hold down the left mouse button, drag the file to the Table of Contents, and drop the file beneath the **country** layer.

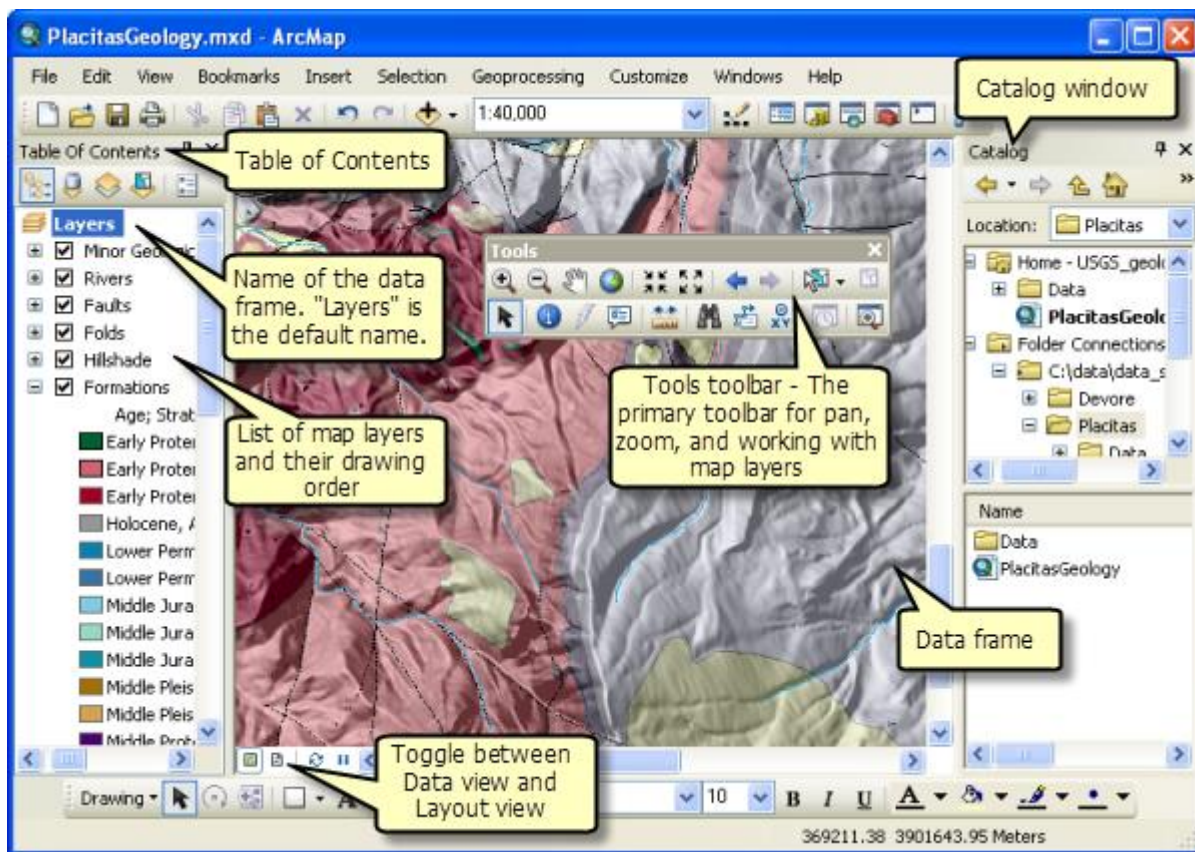





Figure 2: The main components of ArcMap. Image from ArcGIS Desktop Help, © 2012 Esri, Inc.

13. You can turn layers on/off in ArcMap by removing the checkmark from the Table of Contents. Temporarily turn off the **country** layer, and then turn it back on. The **wwf_terr** layer briefly appears beneath the **country** layer. To remove a layer from the Table of Contents and the map data frame, simply right click on the map layer name and choose **Remove**. However, don't remove any of these layers.
14. Use the Zoom in tool  and drag a zoom box encompassing the Gulf of Mexico and the Caribbean Sea as shown in the map below.








15. Create a spatial bookmark of the current map extent zoomed into the Caribbean region. Click the **Bookmarks** pull-down menu and select **Create**. Name the bookmark **Caribbean map**. If you change your map extent, and wish to return to this zoomed-in view, simply go to **Bookmarks>>Caribbean map**.
16. Save the map in ArcMap by clicking on the Save button . You can also save your map work by going to **File>>Save**, or you can use the keyboard shortcut keys **Ctrl+s** (**Ctrl** and **s** keys pressed simultaneously). In the Save As dialog box, navigate to your **M:\geog310\lab2** folder. Save the map as **Caribbean_map1.mxd**. Although it may seem picky, I strongly recommend that you never use spaces in the names of your GIS-generated files and folders. Some operations on data sets, particularly raster data, will produce errors if a file or folder has spaces in the name. Instead of spaces, use the underscore **_** or hyphen **-** characters.
17. In the Table of Contents, single click on the small line symbol beneath the **country** layer. The Symbol Selector dialog box appears. You will become quite familiar with this dialog box during the semester as it is used frequently to change symbol styles and colors. The default "Esri" collection of colored and patterned symbols is shown in the left side of the dialog box. You can scroll through the collection to see all of the symbols. Additional symbols can be loaded by clicking the Style References button. In ArcGIS lingo, a "style" is an organized collection of predefined colors, symbols, properties of symbols, and map elements. They are grouped by category, so the Geology 24K style contains symbols found on USGS geologic maps and the Forestry style contains symbols commonly found on vegetation and forest lands maps. For the **country** map layer, select the **Hollow** symbol style. Click OK.


