

Name: _____

LAB EXERCISE #2
Data Acquisition
(25pts)

The primary objective of this exercise is to learn how to download and input GIS data from the Internet. In addition, you will incorporate some of the knowledge that you have learned in weeks prior to perform some basic analysis of data that you have brought into a GIS.

Follow the steps closely and ask questions when you are unsure about what you are doing. Be sure to email your responses to the questions that are within and at the end of this exercise to the instructor to get credit for the exercise.

DATA ACQUISITION:

1. Create a folder within your “GIS” folder on your USB drive titled, “**LAB2**”.
2. First, we will obtain CA county boundary GIS data from the State of California, GEOPORTAL website at <http://portal.gis.ca.gov/geoportal/>
 - On the homepage, click the “Search” tab.
 - Using the dropdown menu, choose, “Downloadable Data”.
 - In the search box type, “*California County Boundaries*”, then click “Search”.
 - Click on “California County Boundaries (2009)”, then click on “Open”.
 - A box will open asking you to open, save, etc. Click “Save As”. Rename the Zip file you are saving “*CAcounties*” and save it into your LAB2 folder.
3. Open Windows Explorer from your desktop and extract the CAcounties data from the zipped folder it is in. To do this, simply right-click on the zipped folder and select “Extract All”. Un-check the box next to “show extracted files when complete”. Also, double-check the “path” (i.e., the location that the extracted files will be placed) to insure that it will be saved within your “CAcounties” folder that is within your Lab2 folder. Then, click on <Extract>.
4. Repeat step 2 and 3 with the following changes to download the CA Bioregions data from the same website:
 - Type in “*California Bioregions*”.
 - Use the same “Downloadable Data” dropdown option, and click, “Search”.
 - Choose “California Biodiversity Council Bioregions (INACC Regions)” from the list of results.
 - Choose, “Open”.
 - A box will open asking you to open, save, etc. Click “Save”. Rename the file you are saving “*CABio*” and save it into your LAB2 folder.
 - Again, rename the file you are saving, this time naming it “CABio”, and save it in your LAB2 folder
 - In Windows Explorer, extract the CABio data from the zipped folder it is in (in the same manner as done in step 3).

****Note:** Next we will obtain the CA Fire Hazard Severity Zones data from the California Department of Forestry and Fire Protection. For Fall 2014, skip step #5 due to a broken link problem at the CDF website, and instead do step #5.1 as a substitute way of obtaining the same data. ******

5. Next we will obtain the CA Fire Hazard Severity Zones data from the California Department of Forestry and Fire Protection. To download, go to: <http://frap.cdf.ca.gov/>
- Run your cursor over the “Mapping” tab at the top of the webpage, then choose “GIS Data”.
 - Scroll to “Fire Hazard Severity Zones in SRA (ADOPTED in 2007)” and click on the link.
 - Click on the link, “Statewide FHSZ Map”.
 - Under the “Statewide FHSZ Map” section, click on the “GIS Layer” link.
 - Once again, a box will open asking you to open, save, etc. Click “Save”. Rename the file you are saving “*CAfire*” and save it into your LAB2 folder.
 - In Windows Explorer, extract the Cafire data from the zipped folder it is in.

5.1 Temporary instructions for Fall 2014: Next we will obtain the CA Fire Hazard Severity Zones data from the California Department of Forestry and Fire Protection. To download, go to:

<http://www.grossmont.edu/judd.curran/gis.htm>

- On our class website, look in the left column under the “Lab Exercises” section for a link to the “Fire Hazard Severity Zones”.
- Click on the “Fire Hazard Severity Zones” link.
- Once again, a box will open asking you to open, save, etc. Click “Save As”. Rename the Zip file you are saving “*CAfire*” and save it into your LAB2 folder.
- In Windows Explorer, extract the Cafire data from the zipped folder it is in.

