

Create Visually Stunning Maps with the Cartograms Tool

Cartograms are a method of displaying geospatial data as totals, wherein data are displayed with both color and area as a function of their values. Cartograms are analogous to pie charts in which the slices of the pie are geographic regions rather than wedges. The Cartograms tool is a script created for ArcGIS that provides a set of spatial analysis tools not included in the standard ArcGIS software. You can create maps that will provoke reactions and dialog by displaying data as Cartograms.

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This tutorial was expanded and adapted from Kerski, J.J.. (2009). *Exploring Data Using Cartograms within ArcGIS Desktop*. Redlands, CA: ESRI. Retrieved October 5, 2009, from ESRI GIS Education Community: <http://blogs.esri.com/Info/blogs/gisedcom/archive/2009/10/16/exploring-data-using-cartograms-within-arcgis-desktop.aspx>.

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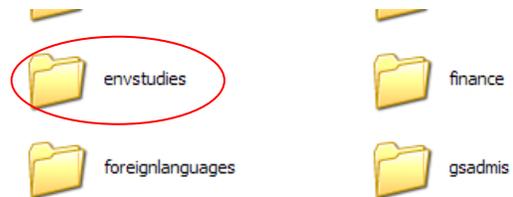
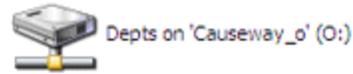
Office HS 104
T, Th 8:00AM-12:00PM, 1:00PM-4:00PM
F 8:00-11:30AM

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Copy Data Files to the Desktop

To complete this tutorial, you will need to copy the **Cartograms** folder from the **O:\envstudies\GIS Tutorials** folder to the desktop of your computer. If you have done this already, skip to the next section, **Start a New Map Document**.

1. Go to the **Start** menu
2. Click **My Computer**
3. Double click on the **O:** Drive
4. Folders are listed alphabetically by department.
Double click on the **envstudies** folder.



5. Double click on the **GIS Tutorial** folder. Inside you will see the **Cartograms** folder.
6. Right click on the **CartogramsTutorial** folder, and choose the **Copy** option.
7. Close the **GIS Tutorial** window.
8. Right click anywhere in the blank, blue space on the **Desktop** of your computer. Choose the **Paste** option. You should now see the **CartogramsTutorial** folder on your **Desktop**.

Install the Cartograms Tool

If you are working on a laptop or a computer in your office, you will need to download and install the ArcScript cartogram tool created by Tom Gross in the ESRI Applications Prototype Lab before beginning this tutorial. Download the files at

<http://arcscrips.esri.com/details.asp?dbid=15638>

and follow the installation instructions in the **ReadMe** file. Once you've installed the software, restart your computer.

Open the USPop2007 Map Project

1. Open **ArcMap**.
2. Click the **An existing map;** button.
3. In the Browse area, highlight **Browse for maps...**
4. Click **OK**. The **Open** dialog box should appear.
5. In the **Look In:** pull down menu, choose **Desktop**.
6. Highlight the **CartogramsTutorial** folder. Click **OK**.
7. Highlight the **USPop2007.mxd** map project. Click **OK**.



Repair the Data Sources for your Map Layers

ArcMap sets file paths to find the data for each of your map layers. Because you moved the data files from the **O:\envstudies** drive to your Desktop, the file paths that ArcMap stored are no longer accurate. You can easily repair the file paths. This is something you will need to do each time you want to use a **Map Project** you've copied or moved from one location to another.

1. Right click on the **2007 Population by County** map layer. In the pop-up menu, choose **Data** → **Repair Data Source**. The **Data Source** dialog box will appear.
2. In the **Look In:** menu of the **Data Source** dialog box, navigate to the **CartogramsTutorial** folder on the **Desktop**. If you do not see a path to the Desktop, you can find it in **I:\YourUserName\Desktop**.
3. Double click on the **CartogramsTutData.mdb** personal geodatabase.
4. Highlight the **Counties** file and click **Add**. The **Counties** file was renamed to **2007 Population by County** in the **ArcMap Table of Contents** for the **Map Project**, but retains its original name in the **Personal Geodatabase**.

The **Data Frame** should now contain a map of the continental United States, with the 2007 Population by County indicated in an orange color scheme.



