

Housing Action Illinois Membership Coverage and Recommended New Office Location

Housing Action Illinois
GEO 242: GIS II
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Project Summary

The goal of this project was to supply the non-profit organization Housing Action Illinois (HAI) with information and maps regarding other housing based non-profits that are members of HAI, potential members for HAI, area served by HAI members and lastly, areas of the state of Illinois that are underserved by HAI and their member organizations. The reason all of this information is needed by HAI is provide it with a visual representation its organization to assess which parts of Illinois do not have any access to HAI or its member organizations. HAI was interested in looking specifically at the southern part of Illinois to find out which counties do not have legislators that support HAI and which areas of the state do not have any member support for HAI. Furthermore looking at demographic factors such as population and median household income, HAI can determine where disparities between the two exist across the state of Illinois. Using this information HAI hopes to look at the underserved areas of the state and determine if it is necessary to open up a satellite office to better serve a poorly represented population.

In order to represent this information to HAI this group created various maps using ArcGIS. In creating said maps, certain issues arose. A significant issue with this project was the it is the first time the topic has been addressed. As opposed to other groups who were continuing work on established projects for other non-profit organizations, this project was just starting out. Significant time was taken in dialogue establishing what HAI was looking for and in turn figuring out how we could best serve their needs. As this is a new project and one we have taken the first steps on with HAI, we hope that this groundwork will allow other groups to continue work with HAI in an even more productive fashion. Issues beyond the first mentioned was the time constraint put on us by the quarter system at DePaul University which only allows a ten week period to complete such a project. Using fairly new data that had to be sorted out, cleaned up and geo-coded one or two more weeks would have been useful in order to achieve a deeper analysis. It should be noted that the ten week period is not solely to blame as the whole city of Chicago, DePaul University included, was shut down by a record-breaking blizzard.

Considering these setbacks we are still satisfied with our project's outcome. This group feels that our analysis accurately depicts the requests of HAI and will assist it in future decisions regarding expansion and public education. The information products we created help show community need, membership location and area served and located potential members throughout the state. Additionally, we created a regional map HAI can use for future analysis and decision-making. Our analysis successfully brought us to two logical recommendations for a new office location, Springfield and East St. Louis.

An outcome that was not achieved successfully was creating a map that showed districts that have political support for HAI and its member organizations. Our group's inability to create this map is largely because of an issue with normalizing the data and not because of a time constraint.

Table of Contents

Page i	– Project summary
Page ii	– Table of contents
Page 1	– Introduction
Page 2	– Needs assessment
Page 6	– System requirements
Page 9	– Data acquisition
Page 12	– Data analysis and visualization
Page 17	– Results
Page 19	– Summary, conclusions and recommendations
Page 21	– Appendix A
Page 22	– Appendix B
Page 23	– Appendix C
Page 24	– Appendix D
Page 25	– Appendix E
Page 26	– Appendix F
Page 27	– Appendix G

Introduction

This project was conducted for a GIS course at DePaul University as well as for HAI. HAI is a statewide non-profit organization that focuses on promoting affordable housing in Illinois. The organization is considering opening a new office downstate to assist in gaining support from lawmakers, while also expanding affordable housing initiatives. It is our goal to examine the size of HAI's network of members, potential members and community need to help HAI in its decision to open a new office and provide insight to which areas of the state could benefit from its services.

The project examined the need for a new HAI office downstate. For our analysis we looked at HAI membership across the state looking for concentrations in membership locations, while also looking at overall area served by HAI members. In addition, we also looked at potential members and membership activity based on participation in HAI's annual conference. The final factor in our analysis dealt with community need by examining census population and median household income data to determine areas with the highest need for affordable housing.

In the following sections, we will detail the process used to complete the study. The Needs Assessment outlines background information about the project including initial goals, objectives and planned information products. The Systems Requirements section explains the data we will use to achieve the goals and objectives by addressing need-to-know questions. The Data Analysis and Visualization section outlines the information products we created to answer the need-to-know questions as well as the execution of creating the products. The Results section explains what our analysis found using the information products created. The final section, Summary, Conclusions and Recommendations, sums up the projects main objectives, provides answers to the need-to-know questions, while also providing recommendations for future analysis and actions HAI can take.

Needs Assessment

Background

Housing Action Illinois (HAI) is a statewide organization that focuses on the expansion, quality and protection of affordable housing for low and moderate-income households. HAI has members located statewide that focus on specialized areas of affordable housing, such as homeless shelters and affordable rental communities. Initial meetings helped determine how GIS could help serve the company's goals and layout a plan to implement the GIS.

Information from meeting with Gianna Baker and Allison Guziec

- Housing Action Illinois works to improve affordable housing through public education
- The organization is looking to grow and open offices in other areas of the state besides Chicago
- Housing Action Illinois wants to examine the possibility of a new office downstate, south of Springfield.
- Lobbyists working for Housing Action Illinois advocate affordable housing public policy to state and national lawmakers in Springfield and Washington D.C.
- Members are nonprofit organizations that focus on a variety of topics within the affordable housing sector, including homeless shelters.
- Members participate in an annual conference, which includes training, lectures and teaching seminars
- Housing Action Illinois lost four supporting legislatures in the November election
- Support is stronger in urban regions than rural, which Housing Action Illinois hopes to improve

Stakeholders

- Direct stakeholders
 - Housing Action Illinois stands to benefit from the project by gaining a clearer picture of the organization's reach and potential through GIS analysis
- Indirect stakeholders
 - Low to middle-income families
 - All Illinois residents
 - Illinois politicians
 - Affordable housing non-profit organizations

Literature Review

Wallace, James E. "Financing Affordable Housing in the United States". *Housing Policy Debate*. Vol. 6, Issue 4. (1995): 785-815.

The article provides a detailed background on the topic of affordable housing in the United States. The U.S. Department of Housing and Urban Development recommends that monthly housing costs do not exceed "more than 30 percent of household income" (Wallace, 786). However, there are so many economic issues that vary among every individual family that make spending less than a third of monthly income on housing very difficult. It is necessary for us to understand these trends in order to see exactly why more affordable housing would benefit the state of Illinois and to see which areas are more suitable for affordable housing.

Can, Ayse. "GIS and Spatial Analysis of Housing and Mortgage Markets." *Journal of Housing Research* 9.1 (1998): 1-26. Print.

This article looks at the ability of GIS to map individual units such as houses, or in the context of our project, individual nonprofit organizations that supply housing information to low-income residents. GIS is able to analyze the spatial distribution of housing, and it can apply these same tactics to the mapping of the organizations. Furthermore, this article examines how multiple data sets, such as the physical location of housing, the mortgage rates, and neighborhood boundaries can be overlaid on a GIS map, in turn making the map more intuitive. We can use this information to look at the location of nonprofit organizations and see if they fall within the congressional districts that have initiatives supporting affordable housing.

Housing Action Illinois, Latino Policy Forum, Nathalie P. Voorhees Center for Neighborhood and Community Improvement, University of Illinois at Chicago, and Sargent Shriver National Center on Poverty Law. "Are We Home Yet? Creating Real Choice for Housing Choice Voucher Families in Chicago" *University of Illinois at Chicago*.(2010)

This article looks at the Housing Choice Voucher Program and its strategies for improving the program. The article looks at various strategies to help the families in the voucher program, which includes moving families into "areas of opportunities" and "healthy communities". It also includes increasing the amount allotted for rent for the families so they might be able to afford rental units in the "healthy communities". Another initiative is to educate the landlords about the program to increase the rental units that are part of the program. The article is relevant to the project because it looks at one of the initiatives that Housing Action Illinois is working on.

Goal

The primary goal of the project will be to provide HAI with an analysis of total membership and membership organization type in order to determine the best place for HAI to expand and open a new office(s). A secondary goal will be to provide HAI with regional information to better help the organization target legislatures in areas of the state with little support for affordable housing.

Questions to answer:

- Is it feasible for HAI to open a new office downstate based on members and community need?
- What is the best location for the new office?

