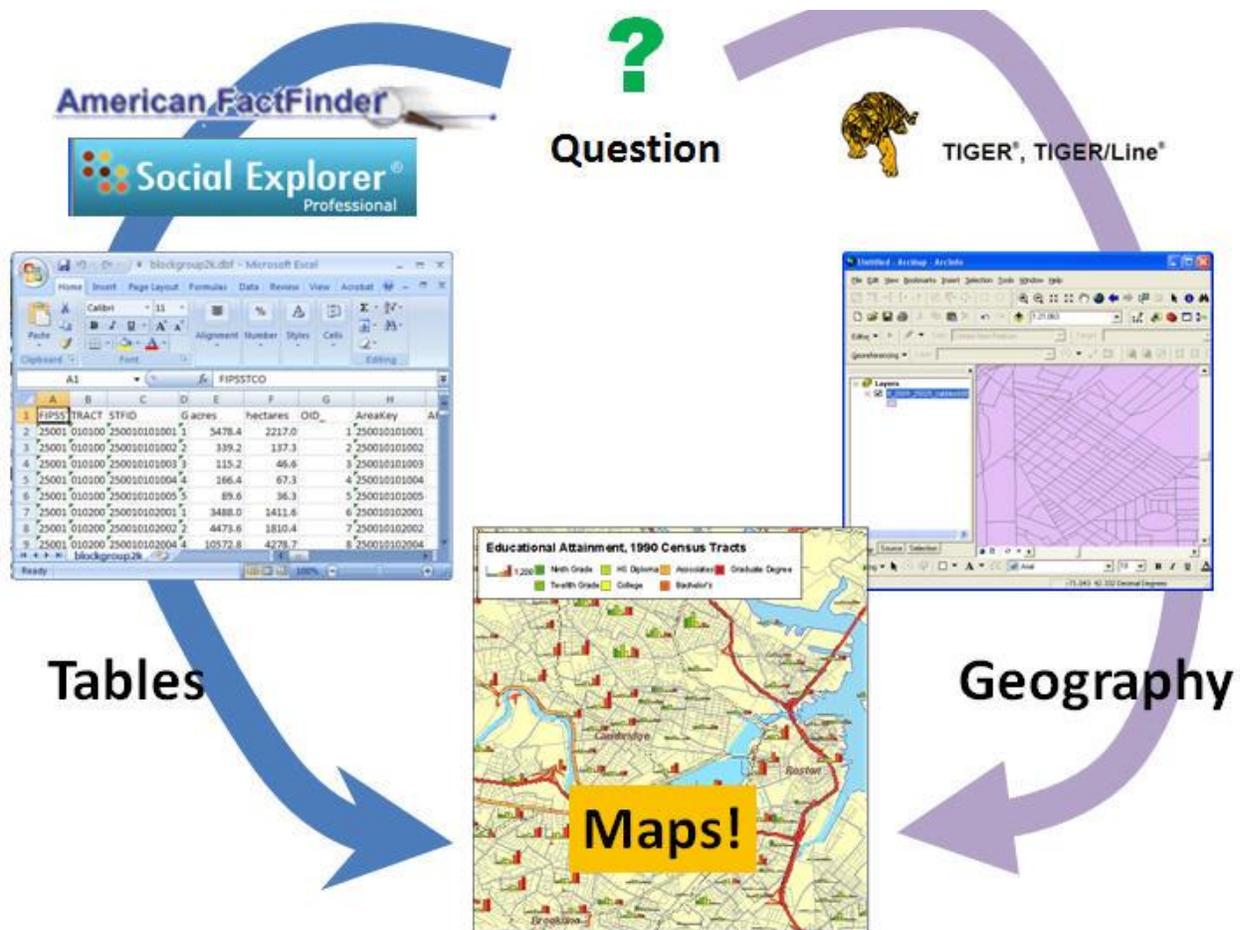


## Cookbook 25 September 2013 *GIS Analysis Part 2*

### Overview

1. Simple Choropleth Maps in ArcGIS Online
2. Opening shapefiles in MS Excel
3. Comparison: shapefiles, zipped shapefiles, and file geodatabase
4. Census Data



## 1) Simple Choropleth Maps in ArcGIS Online

You can upload a zipped shapefile to ArcGIS Online with a maximum of 1,000 spatial features. That's a nice option to share your analysis and map with the rest of the world. The limit of 1,000 spatial features is imposed by ESRI for two reasons: server space on their end and map/browser performance on your end.

Your 13 cities geospatial dataset is perfect for choropleth mapping with ArcGIS Online!