Add the Cartograms Tool to ArcToolbox

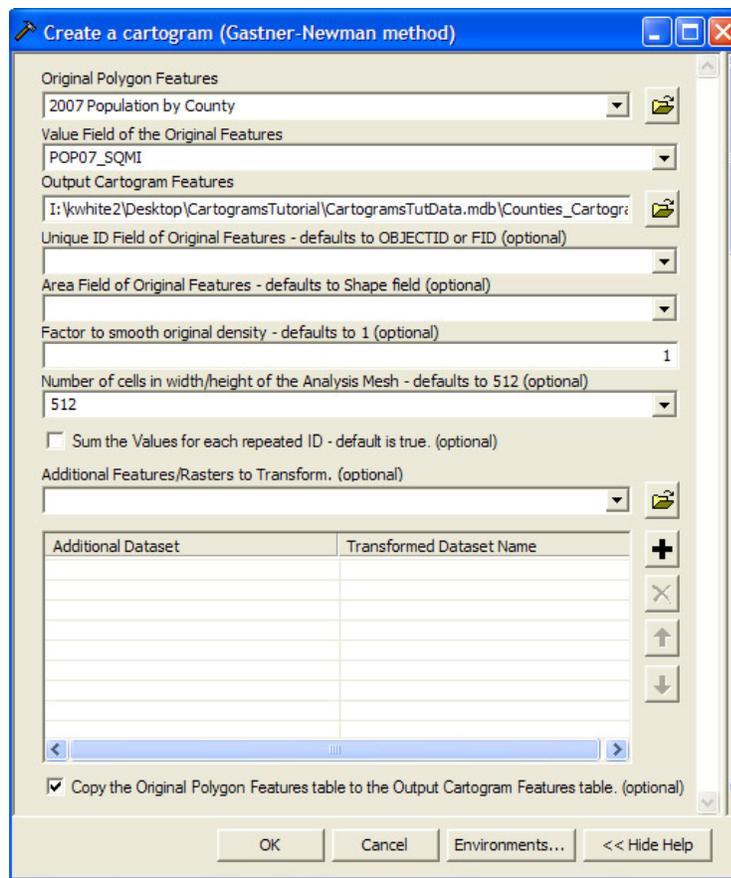
1. Open **ArcToolbox** by clicking on the **ArcToolbox** button .
2. Right click on the white space inside the **ArcToolbox** menu. Choose **New Toolbox**. A new, unnamed toolbox will appear in the **Toolbox** menu. Name it **Cartograms**.
3. Right click on the title of the new **Cartogram toolbox**. Choose **Add** → **Tool**.
4. Check the box next to the **Cartograms** option. Click **OK**.
5. The **Cartogram** → **Create a cartogram (Gastner-Newman method)** tool will appear.



Use the Cartograms Tool

1. Open the **Cartograms Tool** and double click on **Create a cartogram**. The **Create a cartogram** dialog box will appear.
2. Fill in the values for these fields:
 - a. **Original Polygon Features** – Choose **2007 Population by County**
 - b. **Value Field of the Original Features** – Choose **POP07_SQMI**
 - c. Allow the default Output **Cartograms Features**
 - d. Uncheck the box next to **Sum the Values for each repeated ID**
 - e. Scroll down and make sure that the box is checked next to **Copy the Original Polygon Features table to the Output Cartogram Features table**.

Your dialog box should look like this:



3. Click **OK**.

A **Cartogram** will be created in the new layer. Cartograms distort map shapes to emphasize specified values from underlying map data. In this case, shape of the U.S. map will be distorted to reflect the population density of each area, since you chose to use the **POP07_SQMI** value from the attributes of the **2007 Population by Counties Map Layer** as your **Value Field** for analysis. Areas with greater population densities will be larger than those with smaller population densities. This new layer will not be **Symbolized** – meaning that the color scheme indicating population density has not been transferred from the **2007 Population by County Map Layer**.

Symbolize the Counties_Cartogram Layer

1. Right click on the **Counties_Cartogram Map Layer**. Choose **Properties**. The **Layer Properties** dialog box will appear.
2. Click the **General Tab**. In the Layer name field, type **2007 Population Density Cartogram**. This will rename the **Counties_Cartogram Map Layer**. Click **Apply**.
3. Click the **Symbology** tab. In the **Show:** menu, choose **Quantities** → **Graduated colors**. Use the default color ramp.
4. In the **Fields** area under **Value:**, choose **POP07_SQMI**.
5. Under **Classification**, click on the **Classify** button. The **Classification** dialog box will appear.
6. At the top, left hand side of the **Classification** dialog box, under **Classification**, change the number of **Classes** from **5** to **4**. Click **OK**.
7. Back in the **Layer Properties** → **Symbology** area, under **Color Ramp**, click on the **Label** title and choose **Format Labels**.

Symbol	Range	Label
	0.100000 - 1216.900024	0.1
	1216.900025 - 6314.200195	12
	6314.200196 - 21167.000000	63
	21167.000001 - 58457.500000	21167.000001 - 58457.500000
8. In the **Number Format** dialog box under **Rounding**, change the **Number of decimal places** to **0**. Click **Apply**.
9. Click on the **Labels** tab.
10. Check the box next to **Label features in this layer**.
11. Under **Text String** in the **Label Field**, choose the value **STATE_NAME** from the pull down menu.
12. Click **OK**.
13. Turn off the **2007 Population by County** layer by un-checking the box next to its title in the **Table of Contents**.

The graphic clearly emphasizes the areas of greatest population density in the continental U.S., with the Mid-Atlantic region being the most densely populated.