Objectives

To accomplish the goal above, we will need to aggregate the following information:

- 1.) Housing Action Illinois membership addresses
- 2.) Annual conference member participation
- 3.) Divide Illinois into regions for more targeted outreach.
- 4.) Identify factors that contribute to the need for affordable housing, such as household income and population density.
- 5.) Identify potential HAI members locations

Need-to-know

- Membership type, address and whether or not it attended the annual conference
- Statewide socio-economic data by county or census tract

Information Products

The following products will be created to fulfill the information needs above:

Maps

- Location of members and area served
- Location of members participating in annual conference
- Map breaking down Illinois into regions based on members, political and socio-economic factors.
- Community need maps based on population and median household income data

Charts

- Membership location by county

Table

- Illinois representatives supporting affordable housing

Database

- Members name, address, type, annual conference participation and region number

System requirements

Introduction

The goal of the project is to analyze HAI membership and community need. The analysis should help HAI make decisions regarding where to open a new office downstate and where to concentrate efforts to improve the total area served by HAI members to better promote affordable housing in Illinois.

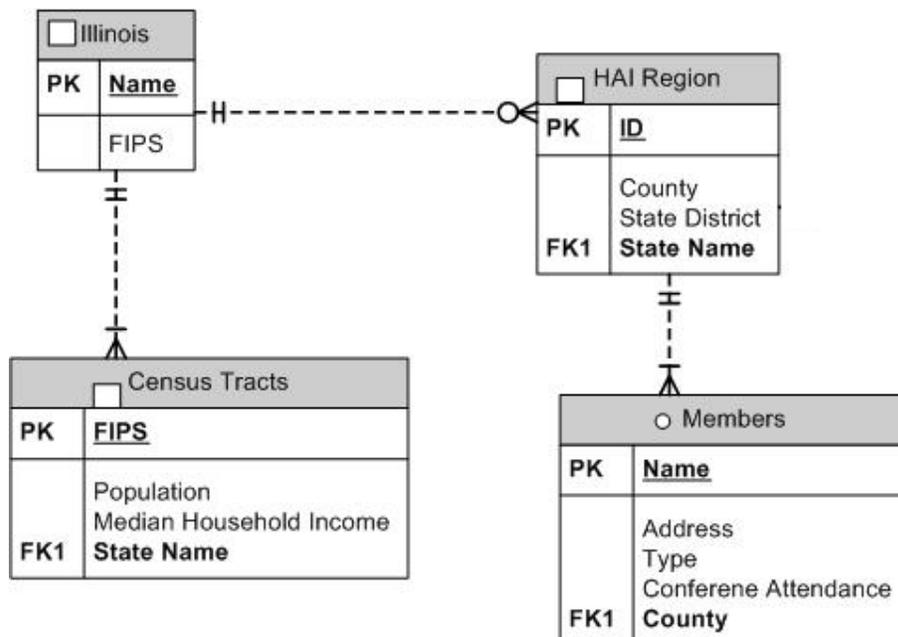
In order to decide if expansion is right, HAI needs GIS to show membership location and areas served, membership activity by examining the organization's annual conference participation, and community need based on areas with low income and high population density. The following system requirements will allow us to help HAI utilize that data for their organization's needs.

Data Requirements

Need-to-know questions answered by entity-relationship diagram (ERD):

1. Who are the Housing Action Illinois members? Where are members located? Which members participated in the annual conference?
2. Are Housing Action Illinois members located in areas with a higher population density and lower income?

Entity-Relationship Diagram (ERD)



Processing Requirements

Need-to-Know Question 1

	Spatial data	Attribute data
Data collection	Geocoding Acquire shapefiles for Illinois and Illinois counties	Data input (data entry in excel spreadsheet) Data transfer (file concersion) Geocoding (from street address)
Data manipulation	Coordinate transformation (spatial adjustment, image registration)	Field Manipulations (add/delete field) Table joining
Data analysis	Analysis	Query (attribute query)
Data visualization	HAI membership location map and annual conference participation	Graphing

Who are the Housing Action Illinois members? Where are members located? Which members participated in the annual conference?

- Enter membership data into excel spreadsheet
- Convert spreadsheet to DBF or CSV
- Add map of Illinois with counties to new ArcMap
- Import data file into ArcGIS for geocoding
- Geocode addresses
- Run an attribute query to determine which members participated in HAI's annual conference
- Export new shapefile and record total members attending annual conference
- Run attribute query to determine membership type
- Export new shapefile and record total members by type
- Use information from two new shapefiles to create charts highlighting annual conference participation and membership by type.

Need-to-Know Question 2

	Spatial data	Attribute data
Data collection	Acquire census tract shapefiles	Data input Data transfer
Data manipulation		Normalization Table join Field manipulation (add/delete field)
Data analysis	Vector overlay Query (spatial query)	Query (attribute query) Field statistics
Data visualization	Thematic mapping (choropleth)	Graphing

Are Housing Action Illinois members located in areas with a higher population density and lower income?

- Download population and income data from the U.S. Census Bureau
- Download census tract shapefile from the U.S. Census Bureau
- Convert data into DBF or CSV format
- Open new ArcMap and input census tract shapefile
- Import census data to ArcGIS
- Join census data to tract shapefile using FIPS code
- Use symbology feature to create graduated color map for population and income
- Run attribute query to determine highest population and low income areas
- Export new shapefile with high population and low income areas
- Import shapefile with geocoded member addresses
- Run a spatial query to determine how many members serve low income and high population areas

Data Acquisition

Introduction

The data we plan to acquire will provide locations of Housing Action Illinois (HAI) members and whether they attended the organization's annual conference, which will show the expanse of HAI's reach across the state of Illinois. Additional statewide census and median household income will also be collected. Vector data in the form of points, lines and polygons will be used to represent boundaries for the state of Illinois, Illinois counties, HAI member locations and census tracts.

We will collect data from two sources to satisfy the system requirements. Most of the data will come directly from HAI itself. This data will cover membership types and locations. The final data acquisition will come from the U.S. Census Bureau to examine Illinois' population density and median household income level distribution. The sections below explain the data we plan to acquire, the source of the data, how we will process it, what the database will look like, the quality of the data, and any constraints we may have to overcome when using the data.

Data Dictionary

File Name: Member Organizations

Description: Memberships name, address, city, state, zip, membership type, conference attendance and potential Members

Source: Housing Action Illinois, Gianna Baker, (312) 939-6074 ext. 110, housingactionil.org

Processing Steps: The data was already processed, but we will have to geocode the addresses

Spatial Object Type: Point

Attributes:

Field Name	Description
Name	Member name
Address	Member street address
City	Member city
State	Member state
Zip	Member state
Type	Member type
Conf_Att	Did member attend annual conference

Data Format: Excel file and shapefile

File name: Census Tract

Description: This data will provide population and household income background for the state of Illinois, which used with Housing Action Illinois membership locations can help show what areas are represented or underrepresented.

Source: U.S. Census Bureau

Processing steps:

1. Collect data from the Census Bureau relevant to Illinois through the online Fact Finder application.
2. Transfer relevant data to an attribute database.
3. Join attribute data to relevant geography at the tract or county level.

Spatial object type: Polygon

Attributes:

Field Name	Description
FIPS	Federal information processing standards of census tract
Pop_2010	Illinois population data from 2010 census
Income	Illinois household income data from 2009 American Community Survey (ACS)

Data format: Excel and shapefile

Fitness for Use

Member Organizations

We will use data about the member organizations, potential members, and conference attendees, which was provided by the Housing Action Illinois organization. The scale is the state of Illinois, which is appropriate because we are looking at the whole state and where all the member organizations are located. The attribute table is accurate, except for the P.O. box addresses for several organizations. The actual address was needed in order to map the organizations accurately. The attribute table was complete; there were no missing values. The data is logically consistent and current. One major limitation is the use of “P.O. Box” addresses in the data table. In order to deal with this issue, geocoding may have to be completed by “postal zip code”.

Census Tract

TIGER shapefiles are released by the federal government and are considered to be a reliable source for state, county, tract, block and other spatial boundary data. The data will be accurate, complete and consistent because the U.S. Census Bureau is a reliable and top rated source for demographic and population characteristic data. By collecting data from the 2010 Census and 2009 ACS, the information will be the most current available. The data has one limitation in that the 2010 Census doesn't include economic data as in years past. The ACS provides this data, but the margin of error is higher at the tract and block level than decennial census data. To ensure the data is most accurate we

will examine the data and determine if a tract level perspective is needed if we can satisfy the need by examining county level data.

Data Acquisition Constraints

This project has an advantage in that there is no precedent set for data acquisition because this is a brand new project and is not a continuation of a previous class' project. For this reason, the data acquisition procedure does not have to be congruent with a previous class' work because said work does not exist. The major constraint put on data acquisition is Housing Action Illinois' ability to supply us with the necessary data that will accomplish our mutually stated goals. The data was delivered to us in excel format and only poses a small geocoding-related issue that can easily be resolved.

Our database uses an entity relationship diagram making the database design straightforward and one that clearly narrates the path used to create our maps. The data supplied to us is fit for use as it was either supplied by Housing Action Illinois, or the data is from the most recent US census which supplies the most official and up-to-date data available.

Data acquisition constraints only influenced the direction of our projection in that it took more time to get certain data from HAI than other data. Because of this, maps had to be started at different times and we were sometimes left waiting for data in order to finish a map.

Data Analysis and Visualization

Introduction

Housing Action Illinois (HAI) is considering expanding its operation to include a downstate office. To help HAI examine possibilities of expansion, we will analyze the locations of HAI members, political support from state lawmakers community need based on population size and economic stature to better determine a suitable location for a new office. In addition, we will also assist HAI in classifying the state into regions to better help the organization target state lawmakers for support and identify new members.

Since submitting the needs assessment in January, our topic has steered more towards analyzing membership and identifying demographics (population and median household income) in Illinois. Our secondary goal of a regional classification has become more of a byproduct of our primary initiative. The final product will include a detailed picture of HAI's influence and reach, which will provide a solid background to draw regional lines.

Information Products

Databases

1. Member Organizations: This data set will aggregate all of HAI's members by address, organization type and whether the member participated in the annual conference. The data will be produced in Excel format.

Produced Maps

1. Member Organizations: This map highlights HAI's membership by members address. The geocoded addresses will show how many organizations are located in different areas of the state. Areas with large concentrations of members will assist in determining where to open a new office.
2. Member participation: This unique variable map will highlight HAI's membership whether the organization attended the annual conference. The map will show any activity trends among members. This map will also assist in evaluating the feasible location for a HAI new office.
3. Member area served: This map highlights what Illinois counties are served by HAI membership. It will be a unique variable map using the variable "yes" to determine if HAI members serve the county. This map will assist in determining feasibility for a new office and what areas of the state HAI can focus its efforts on in the future.

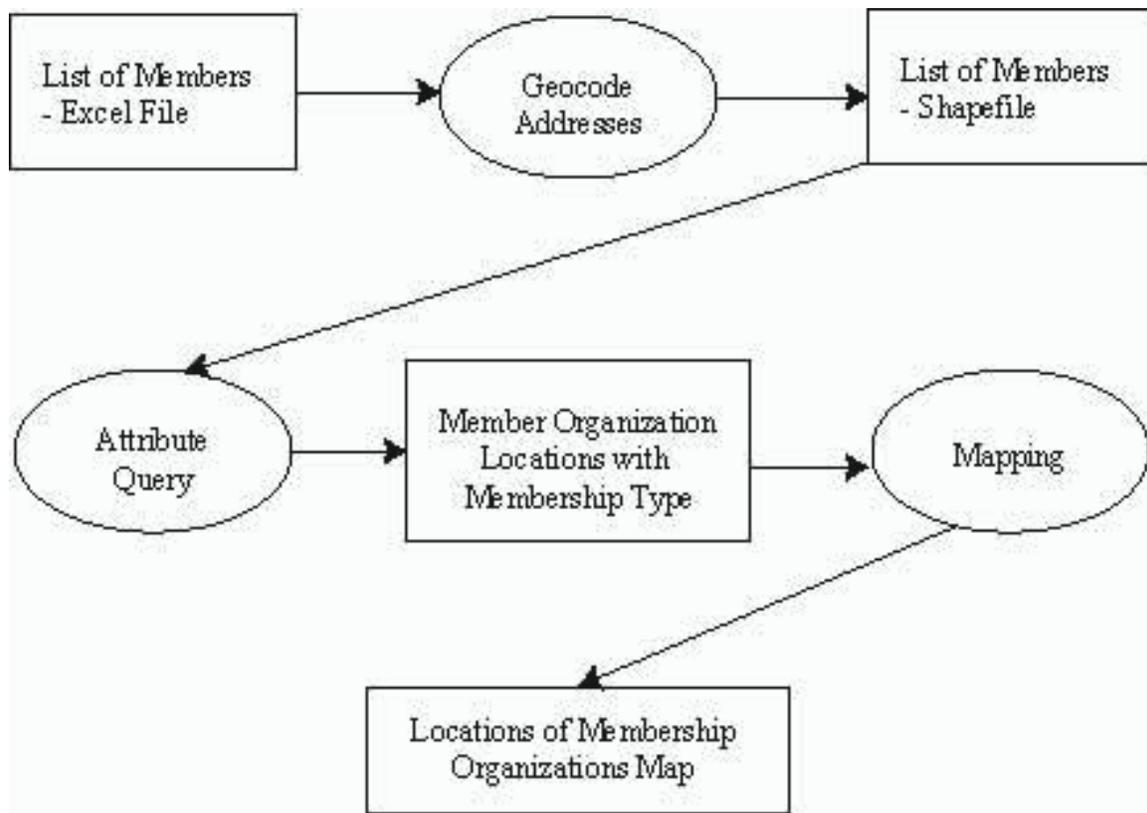
4. Potential members: This map highlights organizations HAI determined to be potential members. The geocoded address map will show how HAI may expand in the future and assist in determining a feasible location for a new office.
5. Community need: This choropleth map will show population density and household income level hot spots. Two maps will be produced to illustrate the trends. The first will show population density the second will show household income. Areas with higher populations and lower household income will show what communities could benefit the most from HAI services and affordable housing support.
6. Regional map: This map will break Illinois into regions HAI can then use as a reference tool for allocating resources and targeting expansion.

Charts

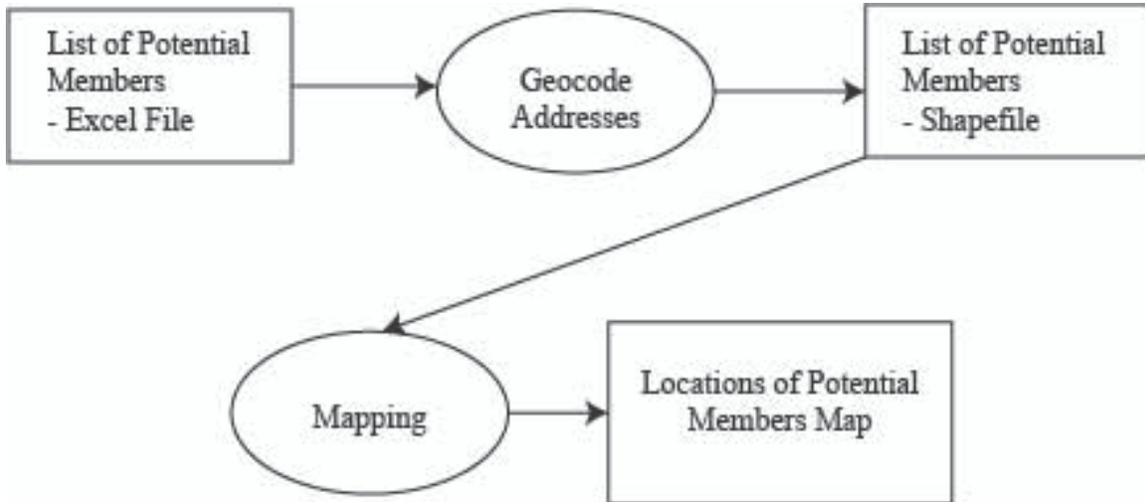
1. Membership location by county: This bar chart will show how many HAI members are based in Illinois' different counties.

Data analysis

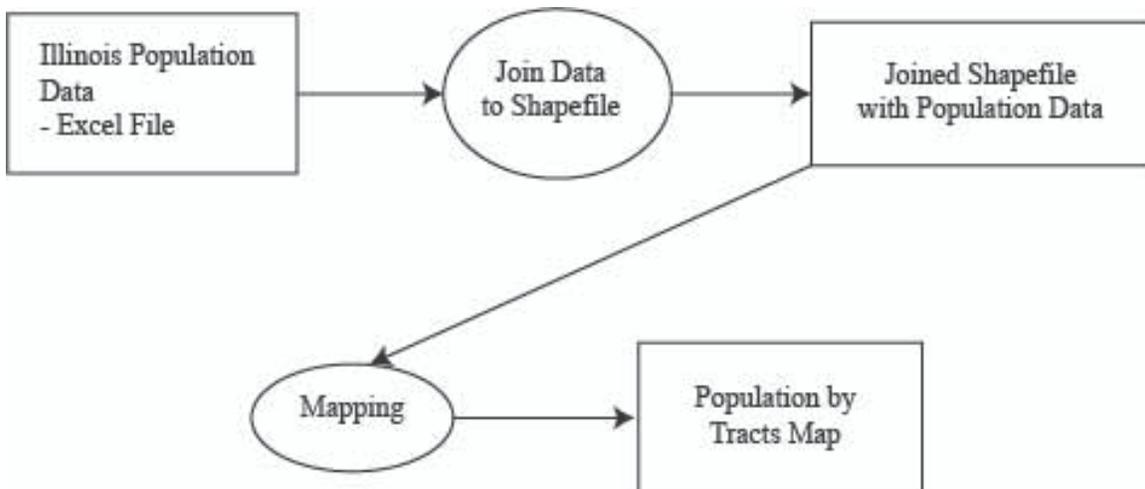
Member Organizations



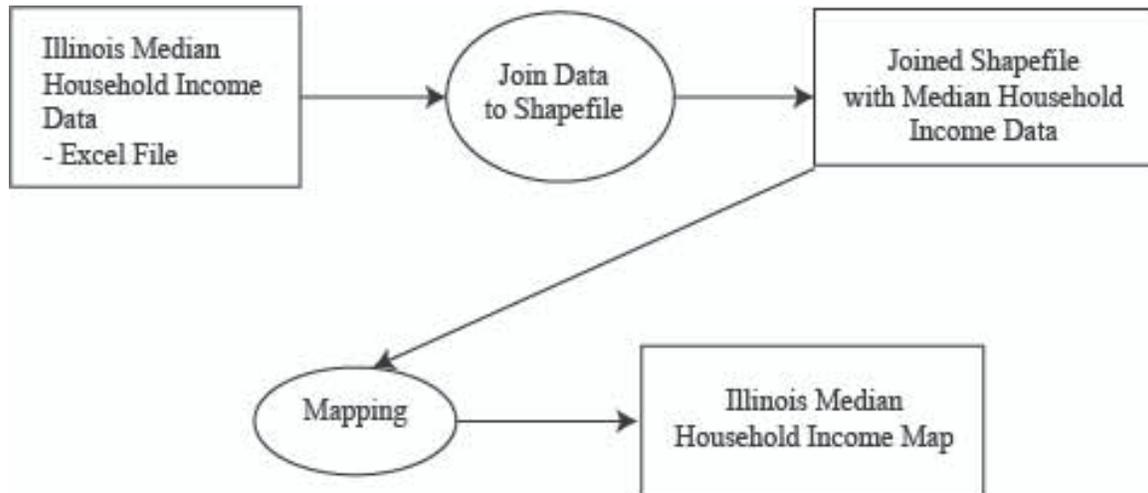
Potential Member Locations



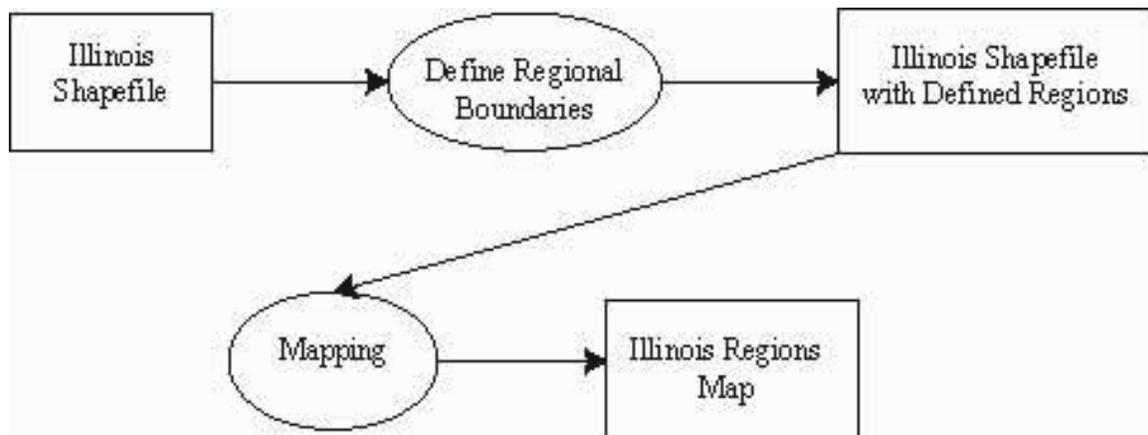
Population



Median Household Income



Newly Defined Regions



Data Visualization

As all three of our data sets look at the state of Illinois as a whole and do not break Illinois into metropolitan areas, cities or other smaller geographic forms of classification, all of our maps will be projected in UTM for the sake of uniformity and ease.

Member Organizations

This dataset will be represented on our UTM maps in three forms, the first being the location of the HAI's member organization on the map. The member location will be

represented by a symbol such as a dot or an X. The second form will be a unique variable map highlighting membership by organization type. The third and final form will also be a unique variable map, but highlighting annual conference participation. Data normalization is necessary because of the potential for missing data or incorrect data. Map elements will be arranged so that the shape symbol is overlaid on the colored or shaded area that the member organization represents.

Potential Member Locations

This dataset will be represented on our UTM map. The potential member locations will be represented by a symbol such as a dot or an X. Data normalization is necessary because of the potential for missing data or incorrect data. Map elements will be arranged so that the shape symbol is displayed appropriately.

Population by Tracts

This dataset will be represented on our UTM map. Graduated levels of shading for each census tract will represent this data as our data comes from the 2010 census. The data will be represented on a graduated choropleth map. This data should be classified into quantile breaks as we are trying to examine areas of the state with denser populations and the Chicago region would skew other classifications. Data normalization will be performed but may not be necessary as our information comes from the US Census. There is no visual hierarchy as there is only one dimension to the dataset.

Median Household Income

This dataset will be represented on our UTM map. Graduated levels of shading for each county will represent median household income. The data comes from **the American Community Survey is not current information from the survey is not readily available at the tract level.** The data will be represented on a graduated choropleth map. This data should be classified into natural breaks as it makes the most sense for this dataset. Data normalization will be performed but may not be necessary as our information comes from the a highly reputable source. There is no visual hierarchy as there is only one dimension to the dataset.

Newly Defined Regions

This data will be represented on our UTM map. Counties will be divided into five regions pre-defined by Housing Action Illinois to better categorize the Chicagoland area. The regions will be shaded with vibrant colors to easily see the region lines.

Results

HAI Member Locations Map

The Housing Action Illinois Member Locations Map (Appendix A), is a unique variable map displaying the statewide locations of organizations that are members of Housing Action Illinois (HAI). After geocoding these organizations, we found that a majority of them are located in the Chicagoland area as well as the surrounding counties. There are also several organizations located near Springfield and East St. Louis in the Sangamon and St. Clair counties respectively. The map also displays the organizations that attended the Housing Action Illinois Annual Conference in 2010. Once again, a majority of organizations that attended the conference are found in the Chicagoland area, while several are also found near Springfield and East St. Louis.

Location of Potential Members Map

The Location of Potential Members for Housing Action Illinois Map (Appendix C), is another unique variable map displaying the statewide locations of potential member organizations for Housing Action Illinois to help determine if a new satellite office is needed and where it should be located. After geocoding these organizations, we found the potential members were dispersed all over the state with some clustering around Chicagoland, the Madison/Montgomery/St. Clair county region, and the Williamson/Franklin county region. The areas to focus more research of a possible new location would be around Springfield, IL.

2010 Illinois Population Density by Tract

The 2010 Illinois Population Density by Tract Map (Appendix F), is a choropleth/graduated color symbol map displaying the overall 2010 population in Illinois by census tract. Overall, census tracts with the highest population are found in the northern part of Illinois in the Chicagoland area. However, there are also highly populated areas in the central and southwestern areas of Illinois near Springfield (Sangamon County) and East St. Louis (St. Clair County) respectively.

Median Household Income by County

The Median Household Income by County Map (Appendix G) is a choropleth/graduated color symbol map that displays the median household income for Illinois residents by county. In general, the northern most counties and a belt of counties strapping across the state from the southwest to the northeast have the highest median

household income. Seven of the nine counties with the highest median household income are located in the northeast corner of the state surrounding Cook County. The counties with the lowest median household income are mainly located to the south and east of the state. Eight of the eleven counties with the lowest median household income are located in the very southern part of the state. They include Alexander, Pulaski, Jackson, Franklin, Hamilton, Saline, Gallatin, and Hardin counties. Brown and McDonough counties on the west side of the state and Coles County on the east side are also in the lowest median household income category.

HAI Membership Counties Served Map

The data breaking down areas of Illinois served by HAI members is shown as a unique values map at the county level, also seen in Appendix B. HAI members serve cities and townships, but in nearly every member serving in a township or city the location already fell within a county. For this reason we decide showing the counties served better-displayed HAI's coverage.

Summary, Conclusions and Recommendations

Summary

In summation, our project to analyze HAI's membership and potential for opening a new office while also providing information products the organization can use for future decisions proved to be both informative and challenging. We set out to answer the question of where to open a new office and what areas of the state to target for public education. Our project was successful in this regard, but our initial objectives were rather ambitious, considering the variety of datasets we would have needed to complete the analysis. This limitation forced us to change our objective to meet our overall goals.

Conclusion

Our project found that HAI membership reaches across the state serving 73 counties (Appendix B). Membership is primarily concentrated in urban areas, specifically the Chicago Metropolitan area (Appendix A), which is not surprising since this area of the state has the highest population density. Most members are located in the higher populated areas of the state (Appendix D) and those located in lower income counties tend to be located in the center and downstate portions of Illinois (Appendix E).

Although initial conversations with HAI representatives focused on finding a location for a new office south of Springfield, our analysis shows Springfield and East St. Louis to be ideal locations for HAI to increase its downstate presence. The areas surrounding and including Springfield (Sangamon County) and East St. Louis (St. Clair County) are comprised mainly of middle to low-income residents (Appendix E). The high population densities in and near Springfield and East St. Louis provide additional support for our recommendation (Appendix D). A majority of the members in these areas of the state participated in HAI's annual conference (Appendix A), which indicates a high level of active members. Additionally, counties directly west and north of Springfield are counties not served by HAI members currently (Appendix B). HAI has also identified potential members (Appendix C), and Springfield is a centralized location for most downstate organizations.

The determination of a suitable location for a new HAI office and the examination of HAI's membership reach answers the questions we set out to answer and satisfy our objectives. The method we used to examine our research question was effective in that it satisfied our primary objectives. However, we were unable to answer some of questions, which may give a more complete picture to HAI's coverage of Illinois and overall feasibility of opening a new office.

Despite not having the data to conduct a direct analysis of political support for affordable housing in Illinois, we can infer that Springfield would also add a political

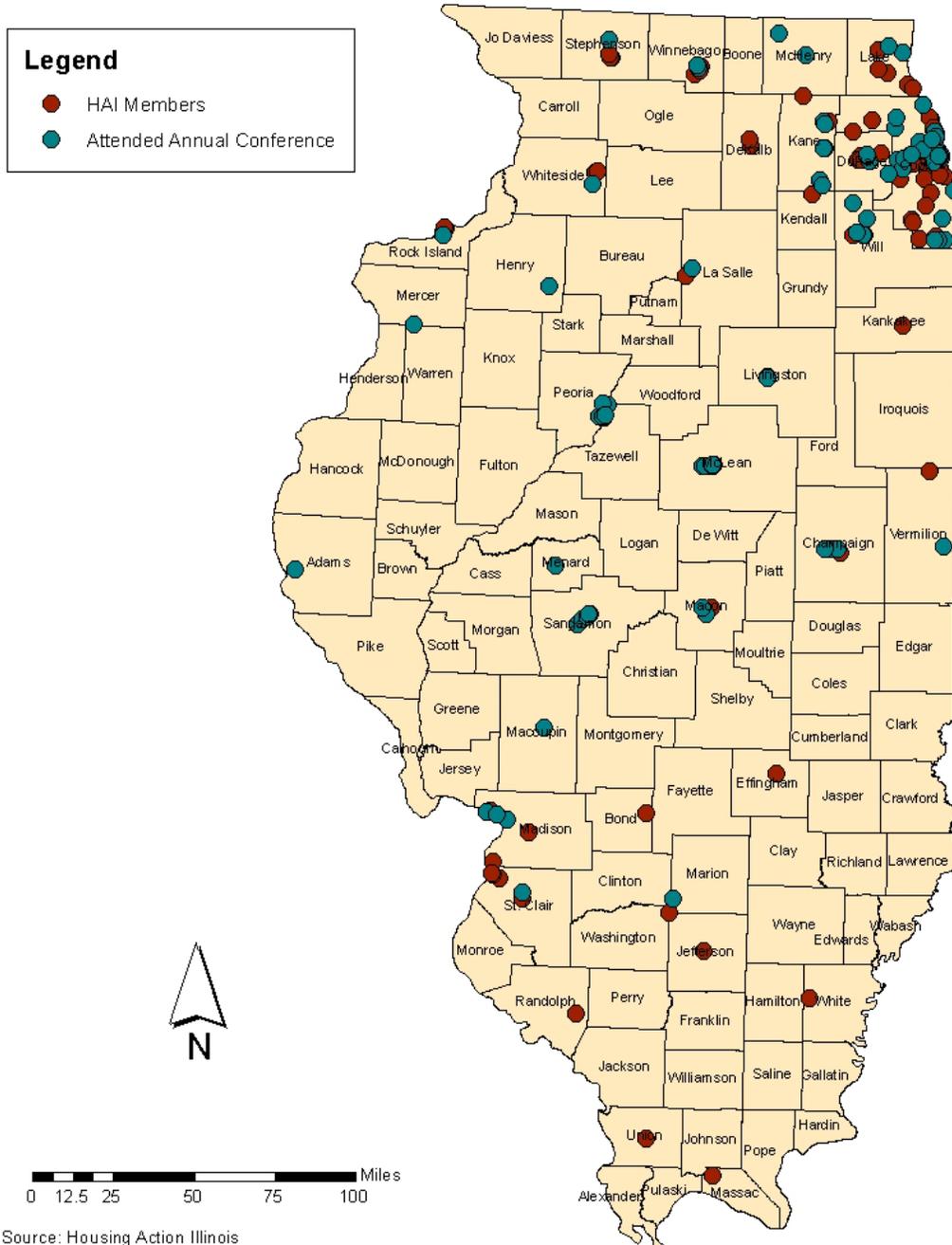
benefit to HAI, as it is the capital of Illinois. Additional analysis of political support could reaffirm this hypothesis.

