

Tracking Latino Population Density and Voting Age Population in Illinois

Sponsor: Latino Policy Forum

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Project Summary

When choosing a project topic for GIS II, our team had the desire to work on an issue that was both relevant and important in today's society. When the Latino Policy Forum asked for students to create GIS maps of Latino voting-age population and Latino population density in the State of Illinois, we saw the important effect our work could have on people's lives and policy decisions at multiple levels of government.

The Latino Policy Forum aims to effect lawmakers and government officials' policy decisions, especially with regards to housing, education, and immigration for all of the Latino citizens currently residing in the State of Illinois. They advocate for this segment of the population, and in a rapidly diversifying country where a substantial demographic shift has already begun, the work they do is extremely important. The maps we have created will help them to get a better picture of where their constituents are located throughout the state, which means they will be able to allocate and direct resources more efficiently.

We broke down our maps by state legislative districts in Illinois, as well as by United States Congressional districts in the state. There are two State House Districts (118 total) to every State Senate District (59 total) representing the people of Illinois in Springfield, with an additional 18 Congressional districts representing Illinois in Washington. To obtain the data needed to achieve the desired outcome for this project, our group turned to the United States Census Bureau. There we found data relating to Hispanic populations of Illinois that, when downloaded into GIS software could be manipulated and assigned into shape files of the legislative district boundaries.

Multiple technical and system requirements were needed to complete this project and are detailed in this report. The complexities of GIS software will always pose challenges depending on the project, and this one was no different. What is important is that those challenges were overcome and we were able to learn about how real-life grassroots GIS implementation can benefit community organizations such as the Latino Policy Forum.

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Introduction

This project was commissioned by Latino Policy Forum, located in Chicago, IL. The main purpose of the project was to use Geographic Information Systems (GIS) to show Hispanic population density and Hispanic voting age populations by state legislative districts in the state of Illinois. The same data was also applied to the United States Congressional Districts in Illinois. This report will address the steps our team took in order to complete this project including needs assessment, system requirements, data acquisition, data analysis and visualization, and most importantly our results, conclusions, and recommendations for other researchers.

Our report will comprise of **6** main sections. **1)** In our needs assessment section we provide an in depth description of our project and enumerate specifically what we intended to accomplish through this project. Our client's goals will be discussed in addition to a review of relevant literary sources. **2)** The next section will detail our system requirements, complete with ERD diagrams and a summary of the technical processing elements this project required. **3)** There will be a section devoted to our data acquisition methods, including a detailed data dictionary and a summary of the challenges that surfaced while trying to find the necessary demographic data. **4)** This section will be followed by enhanced data analysis and visualization with an overview of our information products and multiple diagrams/charts that visualize the data utilized in the project. **5)** There will be a section devoted to the results and findings of our project. **6)** The next section will draw conclusions, summaries, and recommendations based on the previous section's results in order to provide greater meaning to our work.

Section #1: Needs Assessment

Part 1: Background

Our project is being commissioned by the Latino Policy Forum. Their goal is to effect policy in the key areas of housing, education and immigration for the Latino populations of Illinois. They focus on political, social and economic engagement and coalition building as well as advocacy for Latino populations. We have created documents that will be used to influence policymakers at the state and local levels of government. Furthermore the information will be used for educating targeted communities of their standing in the political arena to improve outcomes for Latinos statewide. We will be specifically gathering data around Latino population density in addition to Latino voting population. For example we would be showing where supermajorities, majorities and Latino influenced areas are located and who represents them.

Annotated Bibliography:

1) Forest, Benjamin. "The Changing Demographic Legal, And Technological Contexts of Political Representation (English)." *Proceedings of the National Academy of Sciences of the United States of America* 102.43 (2005): 15331-15336.

This article shows how Geographic information Systems has allowed political parties and other organizations (such as the Latino Policy Forum) to observe election districts with increasingly precise political and demographic characteristics. Scholars have made considerable progress in measuring and evaluating the racial and partisan biases of districting plans, otherwise known as gerrymandering, and some states have tried to use Geographic Information Systems technology to produce more representative districts for certain segments of the population. This relates to our project with the Latino Policy Forum as it informs all parties of the political tools used in redistricting. Furthermore this literature allows the group to understand the constructs of the project more broadly.

2) *The World Wide Web and Multimedia in the 1996 Presidential Election Social Science Computer Review* July 1, 1998 16: 169-184

The article "The World Wide Web and Multimedia in the 1996 Presidential Election Social Sciences Computer Review" written by Patrick Novotny and Richard H. Jacobs shows how decade ago GIS was seen as a vital tool in political campaigns to find voters. According to Jacobs and Novotny, "Through a combination of cartography and demographic research, GIS allows candidates and political campaigns to access voters in a multimedia context that can be put together with the most advanced techniques from marketing and demographics to create sophisticated form of mapping technology with direct applicability to political campaigns" (Novatny & Jacobs 1998). This article directly relates to the project as we are using similar tools for similar reasons.

3) Clark, William, and Peter Morrison. "Gauging Hispanic Voting Strength: Paradoxes and Pitfalls." *Population Research and Policy Review* 11.2 (1992): 145-156.

The 1993 article “Gauging Hispanic Voting Strength: Paradoxes and Pitfalls” gives valuable social science insight into the policies and procedures that surround minority voting. Specifically the article addresses the history of the Voting Rights Act in addition to limitations of social science specifically when it deals with identifying areas that may be included in the Voting Rights Act to ensure equity in political power. The author’s focus on the importance of the “Nature of measurement issue” (148) is particularly enlightening throughout the project’s progress. Furthermore they assert that there are certain elements of research that can significantly strengthen or weaken gauging Latino voting strength. Those areas surround geographic scale, citizenship misreporting, operationalizing ‘Hispanic’ through census terminology and assessing the translation of demographic existence to the potential electorate. Understanding the potential strengths and weaknesses of demographic measurements is critical for our work with Latino Policy Forum. We will certainly be able to express those warnings to Latino Policy Forum in addition to ensuring that our project methodology is sound.

Part 2: Goals

Our main goal is to create informative maps that depict the answers to our questions below and more importantly, to make this map useful to the Latino Policy Forum as they advocate for Latino issues. The maps we create will match the needs of the client and provide them a powerful visual tool to use when presenting to political officials in order to push their objectives forward successfully.

Part 3: Objectives

1. Where is the Latino voting age population located in the State of Illinois?
2. What are the densities of the populations?
3. What Legislative Districts do these populations fall under?
 - a. Illinois State Senate
 - b. Illinois State House
 - c. U.S. Congressional
4. How can we make this information available to be viewed for certain legislative district(s)?

Part 4: Deliverables

1. Create several maps in various formats with the primary differences being in scale from state legislative to Congressional districts throughout Illinois.
 - a. At a minimum we will include a computer file with several color maps indicating the various districts and demographic criteria. An example of what will be included is a map of the congressional districts and Latino population and a scaled down map of certain districts deemed important like districts with supermajority Latinos 65% or more Latino presence.
 - b. These maps will also be given in JPEG format on a flash drive.
 - c. Finally after further discussion with Latino Policy Forum we will create a large paper map for the office’s internal use and use with partner organizations.
2. Compiled data including census tables, shape and TIFF files for Latino Policy Forum’s upcoming ArcGIS initiatives.

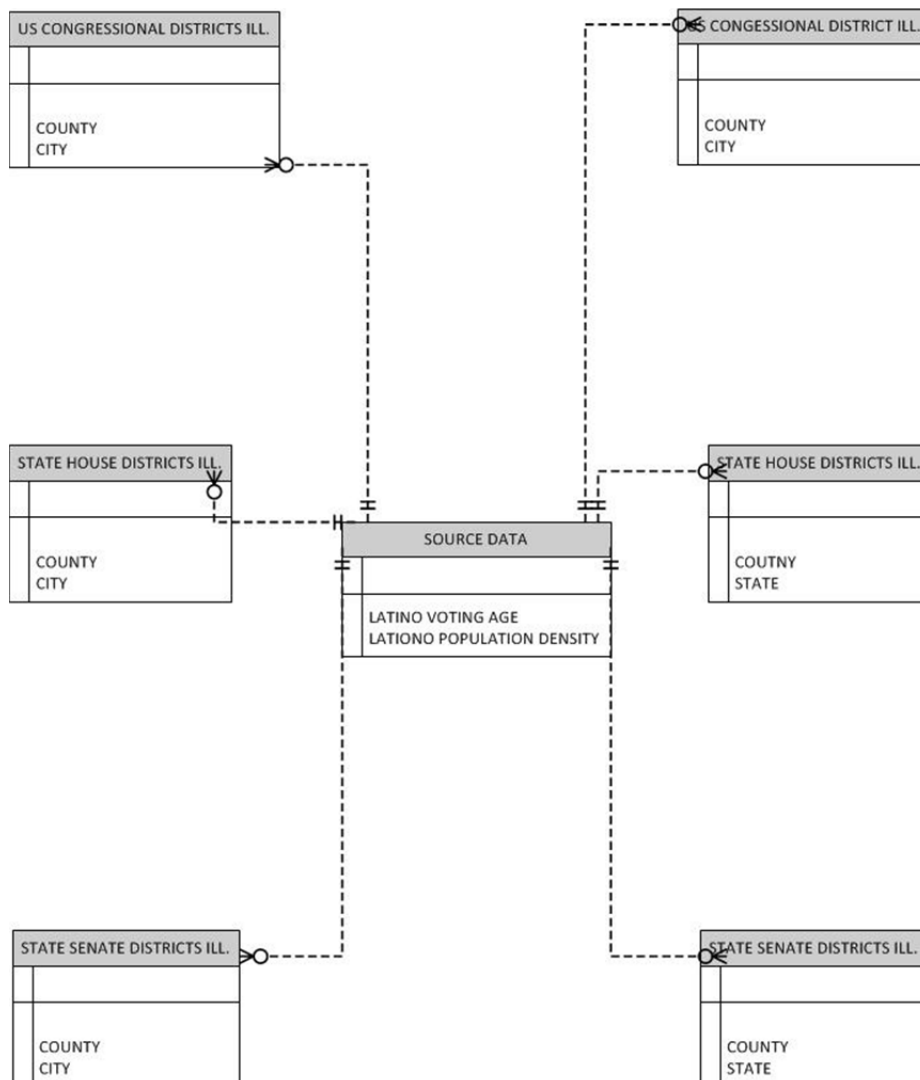
Section #2: System Requirements

Part 1 – Introduction:

We will be creating products that will be used to influence policymakers at the state and local levels of government. Furthermore the information will be used for educating targeted communities about their standing in the political system to improve outcomes for Latinos across the state. We will be specifically gathering data around Latino population in addition to Latino voting population. The most valuable part of our project is that it is scalable and can be added to for many years to give Latino Policy Forum exactly what they need. In essence we will be creating products that can and will be built upon.

We completed several ERD diagrams to answer our need to know questions about this project and also identify our processing requirements in this assignment. These requirements include: data transfer, table joining, using queries, and thematic mapping

Part 2 – ERD Diagrams:



Part 3 – Processing Requirements

	Spatial data	Attribute data
Data collection (input)	Data transfer (e.g., file conversion, extraction)	None
Data manipulation (editing)	Feature conversion (polygon to centroid, line to polygon) Miscellaneous (merge, clip, split)	Field manipulation (add/delete field) Table join
Data analysis	Query (spatial query) Proximity analysis (buffering, distance measurement) Vector overlay (union, intersect, spatial join)	Query (attribute query) Field calculation Field statistics Field summary
Data visualization	Thematic mapping	

Our project includes mapping the Latino population and Latino voting age populations in Illinois. We will need to use the following methods listed above:

Data Transfer: Transferring data and shape files from the 2010 Census

Data Manipulation: Feature conversion, table joining, field manipulation

Data Analysis: Spatial/Attribute queries. Field calculation, Vector overlay

Data Visualization: Thematic mapping, choropleth mapping

Section #3: Data Acquisition

1. Introduction

This project for the Latino Policy Forum will include creating maps based on U.S. Congressional Districts and State Legislative Districts in Illinois. The maps will show voting age population by district as well as Latino population density; this project will also create databases that the Latino Policy Forum can use. This section will enumerate the data requirements and how the data will be acquired for the project this includes a data dictionary, fitness for use and data acquisition constraints.

2. Data Dictionary

File Name: Illinois Congressional Districts

Source: Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing steps: Convert PDF to compatible Excel file manually

Attributes: District Number and Hispanic voting age population percent

Data Format: PDF file

File Name: Illinois Congressional Districts Shapefile

Source: Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing steps: Download from website and upload into ArcGIS software

Attributes: State of Illinois congressional district borders

Spatial Object Type: Polygon

Data format: SHP File

File Name: Illinois State Senate Districts

Source: Unknown (Likely to be derived from state representative data from Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing Steps: Convert necessary information from file to compatible Excel file

Attributes: Illinois State Senate district number and Hispanic voting age population percent

Data Format: PDF

File Name: Illinois State Senate Districts Shapefile

Source: Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing steps: Download from website and upload into ArcGIS software

Spatial Object Type: Polygon

Attributes: State of Illinois Senate district borders

Data format: SHP File

File Name: Illinois State House Districts

Source: Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing Steps: Convert necessary information from PDF file to compatible Excel file by hand through copy and paste method

Attributes: State Representative district number and Hispanic voting age population percent

Data format: PDF File

File Name: Illinois State House Districts Shapefile

Source: Illinois General Assembly (Illinois Redistricting), ILRedistricting@gmail.com, <http://www.ilhousedems.com/redistricting/>

Processing steps: Download from website and upload into ArcGIS software

Spatial Object Type: Polygon

Attributes: State of Illinois Representative district borders

Data format: SHP File

Name: Latino Population Data

Source: US 2010 Census Age and Race File

Processing Steps: join pop density excel to State House shape file and classify ranges

Attributes: population density percentage for Latino Pop

Data Format: Excel format

Name: Latino Population Data

Source: US 2010 Census Age and Race File

Processing Steps: join pop density data to State Senate shape file and classify ranges

Attributes: population density percentage for Latino Pop

Data Format: Excel format

Name: Latino Population Data

Source: US 2010 Census Age and Race File

Processing Steps: Attributes: join population density data to Congressional shape file and classify ranges

Data Format: Excel format

3. Fitness for Use

The data we have acquired was related to the Hispanic voting age population but it was in PDF format. In order to add the data in ArcMap we had to convert the data into compatible excel files. This data is current (post redistricting) and employs statistics from the 2010 United States Census. The data is consistent with what we are trying to accomplish for the first part of this project.

4. Data Acquisition Constraints (During the Project):

As mentioned previously, as of today we are unable to acquire data for Hispanic population by legislative district. The data exists, but it has not been organized by the new redistricted legislative districts. This necessary data would have been ideal to obtain in order to complete this project for our organizations preference. The lack of this data has influenced our project and has caused us to rethink our overall strategy when it comes to making these maps.

Section #4: Data Analysis and Visualization

1) Introduction

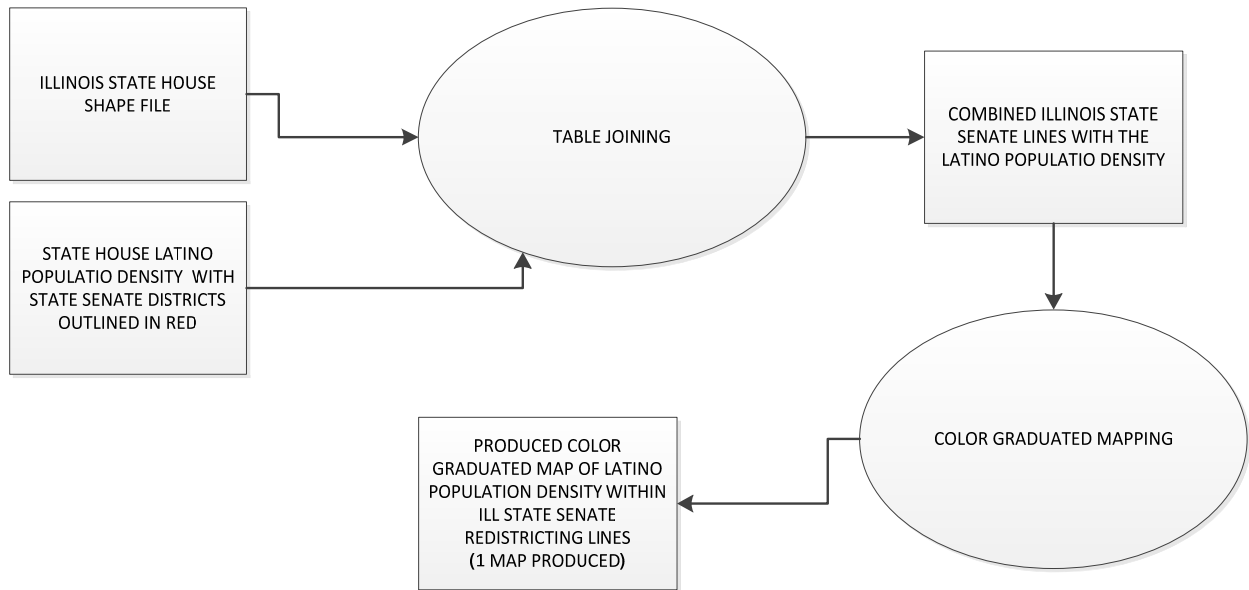
Knowing population and Latino voting age population data is critical for the work of Latino Policy Forum as it shows them where to focus their advocacy attention. The knowledge of each district and their current Latino population and their potential Latino voting power or influence is a need to know question. The goal of our project is to provide, via several mediums, necessary population data through an organized ready-to-use database, printed maps of statewide information and a thumb drive of maps in ready-to-present form. The topic has not changed over the course of the project even in spite of difficulty finding accurate and current data. At the projects conclusion both the GIS team and Latino Policy Forum will have an accurate visual picture of where Latinos are concentrated and where their political influence can be garnered. We will be providing six color graduated map products in jpeg format by using Illinois State shape files with house, senate, and congressional lines shown. The shape files were joined with 2010 census tract data for Latino Population Density and Latino Voting Age Population in excel format. The combined data and shape files were classified using a color graduated method classifying the data by Latino Population Density and Latino Voting Age Population.