Open the Symbol Selector dialog box for the **cities** layer. At the top of the dialog box is the Search box. Type the word **city** in the box and press the Enter key on the keyboard. All of the symbols with the word "city" in the symbol name appear. Select the 3D-like blue **City** symbol in the ArcGIS Explorer style set, and then click OK. Nice symbol, but there are too many of them and they're too large. Return to the Symbol Selector dialog box, and change the **cities** symbol to a simple black dot, size 5. Boring, but easier to see. Also, change the symbol for the **world30** layer to the Esri style set **Blue** color with an outline width of 0. This will remove the latitude and longitude grid in the water bodies.
18. Double click on the **country** layer name in the Table of Contents. The Layer Properties dialog box appears. This is another dialog box that you will become very familiar with before the semester is over as it is the main dialog box used to examine the properties and characteristics of a selected map dataset. In the Layer Properties dialog box, click the General tab. Change the Layer Name to **countries**. Click OK. Also, change the name of the **world30** layer to **water** and the **wwf_terr** layer to **terrestrial biomes**. Click OK to close the dialog box.
19. Right click on **terrestrial biomes** in the Table of Contents, and choose Open Attribute Table. This detailed table consists of numerous attributes (the columns or fields) and 832 rows of text and numeric attribute data. Scroll to the right so that you can see attributes such as ecoregion name (**ECO_NAME**), biome description (**BIOME_DESC**), and the biome's status (**STATUS**). You are going to use the **STATUS** field to symbolize the terrestrial biomes in the next step. Close the table.
20. Open the Layer Properties dialog box for the **terrestrial biomes** layer. Click the Symbology tab. By default, a single colored symbol is used for all of the biome polygons. To make a map that is more interesting, you can set the symbols to match various attribute categories. Click **Categories** on the left side of the Symbology tab. **Unique values** should be highlighted. In the Value Field section, select **STATUS**. Click the Add All Values button. Remove the checkmark next to **<all other values>** as it is unneeded for this dataset. There are 5 polygons that have no **STATUS** attribute value in the attribute table. Beneath the Label column, type the word **unknown**. Double click the colored symbol to the left of this label and change the color to a light gray (specifically, Gray 20%) and set the outline width to 0. With the gray symbol still selected, click the  button and move the symbol and label to the bottom of the listing. Reorder the other symbols so that

Relatively Stable or Intact is on top, **Vulnerable** is second, and **Critical or Endangered** is third. Change the colors and outline widths as indicated below:

- a) **Relatively Stable or Intact**: color = Leaf Green, outline width = 0
- b) **Vulnerable**: color = Autunite Yellow, outline width = 0
- c) **Critical or Endangered**: color = Medium Coral Light, outline width = 0