6. Navigate to the SANDAG website (San Diego Association of Governments) and obtain place name data for San Diego County and San Diego County Climate Zones data. The website address is: <http://www.sandag.org>

- From the left column on the homepage under the “Resources” heading, click on “Maps and GIS”
- Then, choose “GIS Downloads” from the same menu on the left. When the page loads, choose “Regional GIS Data Warehouse”, then scroll to the bottom of the disclaimer and click “Accept”.
- Under “Available Downloads” below, select “Place”. Notice that the left column contains the metadata in PDF format, and the right column contains the corresponding shapefile data. First click on the Places.pdf metadata file to view the details about the shapefile you are about to download. From the metadata, write down the following:



a. Publication Date (**NOT** the “Updated” date): _____

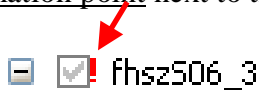
b. Purpose: _____

c. Type of Layer: **Point / Line / Polygon / Cell** (*circle one*)

d. Thus, is it: **Raster / Vector** (*circle one*)

- Use the browser back button to return to the “Available Downloads” page.
- Now, from the right column on the same webpage where you found the metadata, click on “Places.zip” for the **Placenames** shapefile.
- Save the Places.zip to your **LAB2** folder.
- In Windows Explorer, extract the Places data from the zipped folder it is in.

7. Go back to the SANDAG page with the GIS data categories and select the “Ecology” category.
- From the list on the right, select “Climate.zip” for Climate Zones. This is a file of climate zones within San Diego County.
 - Change the name of the file to “ClimateSD” and save to your **LAB2** folder.
 - In Windows Explorer, extract the ClimateSD data from the zipped folder it is in.
8. Navigate to the class website and download one additional zipped data folder from the link titled “Lab2Data”(look in the left column under the “Lab Exercises” section of the class website for the “Lab2Data” link). When choosing to save the file, rename it “CAclimates”. Unzip this folder in the same manner as done for the other data you have already downloaded. This folder includes two different tables of non-spatial data and a more detailed Koppen climate map for all of California (koppenca2.shp).
9. Open ArcMap and follow the step-by-step procedures below...
- **First** display the California climate shapefile data (*KoppenCa2.shp*) by clicking on the “add data” button  at the top of ArcMap.
 - Once added, rename the “KoppenCa2” shapefile in the table of contents to “CAclimates”.
 - Then, of the data you downloaded, using the same method , add the following additional data in the list below to ArcMap. (**Note: *If, in the process of adding the data to ArcMap, you get a warning message about the coordinate system and or projection, ignore the warning and continue loading the data to the map. The warning is indicating that not all of the files are in the same projection and or coordinate system. ArcMap will still display them together by automatically re-projecting some of the files instantly (“on the fly”) so that they are compatible for display purposes.*)
 - climateSD shapefile (aka *climate.shp*)
 - CAFire **layerfile** (aka *fhszs06_3.lyr*)
 - CAcounties shapefile (aka *cnty24k09_1_poly.shp*)
 - CABio shapefile (aka *inaccreg.shp*)
 - Places shapefile (aka *places.shp*)
10. Because the CAFire file you added to your map is a layer file (.lyr), and not a shapefile (.shp), the data will not display correctly until you first establish the link between the layer file you loaded into the map and the shapefile that exists in the same folder. If you look closely within the Table of Contents, you will see a red exclamation point next to the fhszS06_3 (CAFire) layer.



Click once on this exclamation point to make the connection between the layer file and its corresponding shapefile. A “set the data source” dialog box will open. Choose the *fhszs06_3.shp* file and click “Add”.

continue to next page for step 11.....

ORGANIZING AND VISUALIZING THE DATA

11. Rename **all** of the layer titles in the Table of Contents to be consistent with the names you gave each dataset when you saved them in your USB-drive. For example, open the context menu for “inaccreg”, click the “General” tab, then in the “Layer Name” box, change the name to CABio (refer to step #9 for the other names).

12. Remember that the order in which the data is listed in the Table of Contents is the same order that the data is displayed in the map viewer. Thus, if all you can see is the CA counties, then it is likely at the top of your list in the Table of Contents. It is a good idea to re-organize the “layering” of your data to expose those data that might be hidden underneath other layers. However, if you have 2 polygon shapefiles (for example, the CAclimates and CAcounties shapefiles), you can only see one at a time on the map unless you **change the symbology**. That is, you change the way in which the data is represented. Here’s a few things you can do...

