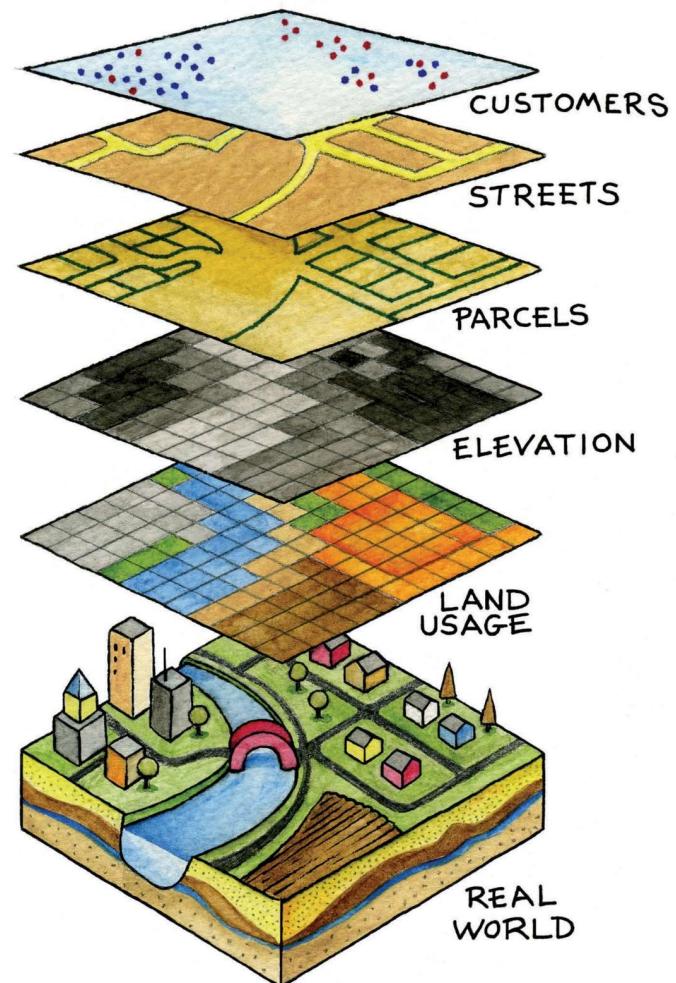


GIS *and related resources*

Geographic Information Systems

Geographic Information Science

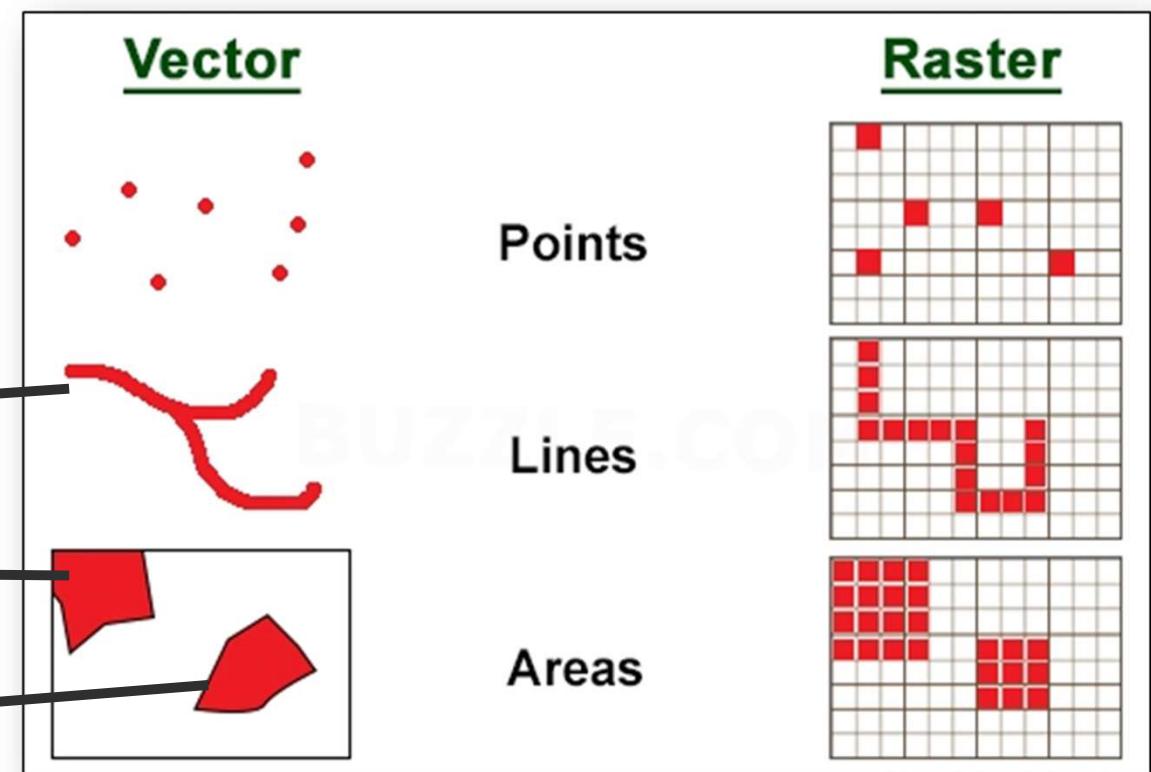
- Unique content management system that can store data by attaching layers of descriptive information to absolute location as well as to a database
- Among its unique benefits is the ability to relate otherwise disparate data sources on the basis of common geography, revealing patterns that are otherwise invisible



GIS Data



Shape	quantity
1	30
2	50
3	1,000



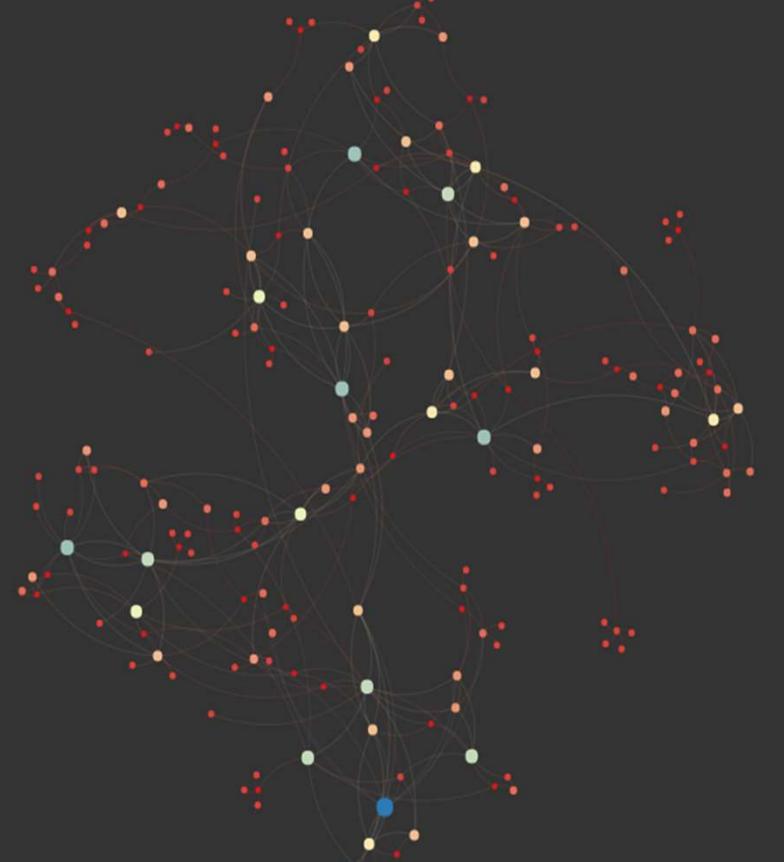
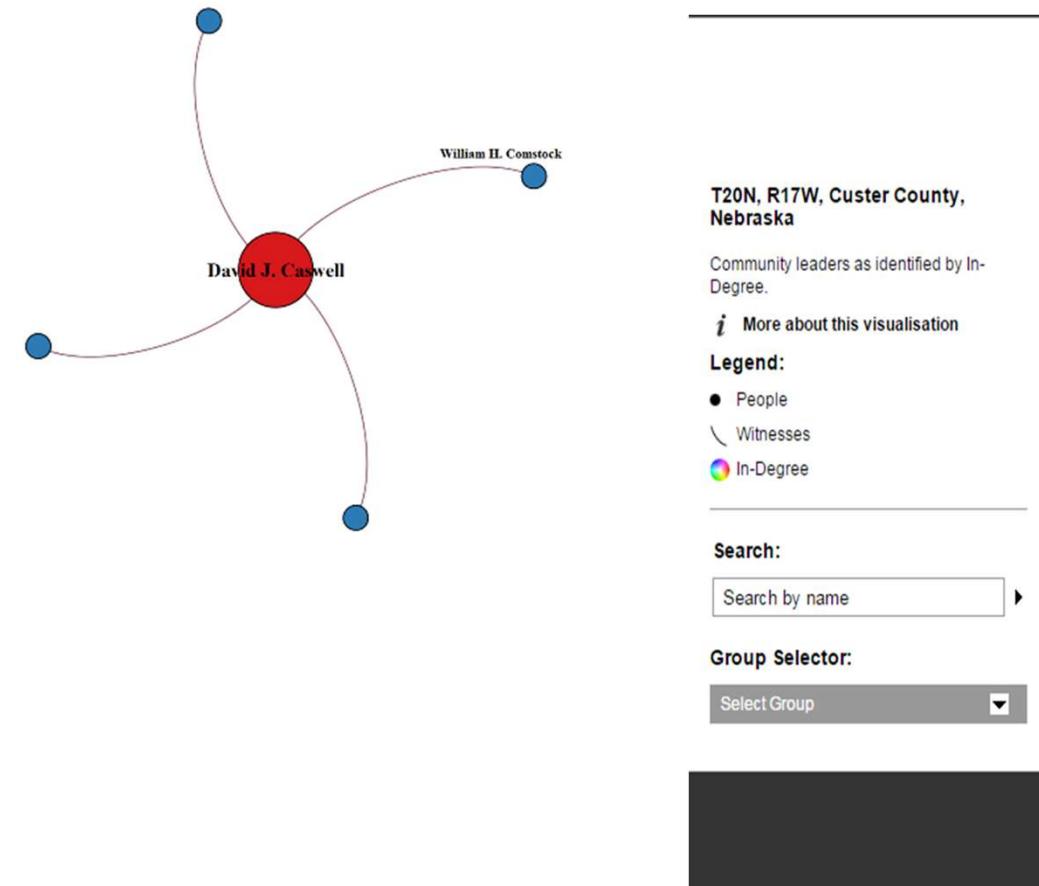
Many technologies (not an exhaustive list)