21. Have you saved your map lately? No?? Good grief – you like to live on the edge, don't you?! Click the Save button  to save the map. You won't be prompted again until the very end of this assignment. Please save frequently!
22. Open the attribute table for the world **cities** data. Notice that there is a column named *STATUS*. Scroll down through the *STATUS* attribute values. The text indicates the city status, and if the city is a capital or not. You can use this attribute and construct a map data query that will only display the cities that are national capitals. Close the attribute table.
23. Reopen the Layer Properties dialog box for the **cities** map layer. Beneath the General tab, change the layer name to **capital cities**. Click the Definition Query tab. A definition query is a written request that examines attributes based on user-selected criteria, and then displays only those geographic features that satisfy the criteria. Click the Query Builder button. You need to write a simple expression in the empty box at the bottom of the Query Builder dialog box that will select the national capitals. To start this, double click on the "STATUS". Single click on the = button. Click the Get Unique Values button. This is the complete list of unique attribute table values for the *STATUS* field. You're interested in the top three. Double click on the first 'National and provincial capital' listing. Single click on the Or button. Double click "STATUS", single click =, and then double click on the second 'National capital' listing. Repeat Or, =, and 'National capital and provincial capital enclave'. The final query should look like the one to the right. Click OK. Click OK. The map will redraw and only the cities that are national capitals will display on top of the other data.
- `"STATUS" = 'National and provincial capital' OR "STATUS" = 'National capital' OR "STATUS" = 'National capital and provincial capital enclave'`
24. Open the Layer Properties dialog box for the **capital cities** layer. Click the Symbology tab. The black dot is kind of ho-hum, and these are now national capitals. Maybe there's a better symbol to use? While you could search for a capital city symbol, here's a way to make a custom symbol. Open the Symbol Selector dialog box. Click the Edit Symbol button. The Symbol Property Editor dialog box is a bit daunting. Change the current symbol size to 12. Select this star symbol . To the left of the symbols, in the Layers box a small version of the symbol appears. Click the  button to add another symbol layer. Click the black circle symbol, and then click the  button to move the black circle beneath the star. Change the black circle symbol's size to 12 and color to white. This will create a star/circle symbol with a white background. Click OK three times! The capital city symbols are much easier to see on the map.
25. In the next step, you will label the countries by name. Before you do that, make sure the ArcMap program is maximized and filling the entire screen, and that you are viewing the map extent from the spatial bookmark that you set in step #15, page 6. Go to the **Bookmarks** pull-down menu and choose **Caribbean map**.
26. To label the countries, you need to use the attribute values in the *COUNTRY* field. Open the Layer Properties dialog box for the **countries** layer. Click the Labels tab. Check the "Label features in this layer" box at the top. In the middle, select *COUNTRY* as the label field. Change the font to Times New Roman and size to 10. Click OK. Ack! Label Overload!! Each polygon feature has a country name label. Return to the Layer Properties dialog box. Under the Labels tab, click the Placement Properties button. Click the radio button  next to "Remove duplicate labels". Click OK twice. That's better.
27. There is currently a spatial referencing problem with one of the world datasets that you are using. I think it's the **world30** dataset (you renamed this to **water** in Step 18). The FLC I.T. department knows about this dataset error, and is working on a fix. In the meantime, do this workaround so the next step (28) will work correctly.

Right click on the map and select **Data Frame Properties** from the popup. In the dialog box, click the General tab. Change the Map Units from **Unknown Units** to **Decimal Degrees**. Click the OK button.

28. Right click on countries in the Table of Contents, and select **Convert Labels to Annotation**. In ArcMap, annotation is the collection of text or number labels that can be repositioned and edited. In the Convert Labels to Annotation dialog box, click the radio button next to "In the map". Click the Convert button. Close the Overflow Annotation window if it pops up. For this map, there's no need to worry about overflows.
29. Make sure the ArcMap program is maximized on your computer screen. Return to your **Caribbean map** spatial bookmark. Stay at this zoom level for the steps below.
30. For the last mapping step, you're going to clean up the labeling. Ideally, a country label should be completely within the country's border and not overprinting on top of the border. At the same time, the label must be easy to read. Some of these labels work in their current positions (Cuba, for example), while others do not (Dominican Republic, for example). Some of the labels need to be resized and some can be deleted. Some labels (Dominican Republic, again) should be stacked. Follow the basic steps below to alter the labels:
 - a) **Repositioning labels.** Use the Select Elements tool  to select and then drag a label to a new position. You can also use the arrow keys on the keyboard to move a selected label to a new position. Hold the Shift key down and you can move the labels around in finer increments. To delete a label, select it and then press Delete on the keyboard. To edit a label, double click on it. Only these countries and/or islands need to be labeled: United States, Mexico, Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Lesser Antilles*, Puerto Rico, Dominican Republic, Haiti, Jamaica, Cuba, and Bahamas. *The Lesser Antilles is the name for the arc of islands extending east and south of Puerto Rico.

By the way, spelling is REALLY important in your GIS work, so make sure all place names are spelled correctly!
 - b) **Resizing and stacking labels.** Double click on a label to open the text Properties dialog box. You can change the font style, size, etc. here. You can create multiple lines of text to stack the label. If you click the Change Symbol button, you can get into even more text symbol details, such as font sizes. Change the font size to 14 for these labels: United States, Mexico, Colombia, and Venezuela.
 - c) **Label the Gulf of Mexico, Caribbean Sea, and Atlantic Ocean.** The simplest way to do this is to select and then copy/paste an existing label. Retype the label. Reposition the label in the correct body of water. I recommend dark blue, Times New Roman, 14 pt., italics font.
31. Save your map!

Finishing up...

Normally, you would create a map layout at this point, but I think you are getting tired. To keep your good humor intact, simply screen-capture the map, and paste this image into the third page of your Microsoft Word document. Once it's pasted, select the map, and then click the Picture Tools Format tab. Rotate the map left 90° . Also, change the map's height and width dimensions proportionally so that you have a map that is as large as possible on page 3.

- 1) Send these three pages to the black and white laser printer (**BH570 B&W**) in the computer lab. Do not print the pages in color. Staple all three pages together (please!), and hand them in to your friendly lab instructor before the start of your next lab period.
- 2) Email the complete Word document to me at **white_s@fortlewis.edu**. I want to see your color maps!

This final map is worth 20 pts. The entire lab exercise is worth 60 pts. When you're done, save your ArcMap document. Save your Word document. Quit the two programs and log off the computer. You are finished with this week's GIS lab! 😊