- In the table of contents, move the CAcounties data to the top of your list. Then, just under the name “CAcounties” in the table of contents, click once on the color box that defines the color being used for the counties. A “symbol selector” will open.
 - Choose “Hollow”, change the outline width to “2”, and select red for the outline color. Click “Ok”.
 - Note that the counties are re-drawn on the map such that you can now see the other data at the same time.
 - We can also label the counties with their respective name. First, find the attribute in the CAcounties attribute table that contains the county name (choose the one that is not all upper-case, and that includes the word “county” within the name. What is the name of the attribute field (i.e., the column heading) of the field containing the county names?
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- Close the attribute table. Then, in the Table of Contents, right click on the CAcounties layer and choose “Properties”. A Layer Properties box will open.
 - In the layer properties box, click on the “Labels” tab.
 - Check the box in the upper-left to “Label Features in this Layer”.
 - Under “Label Field”, choose the attribute field that you wrote down above.
 - Change the font color to match the county color (red).
 - Click “Ok”. Notice that the counties are now labeled with their corresponding names in matching red color.
 - Perform a similar operation on the CAclimate data, but use a different color than the counties.
 - For the other polygon layers, you can change the colors used in each category (instead of making the polygons “hollow”). Adjust the symbology to add colors within each category for the ClimateSD layer and the CABio layer. To adjust the symbology, go to: *Table of Contents, right-click on the layer to bring up the context menu, click properties, then symbology tab. Choose “categories”, “unique values”, “add all values”, and choose an appropriate color ramp from the drop-down list. Then, click “OK”.*

DATA ANALYSIS

13. Examine the attribute table in ArcMap for the ClimateSD shapefile. Notice that the CLIMTYPE attribute contains information on the different climate zones. These zones are described as “coastal”, “interior”, “transitional”, etc. These very general categories are not very useful. A more commonly used classification of climate is the Koppen classification system. In the case-sensitive Koppen system, letters of the alphabet are used, sometimes in combination, to represent different climate regions. For example:

- BS = semi-arid
- BW = arid
- C = warm mid-latitude climate with moderate seasonality
- D = cool mid-latitude climate with strong seasonality
- H = highland climate found in high elevations
- s = dry summers and wet winters
- f = wet year-round
- a = hot summers
- b = warm summers

But, our ClimateSD shapefile does not contain any attribute information on the Koppen system. To associate the climate zones with the Koppen system, we can join a non-spatial data table to this spatial data.

- In the CAclimates data folder you downloaded from the class website, find the <Koppen.mdb> file. Join this Koppen.mdb table to the Climate layer. If you forgot how to join a non-spatial data table, reference your notes from class. Use the “FID” field for both the existing climate data and the new non-spatial table as the common field (attribute).
- Label the climate zones in ArcMap using the newly-joined Koppen classification.
 - Hint: *Table of Contents, context menu, properties, labels tab.*
- Change the display color for each of the Koppen categories.
 - Hint: *Table of Contents, context menu, properties, symbology tab.*

14. Repeat step 13 using the California climate data <CAclimates.shp> and the <KoppenCodes.txt> table. This data does not have the same fields in the attribute table as with the San Diego climate data. Thus, look at both the attribute table for the shapefile and the Koppen codes table (.txt file) to find out which fields in each are in common and can be used to join the tables. (*hint: you can preview the KoppenCodes.txt file by double-clicking on it in Windows Explorer*)

15. ANALYZING THE DATA AND SUBMITTING YOUR RESULTS:

- a. Generate an email to your instructor with the subject line, “*lastnameLX2*”.
- b. With all of the data displayed in ArcMap, answer the following questions on the next page. Include those answers in the email (or Microsoft Word doc attached to email).
- c. Also attach the PDF map that you generated in step #8 below to the email.
- d. Send email to instructor before the posted deadline.

HINTS:

- To help in answering the following questions, use the Select by attributes option in the “Selection” menu to select and display only the information that you need.