2) Information Products

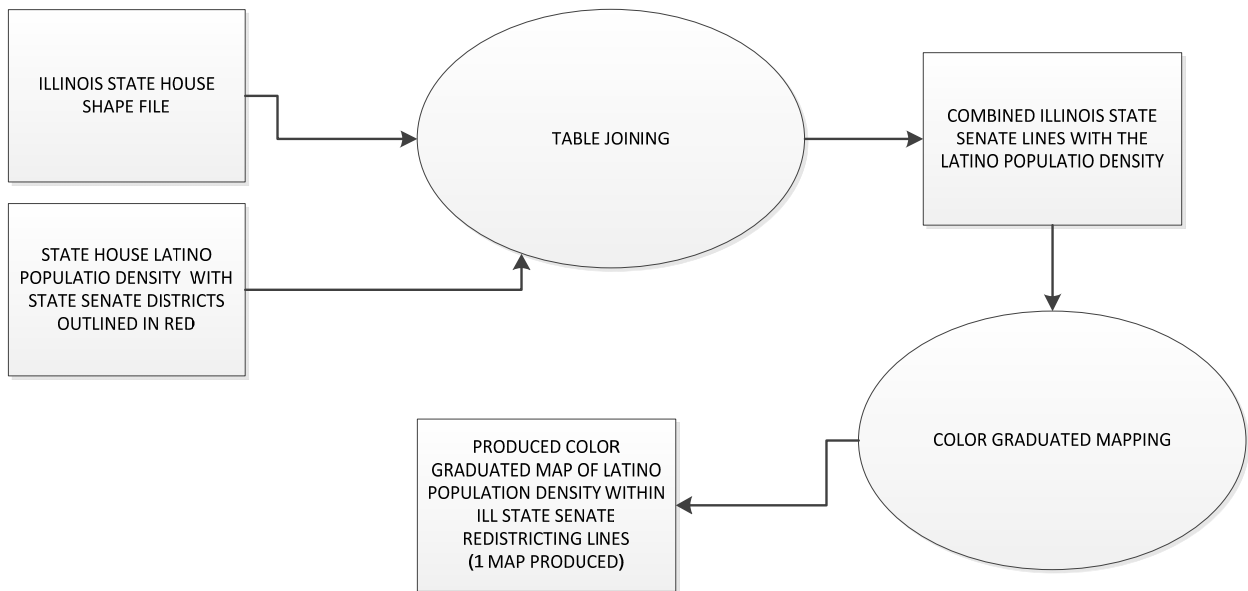
There are six information products all within the boundary of Illinois. Three maps showing the Latino Voting Age Population in the State House, State Senate, and Congressional Districts lines. Three additional maps showing the Latino population density in each of the three districts. The maps show the spatial distribution of the Latino Voting Age across three districts in Illinois as well as the spatial distribution of the Latino Population Density across Illinois in those same three districts. These maps will aid the organization in their efforts to provide a voice for the underrepresented Latino population in Illinois. These six information products address the needs of the client by providing visual representations of the spatial distribution of the Latino population by population density and voting age to address and present a number of affordable housing issues, education issues, political, and voting issues within the State House, State Senate, and the Congressional Districts based on the new re-districting lines.

3) Data Analysis

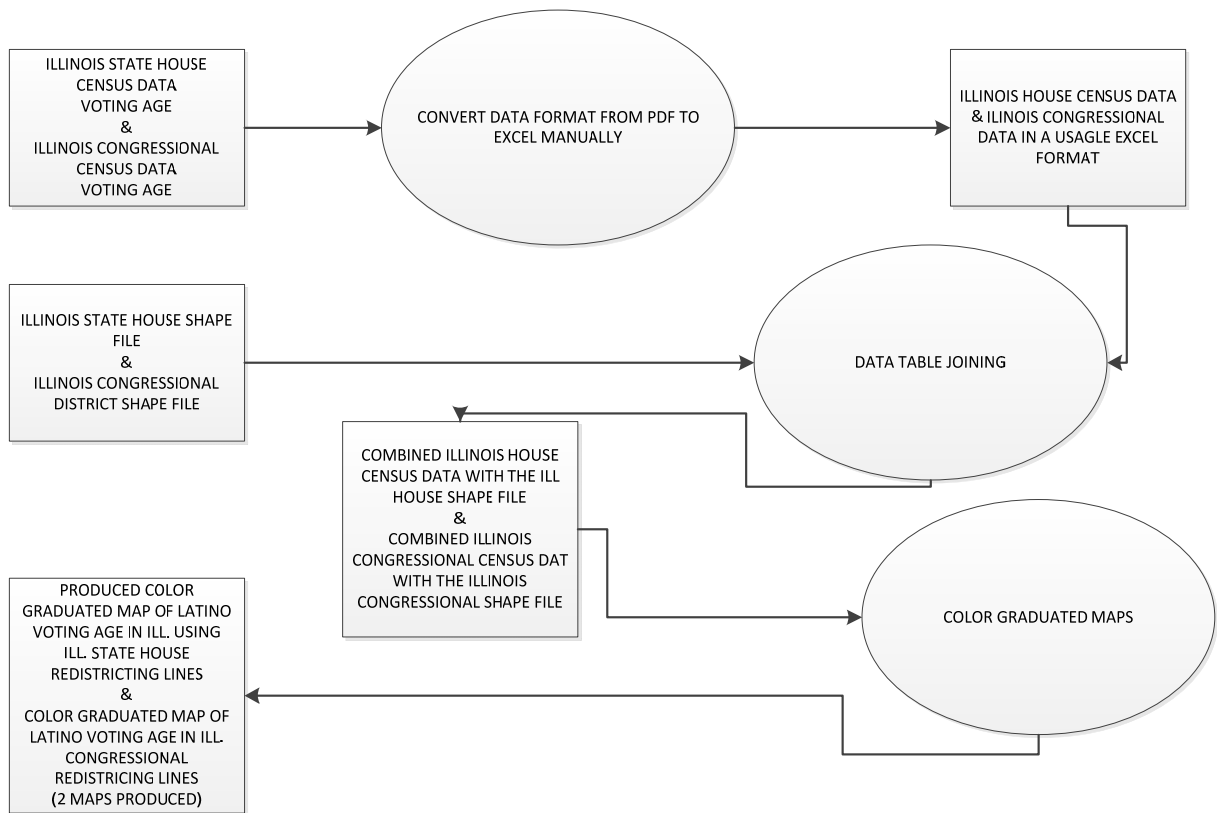
ILLINOIS STATE LEGISLATIVE DISTRICTS MAP FOR POPULATION DENSITY



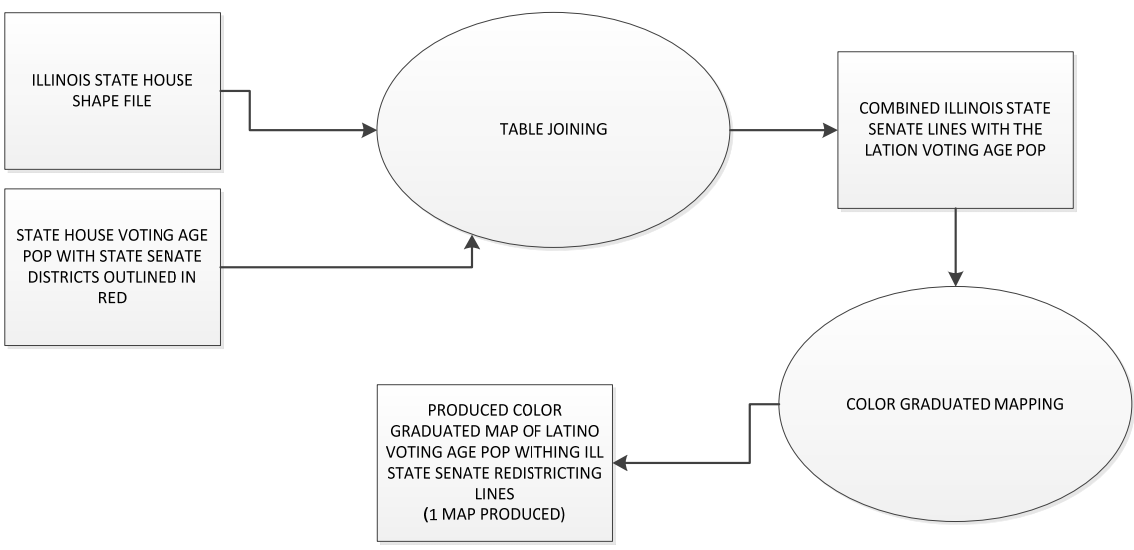
ILLINOIS STATE LEGISLATIVE DISTRICTS MAP FOR POPULATION DENSITY



PROCESS DIAGRAM FOR THE LATINO VOTING AGE POPULAION BY STATE HOUSE, STATE SENATE, & CONGRESSIONAL REDISTRICING LINES (3 MAPS PRODUCED)



ILLINOIS STATE LEGISLATIVE DISTRICTS MAP



4) Data Visualization

- 1) Map of Latino Population Density by Illinois Congressional Districts
Map Projection: NAD83 UTM 16N
Map Symbols: Graduated Color Shading for Latino Population Density
Map Types: Color Graduated map
Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments) and/or based on the scale Latino Policy Forum requested
Normalize Data: NA
Map Elements: North Arrow, bar scale, legend
- 2) Map of Latino Population Density by Illinois State Senate Districts
Map Projection: NAD83 UTM 16N
Map Symbols: Graduated Color Shading for Latino Population Density
Map Types: Color Graduated map
Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments) and/or based on the scale Latino Policy Forum requested
Normalize Data: NA
Map Elements: North Arrow, bar scale, legend
- 3) Map of Latino Population Density by Illinois State House of Representatives Districts
Map Projection: UTM
Map Symbols: Graduated Color Shading for Latino Population Density
Map Types: Color Graduated map
Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments) and/or based on the scale Latino Policy Forum requested
Normalize Data: NA
Map Elements: North Arrow, bar scale, legend
- 4) Map of Latino Voting Age Population (VAP) by Illinois Congressional Districts
Map Projection: NAD83 UTM 16N
Map Symbols: Graduated Color Shading for Latino Voting Age Population
Map Types: Color Graduated map
Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments)
Normalize Data: NA
Map Elements: North Arrow, bar scale, legend
- 5) Map of Latino VAP by Illinois State Senate Legislative Districts (Senate Outlined in Red)
Map Projection: UTM
Map Symbols: Graduated Color Shading for Latino Population Density
Map Types: Color Graduated map

Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments)

0%-20%, 21%-50%, 51%-65%, 65%+

Normalize Data: NA

Map Elements: North Arrow, bar scale, legend

6) Map of Latino Population VAP by Illinois State House of Representatives Districts

Map Projection: UTM

Map Symbols: Graduated Color Shading for Latino Voting Age Population

Map Type: Color Graduated Map

Data Classification: Manual classification (based off of Natural Jenks Classification with manual adjustments) and/or based on the scale Latino Policy Forum requested

Normalize Data: NA

Map Elements: North Arrow, Scale Bar, Legend

Section #5: Results

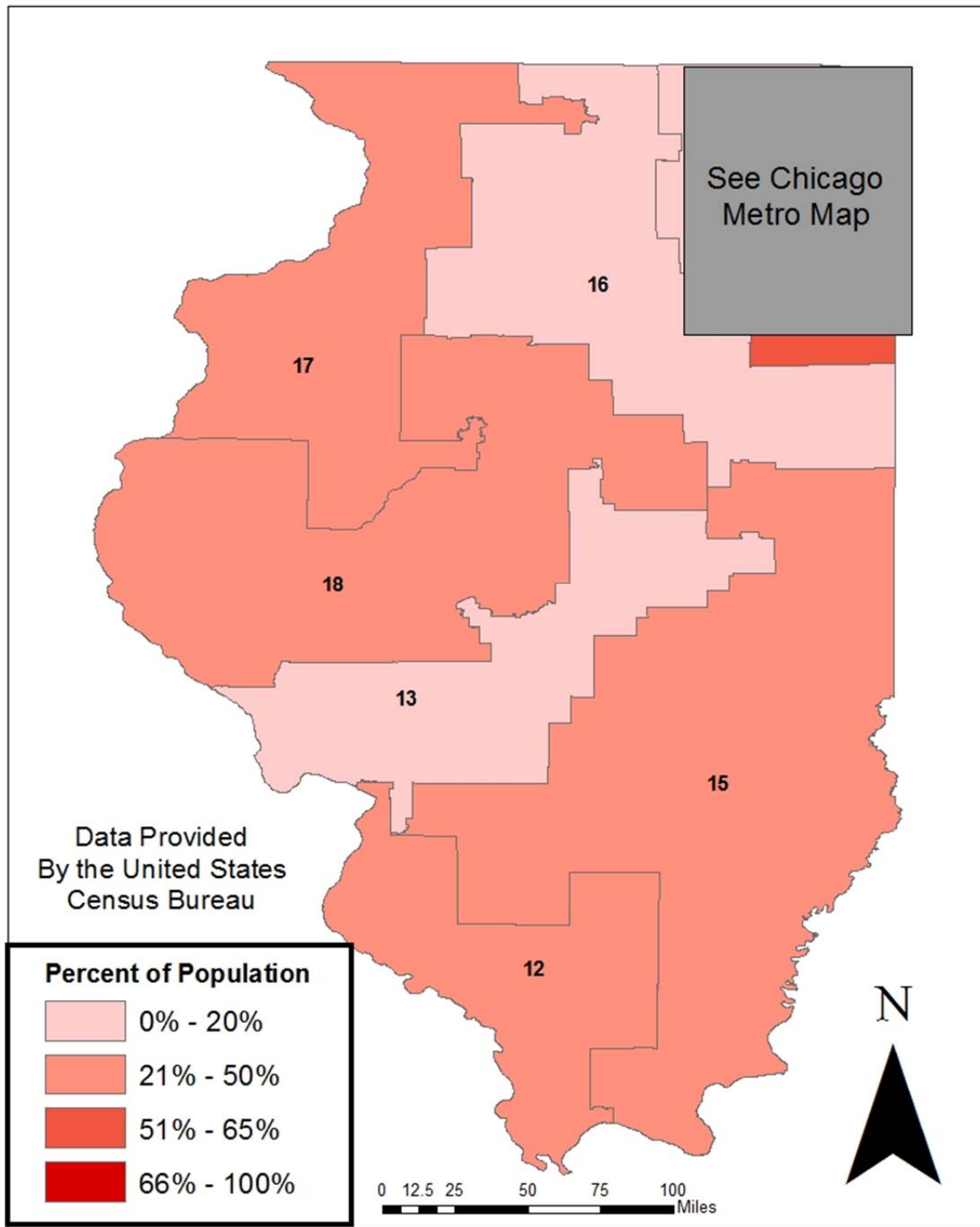
The following section will show each map created. The results are similar as the voting age population follows population density. Therefore the biggest differences among the maps are the legislative districts shown. In essence the data is the same the scale only changes based on political boundaries. The first set of maps is depicted in red they show Latino population density and are divided into four primary divisions. Population from 0%-20% showing a minority, 21%-50% showing potential political influence, 51%-65% showing majority political influence, and 65%+ showing a supermajority district. The second set of maps show Latino voting age population projected through the natural breaks analysis in ArcGIS they are depicted in blue.

Each statewide map has a Chicago Metro map that accompanies it for improved visual projections in the densely populated Chicagoland area.

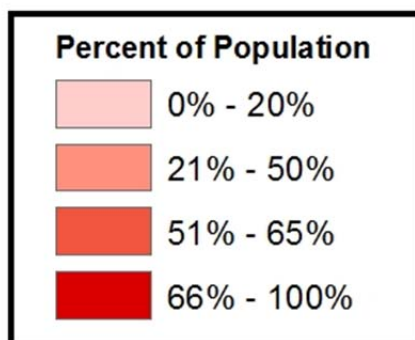
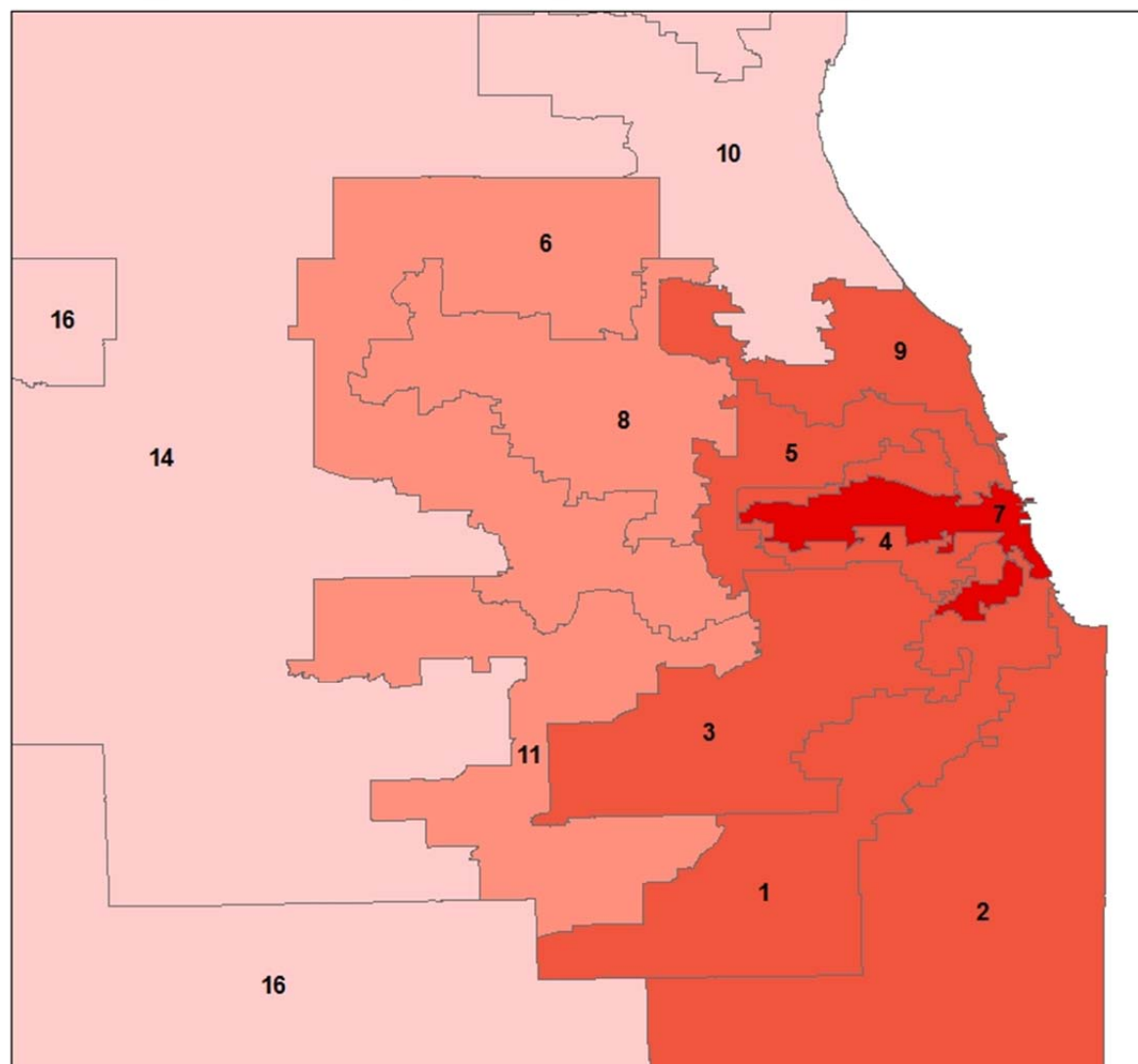
Each district in the maps provided is labeled with the corresponding district number.

Results on a statewide level for all data are somewhat surprising as Latinos are represented in nearly every district throughout the state. The group assumed that the supermajorities would be located in or near Chicago proper. This assumption was accurate. However the potential political influence breakdown or 21%-50% was much higher throughout the state than originally assumed. This is telling as Latino population is on an upward trend. It can be inferred that these districts will only grow in Latino influence which could drastically change the representation of some districts in the central and southern regions of the state. Furthermore it was interesting to see that Latinos are populated around the southern portions of the state in the bigger cities like the quad cities. What we were impressed to find was the pure potential for political influence that existed not only near Chicago but all throughout the state. The most telling level is the Congressional level. There will be smaller districts that will remain mostly white but at the Congressional level Latino population and influence can not be denied.

