

# Helping patrons navigate GIS (Geographic Information Systems)



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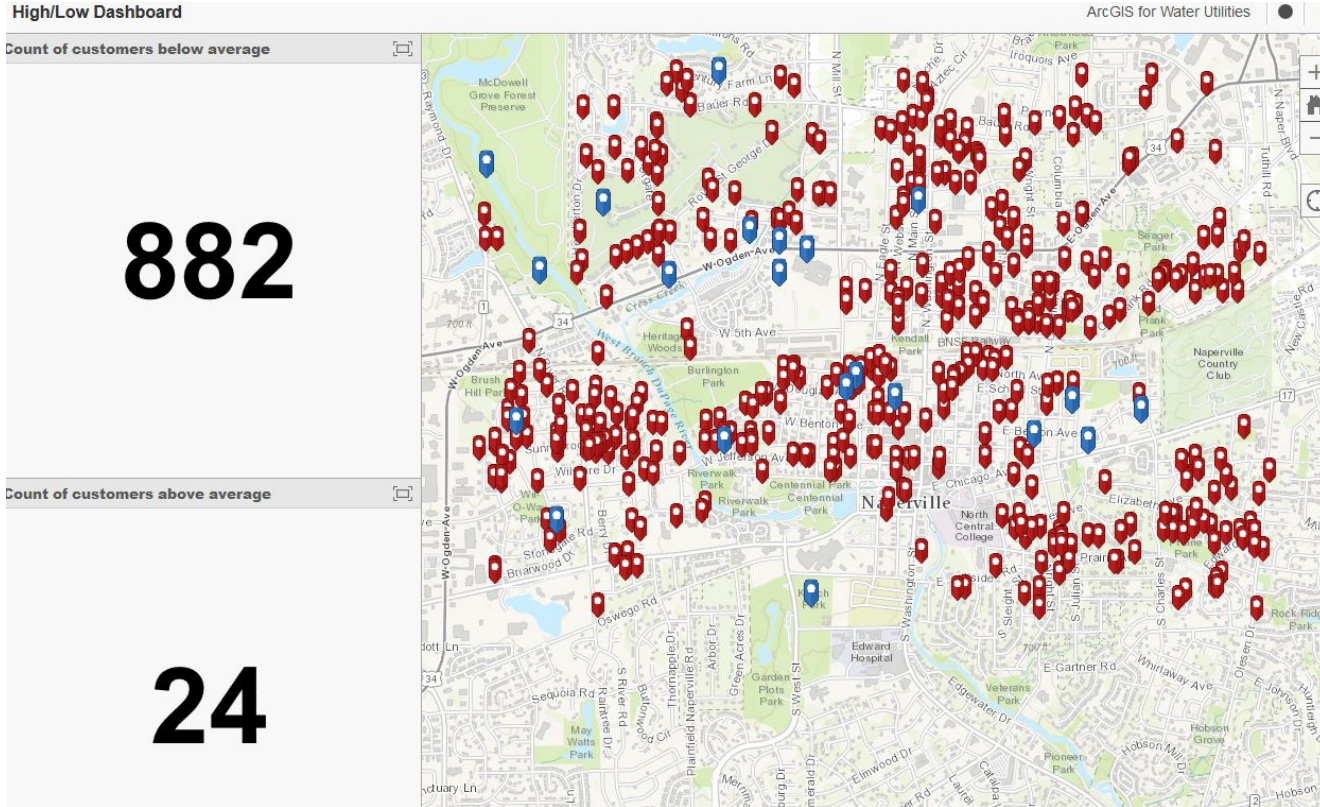


# Learning Objectives

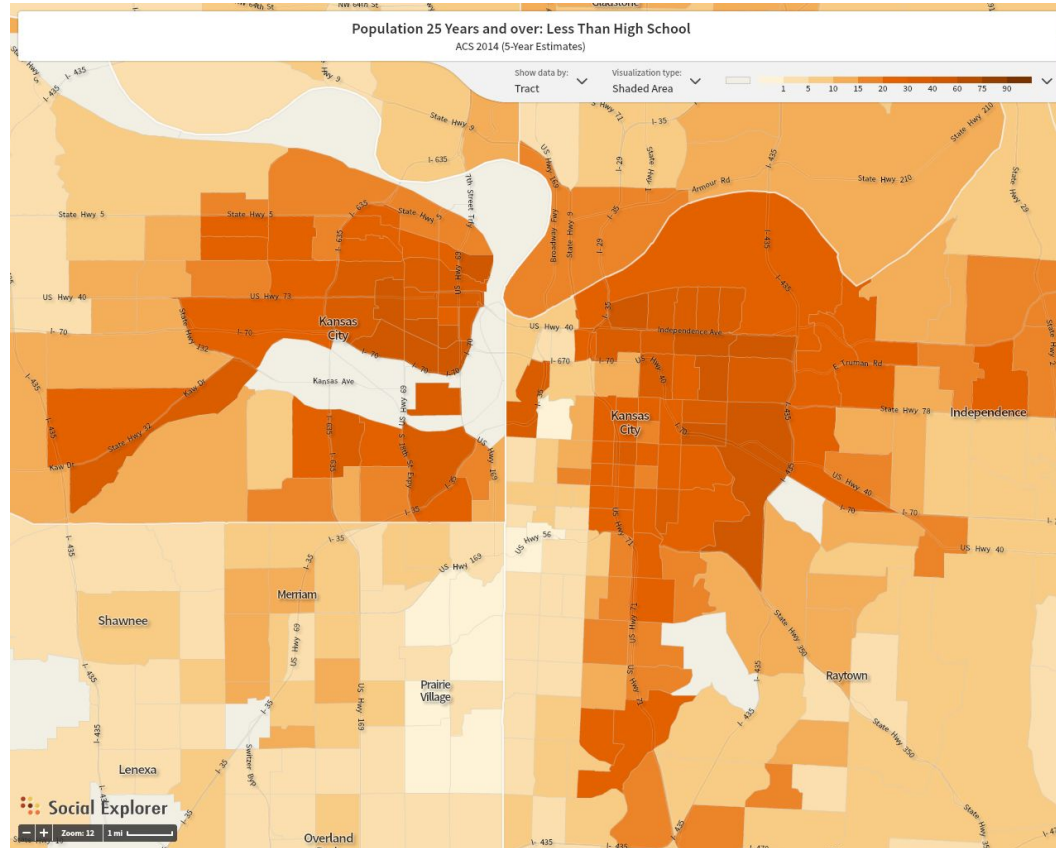
This presentation should help you:

- Understand more GIS vocabulary
- Appreciate the scope of applications and the variety of professions using GIS
- Identify key/popular GIS software by name
- Know about Social Explorer, an easy-to-use database for simple analysis of U.S. Census Data
- Be able to access and share a stable URL from UMKC Libraries providing a Research Guide pointing to directories of GIS datasets
- Know where to point motivated patrons to quality open courseware tutorials on GIS

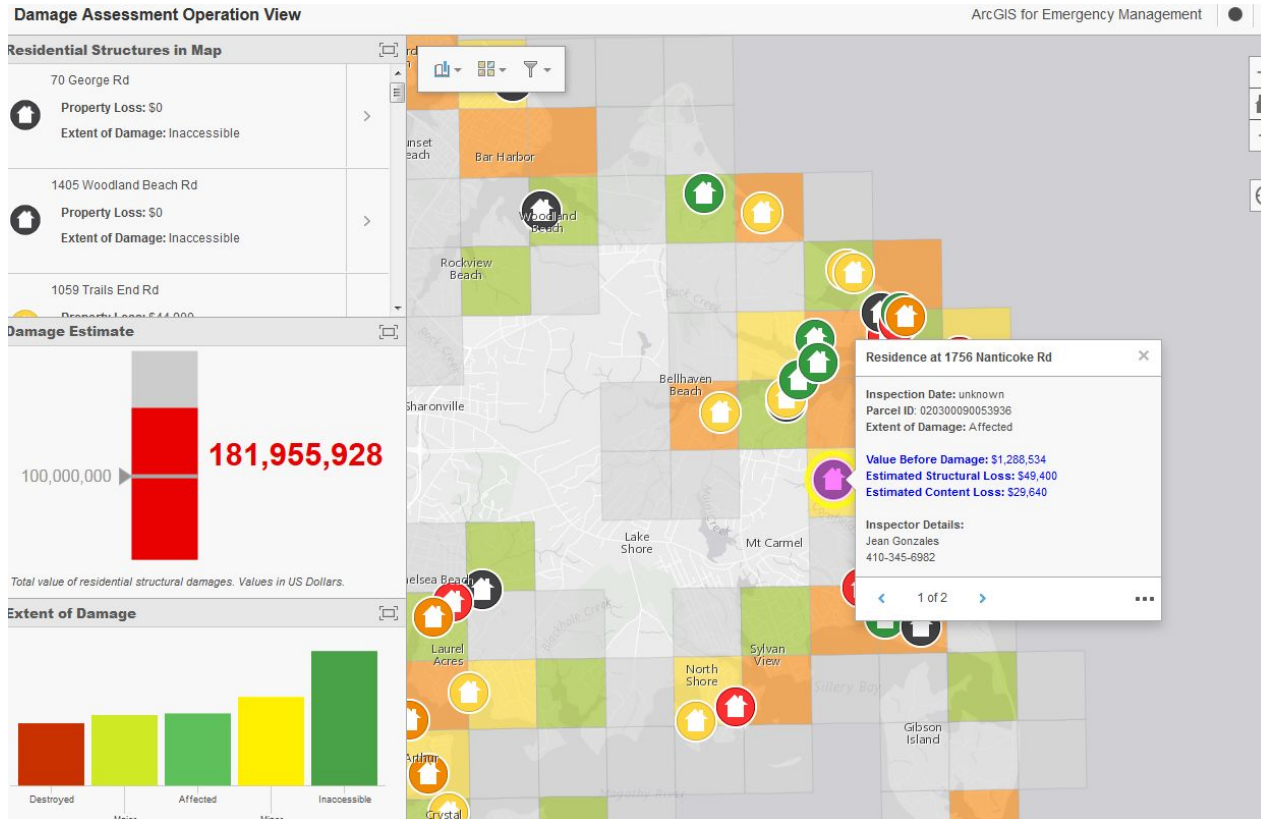
# Application - Mapping High/Low Water Use