Processing+ Tools	Visualization Tools
ArcGIS Pro	<i>Google Earth</i>
QGIS & GRASS	<i>JavaScript Applications</i>
GeoDa	<i>Neatline</i>
<i>Excel (yes)</i>	<i>Gephi</i>
<i>R</i>	<i>StoryMap JS</i>
...	...

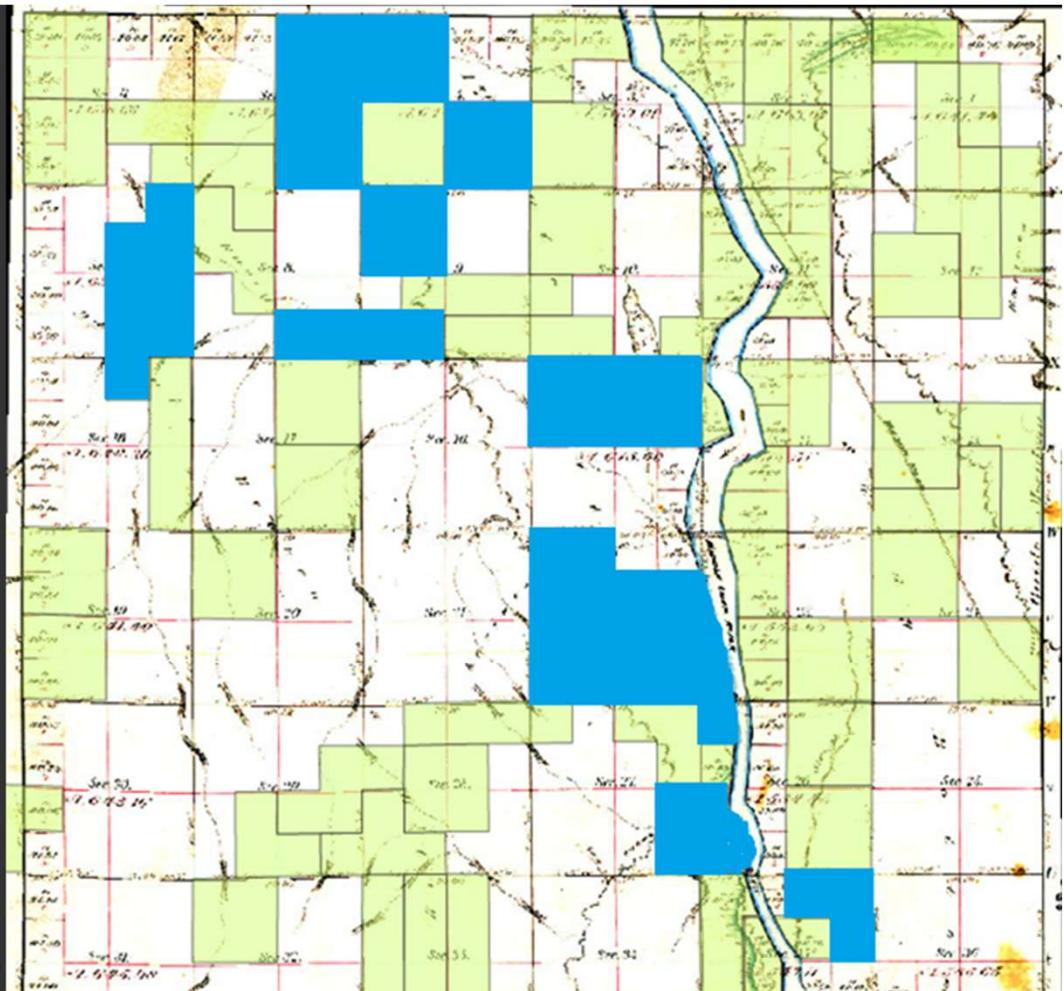
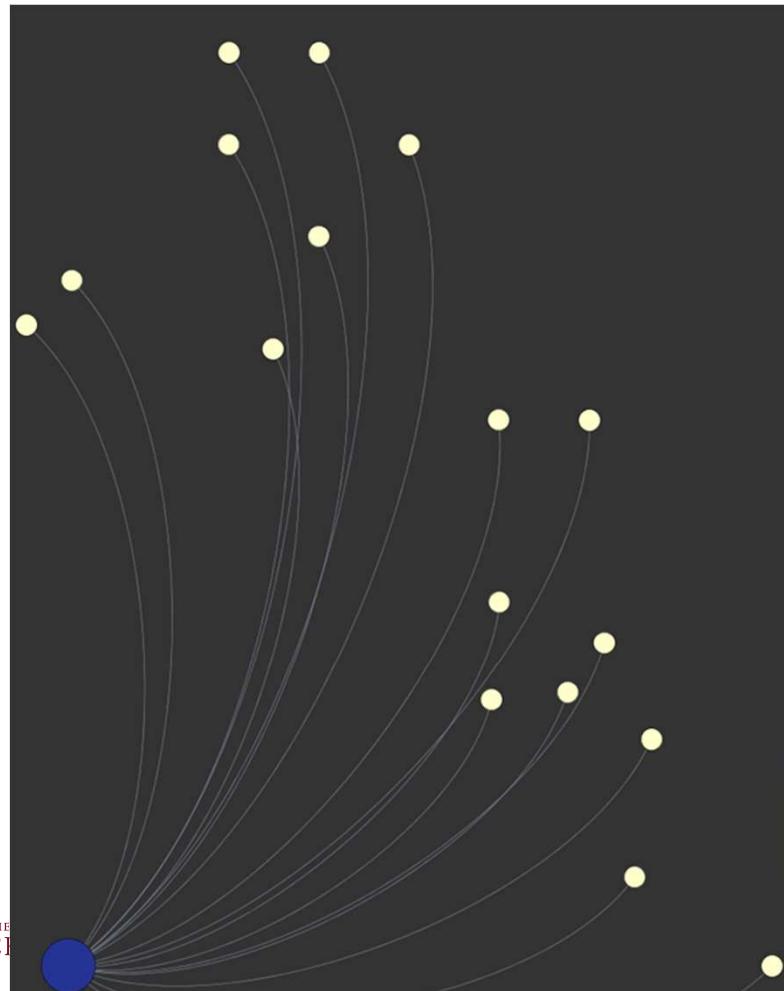
Visualizing & Exploratory Data Analysis

Library
THE UNIVERSITY OF CHICAGO

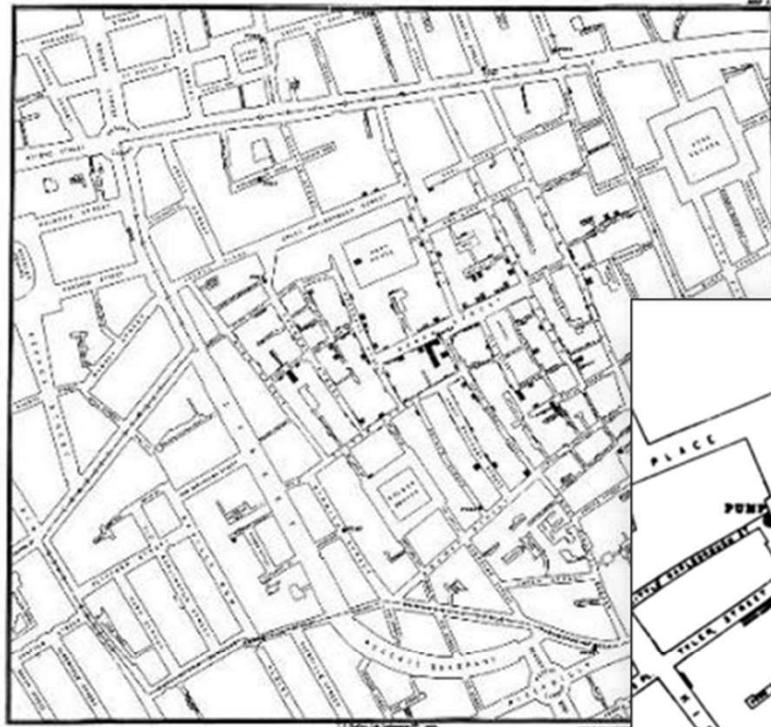


Visualizing & Exploratory Data Analysis

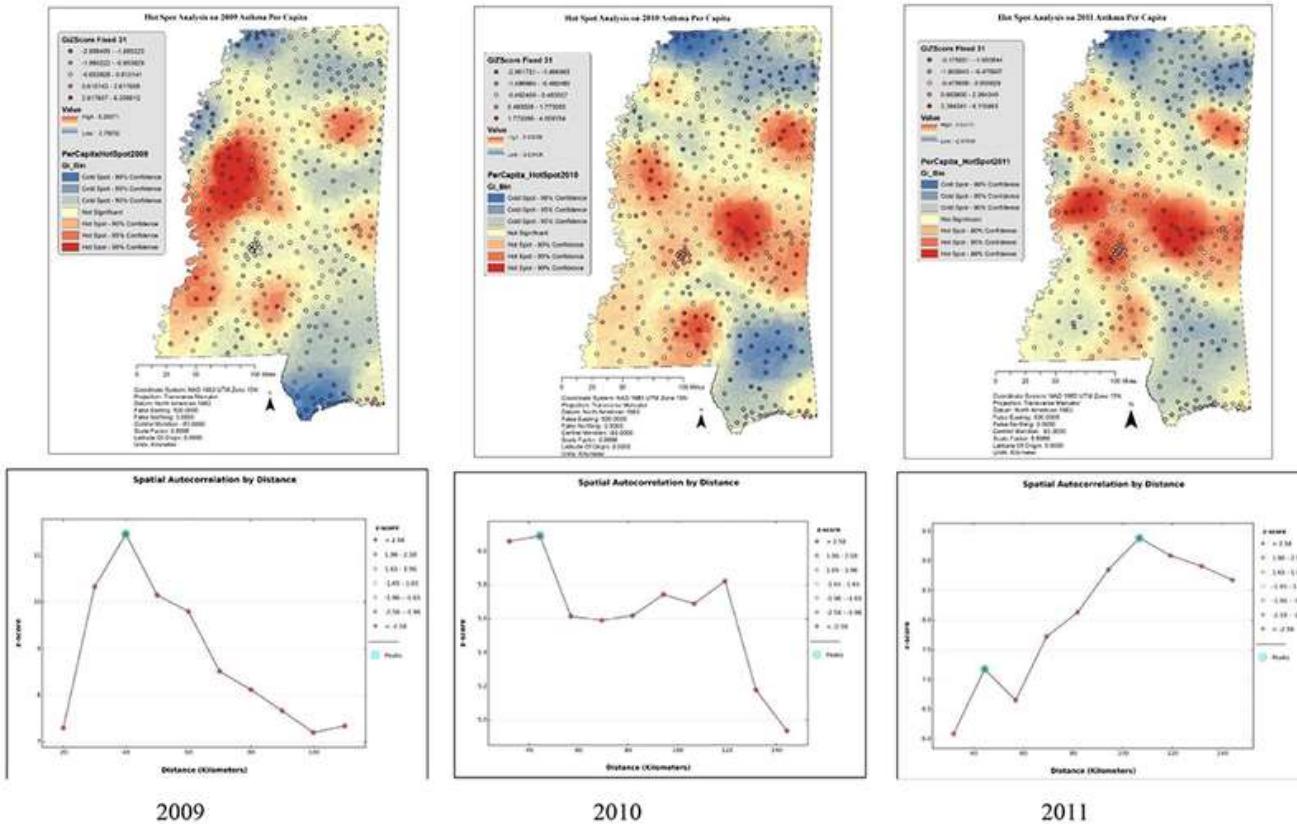
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Hotspot and Cluster Analyses

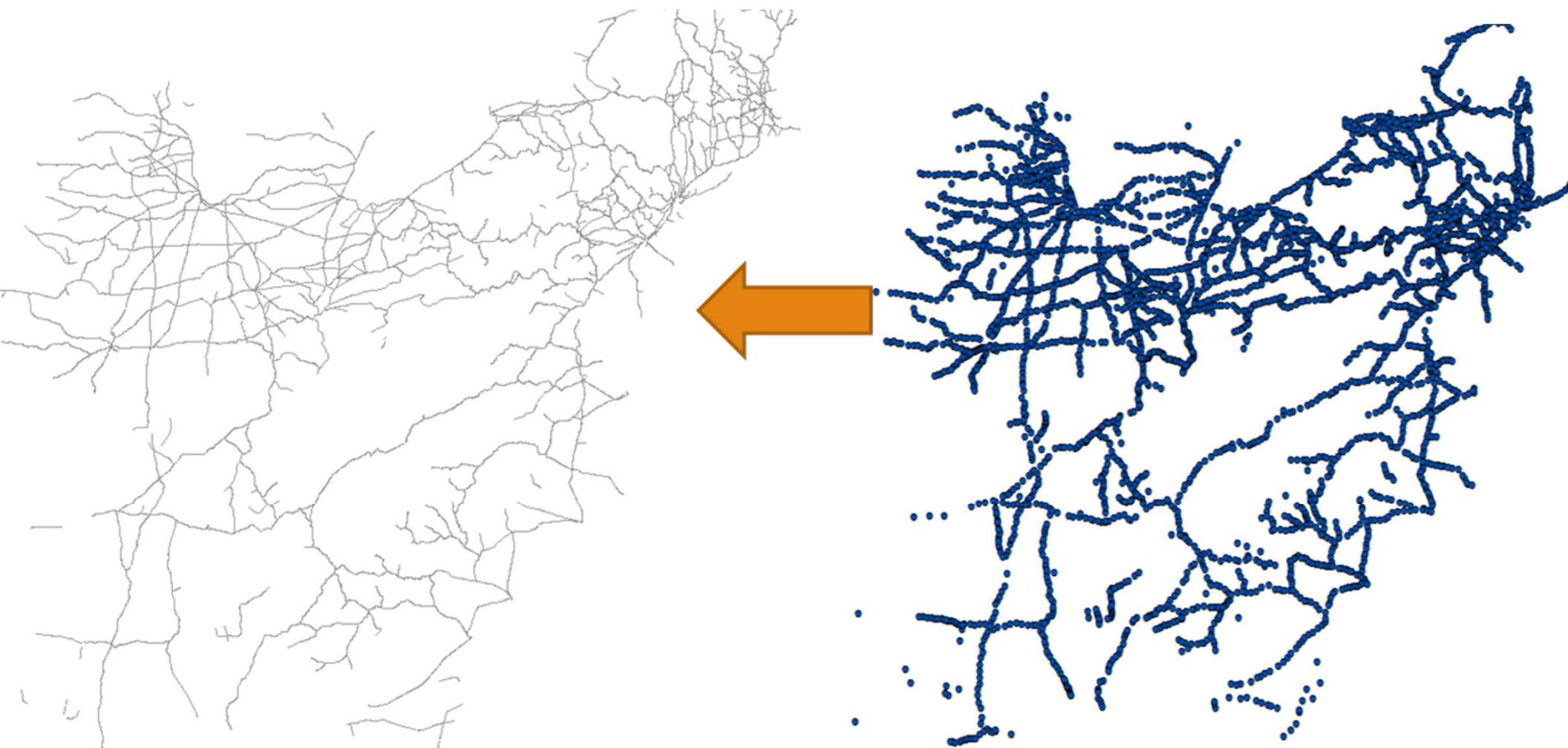


Quantitative spatial analysis



Building and Analyzing Networks

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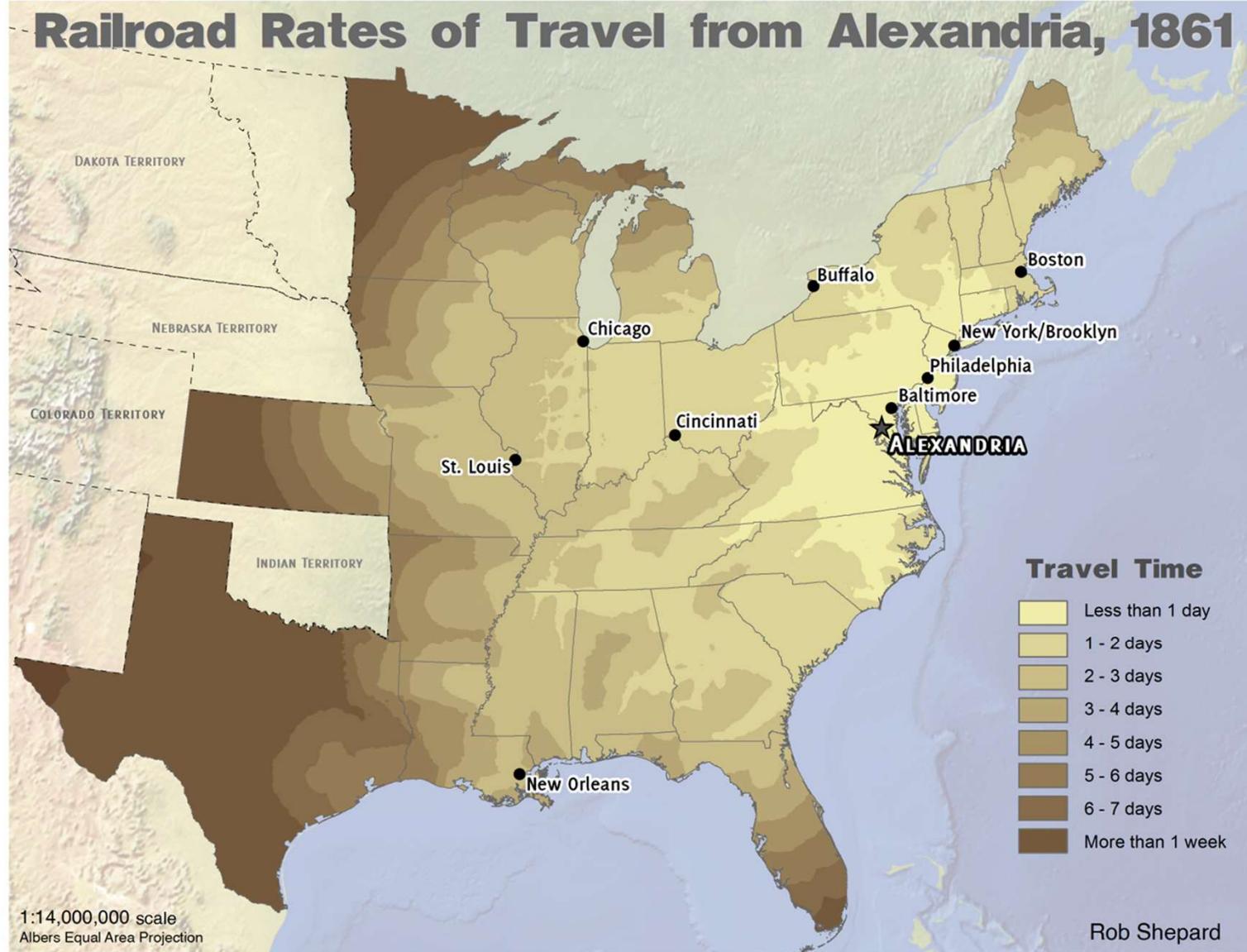
Building and Analyzing Networks



Building & Analyzing Networks

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Synthesizing Sources...

Page No. 79	
SCHEDULE 1—Free Inhabitants	
of <i>Canal</i> enumera-	
Post Office <i>Columbus</i>	
The name of every person whose place of abode on the first day of J. 1860, was in this family.	
1	2
Margaret Camille	
Naomy	
Anna Schneppa	
Salome	
Benjamin A	
Francis D	
Daniel L	
David & George	
Alfred	
Henry E	
Naomy C	
Eliza E	
Melvin E & Camille	
Jerry	
Vivie F	
Alex Story	
Marcella	
George E	
Quincy Davis	
Peter A. St. O	
322	323
39	40
24	25
24	25
115	116
21	22
300	301
292	293
300	301
340	341
358	359
370	371
381	382
10th W.	10th W.
11th W.	11th W.
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14th W.	14th W.
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95th W.	95th W.
96th W.	96th W.
97th W.	97th W.
98th W.	98th W.
99th W.	99th W.
100th W.	100th W.

WASHINGTON STREET DIRECTORY.

496 493 7th W.
 526 531 6th W.
 — Massachs. av.
 528 553 5th W.
 604 605 4th W.
 622 — 3d W.
 652 — 2d W.
 — New Jersey av.
K North, from Rock Creek, Georgetown, to Boundary.
Left Rt.
 2 1 Bridge.
 26 25 27th W.
 40 49 26th W.
 66 65 25th W.
 84 83 24th W.
 — Circle.
 — Pennsylvania av.
 — 91 22d W.
 128 121 21st W.
 148 — 20th W.
 168 167 19th W.
 178 177 18th W.
 — 189 Connecticut av.
 224 211 17th W.
 254 235 16th W.
 280 291 15th W.
 292 — Vermont av.
 300 — 14th W.
 340 339 13th W.
 358 365 12th W.
 370 377 11th W.
 — 381 10th W.

204 195 19th W.
 — 18th W.
 — Connecticut av.
 — 17th W.
 Creek, not open.
 314 327 18th W.
 314 357 15th W.
 — 14th W.
 416 417 Massachs. av.
 — Vermont av.
 446 449 13th W.
 476 479 12th W.
 488 498 11th W.
 508 — 10th W.
 542 541 9th W.
 564 — 8th W.
 584 581 7th W.
 614 613 6th W.
 624 625 5th W.
 686 685 4th W.
 — 3d W.
N North, from Rock Creek, Georgetown, to Boundary.
Left Rt.
 368 — 15th W.
 410 — 14th W.
 426 — Vermont av.
 438 439 13th W.
 462 465 12th W.
 — 11th W.
 488 485 10th W.
 528 525 9th W.
 — 8th W.

— 8th W.
 — 18th W.
 — Connecticut av.
 — 17th W.
 Re-opens at
 208 — 2d W.
 242 239 1st W.
 — S. Capitol.
 Re-opens at
 268 265 New Jersey av.
 — 301 1st E.
 350 351 2d E.
 — Pennsylvania av.
 364 — 3d E.
 384 387 4th E.
 — 5th E.
C South, from the Potomac to 19th East.
Left Rt.
 58 — 14th W.
 80 — 13½th W.
 106 — 13th W.
 142 — 12th W.
 150 — 11th W.
 170 — 10th W.
 — Virginia av.
 — Maryland av.
 — 185 6th W.
 274 277 4½th W.
 316 — 3d W.
 332 331 2d W.
 — 353 1st W.
 Canal, no Bridge, from New Jersey av. eastward. But par-



teenth.
 Dellone Frederick, carpenter, res 565 Thirteenth.
 Delor S A, barber and Wigmaker, 491 Eleventh.
 DeMary C S, (C T Whitmore & Co) res e s Twelfth bet Howard and Jackson.
 Deming James, stableman, M Hunt, bds Douglas House.
 Demorest George B, (Demorest & Phelps) res 295 Howard.
 Demorest Peter A, farmer, res s s Capitol av bet Ninth and

...to answer social questions



GIS Data Resources

Common GIS Data Resources



U.S. T.I.G.E.R. file (census.gov/cgi-bin/geo/shapefiles)



United States®
Census
Bureau

TIGER/Line® Shapefiles

Select the year and layer type you are interested in from the dropdown menus below and click "Submit" for a list of the available geographic areas.

Select year

Select a layer type

- Roads
- Consolidated Cities
- Core Based Statistical Areas
- Counties (and equivalent)
- County Subdivisions
- International Boundary
- Estate
- Places
- Public Use Microdata Areas
- School Districts
- School District Administrative Areas (SDADM)
- States (and equivalent)
- State Legislative Districts
- Subbarrio (SubMinor Civil Division)
- Urban Areas
- ZIP Code Tabulation Areas
- Features
- All Lines
- Coastline

Source: US Census Bureau

CONNECT

Information

Measuring

Access our FTP site for additional downloading options

[Action and Privacy Policy](#) | [Accessibility](#) | [FOIA](#) | [Inspector General](#) | [No FEAR Act](#) | [U.S.](#)

Common GIS Data Resources

The National Map (nationalmap.gov)

 USGS science for a changing world

TNM Download (v2.0) Help Custom Views Share Link Contact Us [topoBuilder](#)

Datasets Products Cart

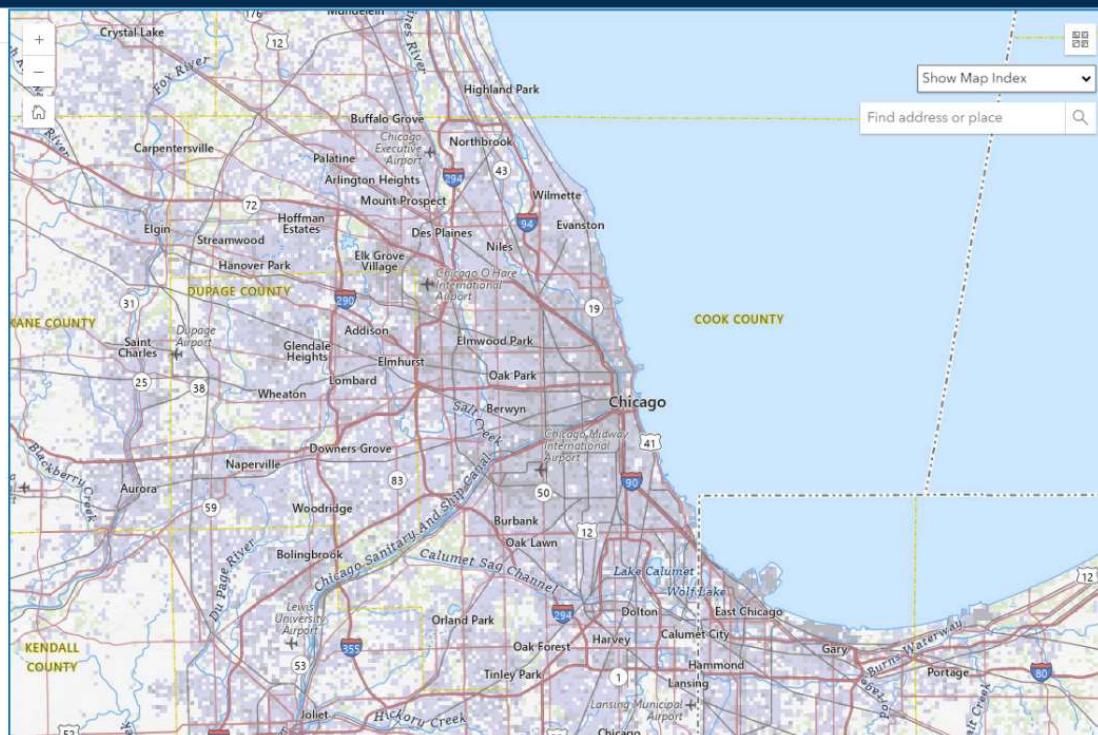
Select products below and click "Search Products"