Latino Population Density - U.S. Congressional Districts



Latino Population Density - Chicagoland U.S. Congressional Districts

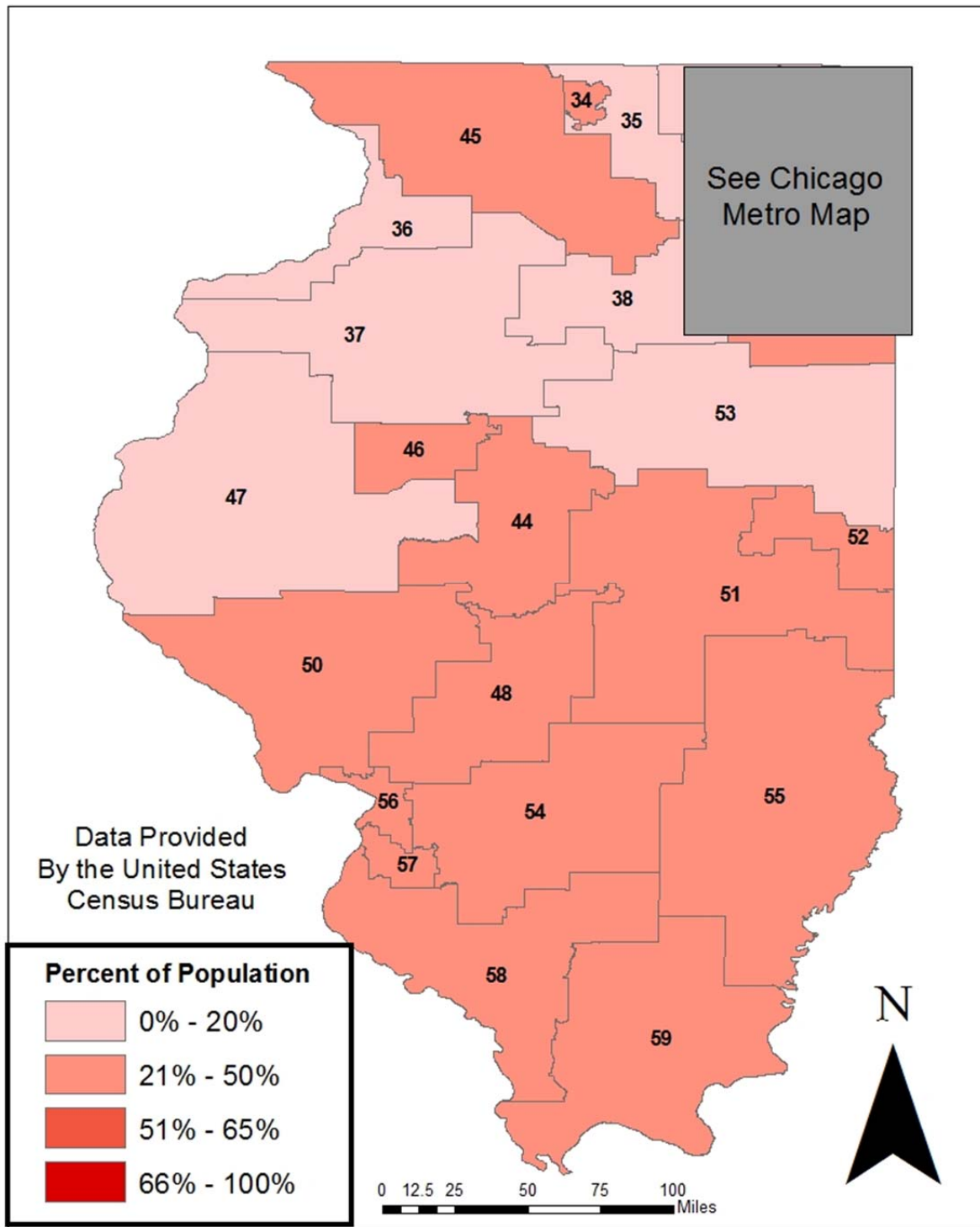


Data Provided
By the United States
Census Bureau

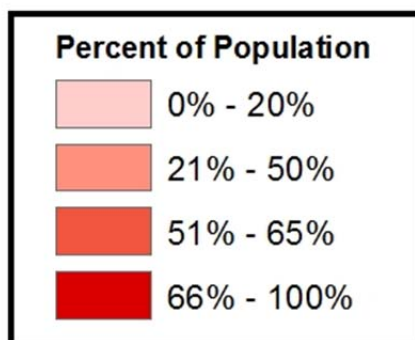
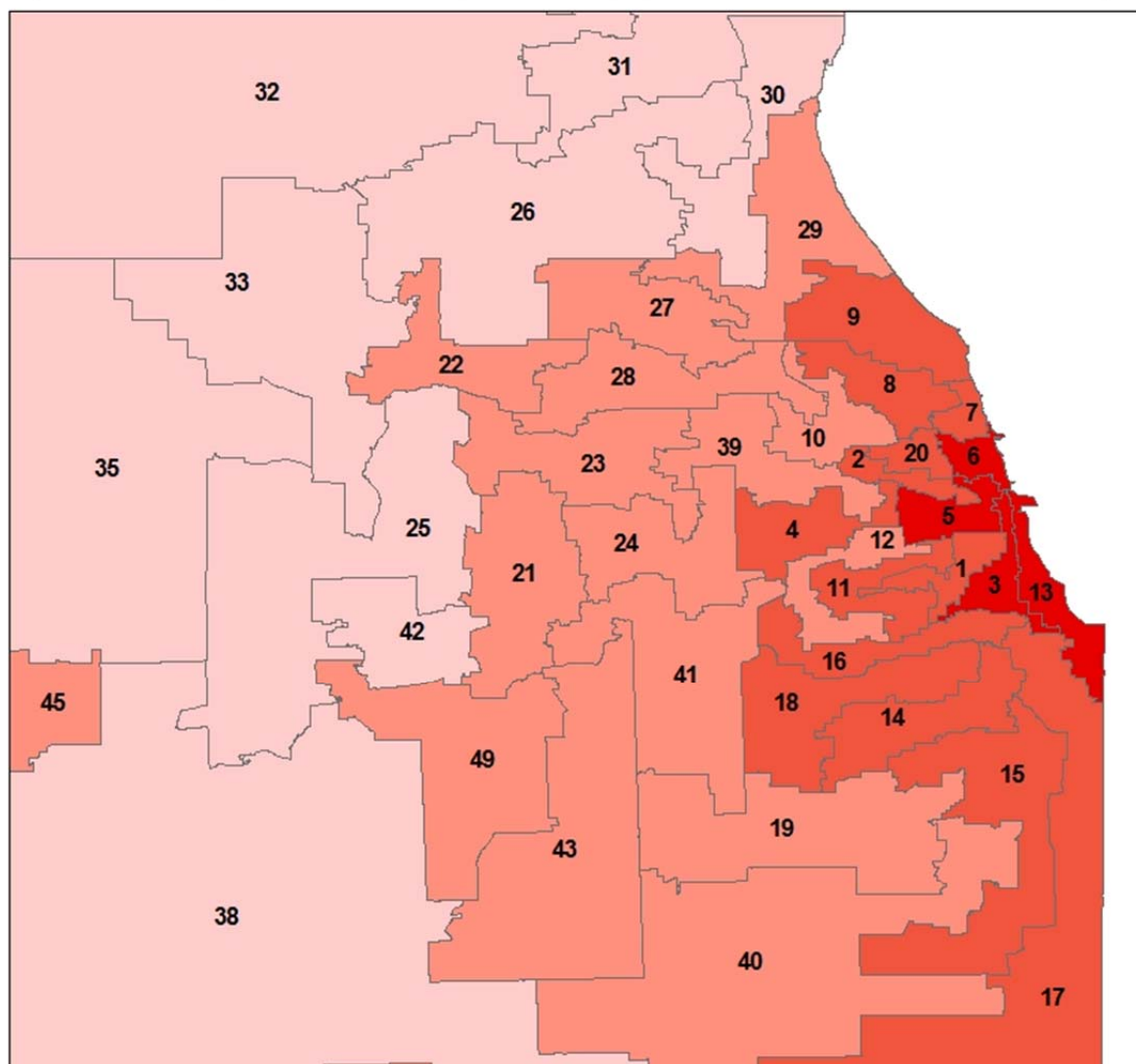
0 3 6 12 18 24 Miles