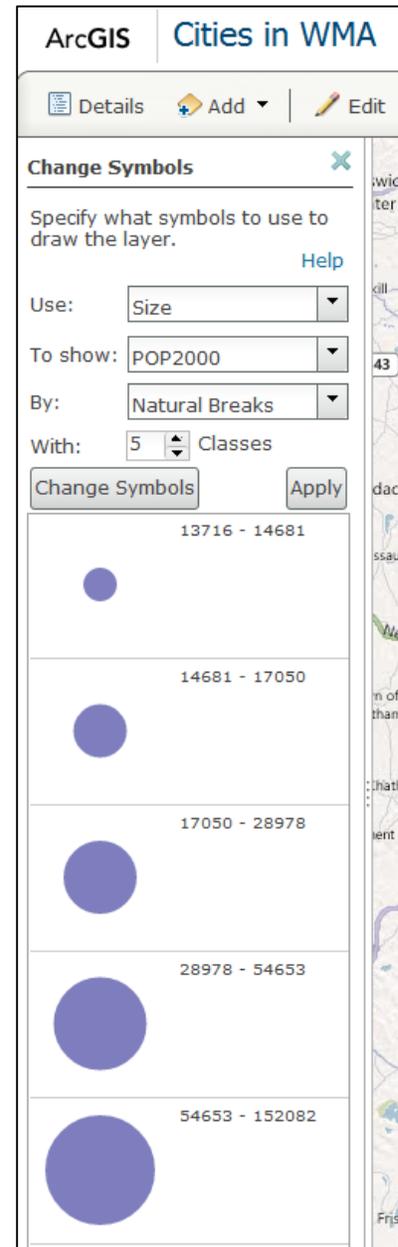
### Basic Procedure

1. Zip-up your shapefile.
2. Create new map in ArcGIS Online, choose your basemap, and zoom-into the area of interest (here: Western Massachusetts).
3. Add – Add Layer from File and upload your zipped shapefile.

*Your 13 cities in Western Massachusetts appear!*

4. Now, when you click-on the 13 cities you get a pop-up window with the attribute data. You can configure the pop-up to your liking.
5. Change Symbols: Choose between A Single Symbol, Unique Symbols, Color, and Size.

The Color and Size option allows you to create a choropleth map with options very similar to those available in the Symbology Tab of ArcGIS 10.1.



### More Information:

[http://help.arcgis.com/en/arcgisonline/help/index.html#/About\\_classifying\\_attributes/010q0000009w000000/](http://help.arcgis.com/en/arcgisonline/help/index.html#/About_classifying_attributes/010q0000009w000000/)

## 2) Opening Shapefiles in MS Excel

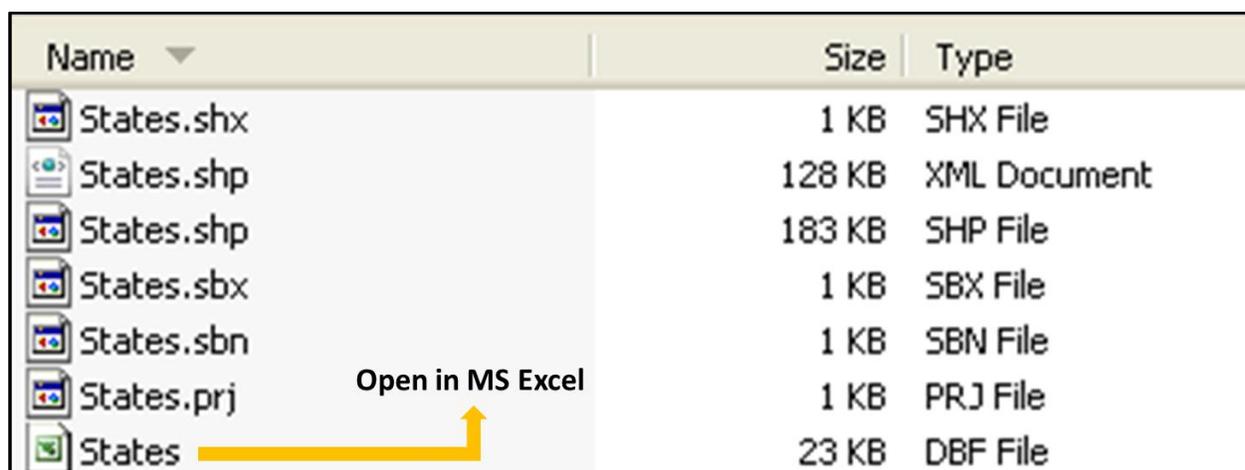
I find that incredibly useful: you can easily open a feature attribute table in MS Excel. That can be much more effective for data analysis than ArcGIS.

### Careful!

Always make a copy of your feature attribute table before opening and manipulating in MS Excel, otherwise you will most likely corrupt your shapefile in ArcGIS.

### Basic Procedure

1. Find the \*.dbf file of your shapefile – that's the feature attribute table, stored in an old database format called dBase.
2. Make a copy of this file with a new name! Suggestion: add \_copy to the file name.
3. In MS Excel, select Open and choose the option All Files.
4. Navigate to your shapefile, select the \*.dbf file, and click-on Open.
5. The file opens in MS Excel.
6. Save the file as a MS Excel Workbook and analyze away.

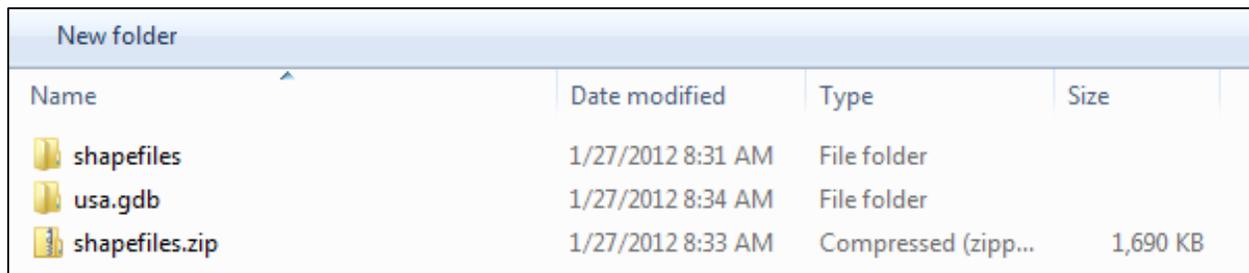


Name	Size	Type
States.shx	1 KB	SHX File
States.shp	128 KB	XML Document
States.shp	183 KB	SHP File
States.sbx	1 KB	SBX File
States.sbn	1 KB	SBN File
States.prj	1 KB	PRJ File
States	23 KB	DBF File

### Additional Information about MS Excel and ArcGIS

- <http://support.esri.com/en/knowledgebase/techarticles/detail/34102>
- <http://www.esri.com/news/arcuser/0104/files/excel.pdf>
- <https://wikis.uit.tufts.edu/confluence/download/attachments/4540/Working+with+Excel+Files+in+ArcGIS+9-2.pdf?version=1>
- <http://en.wikipedia.org/wiki/DBase>

### **3) Comparison:** **Shapefiles, zipped shapefiles, and file geodatabase**



Name	Date modified	Type	Size
shapefiles	1/27/2012 8:31 AM	File folder	
usa.gdb	1/27/2012 8:34 AM	File folder	
shapefiles.zip	1/27/2012 8:33 AM	Compressed (zipp...	1,690 KB

#### **Shapefiles in a folder**

- 3 shapefiles, 21 actual files, ~5.5 MB, directly useable, messy, cannot readily attach to an Email.

#### **Zipped shapefile**

- 1 'folder', ~1.7 MB, not useable unless unzipped.

#### **File Geodatabase**

- Imported the 3 shapefiles as feature classes.
- 1 'folder', 54 files, incomprehensible, ~3.7 MB.

*What's better? You decide!*

## **4) Census Data**

The United States Census is a decennial census mandated by the United States Constitution. The population is enumerated every 10 years and the results are used to allocate Congressional seats (congressional apportionment), electoral votes, and government program funding.

- Mandated by the U.S. Constitution.
- Used to apportion seats in the U.S. House of Representatives.
- Used to define legislature districts, school district assignment areas and other important functional areas of government.

The United States Census Bureau (<http://www.census.gov/>) collects a variety of data:

- Population & Housing Census - every 10 years
- Economic Census - every 5 years
- Census of Governments - every 5 years
- American Community Survey - annually
- Our many surveys -- both Demographic & Economic
- Economic Indicators - each indicator is released on a specific schedule, see the Economic Indicator Calendar



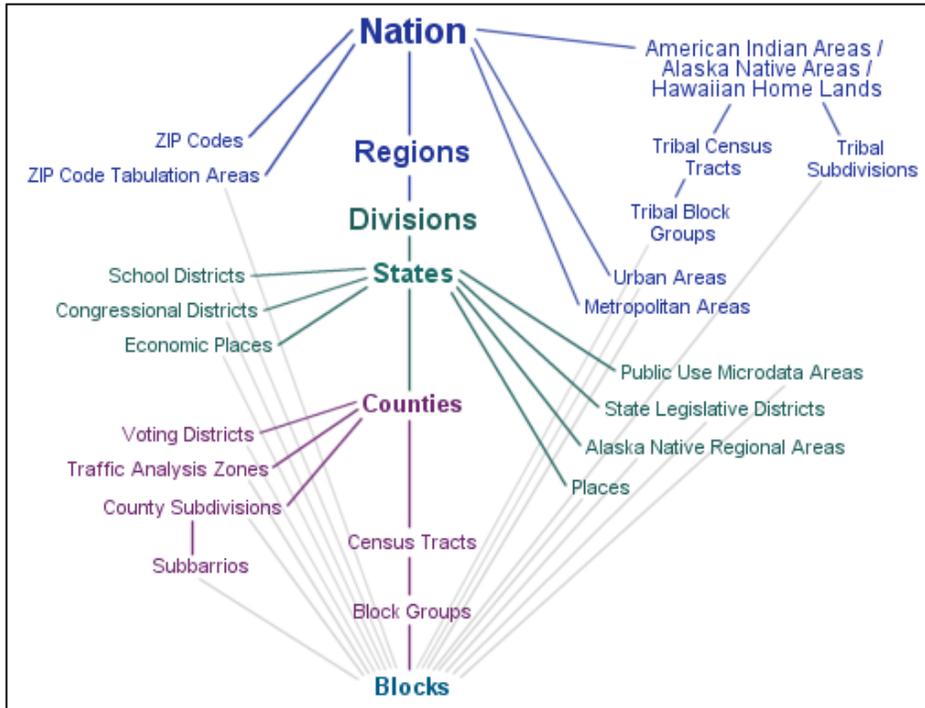
More information at <http://www.census.gov/aboutus/>.

### **Census Organization**

Census geography is organized on a number of different levels. Some of the levels fit completely within one another, while others may cross the boundary of a larger level.

The basic hierarchical organization of census geography is Nation > States > Counties > County Sub-Divisions > Census Tracts > Block Groups > Blocks, with each level nested completely within its predecessor.

These levels cover all areas in the United States, and added up, their populations equal the entire population of the United States. Other levels, such as places, can cross the boundaries of other levels, and some, such as ZIP codes, do not cover all areas of the United States. ZIP codes only cover those where mail is delivered.

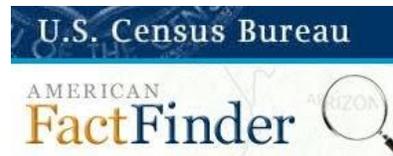


The diagram above shows the relationships between different levels of census geographies. A line between two levels represents a hierarchical relationship between them, meaning that the larger, generally displayed near the top of the diagram, can be subdivided into the smaller level.

### Demographic Data

Census Block	Smallest census unit (population ~85), usually defined by roads ~8.5 million blocks in the 2000 census
Block Group	Blocks are assembled into block groups, population ~600 to 3000 Smallest census unit with detailed demographic statistics
Census Tract	Block groups are assembled into census tracts. Census tracts represent fairly homogenous, permanent areas with similar demographic and economic characteristics, population ~1,500 to 8,000. Supposed to represent a typical “neighborhood”
Counties	Census tracts are grouped into counties, which are the primary division of most states.
States	50 states District of Columbia, Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands are treated as state equivalents for statistical presentation.

## 4.1) American Fact Finder



<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

= the official way to get census data.

- Downloading 2010 Census Data using American FactFinder (Tufts University)  
<http://www.westfield.ma.edu/uploads/cbraun/tufts2010census.pdf>
- Working with 2000 US Census Data in ArcGIS (Tufts University)  
<http://www.westfield.ma.edu/uploads/cbraun/tufts2000census.pdf>
- Census Tip Sheet (Tufts University)  
<http://www.westfield.ma.edu/uploads/cbraun/tuftscensustips.pdf>

## 4.2) MassGIS

MassGIS distributes datalayers from the 1990, 2000, and 2010 U.S. Census:

<http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html>

- Working with Census 2000 Data from MassGIS (Tufts University)  
<http://www.westfield.ma.edu/uploads/cbraun/tuftsmassgiscensus.pdf>

## 4.3) Social Explorer

Social Explorer is a great website to explore current and historic census data. You can create maps and reports for display and download. The Free Edition is already good, but the Professional Edition is truly awesome: all census data for anywhere and anytime!

Free Edition: <http://www.socialexplorer.com/>  
Professional Edition (on-campus) <http://www.socialexplorer.com/>  
Professional Edition (on-campus) WSU Library, Databases, Social Explorer, Login

***Have a look at the [GIS Resources](#) page for great Social Explorer tutorials!***

<http://www.westfield.ma.edu/cbraun/resources/gis-resources/>

### **Task: Explore Holyoke!**

- View the 2000 and 2010 census tract data for Holyoke as a map.
- View the different variables: Race, Income, Housing, Poverty, etc.
- Share your map as a link, embed into your blog, and export as image or MS Powerpoint slide.
- Create a report and download as MS Excel spreadsheet.