Recommendations

Our analysis covered current membership, areas served by members and community need based on demographic variables. This information was helpful in an initial analysis to recommend a location for a new office. However, an additional analysis could be conducted by future GIS II groups to examine the aspect of political support for affordable housing in Illinois. In our initial meetings with HAI we discussed focusing on this topic and we initially planned to include it in our analysis. This additional information would help HAI determine areas of the state to focus its efforts for political lobbying. This information combined with our initial analysis would also benefit HAI in targeting areas of the state for public education and advocacy, which would fulfill the needs of the organization beyond opening a new office.

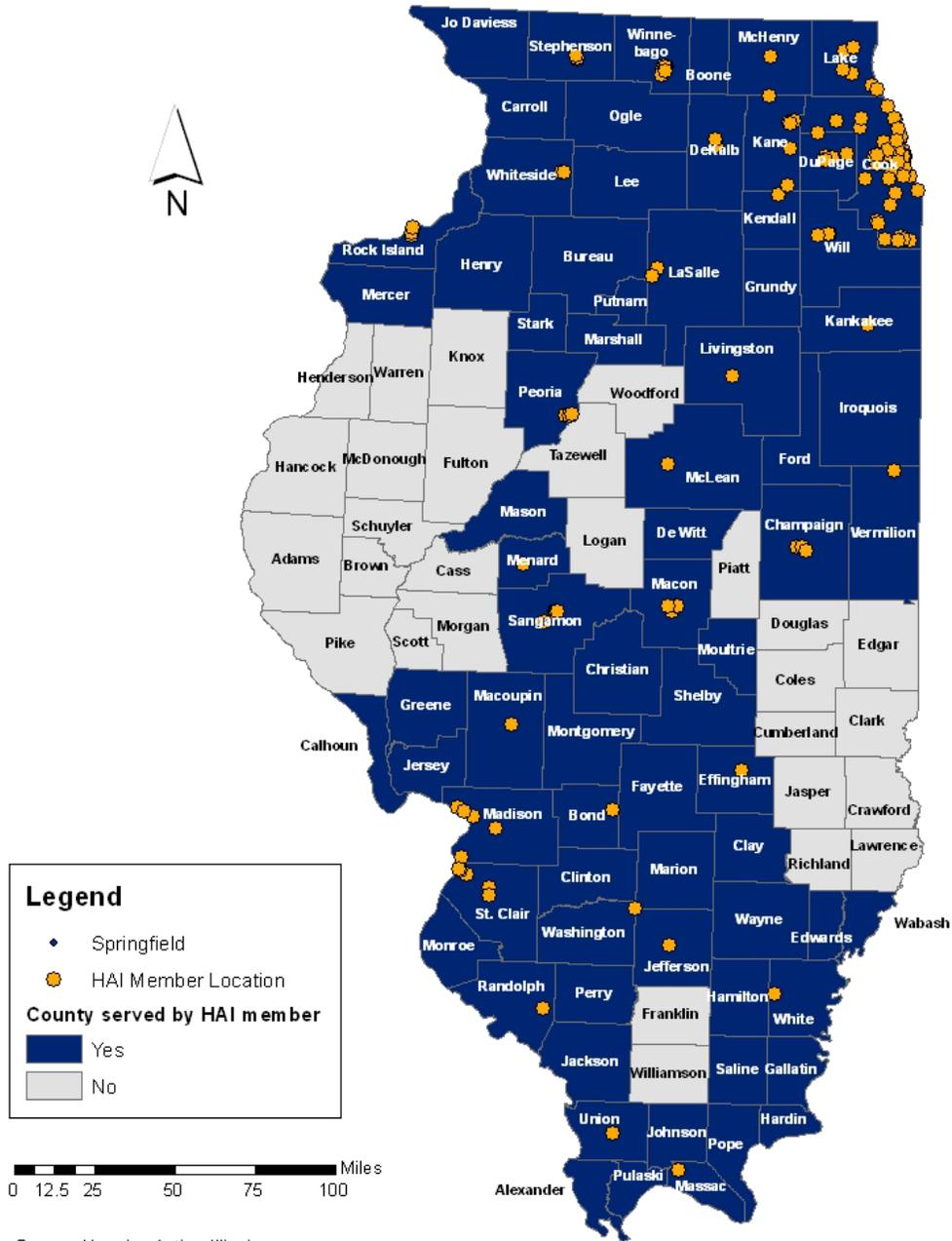
Appendix A

Housing Action Illinois Member Locations



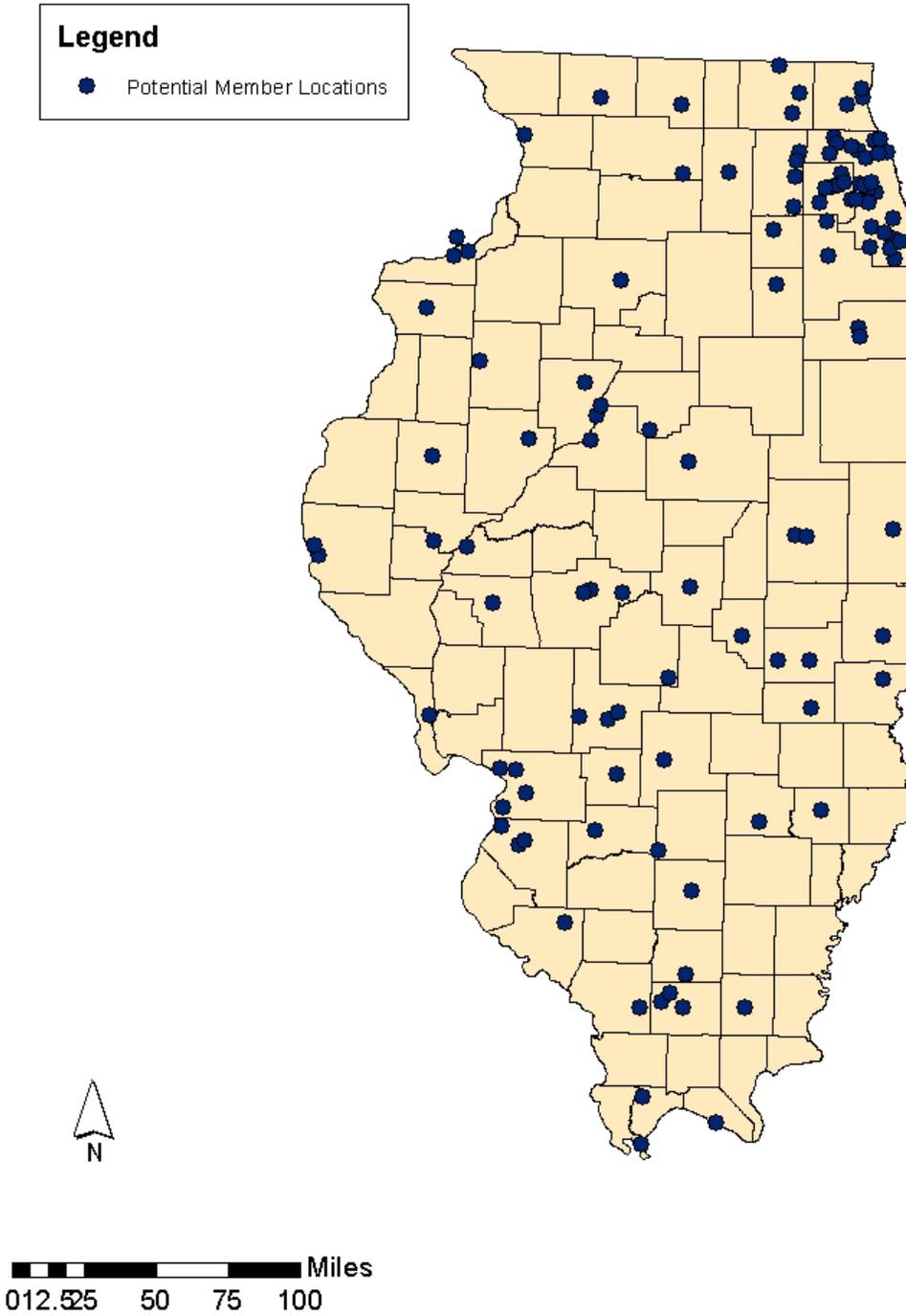
Appendix B

Counties Served by Housing Action Illinois Members



Appendix C

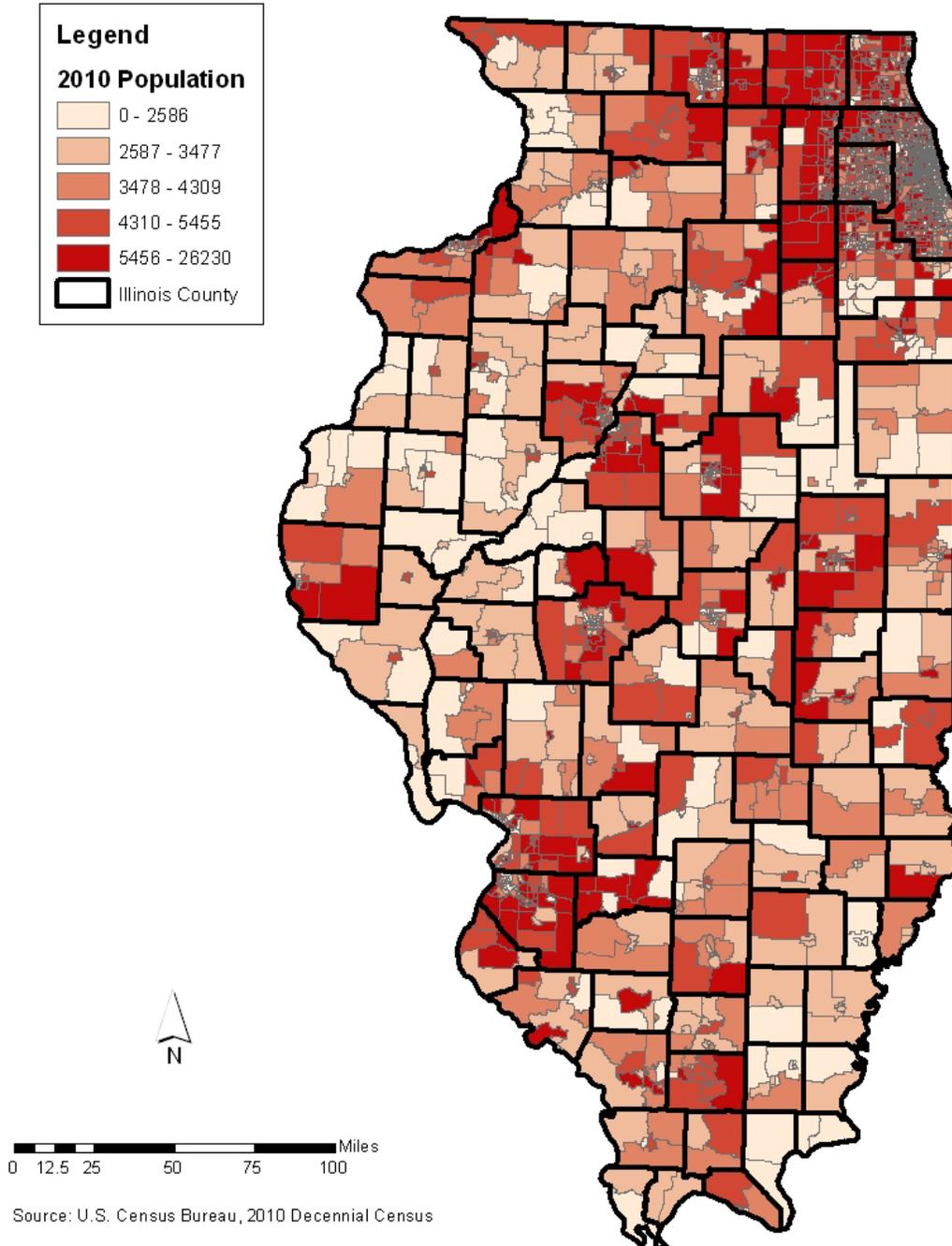
Location of Potential Members for Housing Action Illinois



Source: Housing Action Illinois

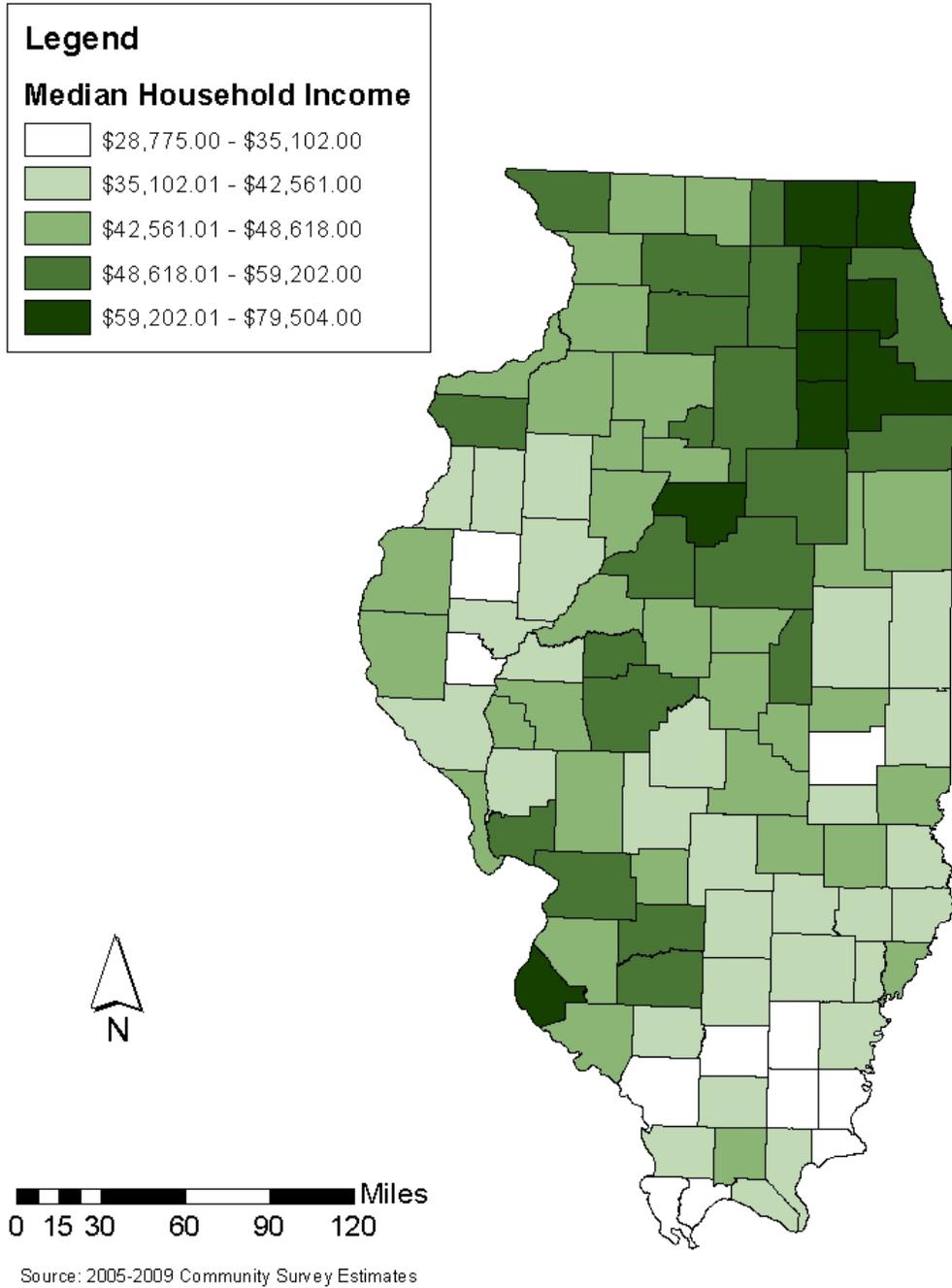
Appendix D

2010 Illinois Population Density by Census Tract



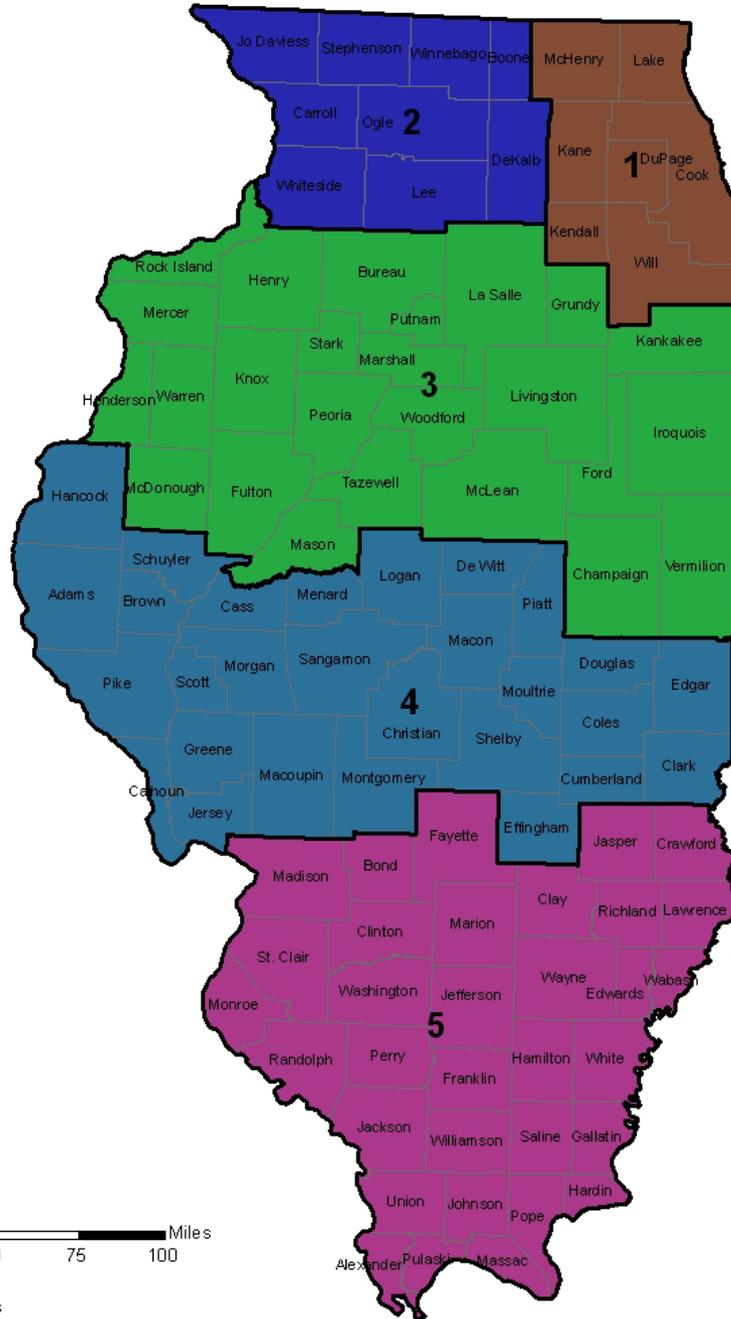
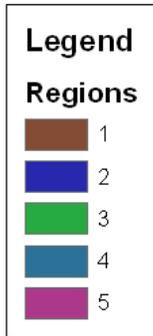
Appendix E

Median Household Income by County



Appendix F

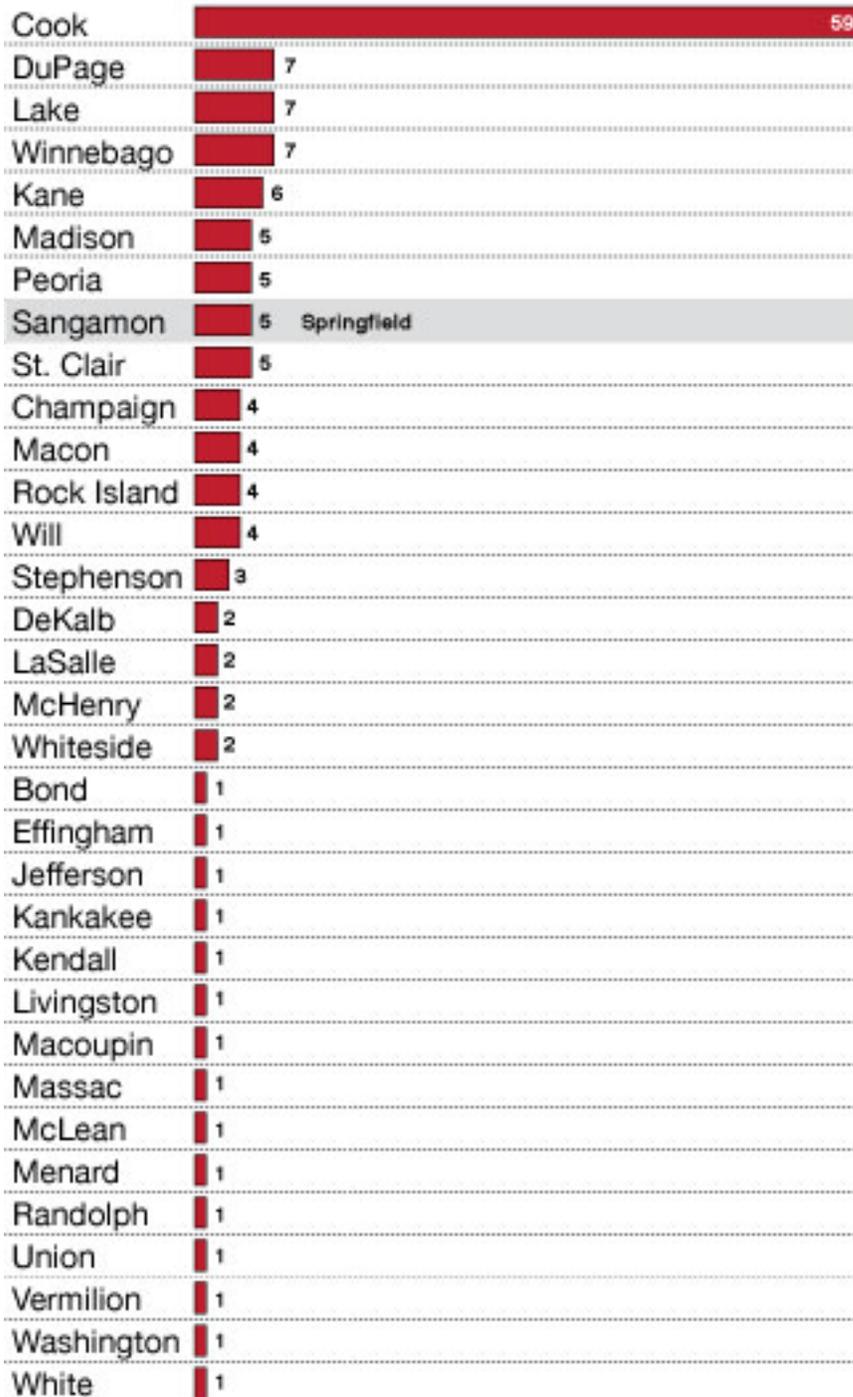
HAI Regions



Source: Housing Action Illinois

Appendix G

Housing Action Illinois Membership by County



Source: Housing Action Illinois