

Training Center Location Analysis



Prepared for Missouri Governor's Task Force on Recruitment,
Licensing and Retention of Foster and Adoptive Homes



Rachel Delcau, GIS Consultant
Liz Hoester, Research Coordinator
Vision for Children at Risk
2433 North Grand
St. Louis, MO 63106

Executive Summary

The Missouri Governor's Task Force on Recruitment, Licensing and Retention of Foster and Adoptive Homes commissioned this analysis to answer the question "Where do we locate training centers if we want 80% of our target population to be within one hour of a training facility?"

This report details the process by which this question has been answered followed by a series of maps that demonstrate various location configurations. In order to facilitate the decision making process, maps indicating where children have entered care and where current vendors are located were also produced.

Network analysis provided insight into site selection, though final decisions will include more factors than those present in this report (e.g. availability of funds). With that in mind, the target population can be nearly reached with a minimum of nine training centers though 14 training centers will best serve Missourians.

An optimal configuration of 14 training centers would include locations in the following cities: Columbia, Farmington, Hannibal, Joplin, Kirksville, Maryville, Sikeston, Springfield, West Plains and two locations in each of the Kansas City and St. Louis metro areas. This configuration reaches 87.25% of Missourians between the ages of 25 and 60 in under an hour of driving time.

Once training center locations are selected the network analysis should be conducted again to establish accurate listings of zip codes covered within the one hour drive time of each service area.



Contents

- Executive Summary..... 1
- Contents..... 2
- Research Question 3
 - Considerations 3
 - Time & Distance 3
 - Population..... 3
 - Urban Vs. Rural 3
- Data Sources 3
- Network Analysis 4
 - Technical Specifications 4
 - Site Selection Decisions 4
 - Service Area Statistics Chart 5
- Conclusions 5
 - Location Recommendations 6
 - Limitations and Further Analysis..... 6
- Reference Maps 7
 - Fiscal Year 2012 LS1 Entries by Zip Code 7
 - Vendors by Type 8
 - Adoptive Care Vendors 8
 - Foster Care Vendors 9
 - Relative Care Vendors..... 10
 - Total Vendors..... 11
 - Missourians Age 25-60..... 12
 - Network Analysis Maps..... 13
 - Site Selection #1..... 13
 - Site Selection #2..... 14
 - Site Selection #3..... 15
 - Site Selection #4..... 16
 - Optimal Site Selection..... 17

Research Question

“Where should we locate training centers if we want 80% of our target population, Missourians between ages 25 and 60, to be within one hour drive to a training facility?”

Considerations

Time & Distance

The question posed asks specifically about travel time. For this reason the research team at Vision for Children at Risk opted to perform a road network analysis in which speed limit, junctions and travel direction were considered. Data were calculated assuming the speed limit for time to travel a distance.

Population

Population data is available on many scales. For this project both the Census block and Zip Codes were considered. While Census Blocks provide a higher level of detail (more than 350,000 blocks in Missouri) than Zip Codes (1,029 in Missouri) they also take a considerable amount more time and processing power to analyze. Given the time-sensitive nature of the research question and limited budget, population was measured at the Zip Code level.¹

Urban Vs. Rural

This analysis first focused on capturing a percentage of the population by drive time polygons. As a result, one location per urban area was used to make preliminary location recommendations. However, drivers’ perception of drive time and distance often vary between urban and rural commuters. Also, traffic is not considered in the network analysis. Furthermore, St. Louis and Kansas City are densely populated metropolitan areas implying a need for more trainers in those areas. Therefore, when planning training sessions and training locations in urban areas, these factors should be considered. It is advisable to have multiple training centers in urban areas. However, rural training centers should not be sacrificed in favor of more urban training centers.

Data Sources

Population data were obtained from the US Census Bureau’s 2010 Census Summary File, Table P1 retrieved from American Fact Finder 2. The target population age range (25-60) extended beyond the age groups tabulated by the Census Bureau, therefore the ‘single years of age’ dataset was used to calculate this field. Zip Code boundaries are 2010 TIGER/Line Shapefiles, available at www.census.gov. City point



¹ This report was prepared for a November 26, 2012 Task Force meeting.

data and road network data were created by ESRI and were retrieved from \\maps.wustl.edu\gispublic (available on Washington University computers).

Data for LS1 entries and vendor maps were obtained from the Missouri Children's Division Central Office from a report run on September 27, 2012. This data captures fiscal year 2012 LS1 entries by zip code and vendors by type and zip code. Adoptive care includes codes "AD" and "FA," Foster care includes codes "CF," "FG" and "FH," and Relative care includes codes "KH," "LG" and "RH." Data provided for LS1 entries indicates that 6,275 children entered care during FY2012. Of those, 156 children entered care in a state other than Missouri and 381 were recorded with invalid zip codes (e.g. 0, 11111 or 99999).

Network Analysis

Technical Specifications

ArcGIS software and Network Analyst extension were used to analyze Missouri's road networks to find ideal training facility locations. Specifically a new service area was selected from the network analyst menu. A selection of cities was used to load facility locations. Analysis settings included a time impedance of 60 minutes towards facility. Allowance was set for U-turns at junctions. Analysis was conducted with both overlapping and not overlapping polygons.

This analysis produced a polygon or multi-sided shape around each city indicating the maximum distance from which one can travel toward a training center (city point) in one hour, represented in green on the maps that follow. The Zip Code layer containing target population data were then selected in relation to the one hour drive time polygon. Zip codes were selected for analysis if their center fell within the one hour drive time polygon. This selection was used to define the service areas for each city point, represented in blue on the maps that follow. From the selection a new data layer was created for future display and analysis.

Site Selection Decisions

This analysis was performed multiple times using various city selections. In one case that is not represented by maps on the following pages, criteria for city selection were 'top-nine most populated cities'². These locations included Independence, Kansas City, Lee's Summit, St. Joseph, Springfield, Columbia, O'Fallon, St. Charles and St. Louis. This placement, or any that concentrates several training centers in urban areas, does not extend the one hour drive time to a greater percentage of the population. Not only did this configuration fail rural Missourians, it also failed to meet the 80% target.

Site selection within each urban area was calculated with different city points as the target for network analysis. In the analysis represented in the maps section, St. Charles is used as the location point for the

² The ESRI city data set that was used included population data from 2007. Although it did not represent the specific age demographic, the overall pattern of population dispersal is similar. Nine cities were selected in a series of configurations to determine if it is possible to meet the 80% target with fewer than 10 training locations.

Greater St. Louis area. This placement, compared to the City of St. Louis, extends the one hour service area west, north and south whereas selecting the City of St. Louis extends the drive time eastward. Similarly, Blue Springs was selected to represent the Kansas City region thereby extending the service area for more Missourians rather than Kansans. In the final analysis two city points were used for both the Kansas City region and the St. Louis region. This configuration better serves urban residents both in terms of travel time and population. In the case of Columbia or Jefferson City, Columbia reaches further north and does not overlap with the Rolla service area.

The Rolla service area includes a geographically large zip code (65560) that extends considerably south of the one hour drive time polygon. However, the geographic center of that zip code is approximately Salem, Missouri. The Rolla service area therefore includes most of the population within that zip code including those living in Salem. A portion of that zip code also includes the western portion of the Mark Twain National Forest.

Service Area Statistics Chart

Service Area*	Number of LS1 Entries	Total Number of Vendors	Count of Target Population
Columbia	325	796	164,209
Farmington	205	543	95,152
Hannibal	87	170	34,822
Joplin	495	178	100,594
Kansas City Area (2 locations: Blue Springs and Kansas City)	1210	2712	628,069
Kirksville	64	125	22,048
Maryville	60	182	62,713
Rolla	239	665	94,590
Sikeston	434	590	100,915
Springfield	609	1963	251,190
St. Louis (2 locations: St. Charles and City of St. Louis)	1150	4,695	1,006,708
West Plains	42	149	33,702

* A service area includes all zip codes that have their center within the one hour drive time polygon. Calculations in this table are based on discrete service areas that may overlap with other service areas and therefore cannot be summed to determine total population served with a configuration of these locations.

Conclusions

A minimum of nine training locations are needed to reach 79.6% of the target population in less than one hour of driving time. Eleven locations strategically placed throughout the state can reach 80% or more of the target population. However there are still geographic areas beyond the one hour drive time polygons.

Location Recommendations

An optimal configuration of 14 training centers includes locations in the following cities: Columbia, Farmington, Hannibal, Joplin, Kirksville, Maryville, Sikeston, Springfield, West Plains and two locations in each of the Kansas City and St. Louis metropolitan areas. Locating two centers in each of these high density urban areas does not greatly increase the drive time reach that was the initial goal of this analysis, though it does take into account the difference between urban and rural drivers as well as the greater need in these areas as determined by sheer population. This configuration reaches 87.25% of Missourians between the ages of 25 and 60 (2,509,959 people) in under an hour of driving time.

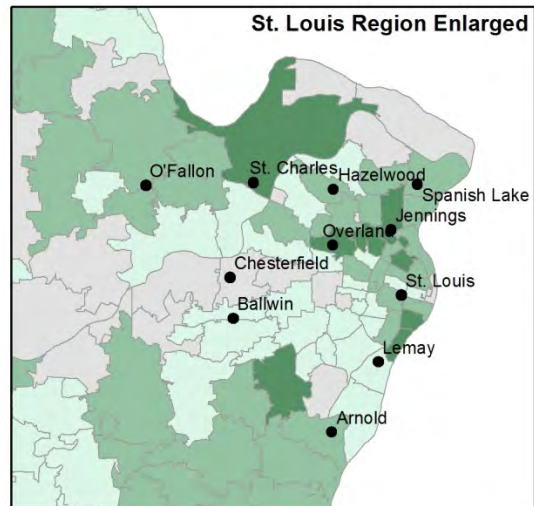
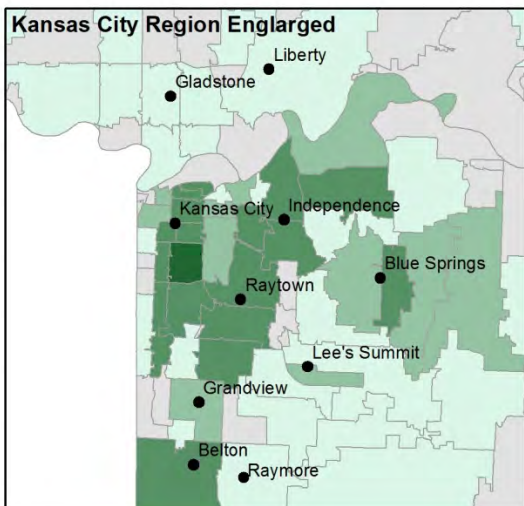
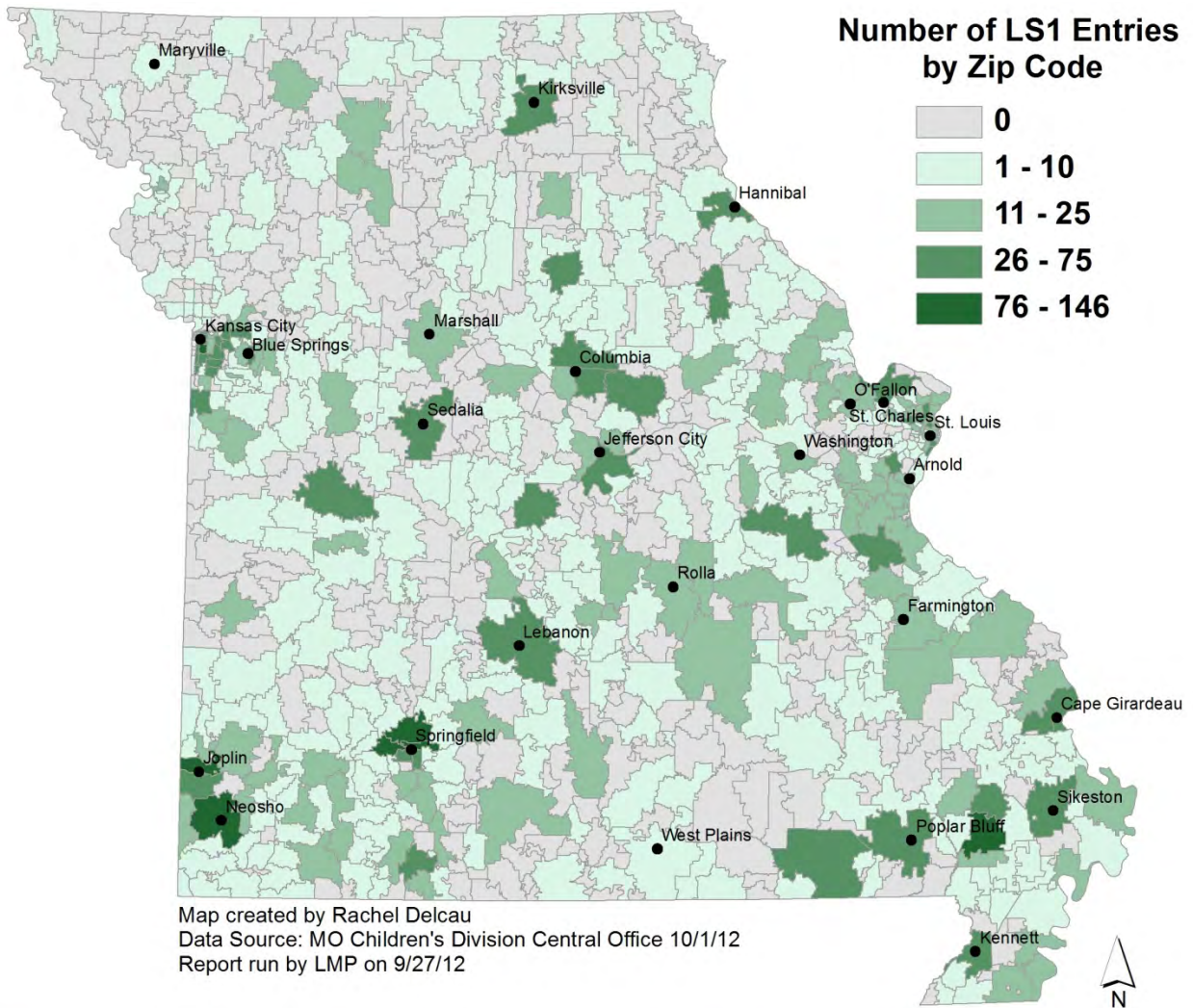
Limitations and Further Analysis

Analysis covered in this report uses city point data for the basis of location analysis. Specific locations within a geographic area will alter the drive time polygons. For this reason it is suggested that additional analysis be conducted once specific sites are under consideration. Once sites are decided upon specific service areas can be defined and decisions can be made regarding service areas for those who live beyond the one hour drive time boundaries.

Further analysis is also needed to determine the best way to cover the area between Joplin and the Kansas City area. It is recommended that Nevada be considered though Clinton may be a better option as it would likely allow for those living in Sedalia to have a training center within one hour of driving time. In order for this analysis to be conducted, additional data will need to be acquired as this portion of Missouri does not have any towns that appear in the ESRI city point data set that was used.

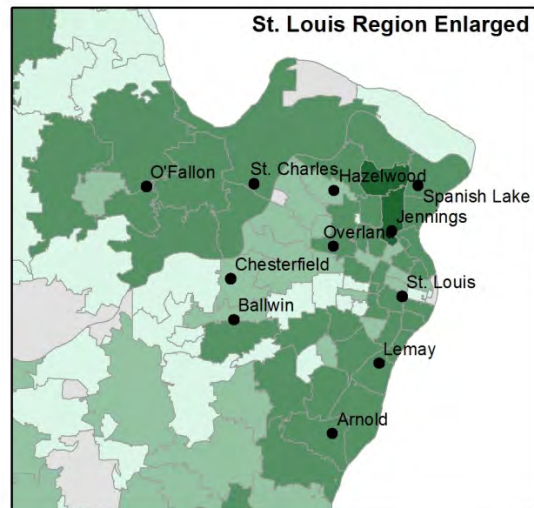
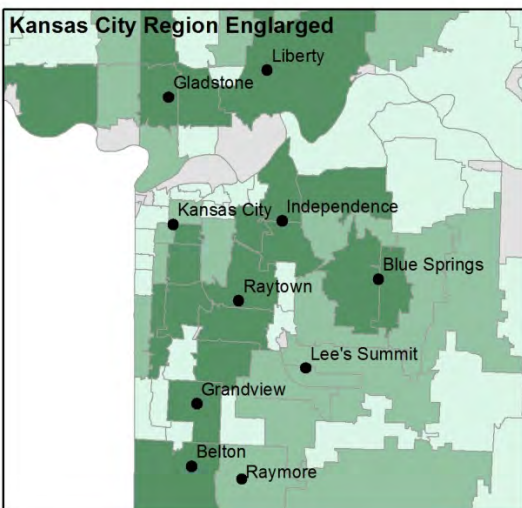
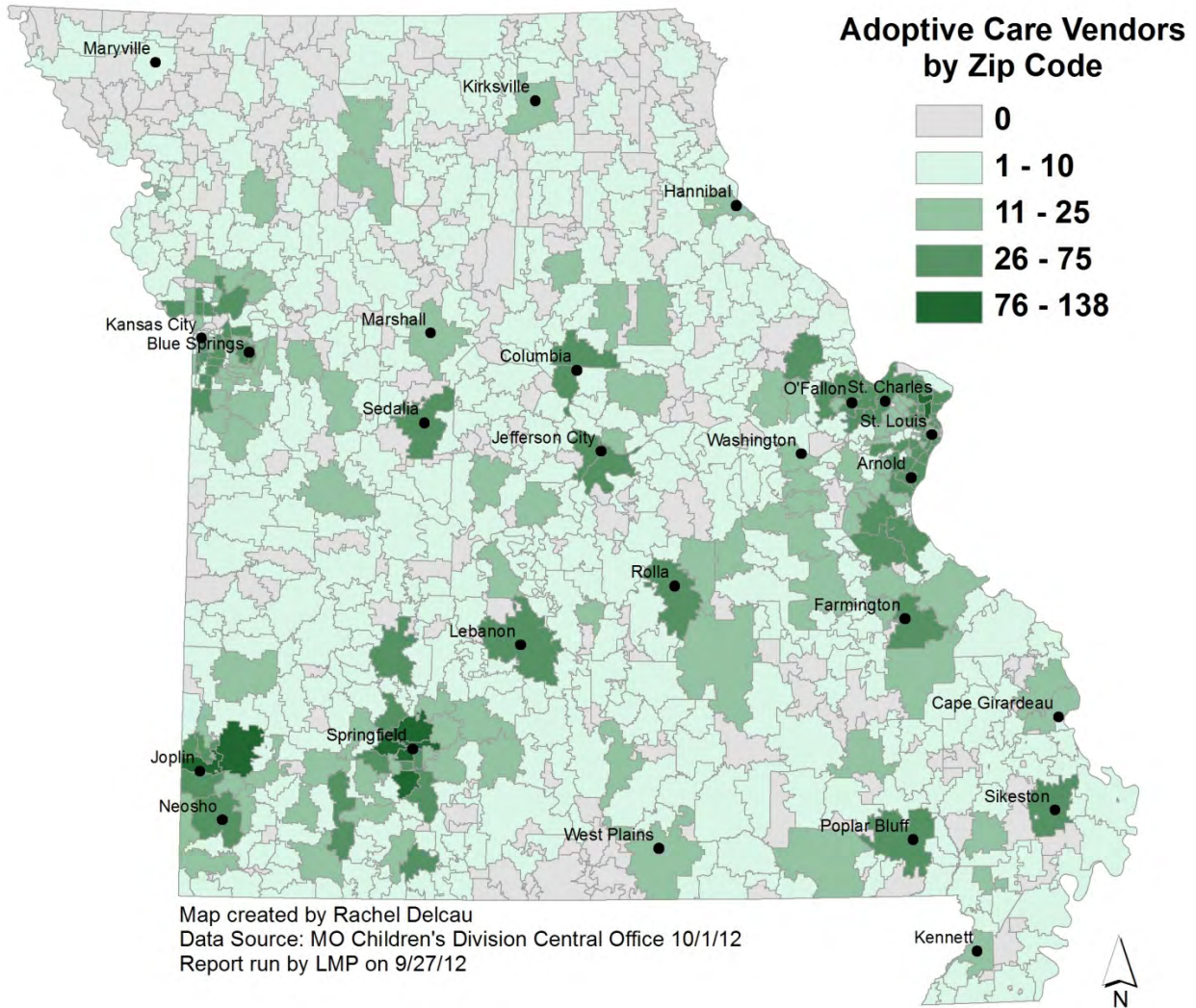
Reference Maps

Fiscal Year 2012 LS1 Entries by Zip Code

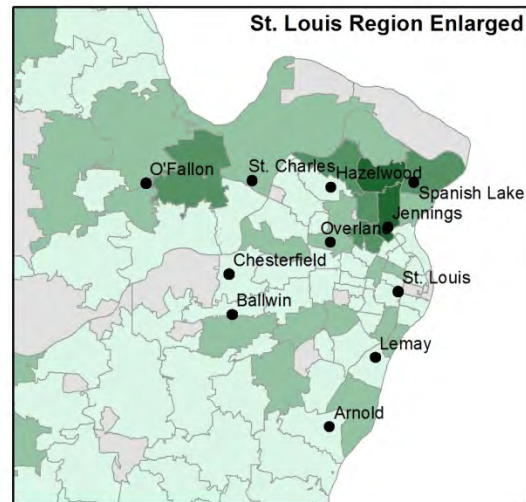
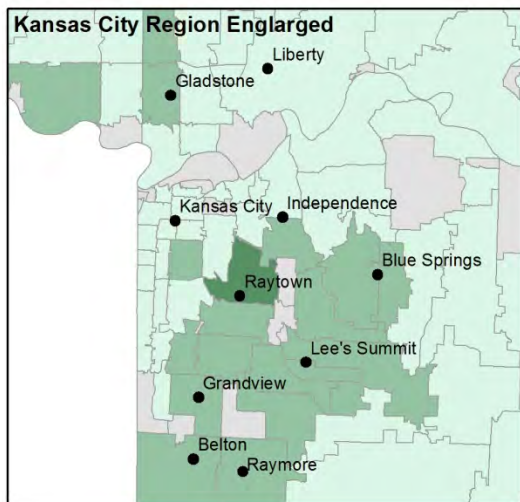
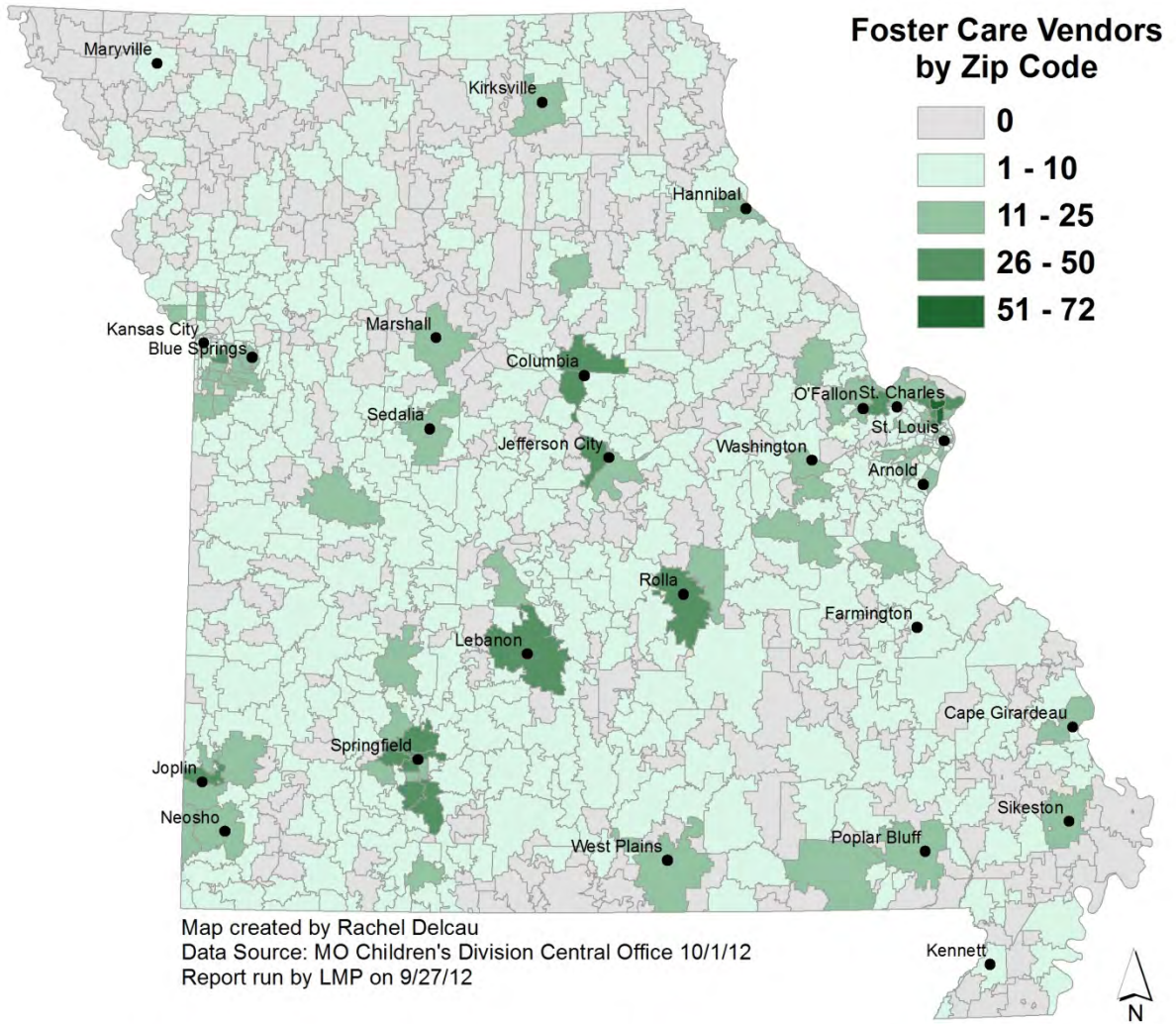


Vendors by Type

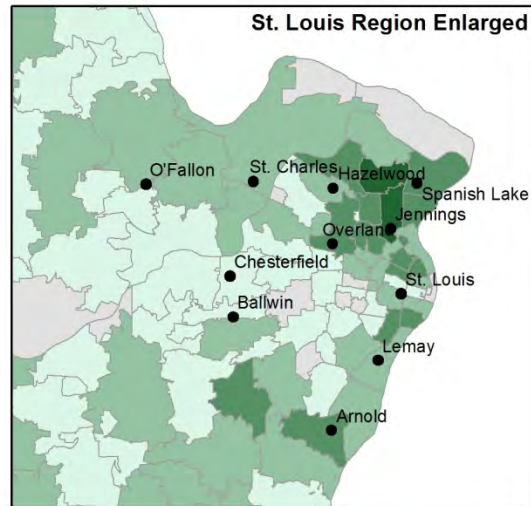
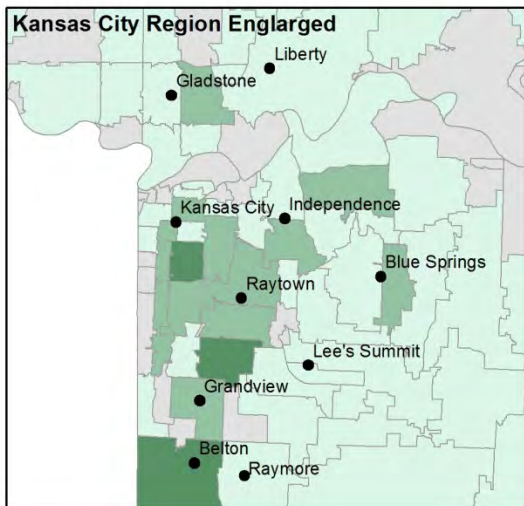
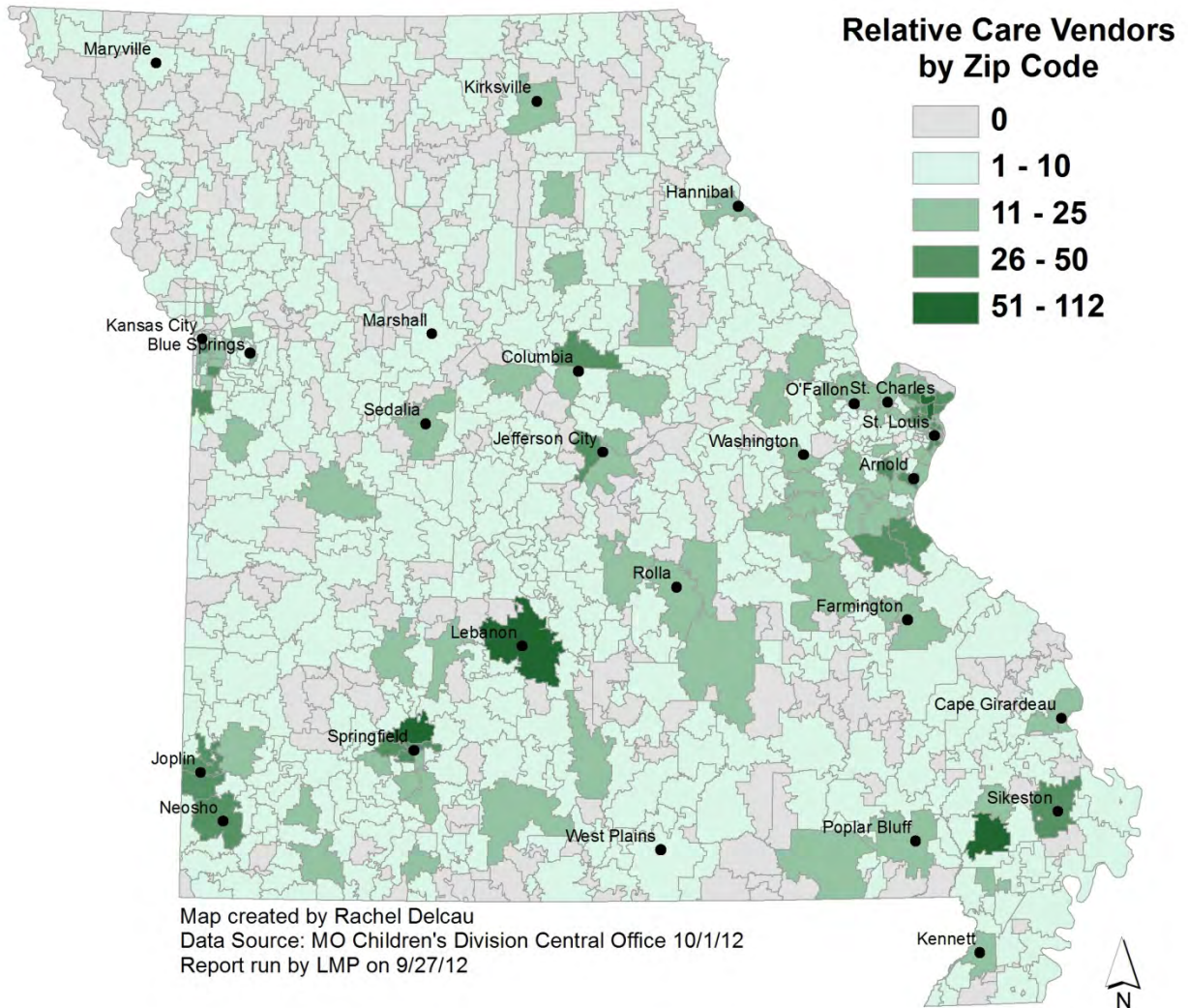
Adoptive Care Vendors



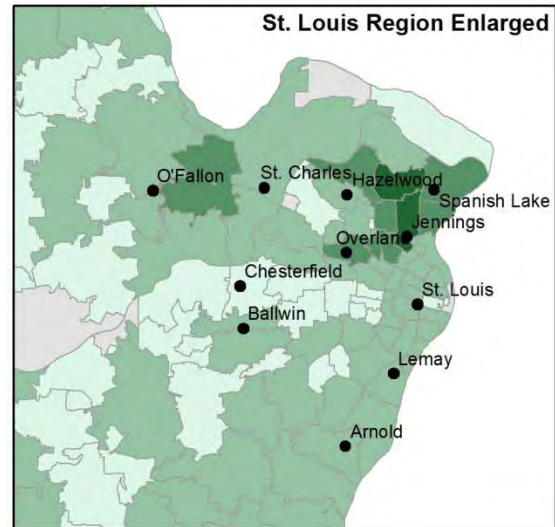
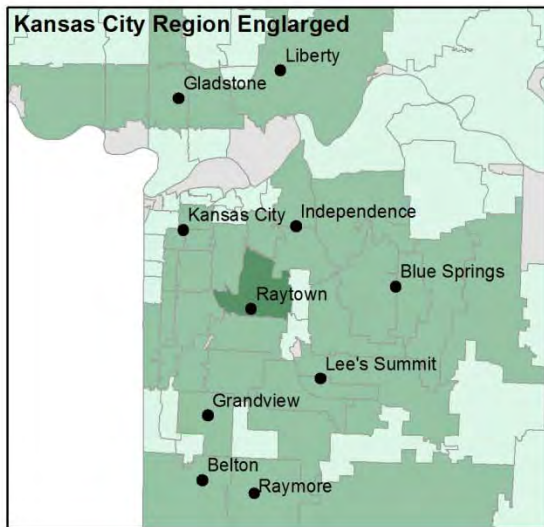
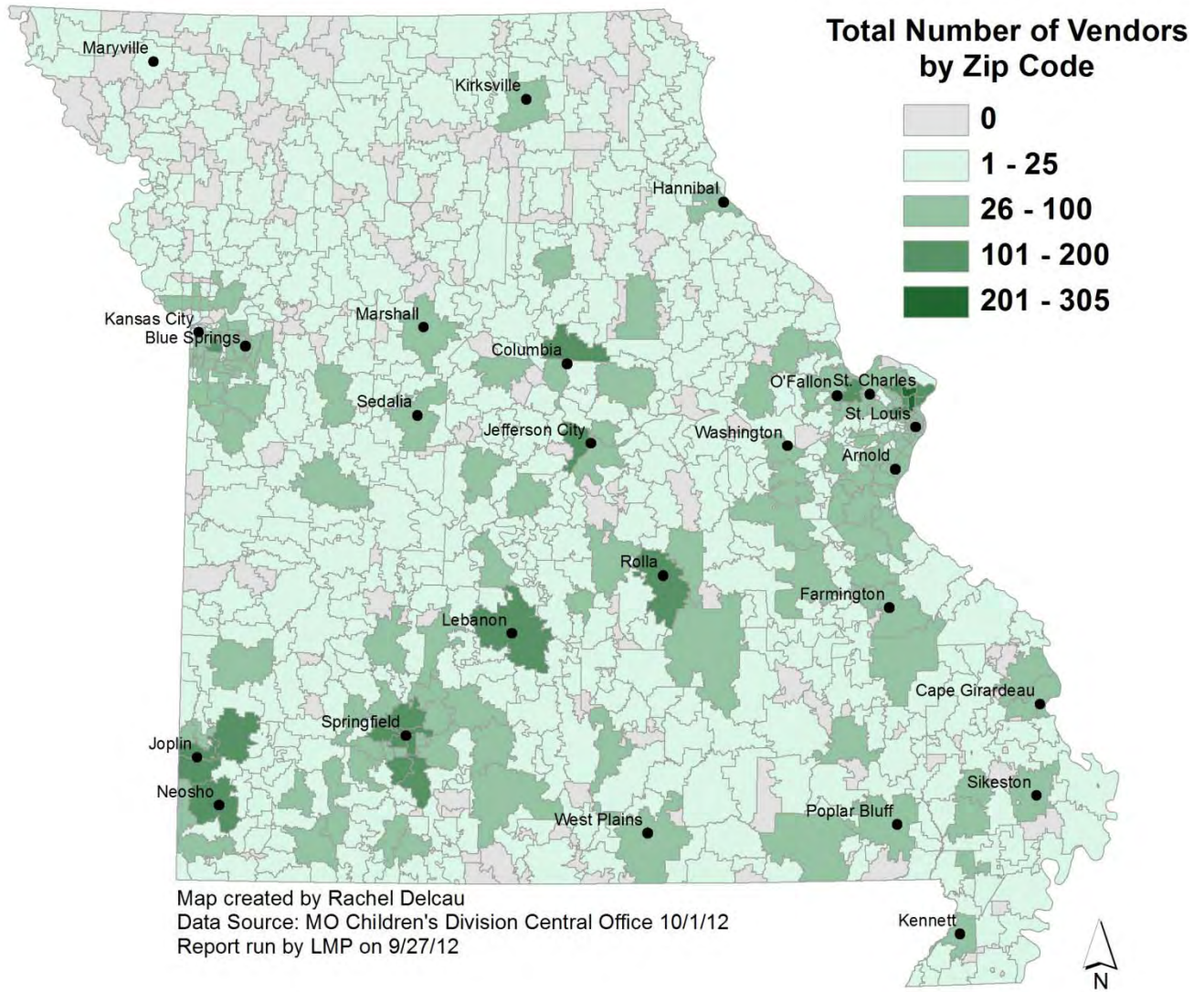
Foster Care Vendors



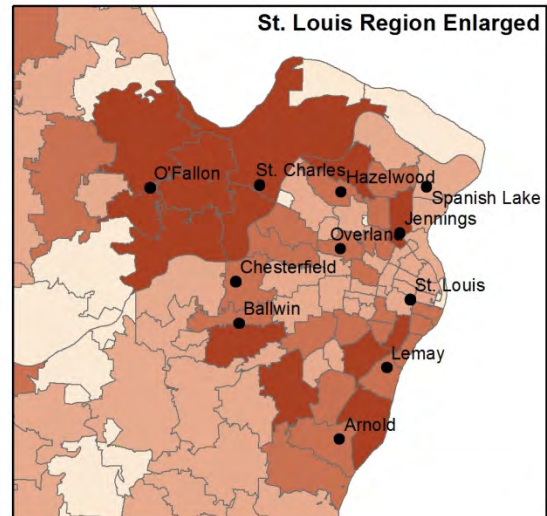
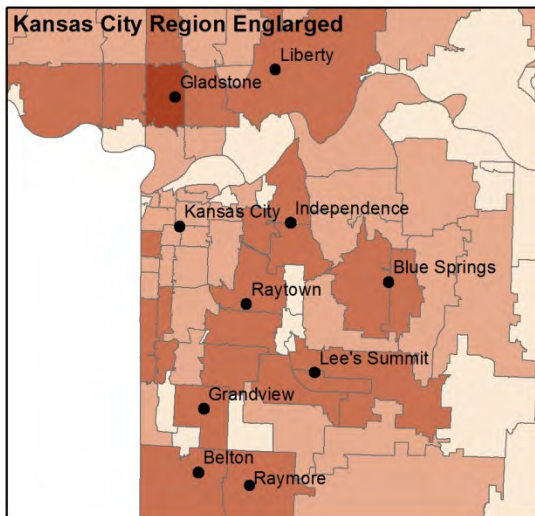
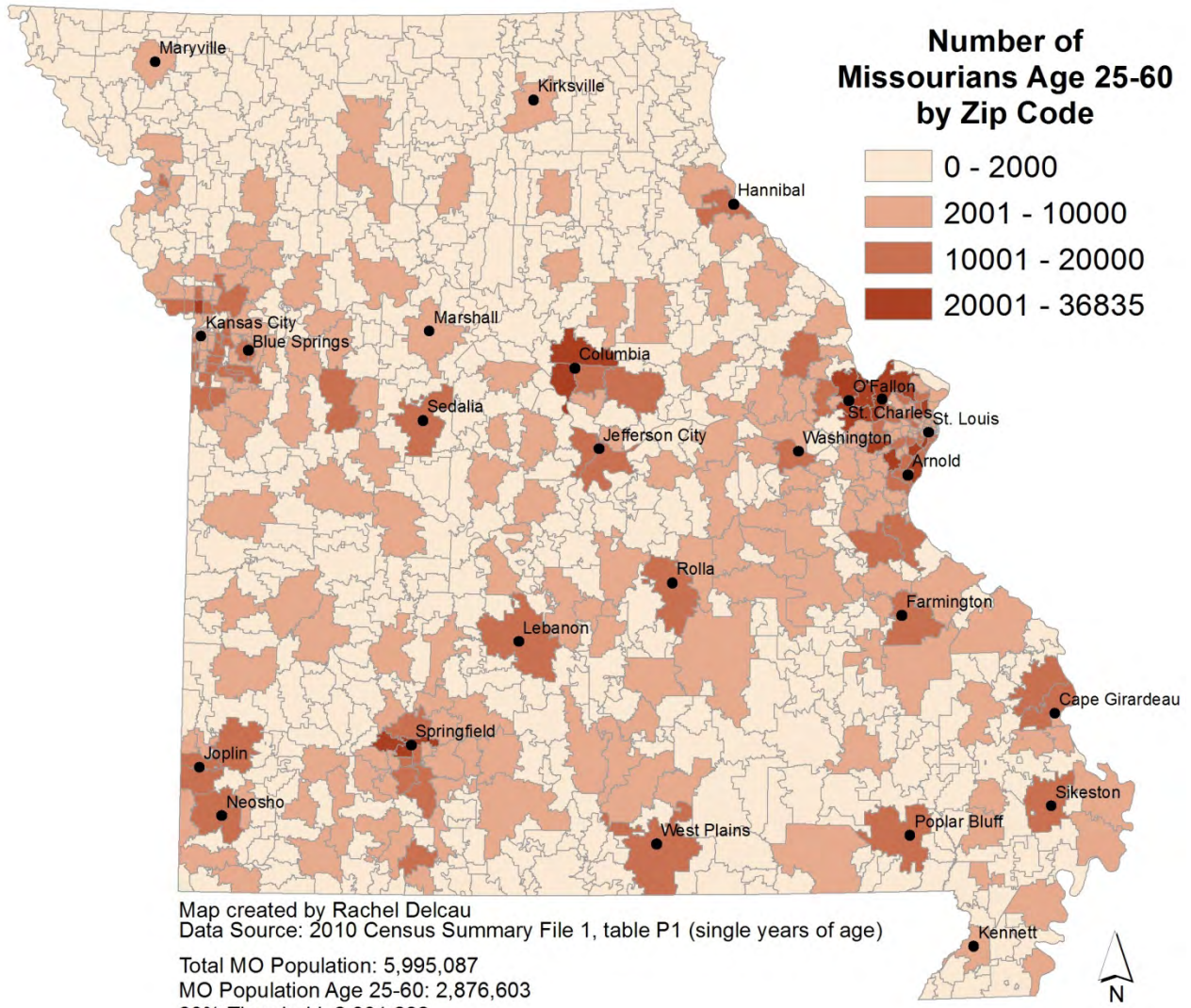
Relative Care Vendors



Total Vendors

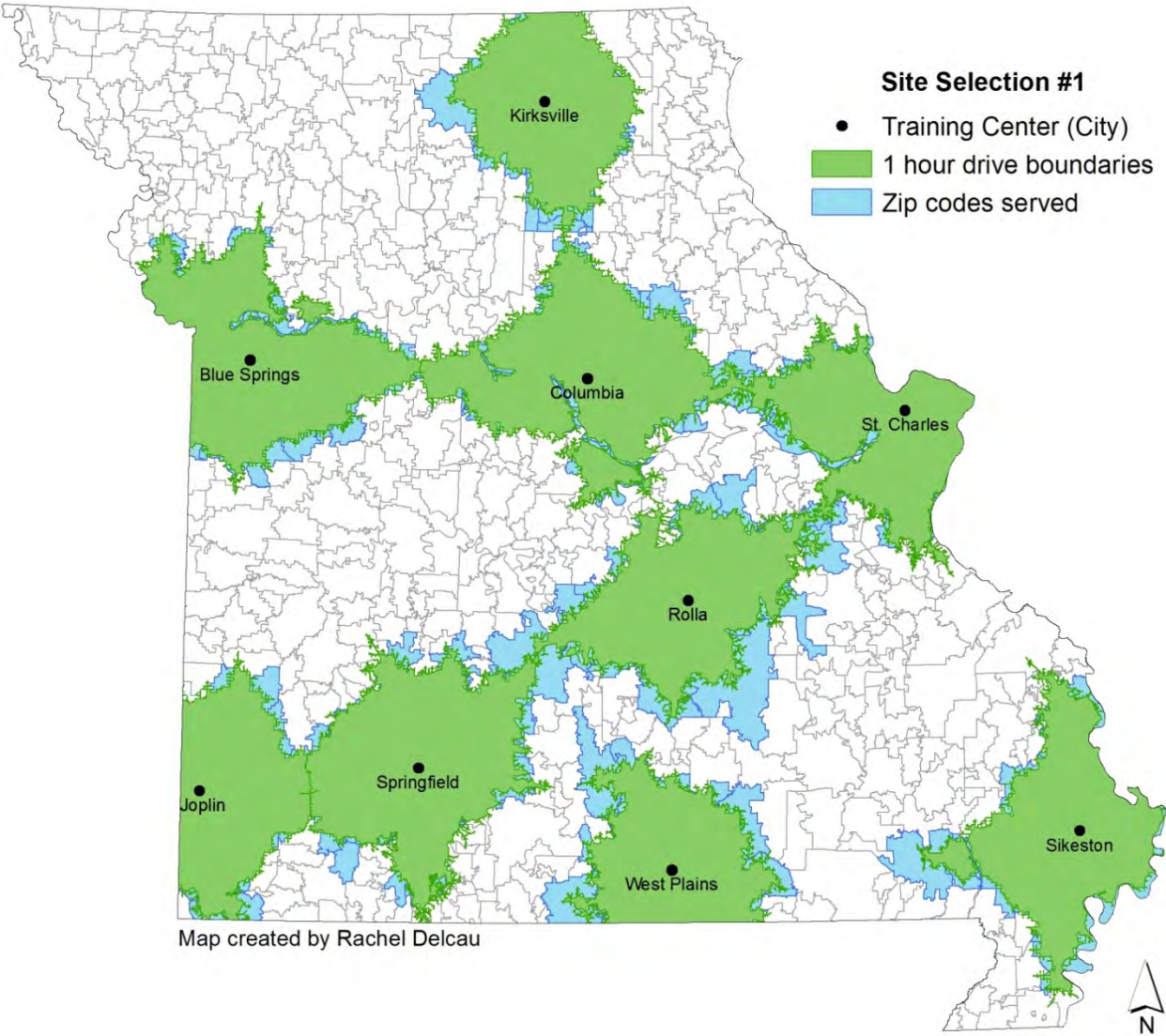


Missourians Age 25-60



Network Analysis Maps

Site Selection #1

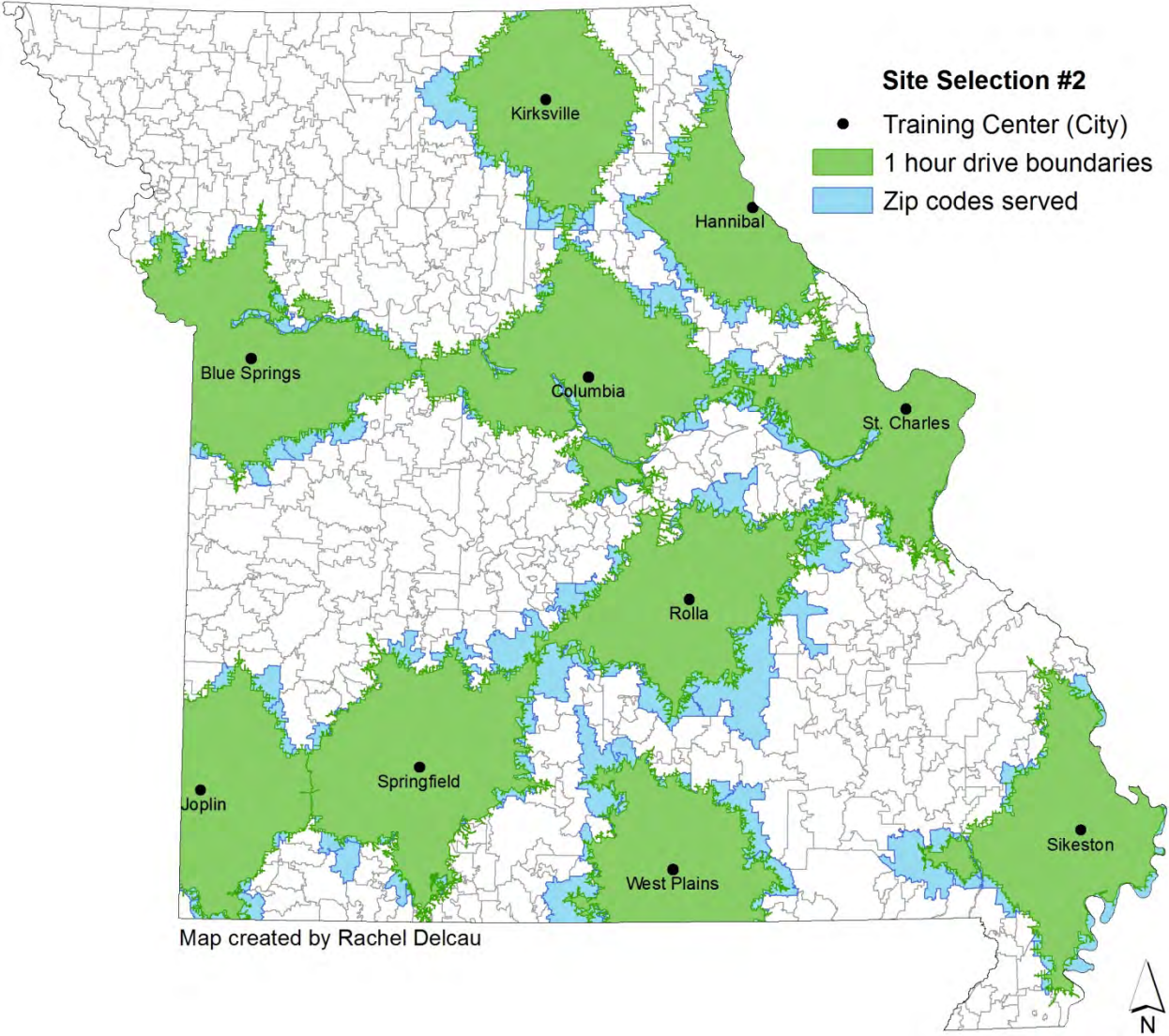


AT A GLANCE FACTS & FIGURES

Number of Training Locations	9
One hour Service Area Reach	79.6% of target population

Although a selection of nine locations comes very close to reaching 80% of the target population, there are four regions that are clearly not served including the northwest and northeast corners of the state, the midwest and mideast sections of the state. This configuration essentially serves those close to Interstates 70, 44, and to some extent 55.

Site Selection #2

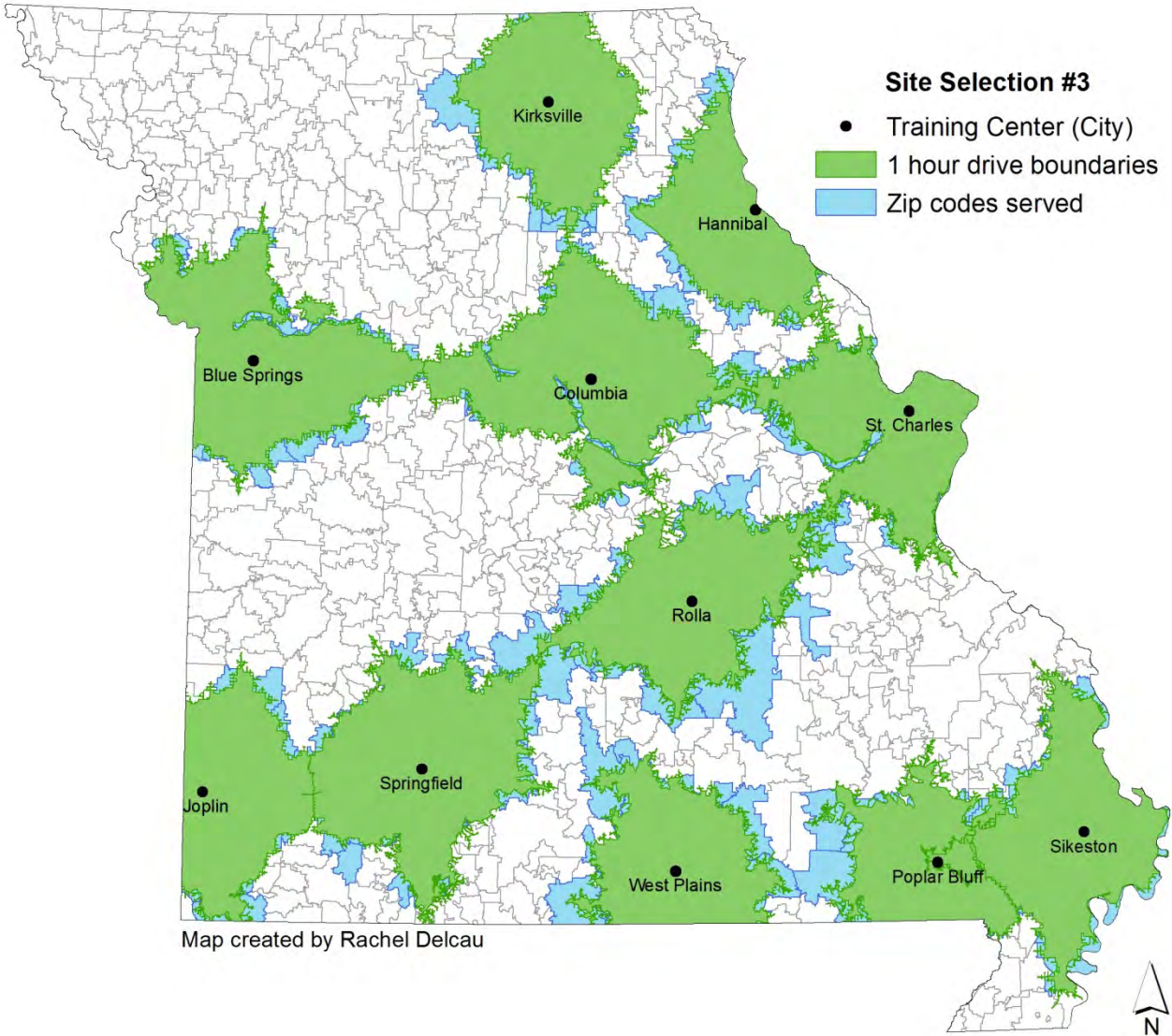


AT A GLANCE FACTS & FIGURES

Number of Training Locations	10
One hour Service Area Reach	80.81% of target population

By adding Hannibal to the location selection the northeastern section of the state is much better served, although the percentage of the target population that is reached only increases slightly. There are both children who enter into care and vendors in Hannibal.

