Creating Custom FXC Background Maps Using ArcGIS
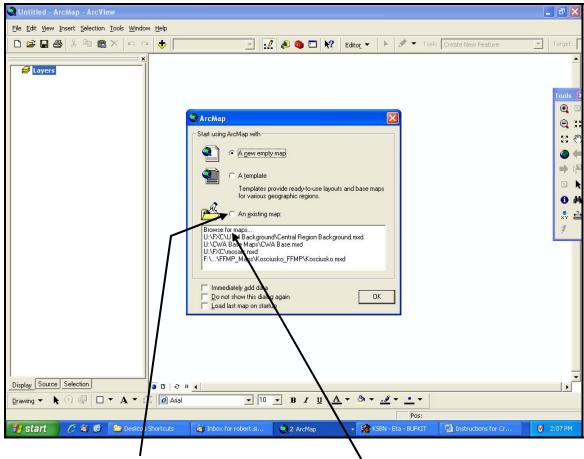## B.J. Simpson - WFO IWX

Several offices have asked about creating the custom background maps we (IWX) are using. The maps are created through the ArcGIS software suite. What follows are instructions on how to create these maps and customize them for your own WFO. These instructions are meant to be simple enough for someone with no experience in ArcGIS.

I. Placement of background starter files

All basefiles for this project have been placed on the Central Region metdat server and are located at: \\intra.crh.noaa.gov\metdat\IWX\fxc. To get to this folder, simply click on Start→Run and type *\\intra.crh.noaa.gov\metdat\IWX\fxc* Once you have located this folder, right click and copy it to your personal or your office's server space. This may take an hour or two to pull off of the metdat server as it is around 168mb worth of data.
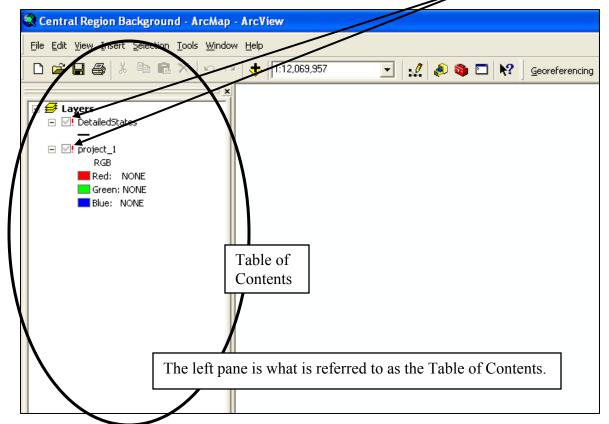
II. Opening these files in ArcMap

Open ArcMap by clicking on Start→All Programs→ArcGIS→ArcMap. Depending on the speed of your computer, the program may take one to three minutes to load. Once the program has loaded, you will see this screen:
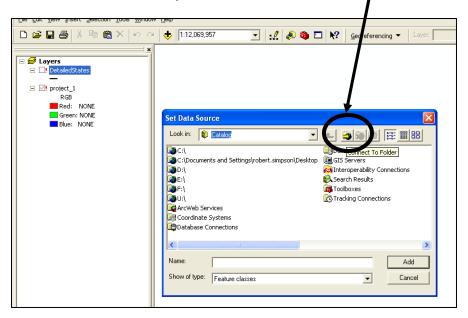

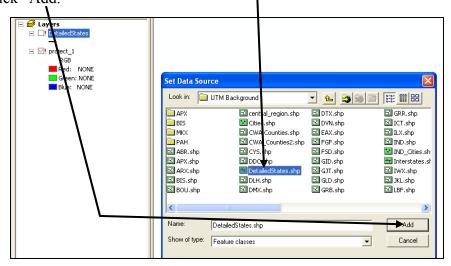Click on "An existing map" and then click "Browse for maps…" Click "OK."

Navigate to the directory where you copied the files and then Open the "*Central Region Background.mxd*" file. ArcMap will come up with red exclamation points next to each layer in the Table of Contents.

Table of Contents

The left pane is what is referred to as the Table of Contents.

Click twice (slowly, don't double click) on the check box next to DetailedStates. When the Set Data Source window pops up, use the Connect to Folder button, browse to the folder where you saved the data, click on it, and click "OK."
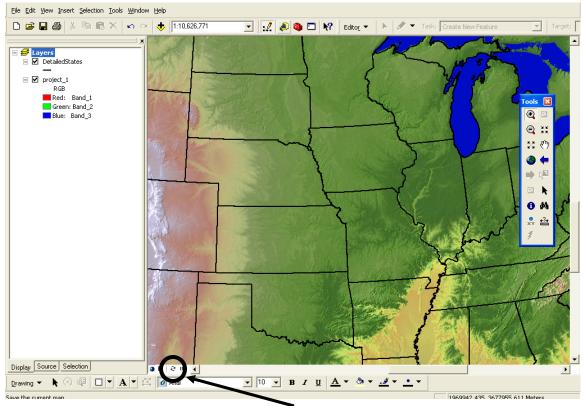
Now that the folder is connected, find DetailedStates.shp, single click on it and click "Add."
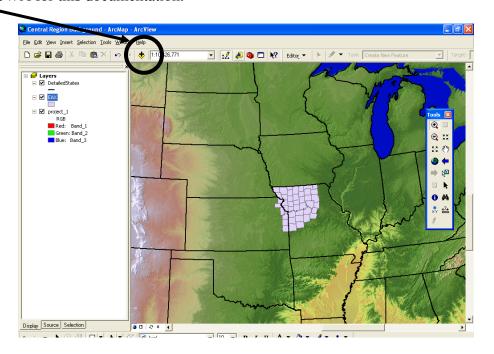

This will tell ArcMap where to go to "find" this layer. This should also remove the red exclamation point from the project_1 layer. If it does not, click twice on the checkbox next to project_1 and find the project_1 file and click "Add."
If ArcMap asks if you would like to build pyramids…answer "yes" as it will take a minute or two to build but make navigation faster later.
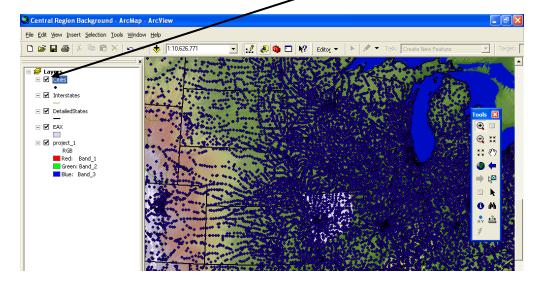When the file has opened, it should look like this:

If a blank screen shows up, use the *Refresh* button to redraw the page.

Now, use the "Add Data" button to add any other files that you would like.
Shapefiles containing individual CWA counties are all located in the folder. Pick
your CWA and click "Add." If ArcMap displays a geographic projection
warning, simply click "Close." I will use Pleasant Hill, MO (EAX) as an example
CWA for this documentation.

If ArcMap ever decides not to display, before panicking, be sure to try the
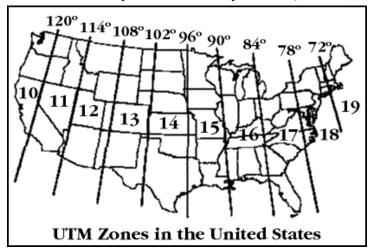*Refresh* button to reload the page.

Now click "Add Data" again and add your CWA for a second time (the reason for
this will be explained later). Click "Add Data" again and add the file named
Interstates. Lastly, click "Add Data" once more and add the Cities shapefile (this
will clutter your map so for now click off of the checkbox in the Table of
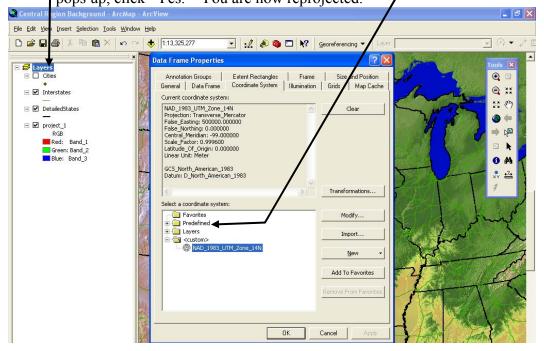Contents to temporarily hide the layer).

Now that you have started working on the map, you should resave the ArcMap file to something of your liking (EAX_Basemap for example). This will keep the original ArcMap file in shape just in case you accidentally screw something up ;) To resave the map, just click "File→Save As" and rename it.
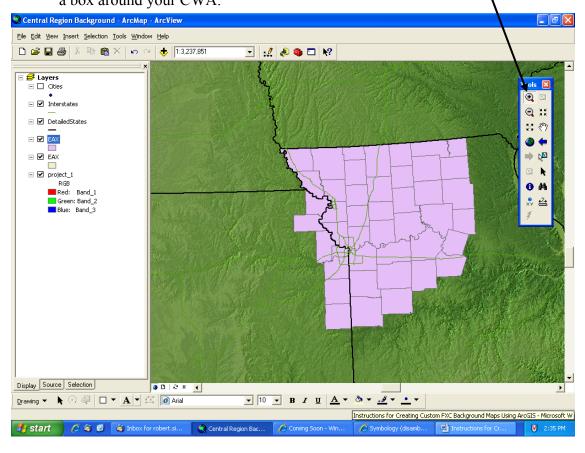
III. Creating Your Local Background

Now that you have all of the files necessary, you will want to make sure that your maps are projected correctly. The best projection for this case will be Universal Transverse Mercator (UTM). The image below shows the various UTM Zones in the US. Pick the zone that your CWA mostly falls in (for IWX, Zone 16).

UTM Zones in the United States

The default zone for these maps is set to Zone 14, so if you are in Zone 14, you can skip this step. If not, here is what to do: right click on the Layers button at the top of the Table of Contents and click "Properties." When the Properties dialog box opens, under the Coordinate System tab click Predefined→Projected Coordinate Systems→Utm→NAD 1983→YourZone. Click "OK." If a warning pops up, click "Yes." You are now reprojected.
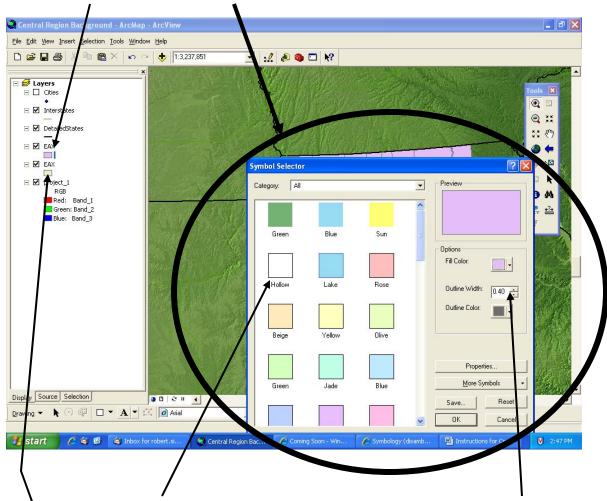
Zoom to the extent that you want the image to be by using the Zoom Tool to drag
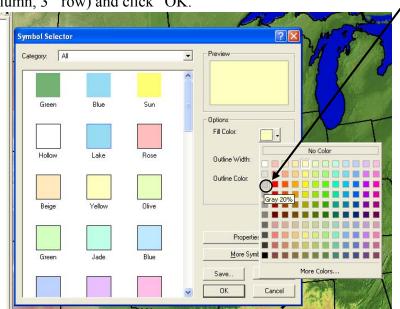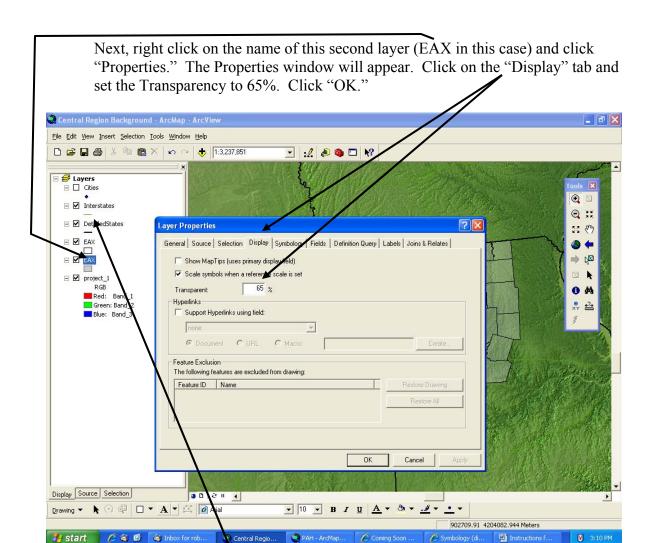a box around your CWA.

-Change the CWA layers

Left click on the colored box under the name of top CWA layer (in this case the box is purple) The Symbol Selector window will show up.
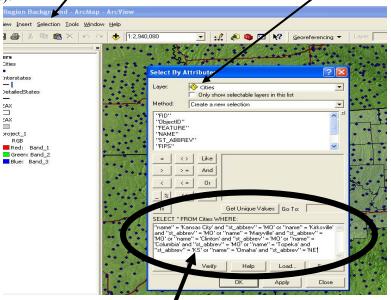

Click on "Hollow" (1st column, 2nd row) and change the outline width to 1. Click "OK." Now, just as you did with this layer, left click on the color box below the second CWA layer (in this case yellow). Change the Fill Color to "Gray 20%" (1st column, 3rd row) and click "OK."

Next, right click on the name of this second layer (EAX in this case) and click "Properties." The Properties window will appear. Click on the "Display" tab and set the Transparency to 65%. Click "OK."

Next, left click on the line corresponding to the Interstates layer and when the Symbol Selector window opens, select "Expressway Ramp" from the left and select Color and select "Poinsettia Red" (2nd column, 4th row).
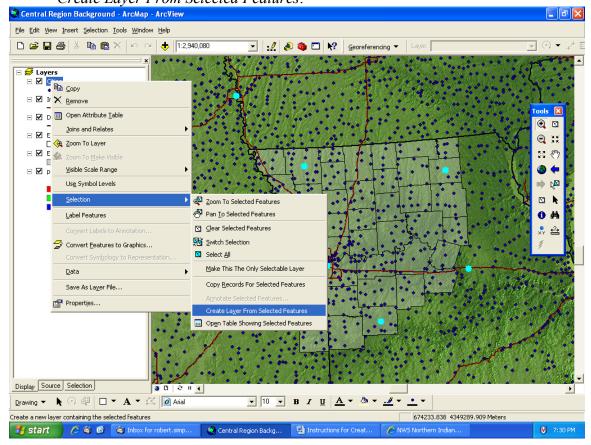
Turn on the Cities layer by clicking the check box in the Table of Contents. Now, select your cities of choice. For this example of EAX, I will choose seven cities (Kansas City, Kirksville, Maryville, Topeka, Columbia, Clinton, and Omaha). Remember although this is a CWA-specific map, you can still choose outside the CWA as references. The number of cities you pick is up to you. To select the cities of choice, click on *Selection→Select by Attributes*. A new window will pop up. On the top of the window, make sure that the layer is set to "Cities." Now, type in syntax similar to the following (many of you will know the Boolean logic idea used):

"name" = 'Kansas City' and "st_abbrev" = 'MO' or "name" = 'Kirksville' and "st_abbrev" = 'MO' or "name" = 'Maryville' and "st_abbrev" = 'MO' or "name" = 'Clinton' and "st_abbrev" = 'MO' or "name" = 'Columbia' and "st_abbrev" = 'MO' or "name" = 'Topeka' and "st_abbrev" = 'KS' or "name" = 'Omaha' and "st_abbrev" = 'NE'
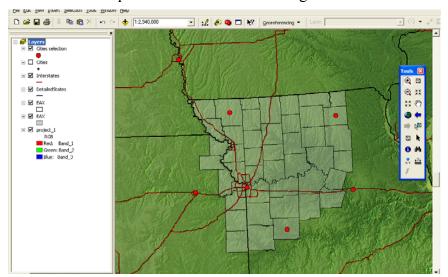
If you are not familiar with this logic, it is fairly simple when looked over. The cities shapefile has an associated table with different fields. You are selecting the city names from the "name" field and state abbreviations from the "st_abbrev" field. Make sure the field has double quotes and the selection has single quotes around it. One option is to copy this logic and paste it into the window and just change your city names and state abbreviations. When you have finished the logic, click "Verify" to make sure that there are no problems with the syntax. When you are finished, click the "Apply" button and the cities you selected should show up in light blue. Once the correct cities show up, click "OK."

Now, right click on the Cities layer, mouse down to *Selection* and mouse over to *Create Layer From Selected Features*.
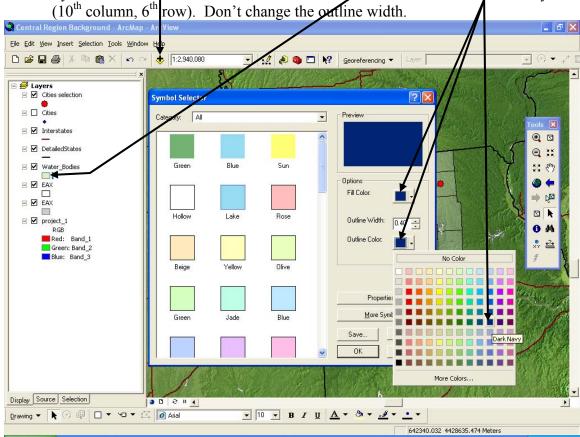

This layer will now display and be called Cities Selection. Click off of the check box next to the Cities layer to display only the selected cities. The cities may be difficult to see until you change the symbology.
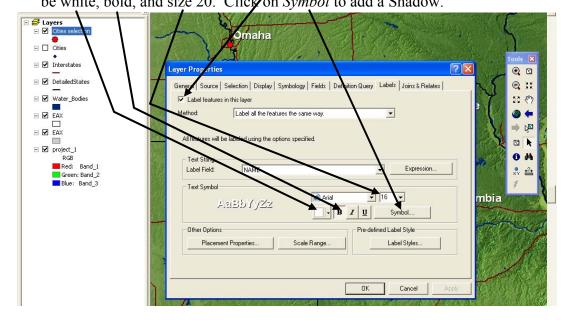
Left click the dot under Cities Selection and when the Symbol Selector window pops up choose "Mars Red" (2nd column, 3rd row) as the Fill Color and "Size 8" as the size. Your map should now look something like this:

Now we will add lakes and rivers to the background. Click on the Add Data button (the yellow plus sign from earlier) and add Water_Bodies. When this layer pops up in the Table of Contents, left click on the box below the name to open the Symbol Selector window. For both Fill and Outline Color select "Dark Navy" (10th column, 6th row). Don't change the outline width.
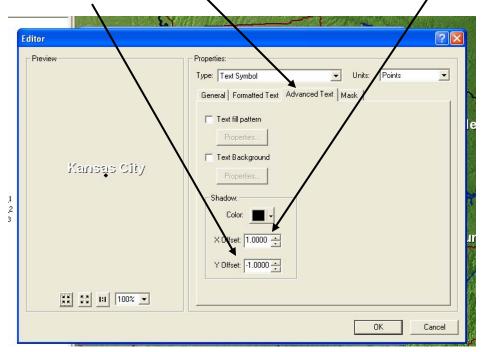

We will now add symbology to the Cities Selection layer and Interstates Layer. Right click on Cities Selection and mouse down and click on Properties. When the Properties window comes up, click on the *Labels* tab. Under this tab you will select the check box next to *Label features in this layer*. Select the font color to be white, bold, and size 20. Click on *Symbol* to add a Shadow.
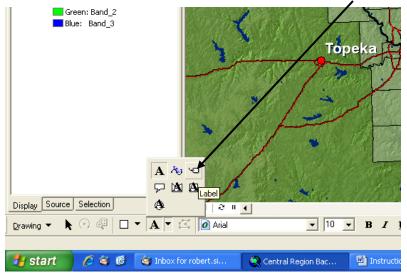
When the new window pops up, click Properties. When this next window pops up, click on the *Advanced Text* tab. In the Shadow box set the *X Offset* to 1.0000 and the *Y Offset* to -1.0000.   Click "OK" 3 straight times.
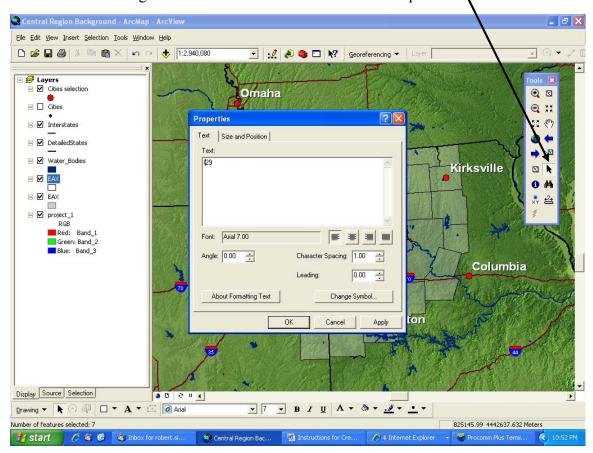

Now we will label the interstates to finish off the map. To do this we will use the *Label Tool* (located in the lower left hand corner of ArcMap). To open the Label Tool, click on the down arrow next to the "A" and go to this tool.
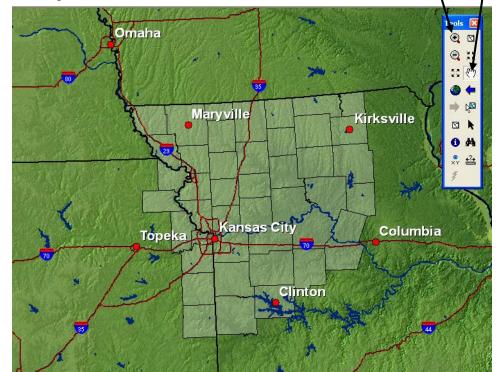

When the Label Tool opens click on *Place label at position clicked* and click on *Choose a style* and choose U.S. Interstate HWY. Now click on the interstate where you want the label placed. It will place a label and call it something like I70 or I35.

To get it to just read 70 or 35 you will have to use the black pointer and double click each logo and delete the I. You can also use this pointer to move labels.

This is what your background should now look like. Use the Zoom and Pan buttons to zoom to a similar level as this one. A reference scale of 1:3,000,000 centered on your CWA should suffice (except possibly large CWAs such as BIS). You can choose the reference level by typing 1:3,000,000 in at the top of the ArcMap window.

IV. Exporting Maps as .png

Now that you have created these maps you will want to export them to an ftp server so that you can transfer them to awips and fxc. To do this, click on *File→Export Map*. Find your office's ftp server, make sure that the file type is PNG and save it as something like eax_background with a *Resolution* of 600 dpi. The ITO or AWIPS Focal Point should be able to transfer these files into the correct directory for use in FXC.

V. Extra Info

I have included a State and National Parks layer the offices can also add if they so choose. Enjoy your new maps!

If you have any Questions, please contact me at Robert.Simpson@noaa.gov or Todd Holsten at Todd.Holsten@noaa.gov