Latino Population Density - State Senate Districts



Latino Population Density - Chicagoland State Senate Districts

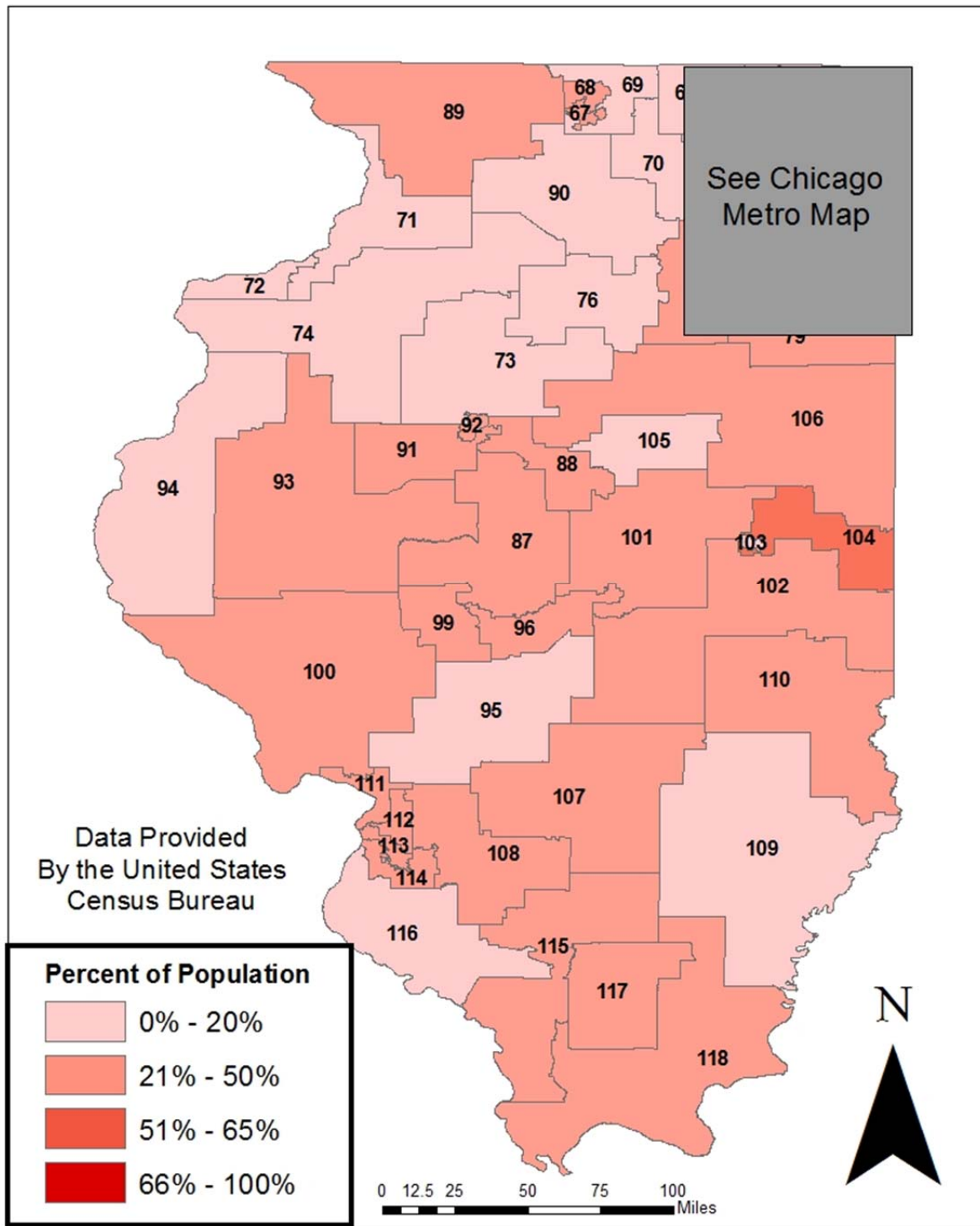


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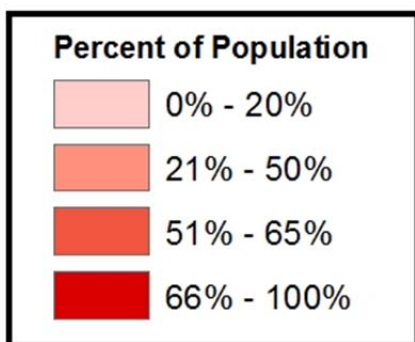
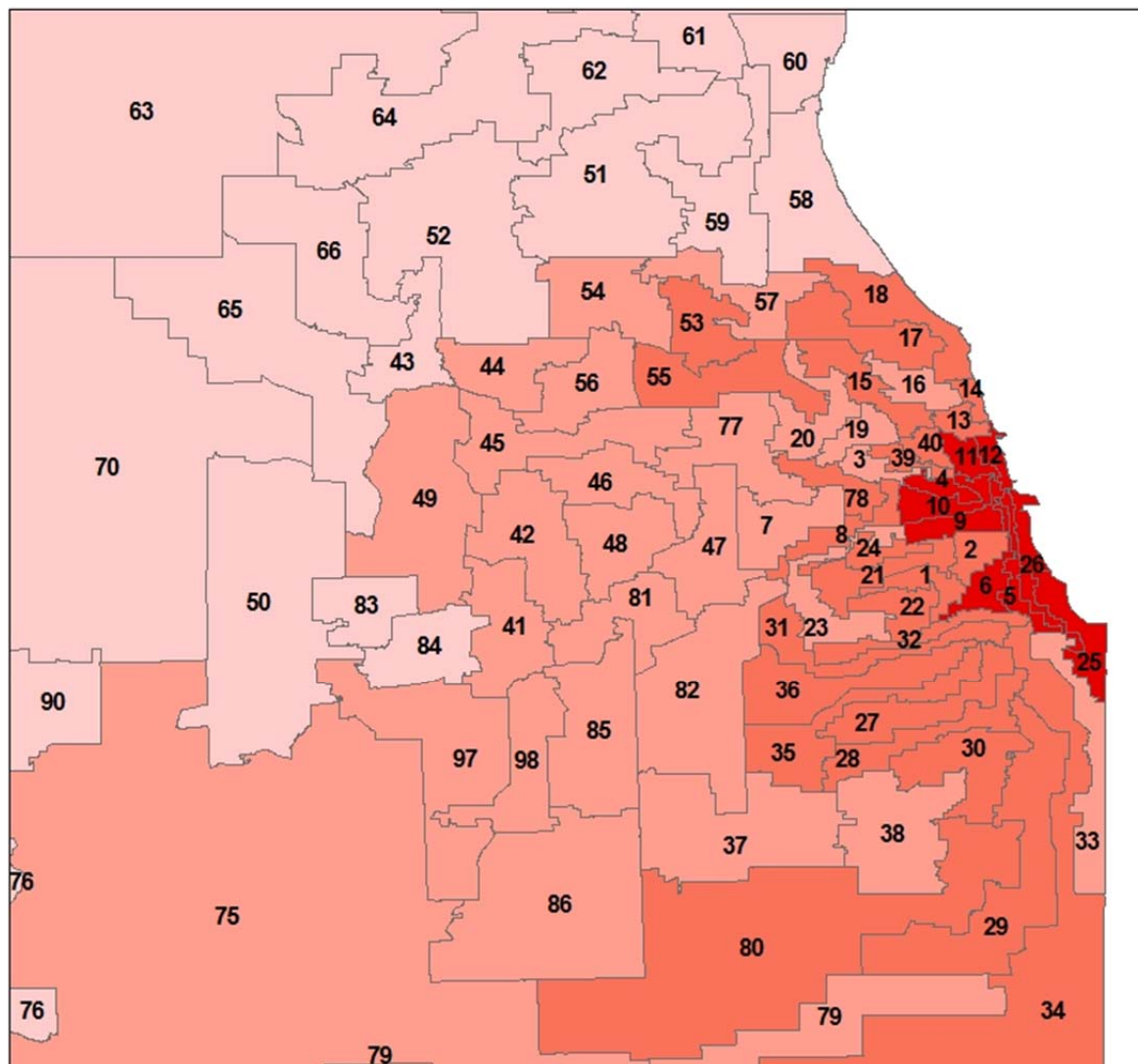
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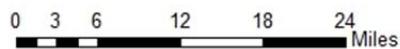
Latino Population Density - State House Districts