Site Selection #3

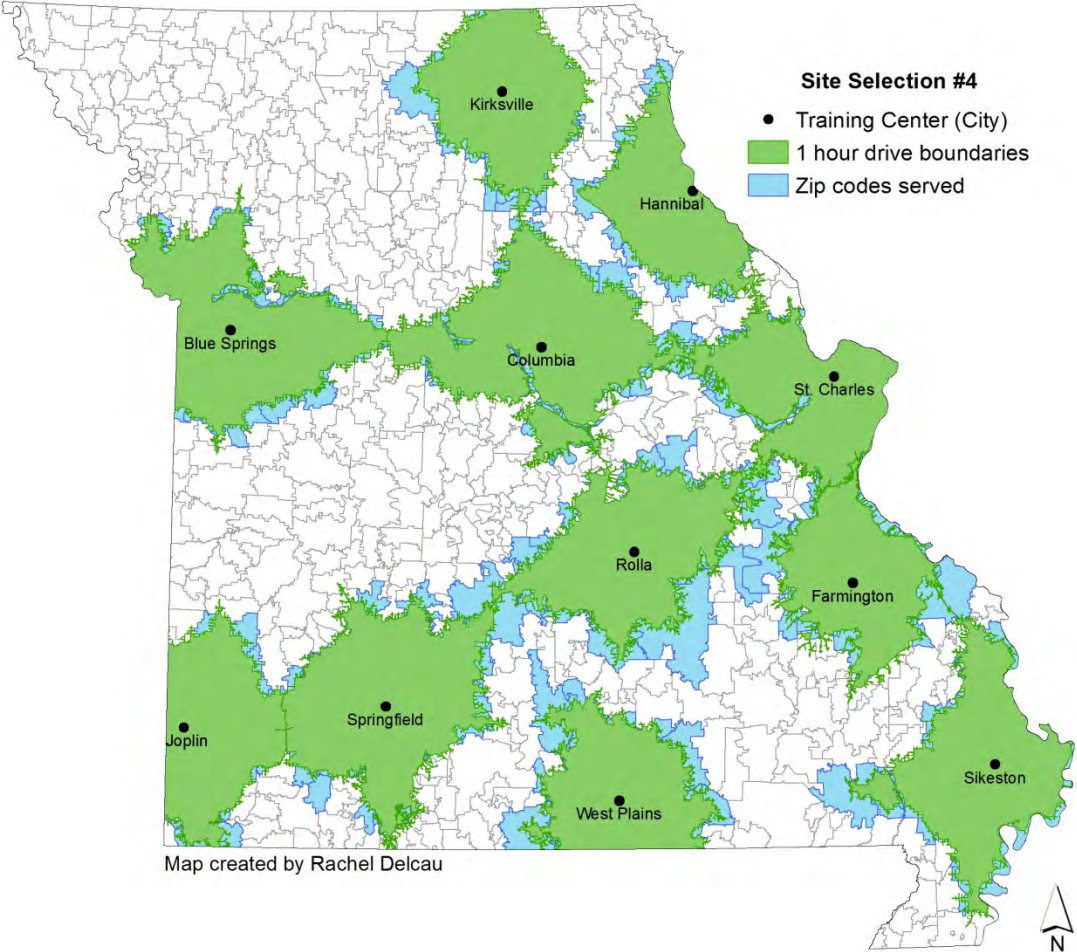


AT A GLANCE FACTS & FIGURES

Number of Training Locations	11
One hour Service Area Reach	81.38% of target population

In this configuration Poplar Bluff is added as a location thereby increasing coverage across the southeast portion of the state. However, the service area overlaps with the Sikeston service are. If choosing between the two, Sikeston’s geographic situation as related to highways allows it to serve both Poplar Bluff to the west and Cape Girardeau to the north making it a better option.

Site Selection #4

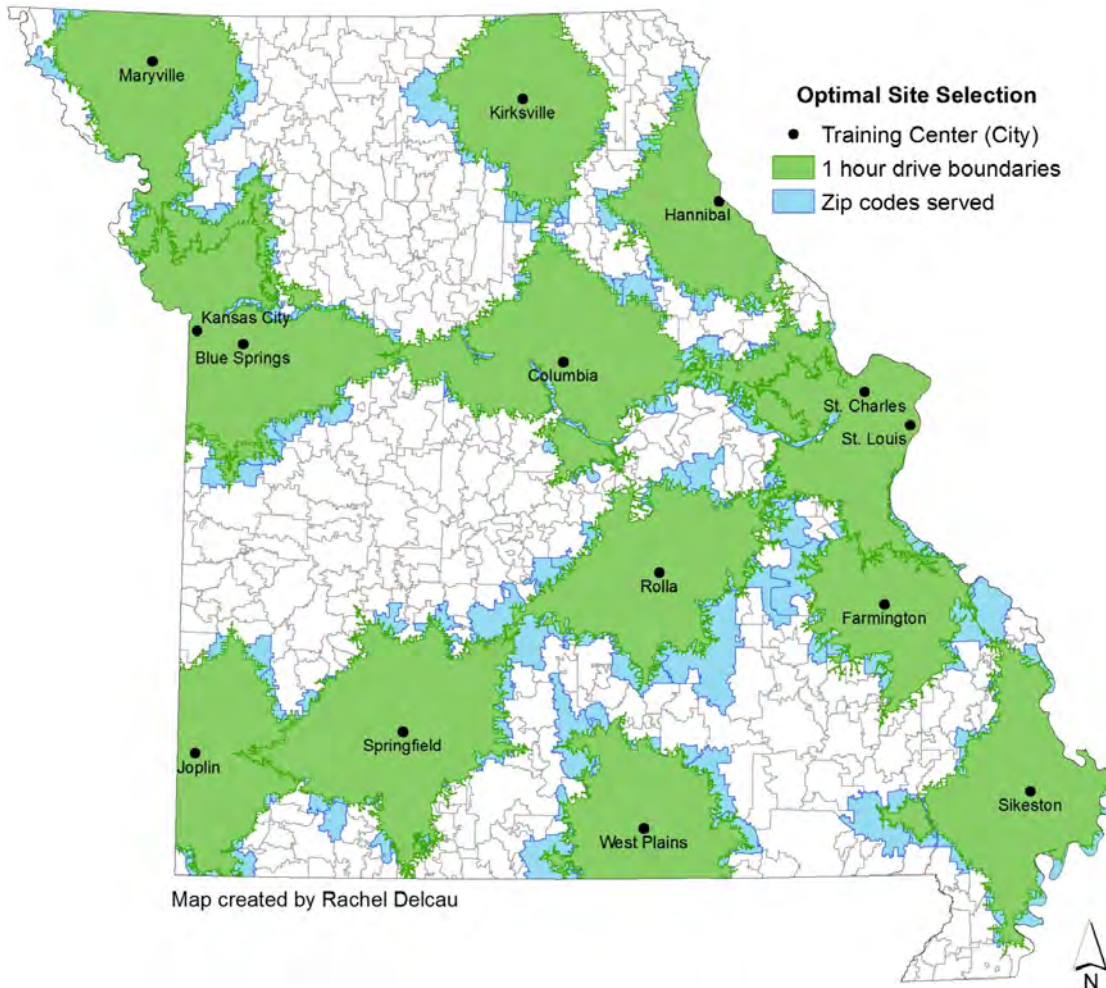


AT A GLANCE FACTS & FIGURES

Number of Training Locations	11
One hour Service Area Reach	83.99% of target population

This site selection also includes 11 locations, opting for Farmington over Poplar Bluff. This reaches a greater portion of the target population and offers one hour drive times to nearly all eastern Missourians. Still, it is clear that a large side of the western portion of the state is not covered by a one hour drive time service area.

Optimal Site Selection



AT A GLANCE FACTS & FIGURES

Number of Training Locations	14
One hour Service Area Reach	87.25% of target population

This configuration includes two training locations in the Kansas City and St. Louis metropolitan areas and adds Maryville as a training center in the northwest of the state. This configuration is ideal in that it reaches nearly all populated areas of the state in less than one hour of driving and provides multiple locations in areas serving a higher population.