# Application - Mapping Educational Attainment



# Application - Damage Assessment



# Application - State Birth Outcomes Briefing

A story map



## Maryland Birth Outcomes Briefing

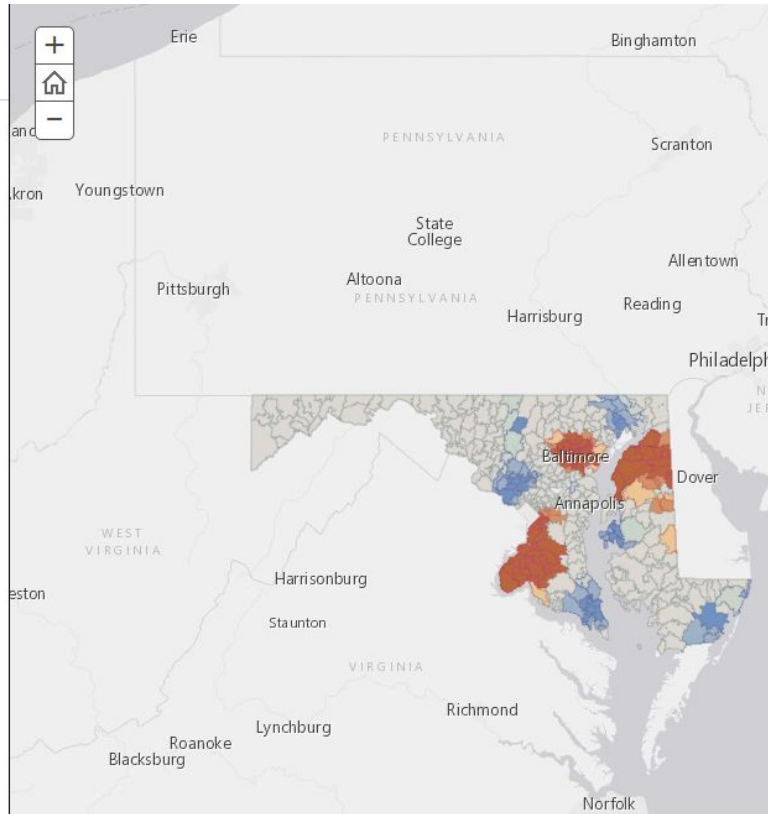
### Low Birth Weight Hot Spots

Hot Spot analysis enables us to readily determine the spatial pattern of the Low Birth Weight Rates across the state.

Areas shown in warmer colors are statistically significant Hot Spots. Areas shown in cooler colors are Cold Spots.

Using Optimized Hot Spots we are able to determine the statistically significant hot and cold spots using the Getis-Ord  $G_i^*$  statistic. It evaluates the characteristics of the input feature class to produce optimal results.

### Socioeconomic and Demographic Factors



# Key GIS software

ESRI - stands for the Environmental Systems Research Institute, its [ArcGIS products](#) have the largest global market share of GIS software (+40%). Other [estimates](#) indicate that 70% of all GIS software users are using ArcGIS in one form or another. *Patrons looking to build job-translatable skills will want to learn ArcGIS.*

There are also [freely available GIS softwares](#), the most prominent of which is [QGIS](#) (formerly Quantum GIS).

There are many, many other options! Wikipedia helpfully maintains a [list of GIS software](#) as well as a [comparison of GIS software](#) features.



# What about Google Earth?

Google Earth is a GIS application that lets the user look at satellite imagery, aerial photogrammetry, and GIS information superimposed over the globe.

Google Earth Plus is a downloadable software that lets you add spatial data to the GIS data available through Google Earth.

Use of Google Earth has *significant copyright restrictions* not present when using USGS GIS data (government GIS data is public domain). From [Wikipedia](#):

“Every image created from Google Earth using satellite data provided by Google Earth is a copyrighted map. Any derivative from Google Earth is made from copyrighted data which, under United States Copyright Law, may not be used except under the licenses Google provides. Google allows non-commercial personal use of the images (e.g. on a personal website or blog) as long as copyrights and attributions are preserved.....Works created by an agency of the United States government are public domain at the moment of creation. This means that those images can be freely modified, redistributed and used for commercial purposes.”



# Looking at GIS Datasets - File Types/Formats

There are several file formats for GIS datasets, including:

- Shapefiles (\*.shp) - a vector-based GIS format promoted by ESRI
- ESRI GRID - a raster-based GIS format promoted by ESRI, implemented as a structured set of files (\*.adf, \*.dat, \*.nit, \*.dir, \*.stk) in grid directories
- Keyhole Markup Language (\*.kml) - a vector-based, XML-native open standard (utilized by Google Earth)
- [ArctInfo interchange format](#) (\*.E00) - a data exchange format from ESRI

A listing of GIS Format Descriptions (very detailed!) is being developed and maintained by the [National Digital Information Infrastructure and Preservation Program](#) at the Library of Congress.

# What's the difference: vector vs. raster?

**Raster** files store data in the same way a digital camera stores an image. The data are rows and columns of cells, each cell containing one value describing cell color.

**Vector** files store data by considering geographical features as shapes. The data on geographical features are stored as geometrical shape data linked to a database file of data that describes attributes of that feature.

Raster files can be LARGE and make it more difficult to “stack” data from multiple files. Individual raster files are less computationally expensive - a plus!

Vector files are generally MORE COMPACT and can be used to represent continuous variables, and allow for much easier analysis. Vector files are also easier to maintain and to add new geographic features to existing files.

# Where to find GIS datasets

## Government resources

- US Geological Survey (Example: [The National Map](#))
- Missouri Spatial Data Information Service ([MSDIS](#))
- Regional city/county groups (Example: [MARC GIS Data](#))

## International organizations and NGO's

- United Nations Environmental Programme ([Environmental Data Explorer](#))
- [Harmonized World Soil Database](#)
- The Nature Conservancy (Global [Conservation GIS](#) data and maps)

# Where to find GIS datasets, part 2...

Find authoritative web directories you can trust. Use your librarian skills!

- [Free GIS Data](#) - this site compiled by [Robin Wilson](#), a researcher in remote sensing at the University of Southampton (UK). Lists 300+ sources.
- [ArcGIS Open Data](#) - 55,000+ datasets from 3,400+ organizations. Anyone can use data published at this source for free.
- Academic library research guides - like [ours at UMKC Libraries!](#)

## **What about making spatial data?**

Patrons may find that they have developed (or found) a set of data that could be visualized spatially.

That's where motivated patrons can learn to use an GIS software like ArcGIS to map that set of data onto a set of appropriate shapefiles.

# Social Explorer - GIS App for U.S. Census Data

[Social Explorer](#) allows you to create maps of U.S. Census demographic data from the Decennial Census as well as from the American Community Survey, in addition to being able to map several other data resources.

- Easy to use
- Graphically (point-and-click) based
- Analysis easily exported
- Clearly brings the value of GIS home for patrons new to thinking about and using GIS

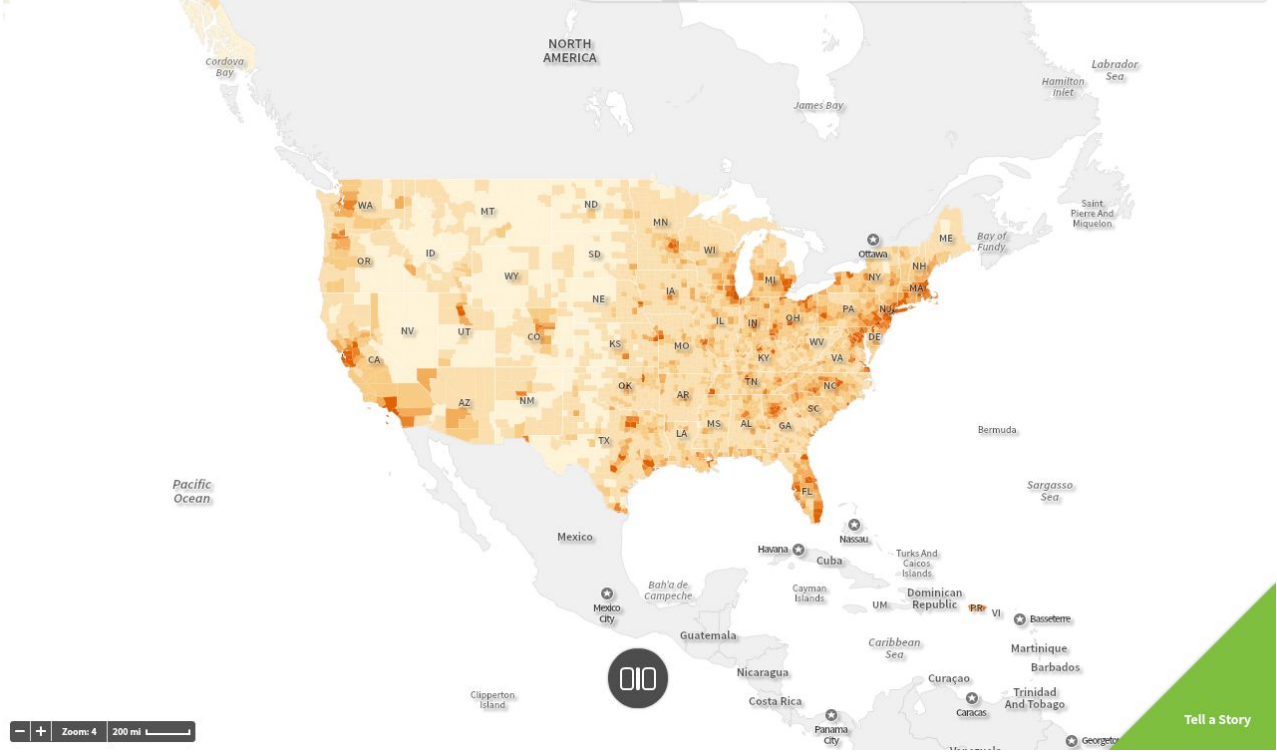
*Note: only held in Missouri by UMKC, UMSL, Saint Louis University, and Washington University in Saint Louis - limited to use by subscribers.*

### Population Density (per sq. mile) ✎

ACS 2014 (5-Year Estimates)

Enter address or geography

Show data by: County | Visualization type: Shaded Area | 5 500 5,000 15,000





### Population Density (per sq. mile)

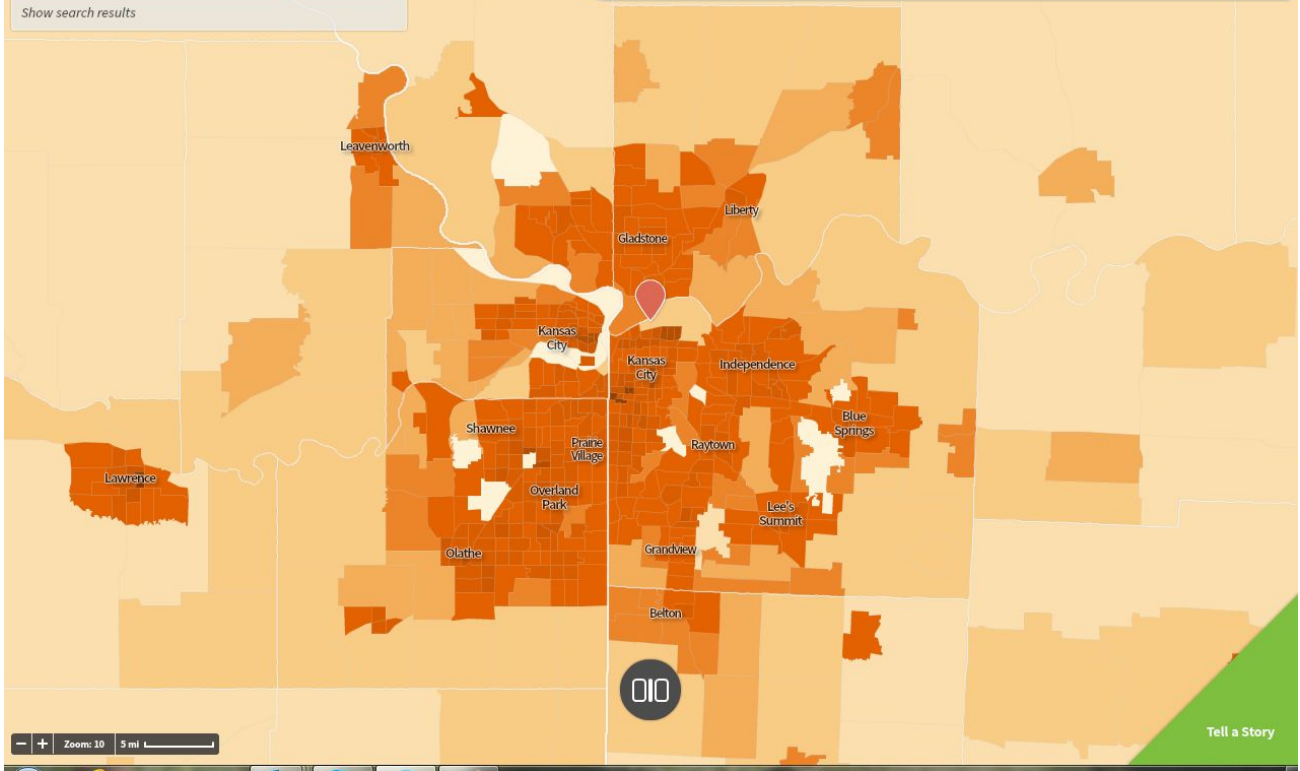
ACS 2014 (5-Year Estimates)

Kansas City, MO

Show search results

Show data by: Tract Visualization type: Shaded Area

5 500 5,000 15,000



Change Data

### Population Density (per sq. mile)

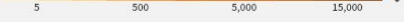
ACS 2014 (5-Year Estimates)

Browse by Category

Browse by Survey

Visualization type:

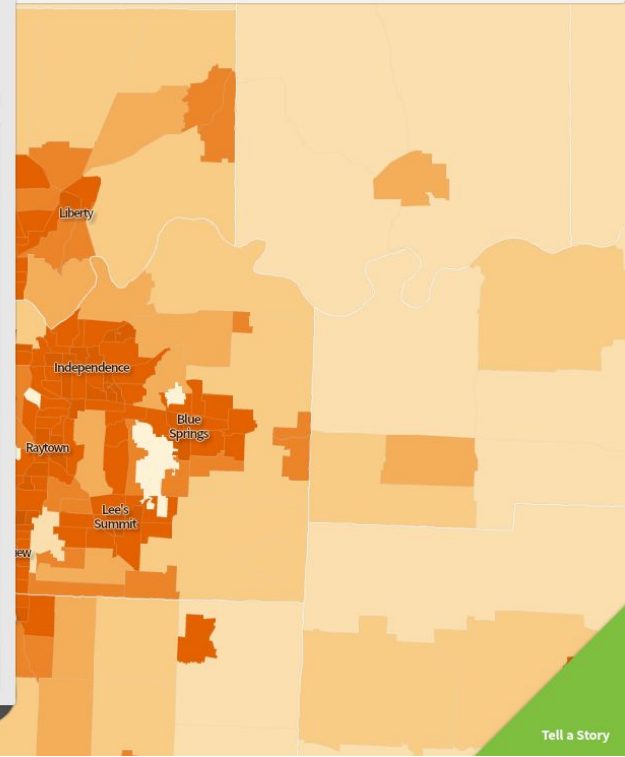
Shaded Area

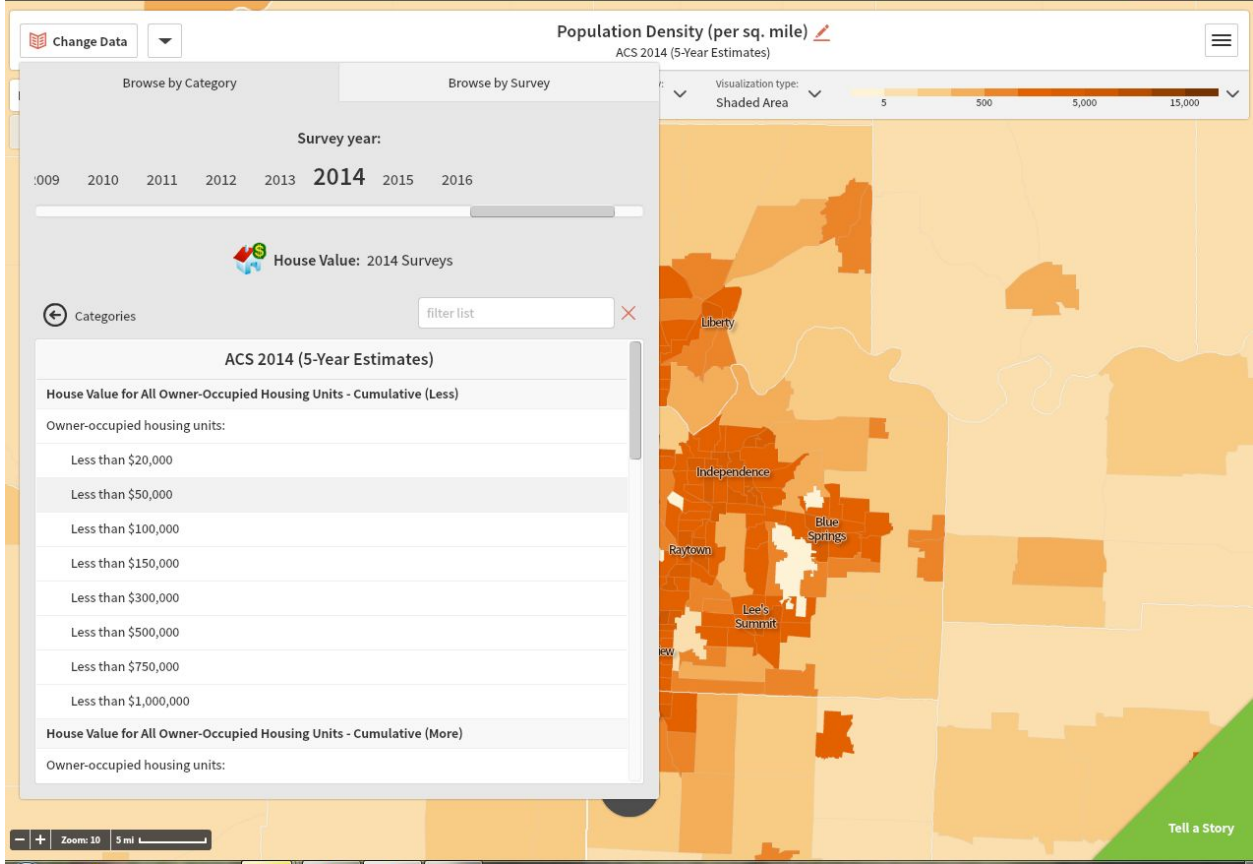


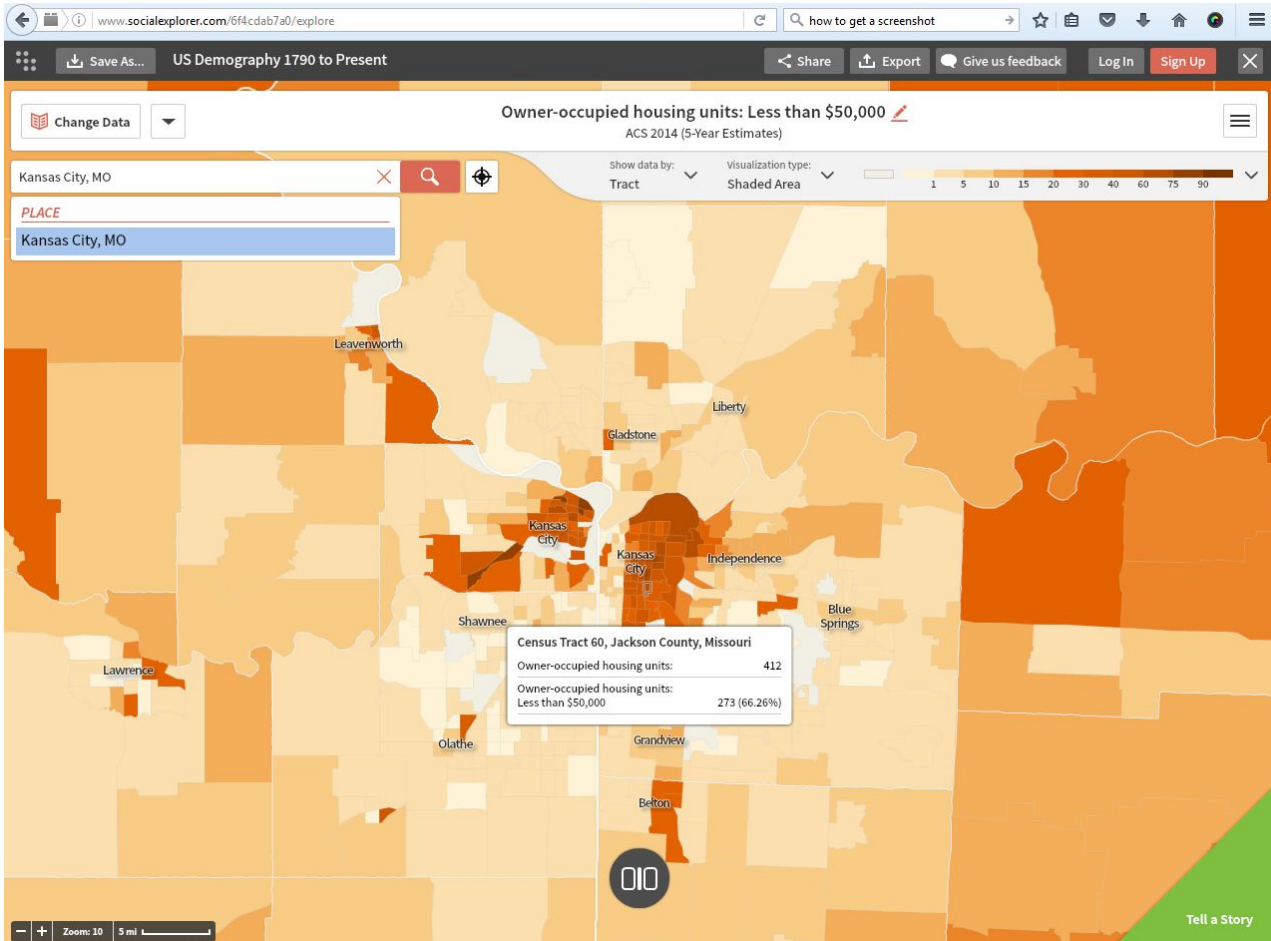
Survey year:

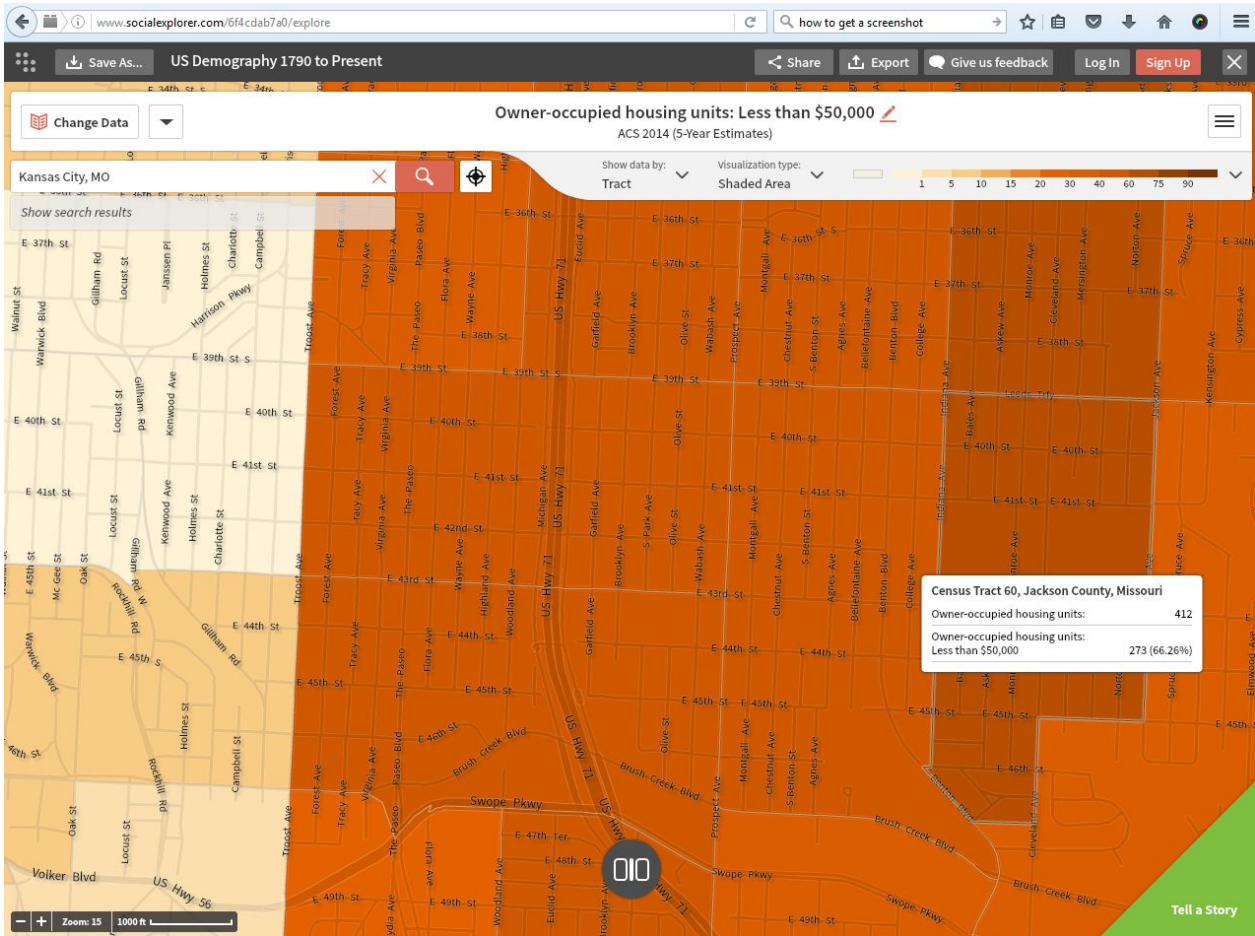
:009 2010 2011 2012 2013 **2014** 2015 2016