Area of Interest:

Advanced Search

Map

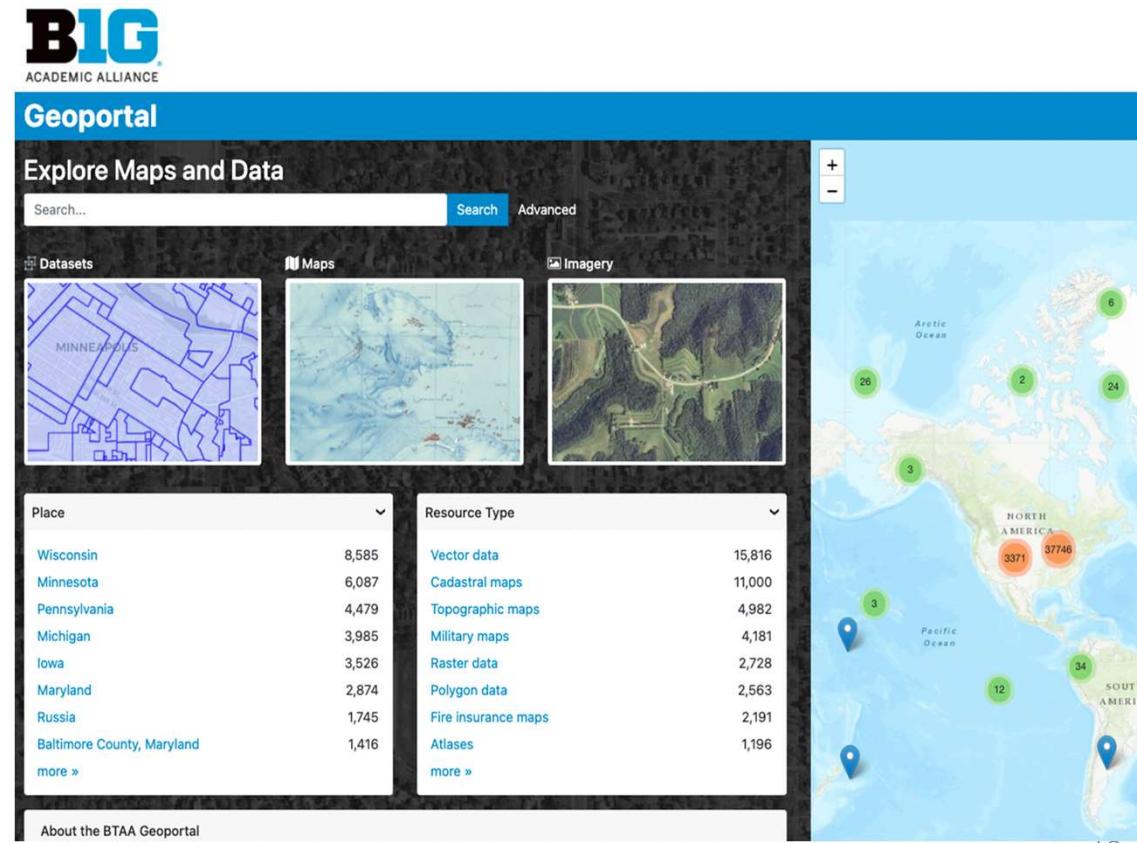
Data



Overlooked GIS Data Resources

Big Ten Academic Alliance Geoportal (geo.btaa.org)

- 97,662 unique datasets in BTAA geoportal
 - GIS data, web map services,
- Includes 38,874 scanned/digitized maps, many are georeferenced
- Thousands of records for Illinois/Chicago
 - Everything from UChicago CAMEL!



Overlooked GIS Resources

Library
THE UNIVERSITY OF CHICAGO

Historical Geographic Information System (nhgis.org)

- Population
 - Time-series versions
- Agriculture
- Business & Economy
- Housing Details

The screenshot shows the homepage of the National Historical Geographic Information System (NHGIS). The header features the IPUMS NHGIS logo and navigation links for NHGIS, GEOMARKER, NATIONAL HISTORICAL GIS, HOME, SELECT DATA, MY DATA, and SUPPORT. Below the header is a row of five images: a city skyline at sunset, a residential area, autumn foliage, a person working in a field, and a historical building. The main content area is divided into two columns. The left column contains links for IPUMS NHGIS (ABOUT, REGISTER, DONATE TO NHGIS), DATA (BROWSE AND SELECT DATA, DOWNLOAD OR REVISE MY DATA, API, ACCESS IN R), SUPPLEMENTAL DATA (GEOGRAPHIC CROSSWALKS, ENVIRONMENTAL SUMMARIES, PRIVACY-PROTECTED DEMO DATA, SABINS SCHOOL AREAS, ANNUAL TRACT DATA), and DOCUMENTATION (DATA AVAILABILITY, OVERVIEW OF DATASETS). The right column features a large text block about the service, a "START HERE:" button, a "Get Data" button, and a "WHAT IS IPUMS?" section with a detailed description.

Overlooked GIS Resources



Data Axle Reference Solutions*

- **Business information**
 - Current and historic
 - Number of employees
 - Sales
 - Owner demographics
 - Size
 - Latitude/longitude
- **Filtering and custom downloads**

Available Databases

Select a Database to Get Started

U.S. Businesses

94 Million Businesses
4.2 Million Closed Businesses

Canadian Businesses

2.4 Million Businesses

U.S. Jobs / Internships

2.5 Million Job Postings

U.S. New Businesses

2.2 Million New Businesses

U.S. Standard White Pages

145 Million Residents

U.S. Consumers / Lifestyle

257 Million Individuals

Canadian White Pages

14 Million Individuals

U.S. New Movers / Homeowners

Overlooked GIS Resources



Data Axle Reference Solutions

Record Type

Search Tips | Collapse

Verified Businesses (Phone verified and quality checked)

Include Unverified Businesses (Not yet fully verified, may not be accurate)

Include Closed / Out of Business Records (Suspected to be out of business)

Major Industry Group

Search Tips | Collapse Remove

- Agriculture, Forestry, & Fishing (01-09)** 0 selected
- Mining (10-14)** 0 selected
- Construction (15-17)** 0 selected
- Manufacturing (20-39)** 0 selected
- Transportation (40-49)** 0 selected
- Wholesale / Distributors (50-51)** 0 selected
- Retail Trade (52-59)** 7 selected
 - 52-BUILDING MATERIALS & HARDWARE** 0 selected
 - 53-GENERAL MERCHANDISE STORES** 0 selected
 - 54-FOOD STORES** 7 selected
 - 5411-GROCERY STORES** 0 selected
 - 5421-MEAT & FISH MARKETS** 0 selected
 - 5431-FRUIT & VEGETABLE MARKETS** 0 selected
 - 5441-CANDY NUT & CONFECTIONERY STORES** 7 selected
 - 5451-DAIRY PRODUCTS STORES** 0 selected
 - 5461-RETAIL BAKERIES** 0 selected
 - 5499-MISCELLANEOUS FOOD STORES** 0 selected
 - 55-AUTOMOTIVE DEALERS & SERVICE STATIONS** 0 selected
 - 56-APPAREL & ACCESSORY STORES** 0 selected

City / State

Metro Area

ZIP Codes

Radius

County

Street Address

Neighborhood

Mailing Address

Phone

Business Phone

Area Code

Toll Free Numbers

Fax Numbers

Business Size

Number Of Employees

Sales Volume

Ownership

Public/Private Company

Headquarter/Branch

Foreign Parent

Home Based Business

Government Office

Female Owned

Veteran Owned

Minority Owned

Financial Data

Finance, Insurance, & Real Estate (60-67) 0 selected

Services (70-89) 0 selected

Public Administration (91-98) 0 selected

Nonclassified Establishments (99) 0 selected

Search Primary SICs Only

City / State

Search

Results

Selected	City
<input checked="" type="checkbox"/> Chicago, IL	City
<input type="checkbox"/> Chicago Heights, IL	City
<input type="checkbox"/> Chicago Park, CA	City
<input type="checkbox"/> Chicago Ridge, IL	City
<input type="checkbox"/> East Chicago, IN	City
<input type="checkbox"/> New Chicago, IN	City
<input type="checkbox"/> North Chicago, IL	City

City / State

Search Tips | Collapse Remove

5431-FRUIT & VEGETABLE MARKETS 0 selected

5441-CANDY NUT & CONFECTIONERY STORES 7 selected

5451-DAIRY PRODUCTS STORES 0 selected

5461-RETAIL BAKERIES 0 selected

5499-MISCELLANEOUS FOOD STORES 0 selected

55-AUTOMOTIVE DEALERS & SERVICE STATIONS 0 selected

56-APPAREL & ACCESSORY STORES 0 selected

57-HOME FURNITURE & FURNISHINGS STORES 0 selected

58-EATING & DRINKING PLACES 0 selected

59-MISCELLANEOUS RETAIL 0 selected

Finance, Insurance, & Real Estate (60-67) 0 selected

Services (70-89) 0 selected

Public Administration (91-98) 0 selected

Nonclassified Establishments (99) 0 selected

Overlooked GIS Resources



Data Axle Reference Solutions

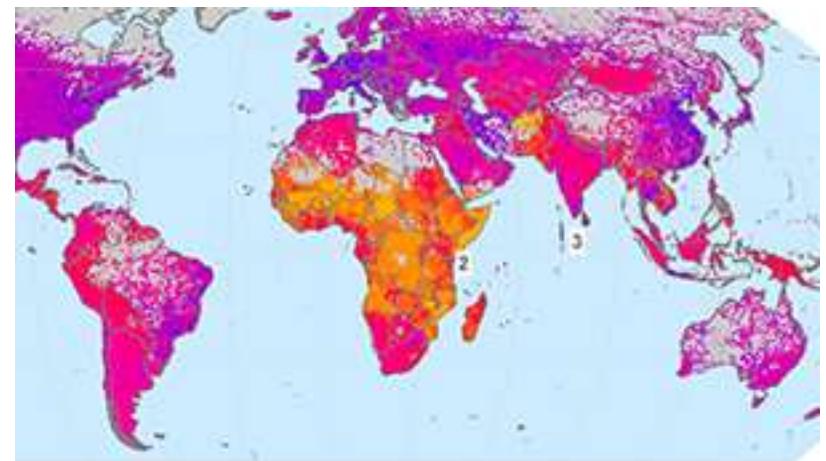
- Restricted UChicago Library site has ALL data, 1997-2021

www.lib.uchicago.edu/restricted/db/infogroup-historical-datafile

Underused datasets...

NASA's Socioeconomic Data and Applications Center
<https://sedac.ciesin.columbia.edu>

- Gridded Population Data
 - 30 arc-seconds (~1km at equator, less at higher latitudes)
 - 2005, 2010, 2015, 2020
- Digital Elevation Models
- Climate Risk and Vulnerability
- Food Insecurity
- Poverty



Overlooked GIS datasets

Census Place Project

- linking individuals and households to consistently-defined place names, longitude-latitude, counties, states.
- we geocode an average of 83% of the individuals and households in 1790--1940 census microdata,
 - compared to 23% in conventional crosswalks.
- In years with individual-level microdata (1850--1940), average match rate is 94% relative to 33% in widely-used crosswalks.



OPENICPSR

Find Data Share Data

Find Data / [The Census Place Project: A Method for Geolocating Unstructured Place Names](#)

The Census Place Project: A Method for Geolocating Unstructured Place Names

Principal Investigator(s): [Enrico Berkes](#), Ohio State University; Ezra Karger, Chicago Federal Reserve Bank; Peter Nencky, Miami University

Version: [V2](#)

Name	File Type	Size	Last Modified
1790_csv.zip	application/zip	1.2 MB	03/27/2023 10:57:AM
1800_csv.zip	application/zip	1.6 MB	03/01/2023 01:03:PM
1810_csv.zip	application/zip	2.4 MB	03/01/2023 01:02:PM
1820_csv.zip	application/zip	3.8 MB	03/01/2023 01:02:PM
1830_csv.zip	application/zip	5.2 MB	03/01/2023 01:02:PM
1840_csv.zip	application/zip	7.4 MB	03/01/2023 01:02:PM
1850_csv.zip	application/zip	390.2 MB	03/01/2023 01:03:PM
1860_csv.zip	application/zip	539.2 MB	03/22/2023 09:39:AM

[DOWNLOAD THIS PROJECT](#)

Usage Metrics [Overall Project Metrics](#)

1364 Views 328 Downloads

[Download Detailed Metrics](#)

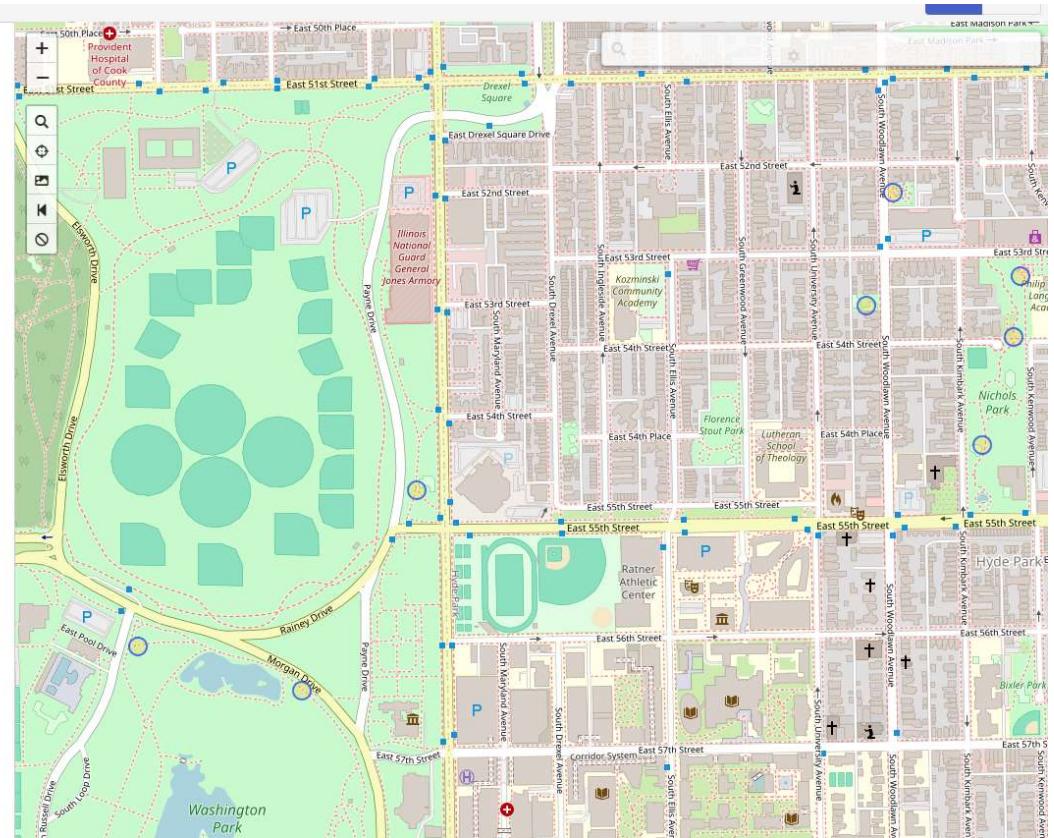
Published Versions

[V2 \[2023-03-28\]](#) [V1 \[2022-09-06\]](#)

Overlooked GIS Data Resources

OpenStreetMap/Overpass API (overpass-turbo.eu)

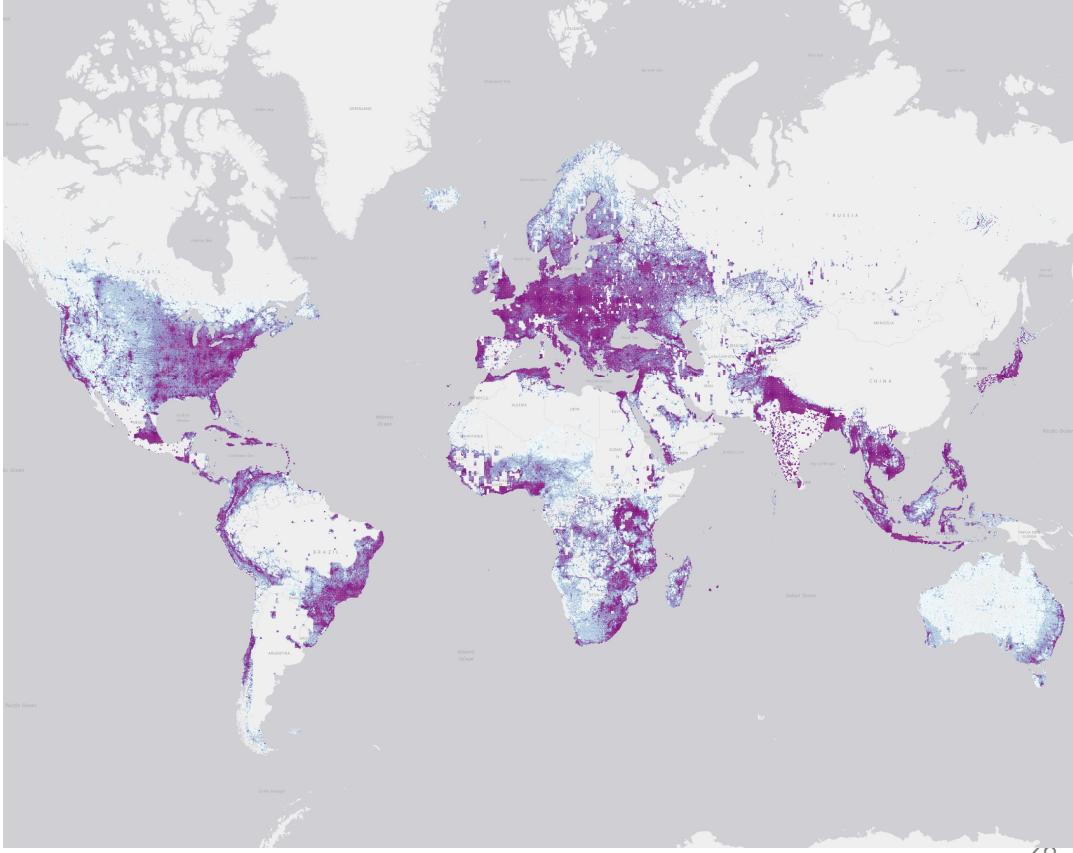
```
/*
1 This is an example Overpass query for fountains/drinking water in Hyde Park.
2 Try it out by pressing the Run button above!
3 You can find more examples with the Load tool.
4 */
5
6 node
7 [amenity=drinking_water]
8 (({{bbox}}));
9 out;
```



Overlooked...