LAB #2 QUESTIONS:

1. Answers from Question #6, a, b, and c.
2. Answer from Question #12.
3. Which 7 of the Koppen climate categories are represented within San Diego County, considering both the CA climate map and the San Diego County climate map?
4. Compare the representation of different Koppen climate types within San Diego County to that of San Bernardino County. What types are in S.D. County, but not in S.B. County? Likewise, what climate types are in S.B. County, but not S.D. County?
5. List the different bioregions that are represented within San Diego County.
6. Is there any visual relationship between Koppen climate type and bioregion in San Diego County? That is, when the climate changes from one type to the next, is that in the same locations where the bioregions change from one type to the next? (be specific, siting the location of change and with which Koppen climate categories does a change occur that corresponds to a change in bioregion).
7. Is there any visual relationship between Koppen climate type and bioregion in California? If so, explain in detail, citing specific examples.
8. Compare the fire hazard zones to the bioregions.
 - a. Is there an increased risk of fire in certain bioregions in San Diego County?
 - b. If so, which bioregions are at a higher risk of fire?
 - c. Where within those regions is the risk greatest?
 - d. **Annotate, then save the contents** of the map frame within ArcMap as a PDF (refer to steps below):
 - i. Zoom-in so that San Diego County fills the frame to capture the view of the map contents you used when answering question 8.
 - ii. Insert a title at the top of the map.
 - iii. Insert your name into the lower-left section of the frame below the Table of Contents (use default font size).
 - iv. When you are ready to save...
 - a. Click on “File” from the top of ArcMap, then “Export Map”.
 - b. Choose from the “Save As Type” dropdown menu, “PDF”.
 - c. Navigate to and select the folder you want to save the file into.
 - d. Name the file: LabEx2*lastname*.pdf (insert your last name in place of “*lastname*”).

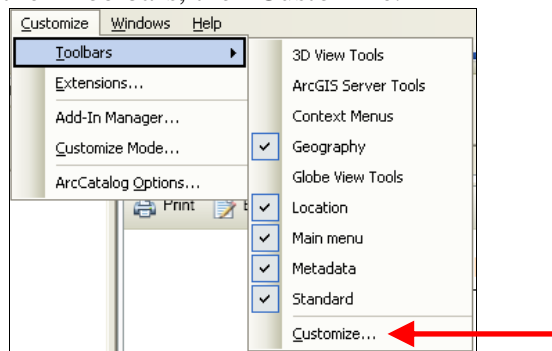
9. Is there an increased risk of fire in certain bioregions in the state of California? If so, are there any that are at a higher risk of fire that are not represented in San Diego County, but that are represented elsewhere in the state? Be sure to include locations (i.e., counties).
10. Is there any relationship between fire hazard zones in California and Koppen Climate type? If so, which climate types are more prone to higher fire risk?

A NOTE ABOUT .e00 FILES

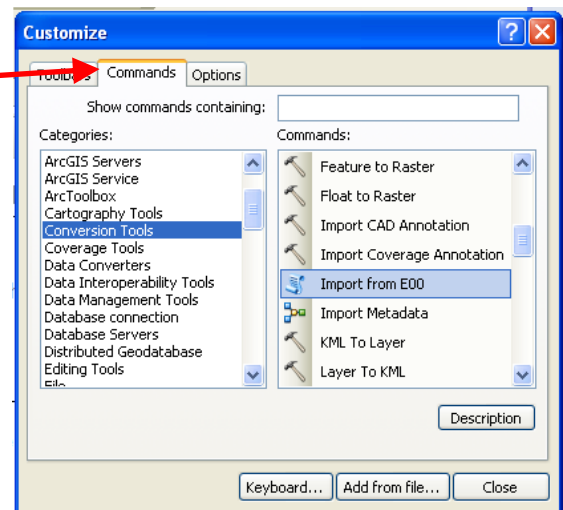
Sometimes you may encounter a file of type **.e00**. This type of file, known as a File Interchange Format, is a compressed file and will need to be uncompressed in ArcCatalog. To make use of such files, follow the instructions below to uncompress the data before opening it in ArcMAP.....

Files of type .e00 must be uncompressed before being displayed in ArcMap. To uncompress:

- In ArcCatalog, select Customize, then Toolbars, then Customize.



- Click on the “Commands” tab.
- Scroll through the categories on the left and choose “Conversion Tools”.
- On the right, scroll to “Import from e00”
- Move your cursor over this option, click and hold, and drag this tool up to the tools toolbar (the toolbar that contains zoom-in, zoom-out, etc) and let go.
- The conversion tool will affix to the tools toolbar.
- Click on to open the “Import from e00” tool.
- Select the .e00 file as input.
- Specify the output by browsing to the same folder that the .e00 file is currently in.
- Name the output file. Then click ok.



NOTES: