

GEOG: 3231/5231

ArcGIS Mapping Basics

Today we will begin our first mapping project. We will work through this project in class together to build some basic familiarity with ArcMap. **These step-by-step instructions will not be provided in future projects, so please add your own notes and hang onto them for reference.**

Download and extract the file *ArcBasics.zip* from the content section of D2L to your folder on the C: drive.

Data source: ESRI (This detail will always be provided somewhere in your instructions and MUST be disclosed on ALL maps)

- A. Browse to this folder on the C drive and examine the files contained within. Refer to the Shapfiles_ESRI document on D2L to help answer the following:
- How many total files are there?
 - How many files make up one shapefile?
 - What is the function of each of the following file components:
 - .shp =
 - .shx =
 - .dbf =
 - .prj =
- B. Start a new, blank ArcMap document by launching that program (Start menu or the shortcut icon)
- If it's not already, pin this icon to your task bar
- C. Before getting too far into a map, it is good practice to set your map document & print properties:
- Go to *File > Map Document Properties*, and check the "Store relative pathnames to data sources" box. This helps your ArcMap documents "find" the data. Click OK.
 - Go to the Customize tab, and make relative paths the default.
 - Go to *File > Page and Print Setup*. Choose the color printer for the lab (*bsuprint...3600*), then check the "User Printer Paper Settings" and "Show Pint Margins on Layout" boxes. Click OK.
- D. We will map US data from ESRI. Open the ArcCatalog sidebar and expand your folder on the C drive, then drag the *States* shapefile into the blank map to add that layer to your map document.
- The main toolbar (Tools) is used for working with data in Data View:

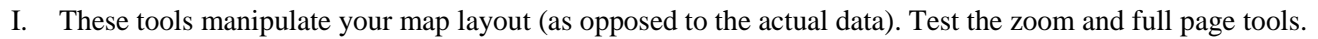


- E. Use the Zoom In tool from the data toolbar to zoom into the 48 contiguous states
- F. Use the Identify tool to find out the SUB_REGION of a particular state
- What is MN's sub-region?

Access the attributes of a feature via the attribute table

- G. Right mouse click on the *States* layer and select *Open Attribute Table*
- Sort the SUB_REGION attribute column in ascending order
 - Select the E N Cen records to highlight this area in the map
 - How many states are included?

The Layout toolbar: equivalent to data toolbar for the Layout View (*Notice the page symbol behind each icon)



J. From the insert menu, add a second data frame

- K. Right click on the US map, select *Distribute > Fit to Margins* to auto-fit the size of the data frame

M. In the table of contents (TOC) window on the far left, right click on *Layers* (the default name of the data frame) and change the name to “US”

- N. Return to the Data View and add the shapefiles *Cities* and *Roads*

O. Right click on **Cities**, select *Properties* and then click the *Labels* tab

P. Click the “*Label features in this layer*” box (top left), then close the *Properties* menu

- Q. Use the data tools to measure the distance in miles between Seattle and Minneapolis

- R. Right mouse click on the data frame (now called US) and select *Properties*. A dialog will open up with several tabs. Select the *Coordinate System* tab

- ## Modify the appearance of a map (all layers within a data frame)

S. Scroll down to the *Projected Coordinate Systems* folder and click the + sign to expand it

- T. Again measure the distance in miles between Seattle and Minneapolis

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Cartography: Modify the visual aspects to make a nice map

- 1) Double click on the **Cities** layer and change the color and style of the points
- 2) Double click on the colored square under the **States** layer to change the color and outline
- 3) Right mouse click on the **Roads** layer and select *Properties*
 - a. Go to the *Symbology* tab and select *Categories* on the left side of the dialog
 - b. Click the *Value Field* dropdown box on the top of the dialog and select ADMN_CLASS
 - c. Click the *Add All Values* button at the bottom and highway class info will be displayed
 - i. Uncheck the <all other values> box
- 4) To change the appearance of each class, double click the colored lines
 - a. Make interstates red, 2pt width
 - b. State Highways black, 1.5 pt width
 - c. US Highways, black dashed line, 1.5 width

Label the states with the two letter state abbreviation field

- 5) Right mouse click on the **State** layer and select *Properties* then go to the *Labels* tab
 - a. Click the “*Label Features in this layer*” box
 - b. Choose the STATE_ABBR field from the dropdown menu
 - c. Click the *Placement Properties* button and select the *Remove Duplicate Labels* radio button

Since we have a fair bit of work invested in this map now, be sure to save it

- 6) Go to *File > Save As*, browse to your **ArcBasics** project folder, name the map **Basics** and click *Save*

Last, we can set up our map layout and the necessary elements to finish this project

- 7) Switch to the Layout View and reposition the data frame if necessary. Be sure it fills most of the page, but save room along the top and bottom for titles, credits, and other map elements
- 8) Click on the US data frame to select it. Add a Scale bar and Legend from the *Insert* menu
- 9) Delete the title “**Legend**” as you click through the Legend Wizard prompts.
 - a. DO NOT label your legends with the word “Legend”!!! This is like placing the word “Title” above a book’s title – redundant and unnecessary. (And it will cost you points.)
- 10) Right or double click the scale bar & select the *Properties* menu to adjust the formatting.
 - a. Set the scale bar to have 2 divisions and 2 subdivisions, with display in Miles.
 - b. More than 3 divisions is ALMOST NEVER WARRANTED and only clutters your scale bar
- 11) Open the legend *Properties* menu. Click the *Items* tab, select **Roads**, and then click *Style*. Set the legend style to display the Layer name and Label. Click OK, OK.
 - a. If necessary, in the General tab, adjust the order of the layers
 - b. The finished legend will show Roads by admin class beneath the Cities and States.
- 12) Add a North Arrow from the *Insert* menu.
 - a. TIP: anytime you are showing multiple maps (data frames) in one layout, as long as both maps have the same orientation (which they almost always will) you need only ONE north arrow.

Drawing toolbar and finishing touches

Use the Drawing toolbar to add a graphic Neatline, Title, Subtitles, and descriptive Text boxes to your map.



- 13) Click on the dropdown arrow next to the square symbol and select *Rectangle*.
 - a. Go to the NW corner of your map, just inside the grey dotted print margin. Click and drag to the SE corner, just inside the print margin, to draw a box.
 - b. With the box still selected (it will have a blue border and be covering your map at this point) right click, go to *Order*, and select *Send to Back*.
 - c. Right click again, go to *Properties*, and set the background color and border style.
 - i. A fill color is NOT required, and in fact no color is easier to work with and saves ink. However, the outline (Neatline) is a must on all maps!
- 14) Click the dropdown arrow next to the capital **A** symbol and select *Rectangle Text* to add a title.
 - a. Click and drag to create a long rectangle at the top of your map.
 - b. Double click the new textbox to open the *Properties* for editing.
 - c. Type in a descriptive title. Something that describes the map &/or its purpose
 - d. Click *Change Symbol* to edit the font and text size.
 - e. Click the *Frame* tab, then set the *Border* to <None>.
 - f. Click *Apply* to preview your title, click *OK* when you are satisfied.
 - g. *Note: RECTANGLE TEXT WILL TRUNCATE YOUR TEXT if it is not sufficiently expanded, so DOUBLE CHECK your text boxes!
- 15) With your title textbox selected, right click *Copy*, then right click *Paste*, to create a subtitle textbox with the same formatting. Edit the text, font size & style so the subtitle is smaller than the main title.
- 16) Use this copy and paste technique, then edit the font size & style, to create textboxes documenting the data sources and spatial reference of your map.
 - a. *If you forget the spatial reference, go to the data frame *Properties* > *Coordinate System* tab
- 17) Create a textbox for your credentials (again you can copy paste):
 - a. Organization (Bemidji State University, or BSU)
 - b. Course (Intro GIS)
 - c. Which project the map was made for (ArcBasics)
 - d. Your name as the cartographer
 - e. Date of the map (can be just Fall 2016)
- 18) After you are happy with your map, export it to a jpg file.
 - a. Click on *File* > *Export Map* while you are in the Layout view
 - b. Browse to the ArcBasics project folder, select .jpg format, and click Save.
- 19) Upload the jpg version of your map (NOT the mxd) to the D2L dropbox.

****Keep these instructions and add your notes for future reference of how to preform basic tasks - these same steps will not be spelled out with as much detail in future assignments****