Microsoft (Bing Maps) GlobalML Footprints

- 1.3B buildings
- GeoJSON format
- Coverage map to the right →
- US, Canada, Western Europe*, Australia also have height information
- Enormous file sizes...



THE UNIVERSITY OF CHICAGO
Library

Overlooked GIS tools...

WHO AccessMOD 5 (accessmod.org)

- Free and open-source standalone software to model physical accessibility of existing health services relative to target population, to:
 - estimate the part of the target population that would not receive care despite being physically accessible due to shortage of capacity in services (human/equipment)
 - measure referral times and distances between health facilities,
 - identify where to place new health facilities to increase population coverage through the scaling up analysis.

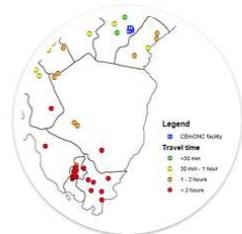
AccessMod 5 is composed of five main tools



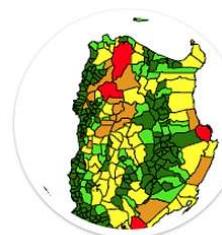
Accessibility analysis
Compute the traveling time surface, informing the time needed to reach the nearest health facility



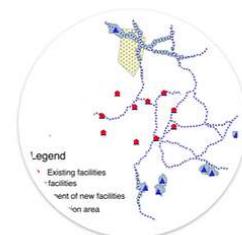
Geographic coverage analysis
Take into account the coverage capacity of each health facility to estimate the part of the target population that would not receive care despite being physically accessible



Referral analysis
Calculate travelling times and distances separating different types of health facilities



Zonal Statistics
Obtain the percentage of the population being covered in each sub national division

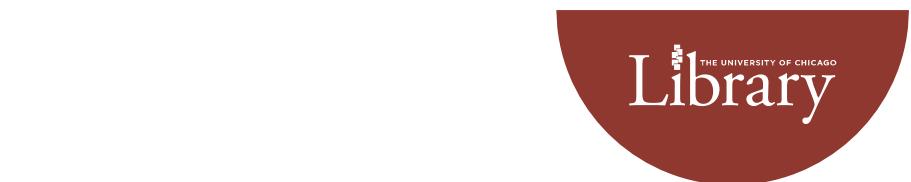


Scaling up analysis
Identify the optimum location for building new health facilities

Overlooked GIS tools...

RCC Geocoder (@ gis.rcc.uchicago.edu)

- Quickly turn tens of thousands of addresses (from a CSV/spreadsheet) into coordinates for use in GIS, analysis/mapping tools



RCC-GIS

[Home](#) [Resources](#) [Support](#) [Contact](#) [Geocoding Service](#)

RCC-GIS Geocoding Service

Welcome to the University of Chicago RCC-GIS Geocoding Service. This application allows UChicago affiliates to take lists of street addresses or place names and convert them into latitude and longitude coordinates. The coordinate pairs can then be used in any sort of mapping application or spatial analysis method.

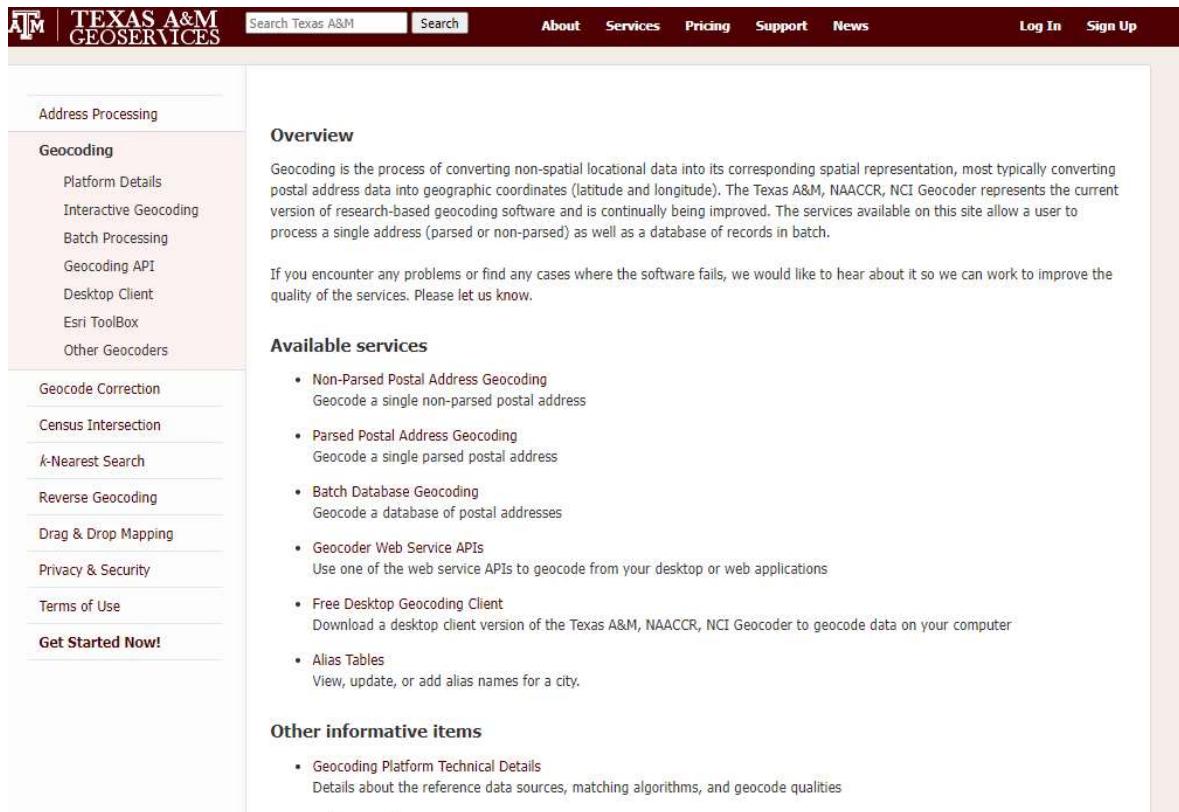


The engine behind the RCC-GIS Geocoding Service is the ESRI's World Geocoder for ArcGIS. The Geocoding Service has the ability to retrieve coordinates for places around the world. However, coverage does differ from country to country. Click [here](#) to see what level of detail is available for different parts of the world. The RCC-GIS Geocoding Service is available to any UChicago affiliate with an active CNetID login and works on a credit-based system. All users are allocated 2000 credits by default. 2000 credits will allow a user to geocode 50,000 records. If a user needs to geocode more records, a request must

Overlooked GIS tools...



Alternative: **Texas A&M Geocoder**
(<https://geoservices.tamu.edu/Services/Geocode/>)



The screenshot shows the Texas A&M Geoservices website. The header includes the Texas A&M logo, a search bar, and links for About, Services, Pricing, Support, News, Log In, and Sign Up. The left sidebar has a navigation menu with sections like Address Processing, Geocoding (Platform Details, Interactive Geocoding, Batch Processing, Geocoding API, Desktop Client, Esri ToolBox, Other Geocoders), Geocode Correction, Census Intersection, k-Nearest Search, Reverse Geocoding, Drag & Drop Mapping, Privacy & Security, Terms of Use, and a prominent "Get Started Now!" button. The main content area features an "Overview" section with text about geocoding and a "Available services" section listing various geocoding options with brief descriptions.

Address Processing

Geocoding

- Platform Details
- Interactive Geocoding
- Batch Processing
- Geocoding API
- Desktop Client
- Esri ToolBox
- Other Geocoders

Geocode Correction

Census Intersection

k-Nearest Search

Reverse Geocoding

Drag & Drop Mapping

Privacy & Security

Terms of Use

Get Started Now!

Overview

Geocoding is the process of converting non-spatial locational data into its corresponding spatial representation, most typically converting postal address data into geographic coordinates (latitude and longitude). The Texas A&M, NAACCR, NCI Geocoder represents the current version of research-based geocoding software and is continually being improved. The services available on this site allow a user to process a single address (parsed or non-parsed) as well as a database of records in batch.

If you encounter any problems or find any cases where the software fails, we would like to hear about it so we can work to improve the quality of the services. Please let us know.

Available services

- Non-Parsed Postal Address Geocoding
Geocode a single non-parsed postal address
- Parsed Postal Address Geocoding
Geocode a single parsed postal address
- Batch Database Geocoding
Geocode a database of postal addresses
- Geocoder Web Service APIs
Use one of the web service APIs to geocode from your desktop or web applications
- Free Desktop Geocoding Client
Download a desktop client version of the Texas A&M, NAACCR, NCI Geocoder to geocode data on your computer
- Alias Tables
View, update, or add alias names for a city.