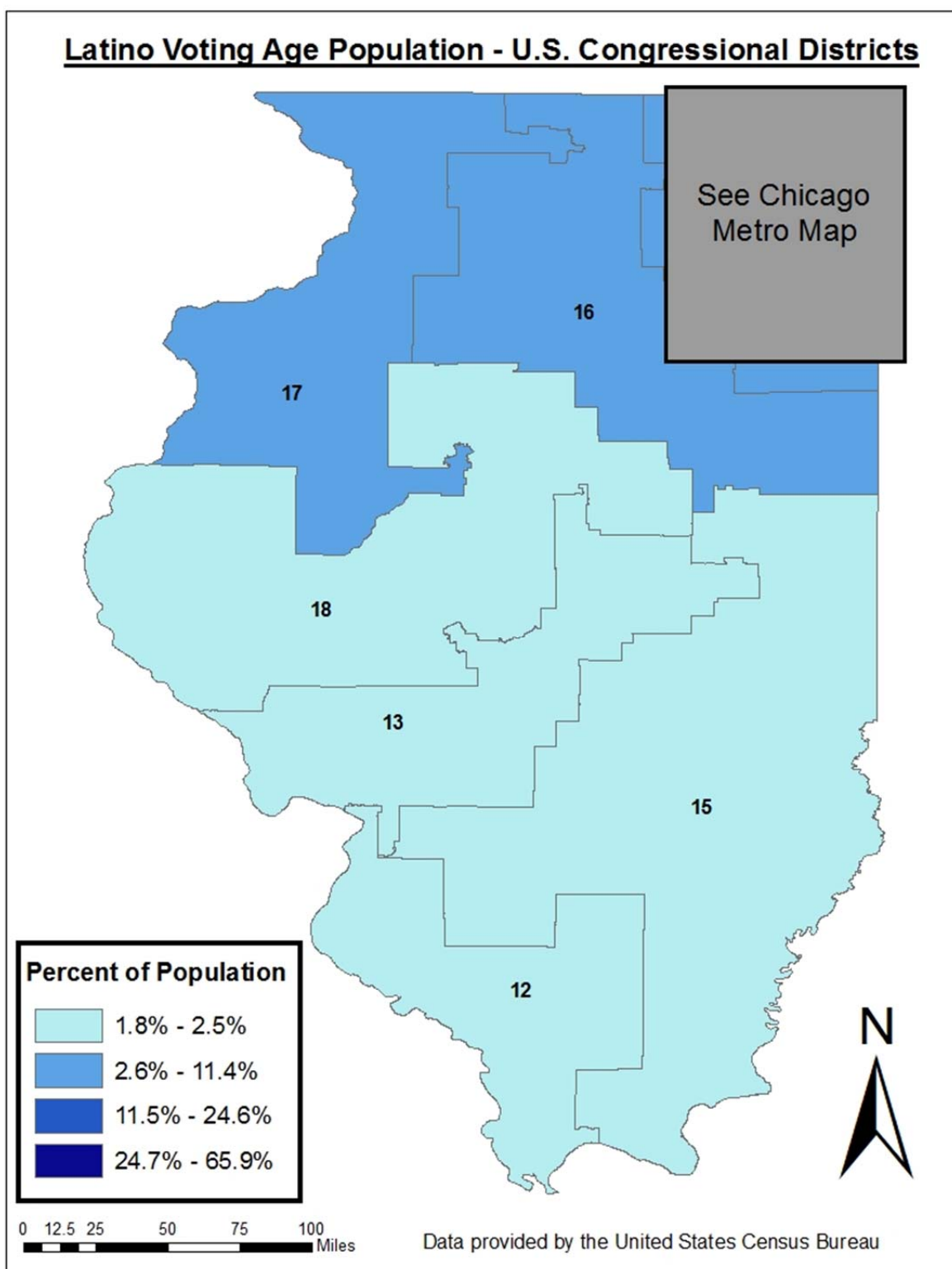


Latino Population Density - Chicagoland State House Districts

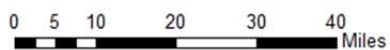
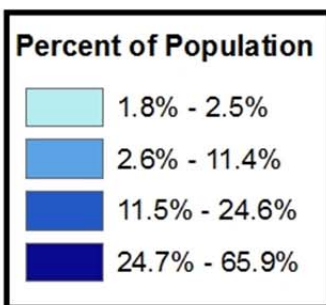
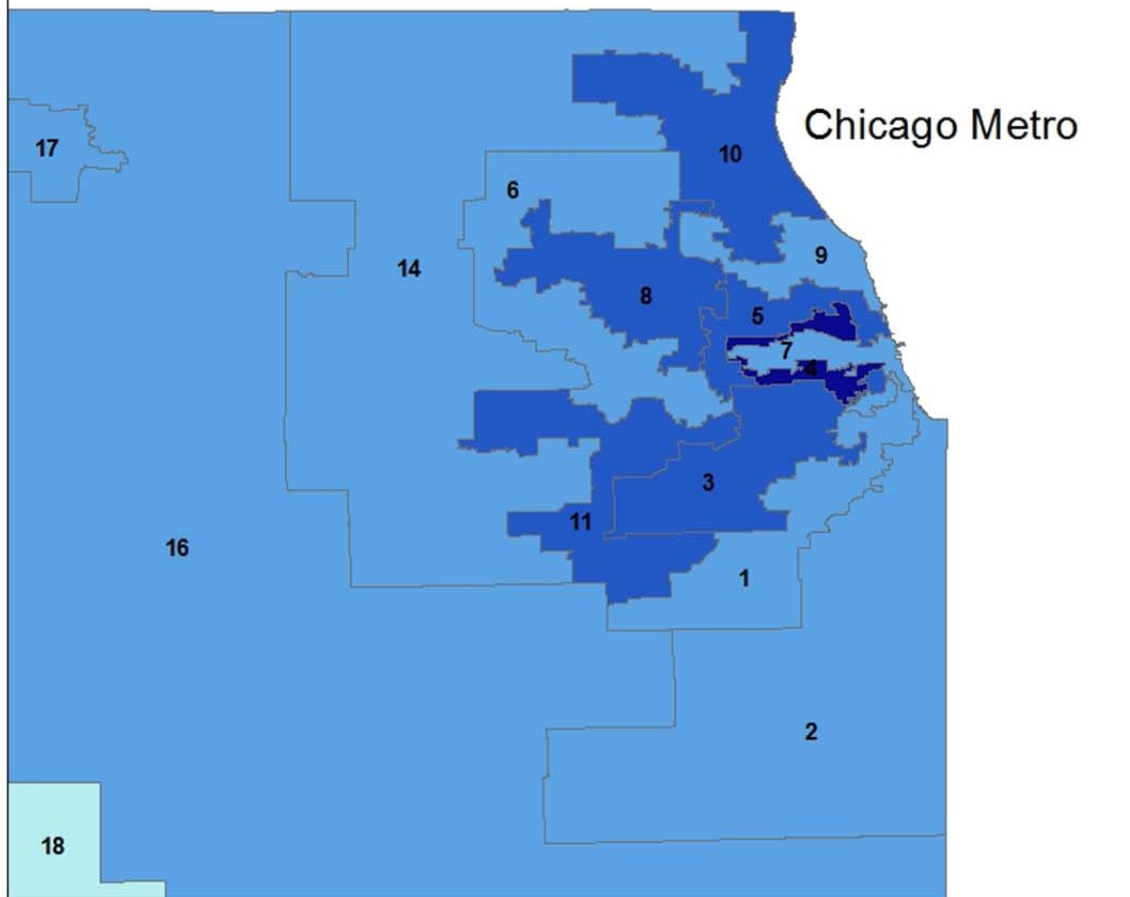


Data Provided
By the United States
Census Bureau





Latino Voting Age Population - U.S. Congressional Districts

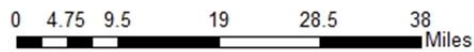
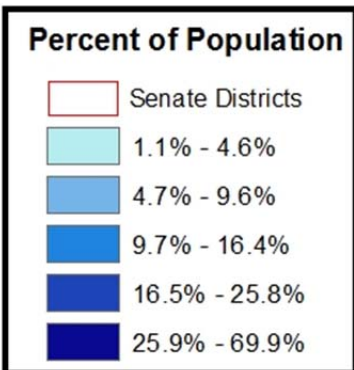
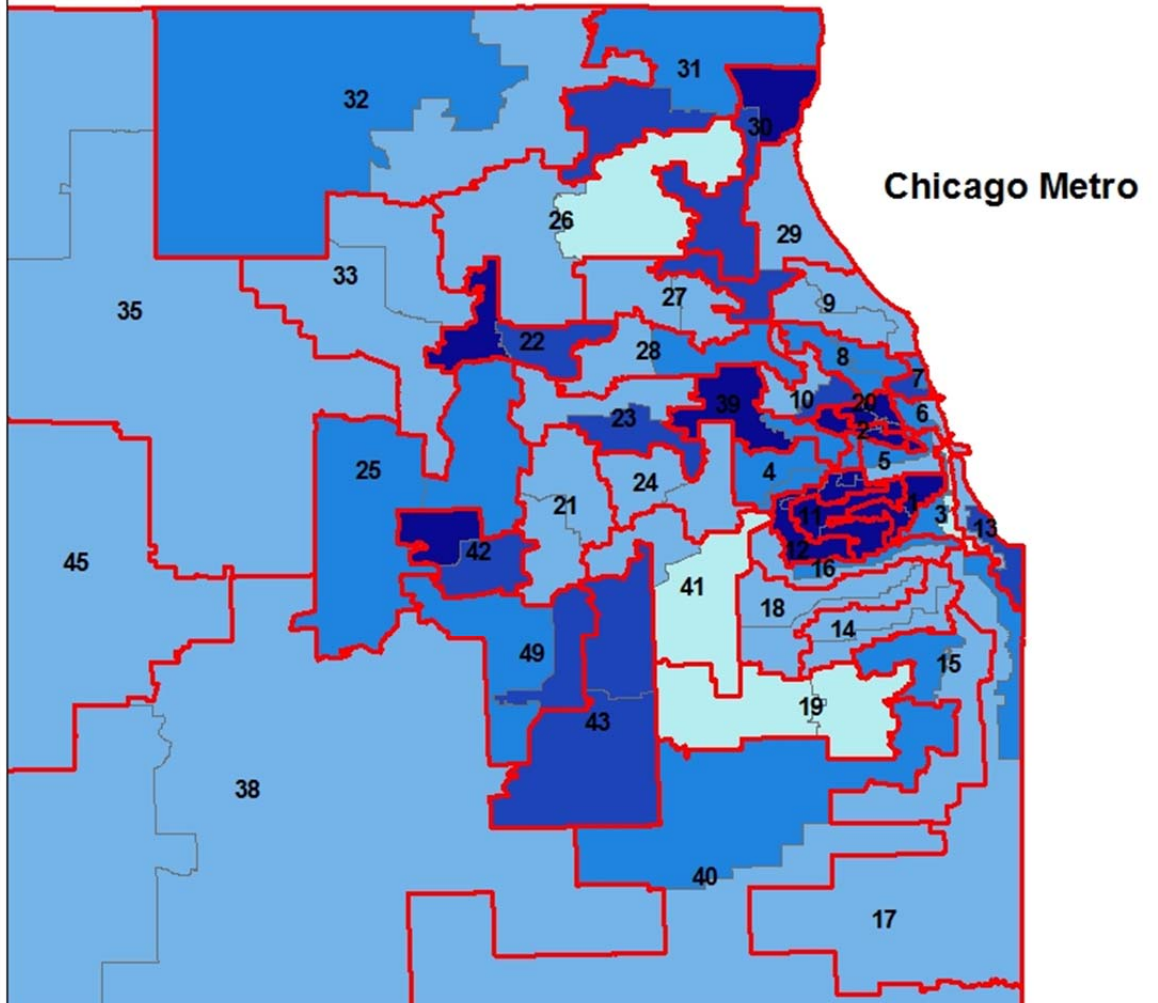


Data provided by the United States Census Bureau



Latino Voting Age Population - State Legislative Districts

State Senate Districts Outlined in Red, Each Contains 2 House Districts



Data provided by the United States Census Bureau



Section #6: Conclusions and Recommendations

1) Conclusions:

Our research question that was set at the beginning of the project was ultimately met. Our team was able to visually represent Latino voting age population, and Latino population density within Illinois legislative districts. The approach we took to accomplish our primary goal was effective and with consistent communication and cooperation between our group members the primary goal was satisfied.

2) Recommendations:

There are areas of this research that should be further developed in order to identify why certain areas of the state have an unexpectedly high percentages of Latino residents.

There are a number of Federal, County, and State Correctional facilities in the southern part of Illinois which in a low population area could skew the data. This needs to be further investigated to confirm our belief that the correctional facilities are causing the southern districts to contain a larger percentage of Latino residents than we initially thought.

Now that this data is being visually represented through GIS technologies we recommend that this data should be looked at in the broader context of immigration in the United States. Immigration policy has been a point of contention for this country and data such as this can help to provide information about our ever-diversifying population. This project can be scaled-up to and applied to other states, helping to discover where the Latino population exists, and where it does not, across the country.

Currently the project addresses the surface question of where Latinos are populated. Our recommendation would be to analyze *why* Latinos and other minority groups populate in the way they do where they do. Understanding patterns of population growth can take reactionary advocacy to a proactive advocacy which directly benefits the groups focus population. If we know where they are going we can set up systems that will ensure the success of each person.