- |                     |                   |                           |
|---------------------|-------------------|---------------------------|
| Population          | Age               | Sex                       |
| Race                | Income            | Family Structure          |
| Marital Status      | Group Quarters    | Unmarried Partners        |
| Education           | Housing           | House Value               |
| Labor Force         | Employment Sector | Occupation                |
| Unemployment        | Poverty           | Travel Time To Work       |
| Transportation      | Veterans          | Residence                 |
| Native/Foreign Born | Ancestry          | Asian and Hispanic Groups |
| Disabilities        | Farms             | Slavery                   |
| Religion            | Carbon Emissions  | Health                    |









www.socialexplorer.com/6f4cdab7a0/explore

how to get a screenshot

Save As... US Demography 1790 to Present

Share Export Give us feedback Log In Sign Up

Change Data

### Owner-occupied housing units: Less than \$50,000

ACS 2014 (5-Year Estimates)

Kansas City, MO

Show search results

Show data by: Tract Visualization type: Shaded Area

1 5 10 15 20 30 40 60 75 90

#### Share






Link E-mail Embed

Link to share:

<http://www.socialexplorer.com/0305040800/view>

Copy to Clipboard

Share via:

Volker Blvd US Hwy 50

Zoom: 15 1000 ft

Tell a Story



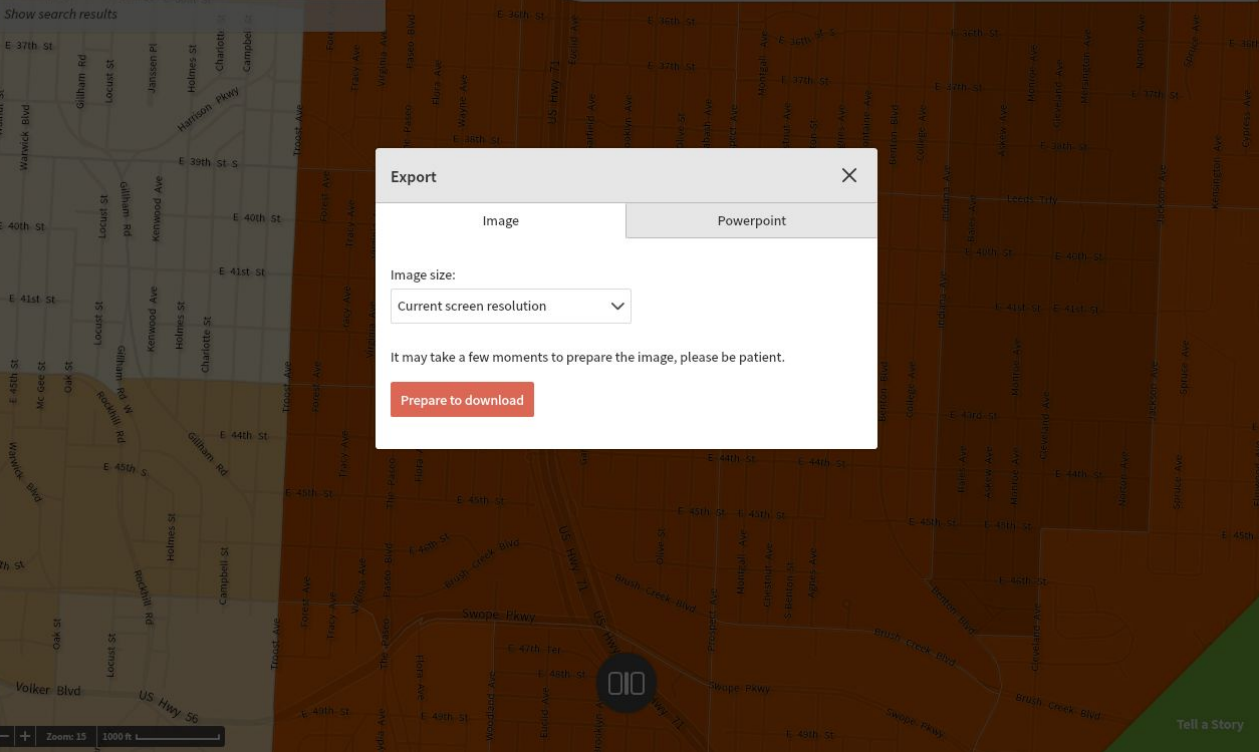
Change Data

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#### Export

Image **Powerpoint**

Image size:  
Current screen resolution

It may take a few moments to prepare the image, please be patient.

**Prepare to download**

Tell a Story



# When patrons want to learn GIS

There are many options to point patrons in directions to learn more about using and developing GIS:

1. Search for MOBIUS-available books on specific patron interests / applications (Example from UMKC Libraries, [Introduction to Geospatial Technologies](#))
2. Recommend online tutorials to gain expertise (Example: MIT Open Courseware [Geographic Information System Tutorial](#))
3. Point to vendor-sponsored learning tools (Example: ESRI [Learn ArcGIS](#))

# UMKC Libraries has your back!

UMKC Libraries has produced a Research Guide for GIS resources:

<http://libguides.library.umkc.edu/GIS>

Please link to this guide from your library if you find it useful!

Also, feel free to adapt parts of this guide for any search guides for your library!

*Note: While some resources (notably eBooks) mentioned in the guide are for UMKC students/faculty/staff, most resources are freely accessible via an internet connection!*

# Questions?

*Thank you very much!*

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