Other informative items

- Geocoding Platform Technical Details
Details about the reference data sources, matching algorithms, and geocode qualities

Overlooked GIS tools

The screenshot shows a map of the Chicago metropolitan area and surrounding suburbs. A specific polygon is highlighted in dark blue, representing the city of Chicago. To the right of the map is a JSON editor interface. The JSON code defines a FeatureCollection with a single Feature, which is a Polygon. The coordinates for this polygon are listed, corresponding to the vertices of the highlighted area.

```
[{"type": "FeatureCollection", "features": [{}], "type": "Feature", "properties": {}, "geometry": {"coordinates": [[-87.72815758563706, 41.94901398985127], [-87.7310979350294, 41.83957745873798], [-87.58604069836136, 41.72922199998209], [-87.48015286902714, 41.88191569336226], [-87.72815758563706, 41.94901398985127]]}, "type": "Polygon"}]
```

GIS @ UChicago

Mapping Chicagoland



NEH funded project to make over **5,000 maps** of Chicago publicly available from:

UChicago Library | Newberry Library | Chicago History Museum

Workflow includes:

- Scanning
- Georeferencing (adding spatial data)
- Enriching catalog records
- Making available in public portals
 - UChicago Library
 - Chicago Collections
 - BTAA Geoportal

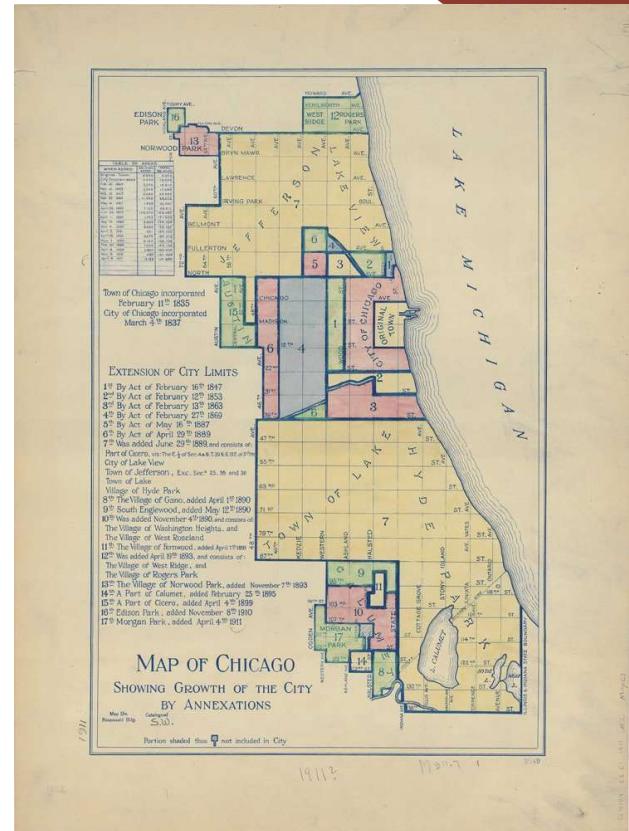
Mapping Chicagoland

Library
THE UNIVERSITY OF CHICAGO

UChicago – all our maps up to 1940

Maps from 1853-1940

- Social Science Research Committee
- Transportation
- Utility companies
- Civic institutions
- Topics covering social, urban, and economic features such as land use, parks, and urban planning.



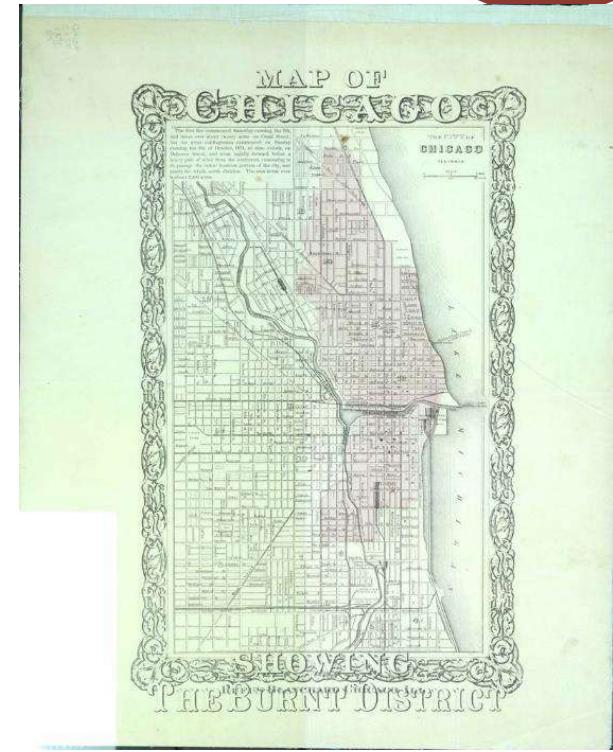
Map of Chicago showing growth of the city by annexations [map]. Scale not given. Chicago: [Chicago], 1911. The University of Chicago Library.

Mapping Chicagoland

Chicago History Museum – all maps up to 1940

Maps from 1812-1940

- Annexations
- Communities
- Parks
- Wards
- Industries
- Transportation
- Topography
- Cemeteries
- Population



Map of Chicago Showing the Burnt District (1871) by Blanchard, Rufus. Chicago History Museum.

Mapping Chicagoland

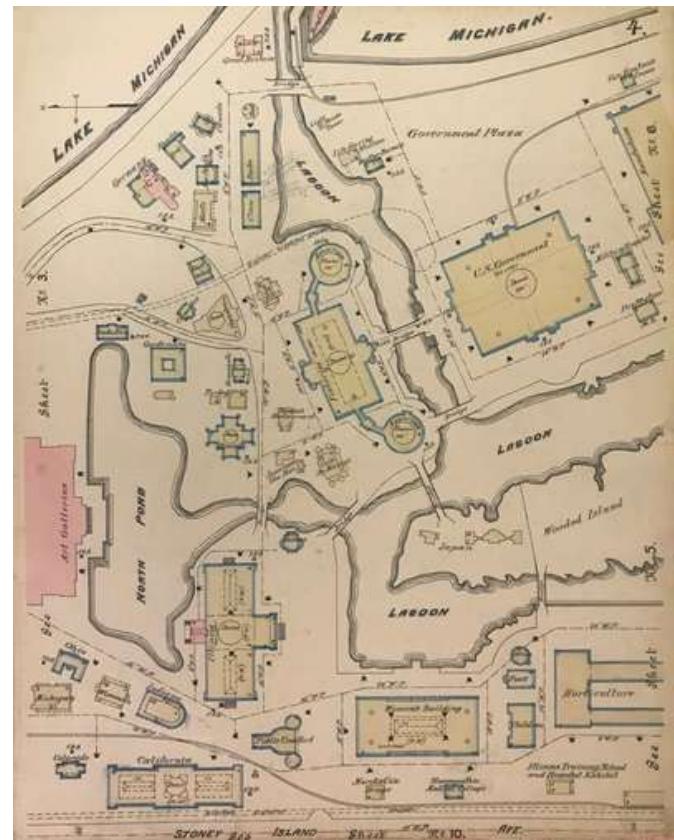


Newberry Library – a selection of atlases

Maps from 1872-1924

- Large-scale real estate
 - Fire insurance
 - Land valuation

The atlases show footprints of individual structures and lots, providing large scale details for studying Chicago's cultural geography.



Yerkes, Chas. S. Insurance map of the World's Columbian Exposition, Jackson Park, Chicago. 152 Monroe Street, Chicago: Chas. S. Yerkes, April, 1893. Newberry Library. 35

Data mining opportunities...?

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<https://allmaps.xyz/maps/da2b72099eaa12d7/{z}/{x}/{y}.png>



GIS @ University of Chicago



guides.lib.uchicago.edu/c.php?g=546121&p=3746280

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Geographic Information Systems (GIS)

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- Access GIS software remotely
- Free desktop GIS software
- Web GIS
- Access GIS software on campus
- GIS Software in the library

GIS Help & Training

GIS Books & Journals

Spatial Data Resources

Teaching with GIS

Helpful tools

RCC Geocoder (UChicago Only)

Allows UChicago affiliates to take lists of street addresses or place names and convert them into latitude and longitude coordinates. The coordinate pairs can then be used in any sort of mapping application or spatial analysis method.

BatchGeo

Upload a spreadsheet of addresses to get the coordinates of up to 250 places for free. Download files as KMZ, or use the platform to host a map.

Map Warper

Georeference maps online. Can export as GeoTIFF, KML, and even WMS layer to use in ArcGIS Online.

U.S. Projections

Find an appropriate projection for places in the U.S.

Access GIS software remotely

Virtual Lab (vLab)

The vLab has ArcGIS, GeoDa, and Google Earth Pro. To access vLab on your personal computer, see the instructions provided via the [link](#) above.

ArcGIS Online

Use your browser to find, explore, and analyze spatial data. Use the Enterprise login. When prompted for the URL enter **uchicago**.

ArcGIS for Desktop

The Research Computing Center provides student copies of ArcGIS for Desktop.

Need help choosing a GIS?



Rob Shepard

[Send Email](#)

Contact:

262 Regenstein Library

Free desktop GIS software

GeoDa

The premier free and open-source tool for spatial analysis.

QGIS

Free and open-source GIS for creating, editing, visualizing, analyzing, and publishing spatial data.

Google Earth Pro

Free desktop software for viewing, creating, and displaying spatial data and information.

ggmap for R

For those familiar with R/RStudio, install the ggmap package to visualize and analyze spatial data.

Web GIS

Popular online tools:

ArcGIS Online

Use your browser to find, explore, and analyze spatial data. Use the Enterprise login. When prompted for the URL enter **uchicago**.

Carto

Create maps and apps for business decision making.

Google MyMaps

A fun tool for getting started with web mapping.

Thank you

ask me a question if you want